

# 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 HPD-PF-100SW (LWD=5 mm)



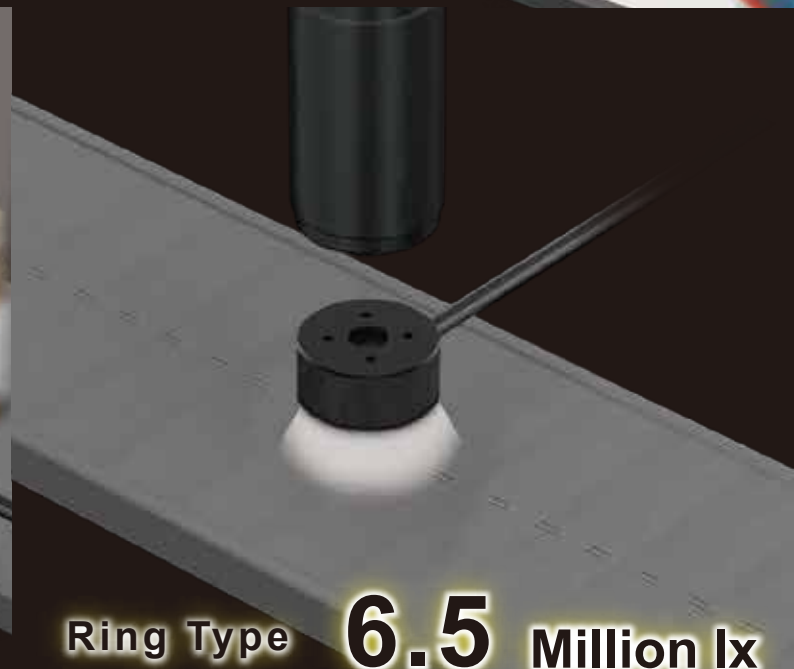
Ring Type for Diffused Lighting **2.5 Million lx**

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)



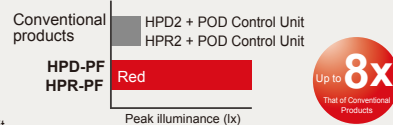
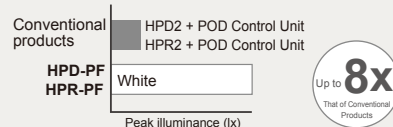
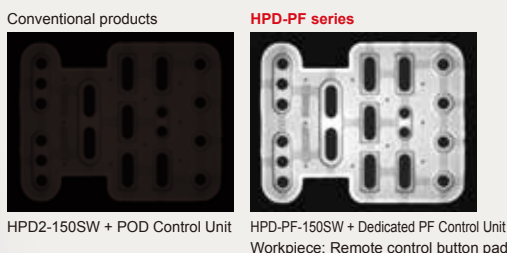
Ring Type **6.5 Million lx**

Peak illuminance measured using LDR-PF-75SW (LWD=30 mm)

# Improved Line of Dome Types and Ring Types for Diffused Lighting



Brightness up to **8x**\*  
That of Conventional Products



\* Current as of CCS's in-house measurement conditions in May 2017. 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.

## Dome Type HPD-PF

### Imaging Examples

Imaging the 2-dimensional code

Workpiece



HPD2-75SW + General purpose Strobe Control Unit



HPD-PF-75SW + Dedicated PF Control Unit



Imaging the appearance of tablets

Workpiece



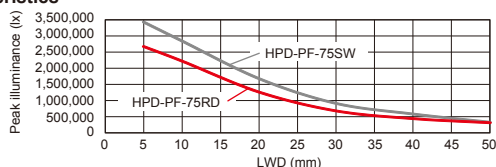
HPD-PF-75SW



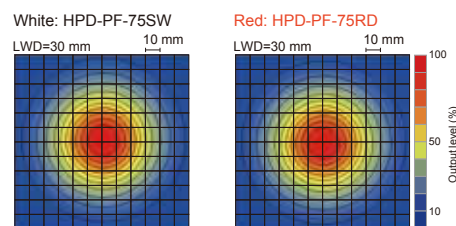
- Application examples
- Visual inspection of foods and pharmaceuticals
  - Visual inspection of semiconductors and electronic components
  - Visual inspection of cans and plastic products
  - Visual inspection of metal parts, etc.

### Data (Representative)

#### LWD Characteristics



#### Uniformity

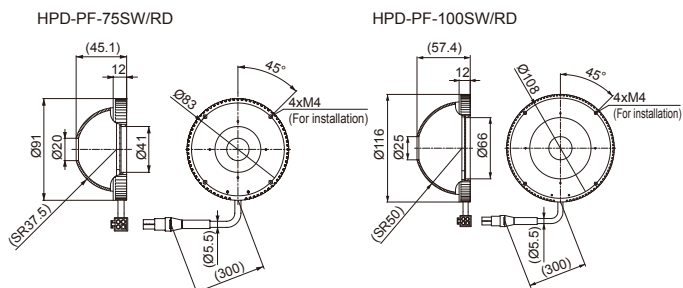


The data included is for reference only. Results for individual products may vary.

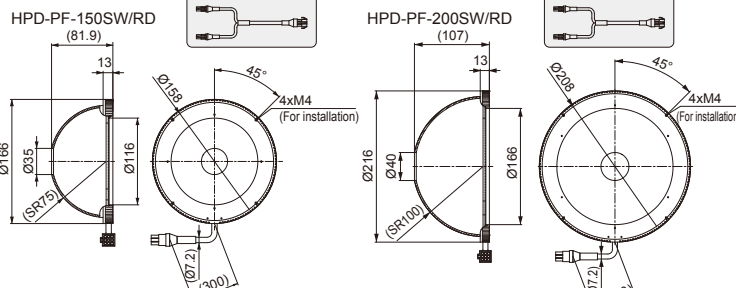
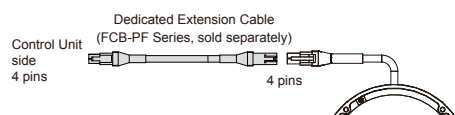
### Specifications

Model name	HPD-PF-75	HPD-PF-100	HPD-PF-150	HPD-PF-200
	SW	RD	SW	RD
LED color	White (SW)	Red (RD)	White (SW)	Red (RD)
Correlated color temp. (typ.)	6,500 K	—	6,500 K	—
Peak wavelength (typ.)	—	636 nm	—	636 nm
Peak current (max.)	12 A	21.6 A	36 A	43.2 A
Input voltage (max.)	48 VDC			
Lighting conditions	Maximum strobe time: 500 μs, Maximum duty ratio: 1%			
Connector	4-pin EL connector (ELP-04NV)		9-pin EL connector (ELP-09V)	
Extension cable	FCB-PF Series (sold separately)		FCB-PF-EL9 Series (sold separately)	
Cooling method	Natural air-cooling			
Operating env. (indoors only)	Temperature: 0 to 40°C, Humidity: 20 to 85%RH (with no condensation)			
Storage environment	Temperature: -20 to 60°C, Humidity: 20 to 85%RH (with no condensation)			
CE marking	Safety standard: Conforms to EN 62471-1			
Environmental regulations	RoHS compliant			
Case material	Aluminum alloy, Resin			
Weight (max.)	150 g	170 g	310 g	480 g
Light spectrum				

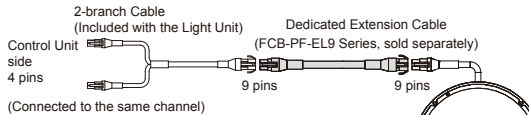
### Dimensions (mm)



Connecting an extension cable to the HPD-PF-75/100 Light Unit



Connecting an extension cable to the HPD-PF-150/200 Light Unit



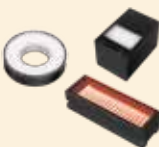
# Extensive Model Variations — Total of 38 Models with 16 Newly Added Types

Dome type  
HPD-PF Series 8 models



Ring type for diffused lighting  
HPR-PF Series 8 models

Newly Added Types



Current PF Series

Total of  
**= 38 models**

- Dome type: 8 models
- Ring type for diffused lighting: 8 models
- Coaxial type: 4 models
- Ring type: 6 models
- Bar type: 12 models

Dedicated Control Units for High Power Strobe Light Units



PF-A16048-4  
(4-channel model)

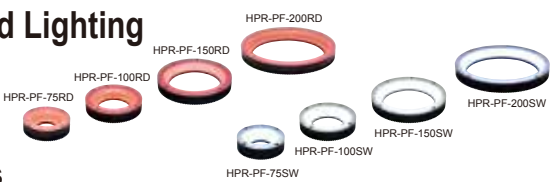


PF-A4048-2  
(2-channel model)

Ring type for diffused lighting and dome type: **16 models** + **22 models**

## Ring Type for Diffused Lighting

# HPR-PF



- 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

### Imaging Examples

Imaging the characters on an electronic component



Image is blurred because exposure time was increased for brightness.



Bright, blur-free image can be captured.

Imaging the bottom surface of a beverage container

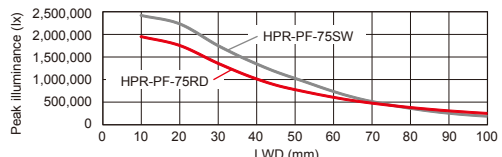


Condition of container bottom and text can be read.

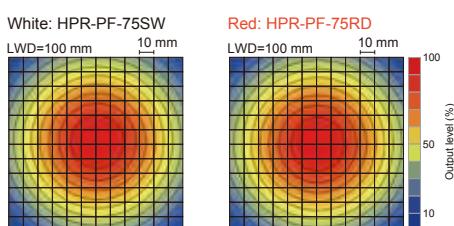


### Data (Representative)

#### LWD Characteristics



#### Uniformity

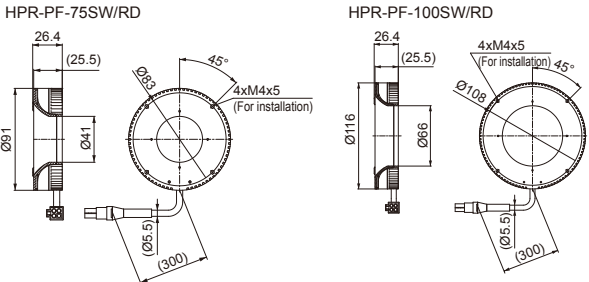


The data included is for reference only. Results for individual products may vary.

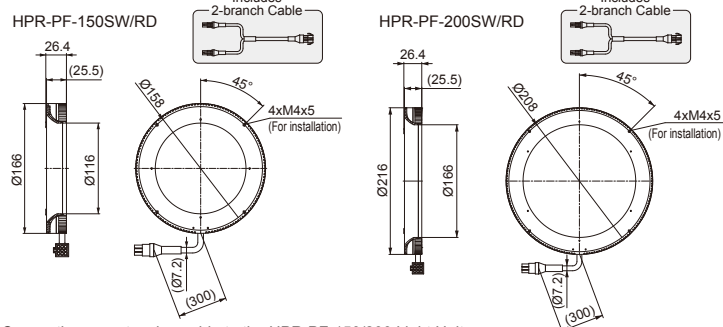
### Specifications

Model name	HPR-PF-75□□	HPR-PF-100□□	HPR-PF-150□□	HPR-PF-200□□
LED color	White (SW) Red (RD)	White (SW) Red (RD)	White (SW) Red (RD)	White (SW) Red (RD)
Correlated color temp. (typ.)	6,500 K	6,500 K	6,500 K	6,500 K
Peak wavelength (typ.)	636 nm	636 nm	636 nm	636 nm
Peak current (max.)	12 A	21.6 A	36 A	43.2 A
Input voltage (max.)	48 VDC			
Lighting conditions	Maximum strobe time: 500 μs, Maximum duty ratio: 1%			
Connector	4-pin EL connector (ELP-04NV)		9-pin EL connector (ELP-09V)	
Extension cable	FCB-PF Series (sold separately)		FCB-PF-EL9 Series (sold separately)	
Cooling method	Natural air-cooling			
Operating env. (indoors only)	Temperature: 0 to 40°C, Humidity: 20 to 85%RH (with no condensation)			
Storage environment	Temperature: -20 to 60°C, Humidity: 20 to 85%RH (with no condensation)			
CE marking	Safety standard: Conforms to EN 62471-1			
Environmental regulations	RoHS compliant			
Case material	Aluminum alloy, Resin			
Weight (max.)	170 g	180 g	270 g	400 g
Light spectrum				

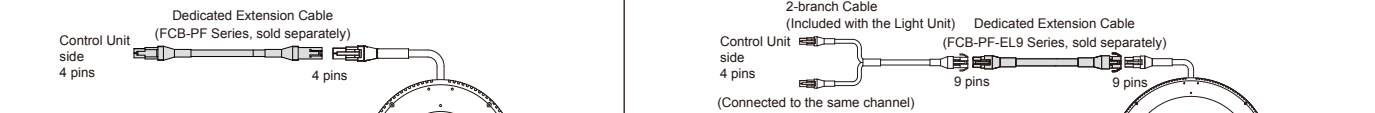
### Dimensions (mm)



Connecting an extension cable to the HPR-PF-75/100 Light Unit



Connecting an extension cable to the HPR-PF-150/200 Light Unit



# “Extreme Power” Strobe Lights

only made possible by mastering LEDs.

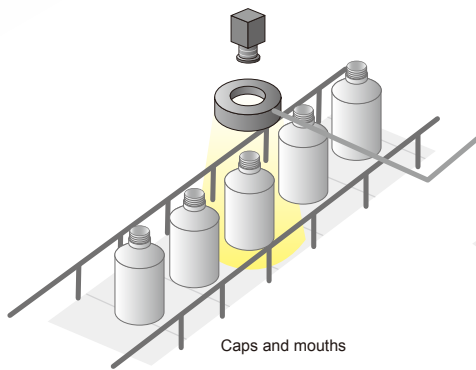
**Peak illuminance: 4 million lx**  
 Measured using HPD-PF-100SW (LWD=5 mm)  
 Actual value may vary.

**Strobe time: 1 to 100 μs**  
 991 levels (0.1 μs increments)

Maximum duty ratio: 1%

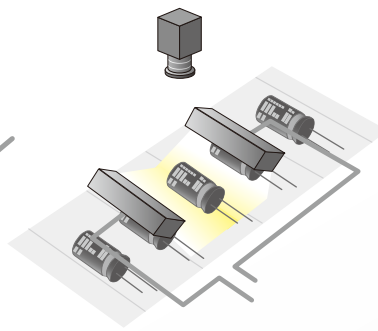
## Expanded Variations & Broader Applications

Dome types in 4 sizes and ring types for diffused lighting 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.



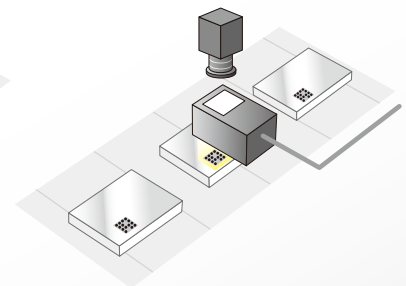
Caps and mouths

Inspection of beverage containers



Capacitors and chip components

Inspection of electronic components



QR codes and barcodes

Reading barcodes

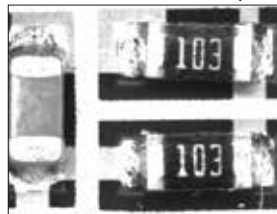
**Delivers high power strobe lighting.**

**Contributes to increasing inspection speeds and improving productivity.**

## High Brightness Comparable to Xenon Flash Lamps

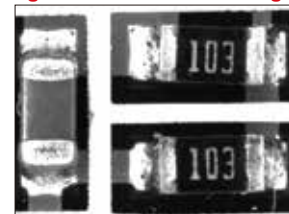
Adjusting the strobe time of the PF series Light Unit enabled the same inspection speed made possible by xenon lamps.

15 W xenon flash lamp



Strobe time: 1.75 μs  
 (measured value)

High Power Strobe LED Light



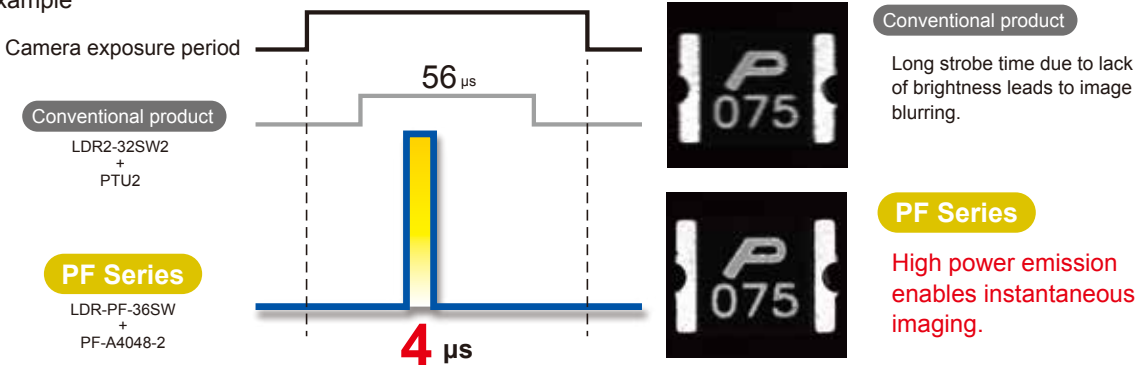
Strobe time: 15 μs

### Solve your xenon flash lamp problems with LEDs.

	Brightness stability	Flashing failure	Controllability	Operational lifetime	Fiber cabling	Environmental impact	Operating noise	Number of channels
<b>High Power Strobe LED Lights</b>	<b>Stable</b> No impact on inspection accuracy.	<b>Flashing does not fail.</b> No impact on inspection accuracy.	<b>Good</b> Light intensity, strobe time, and lighting delay time can be set with various types of external control.	<b>Long</b> Long service life. 50,000 hours. (Expected service life)	<b>Flexible</b> Installation flexibility.	<b>Small</b> Contributes to reducing CO <sub>2</sub> and saving energy.	<b>Quiet</b> No operating noise.	<b>More than one</b> Available with multiple channels. Multiple Light Units can be used with a single Control Unit.
<b>Xenon Flash Lamps</b>	<b>Fluctuant</b> Impacts inspection accuracy.	<b>Flashing sometimes fails.</b> Impacts inspection accuracy.	<b>Poor</b> Light control is possible, but strobe time is fixed.	<b>Short</b> The service life of xenon lamps is typically 3,000 hours.	<b>Inflexible</b> Inconvenient to route fiber.	<b>Large</b> Mercury contained in the used lamps makes them difficult to dispose.	<b>Abrasive</b> Characteristic operating noise.	<b>One</b> If multiple lights are required, additional fiber and light sources are required.

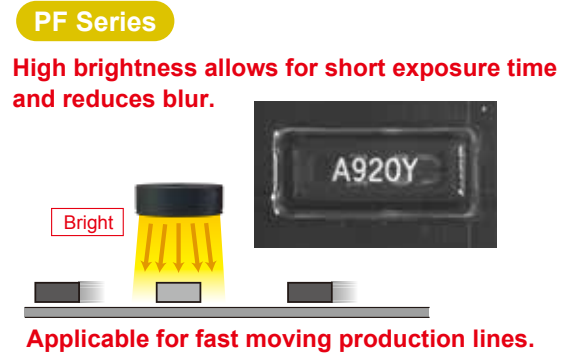
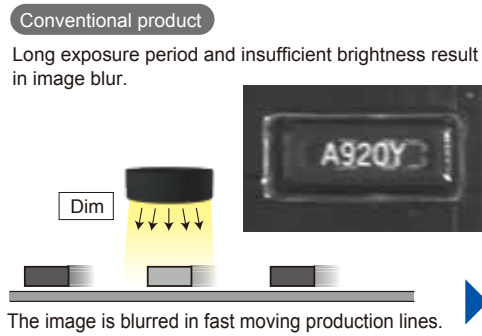
## Using the Flash As a Camera Shutter

Example

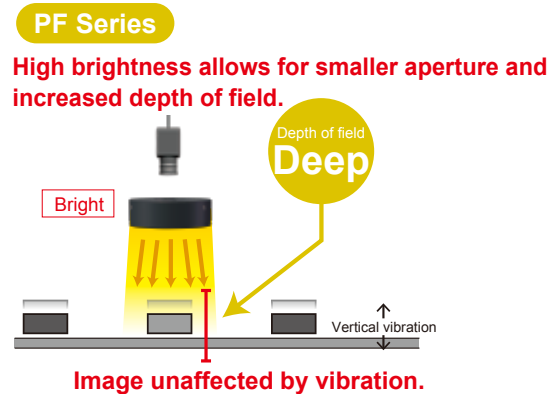
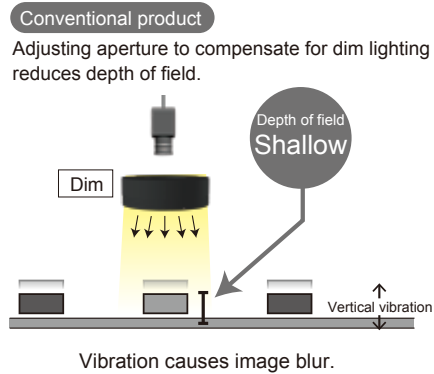


## Eliminating Image Blur

### ● Horizontal blur

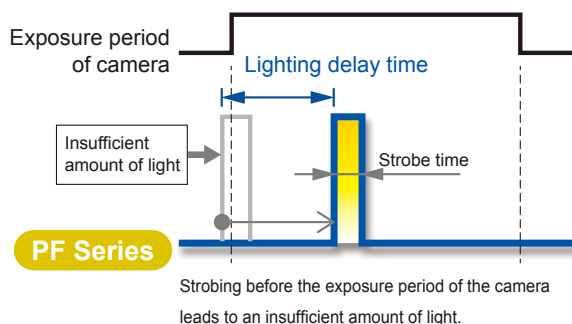


### ● Vertical blur



## 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



**Applications**

Introducing Various Examples Obtained by Using Extreme Power Strobe Lights

**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.

**Resin Industry**

- Imaging Foreign Material Mixed among Resin Pellets



Workpiece



Resin pellets

HPD-PF-150SW (White)



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



Capacitor

Coaxial type only



Dome type only



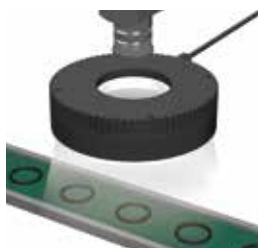
Dome Light: HPD-PF-75SW (White)  
Coaxial Light: LFV-PF-50SW (White)



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

HPR-PF-75SW (White)



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

HPR-PF-75RD (Red)



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

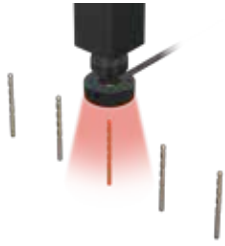
**What is a hypercentric lens?**

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.

## Metal Parts Industry

### ● Imaging Drill Tips



Workpiece



Drill

LDR-PF-54RD (Red)



## Printing Industry

### ● Imaging the External Appearance of Playing Cards



Workpiece



Playing card

LDL-PF-102X18SW (White)



## Electronic Components Industry

### ● Imaging the External Appearance of Chip Components

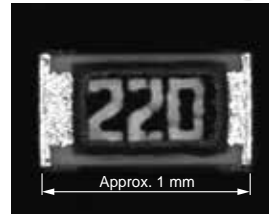


Workpiece



Chip component

LDR-PF-36SW (White)



### ● Imaging the External Appearance of Electronic Components

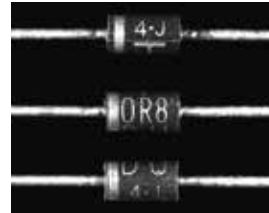


Workpiece



Electronic components

LDL-PF-52X18SW (White)



## Food Industry

### ● Imaging the External Appearance of Paper Label with Barcode



Workpiece



Beverage bottle

LDL-PF-102X18SW (White)

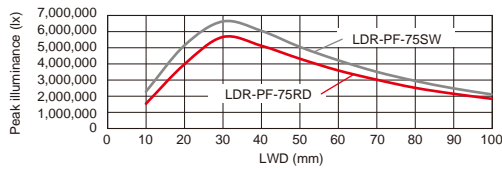


The polarizing plate is used.

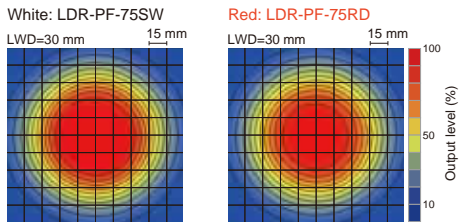
## Ring Type

### ● Data (Representative)

#### LWD Characteristics



#### Uniformity



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



## ● Specifications

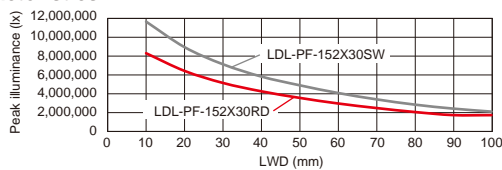
□: SW or RD

Model name	LDR-PF-36□□		LDR-PF-54□□		LDR-PF-75□□	
LED color	White (SW)	Red (RD)	White (SW)	Red (RD)	White (SW)	Red (RD)
Correlated color temp. (typ.)	7,500 K	-	7,500 K	-	7,500 K	-
Peak wavelength (typ.)	-	627 nm	-	627 nm	-	627 nm
Peak current (max.)	5.4 A		10.8 A		21.6 A	18 A
Input voltage (max.)	48 VDC					
Lighting conditions	Maximum strobe time: 500 μs, Maximum duty ratio: 1%					
Connector	EL connector (ELP-04NV)					
Extension cable	FCB-PF Series (sold separately)					
Cooling method	Natural air-cooling					
Operating env. (Indoors only)	Temperature: 0 to 40°C, Humidity: 20 to 85%RH (with no condensation)					
Storage environment	Temperature: -20 to 60°C, Humidity: 20 to 85%RH (with no condensation)					
CE marking	Safety standard: Conforms to EN 62471-1					
Environmental regulations	RoHS compliant					
Case material	Aluminum alloy, Resin					
Weight (max.)	70 g		110 g		150 g	
Light spectrum						

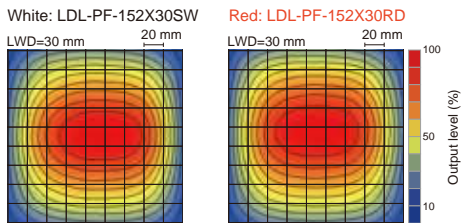
## Bar Type

### ● Data (Representative)

#### LWD Characteristics



#### Uniformity



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



## ● Specifications

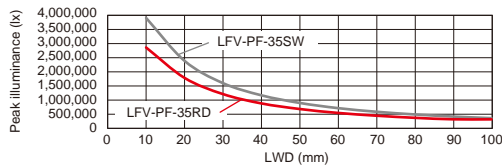
■: 18 or 30 □: SW or RD

Model name	LDL-PF-52X■□□				LDL-PF-102X■□□				LDL-PF-152X■□□			
Emitting width	18 mm	30 mm	18 mm	30 mm	18 mm	30 mm	18 mm	30 mm	18 mm	30 mm	18 mm	30 mm
LED color	White (SW)		Red (RD)		White (SW)		Red (RD)		White (SW)		Red (RD)	
Correlated color temp. (typ.)	7,500 K		-		7,500 K		-		7,500 K		-	
Peak wavelength (typ.)	-		627 nm		-		627 nm		-		627 nm	
Peak current (max.)	5.4 A	9 A	5.4 A	9 A	10.8 A	18 A	10.8 A	18 A	16.2 A	27 A	16.2 A	27 A
Input voltage (max.)	48 VDC											
Lighting conditions	Maximum strobe time: 500 μs, Maximum duty ratio: 1%											
Connector	EL connector (ELP-04NV)											
Extension cable	FCB-PF Series (sold separately)											
Cooling method	Natural air-cooling											
Operating env. (Indoors only)	Temperature: 0 to 40°C, Humidity: 20 to 85%RH (with no condensation)											
Storage environment	Temperature: -20 to 60°C, Humidity: 20 to 85%RH (with no condensation)											
CE marking	Safety standard: Conforms to EN 62471-1											
Environmental regulations	RoHS compliant											
Case material	Aluminum alloy, Resin											
Weight (max.)	140 g	180 g	140 g	180 g	210 g	270 g	210 g	270 g	290 g	380 g	290 g	380 g
Light spectrum												

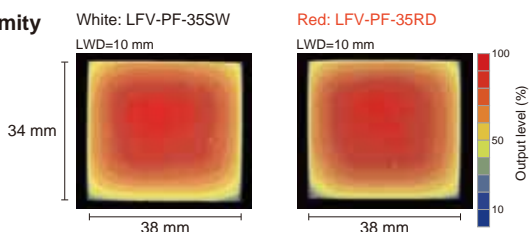
## Coaxial Type

### ● Data (Representative)

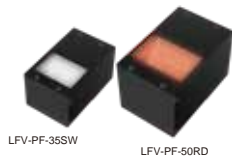
#### LWD Characteristics



#### Uniformity



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



## ● Specifications

□: SW or RD

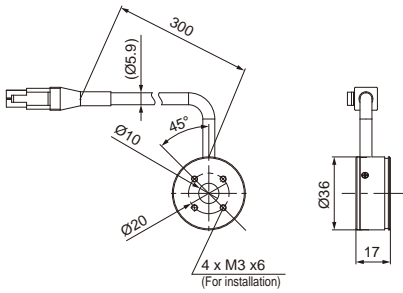
Model name	LFV-PF-35□□		LFV-PF-50□□	
LED color	White (SW)	Red (RD)	White (SW)	Red (RD)
Correlated color temp. (typ.)	7,800 K	-	7,800 K	-
Peak wavelength (typ.)	-	627 nm	-	627 nm
Peak current (max.)	14.4 A	10.8 A	21.6 A	18 A
Input voltage (max.)	48 VDC			
Lighting conditions	Maximum strobe time: 500 μs, Maximum duty ratio: 1%			
Connector	EL connector (ELP-04NV)			
Extension cable	FCB-PF Series (sold separately)			
Cooling method	Natural air-cooling			
Operating env. (Indoors only)	Temperature: 0 to 40°C, Humidity: 20 to 85%RH (with no condensation)			
Storage environment	Temperature: -20 to 60°C, Humidity: 20 to 85%RH (with no condensation)			
CE marking	Safety standard: Conforms to EN 62471-1			
Environmental regulations	RoHS compliant			
Case material	Aluminum alloy, Resin			
Weight (max.)	230 g		400 g	
Light spectrum				



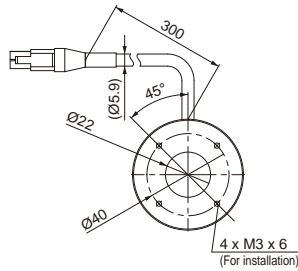
## Dimensions (mm)

### Ring Type

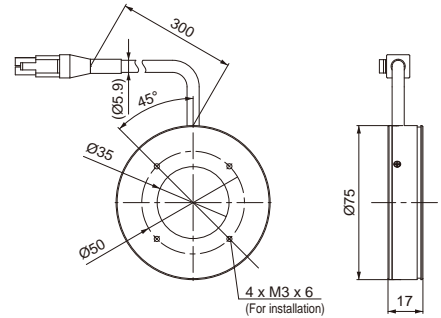
LDR-PF-36SW/RD



LDR-PF-54SW/RD



LDR-PF-75SW/RD



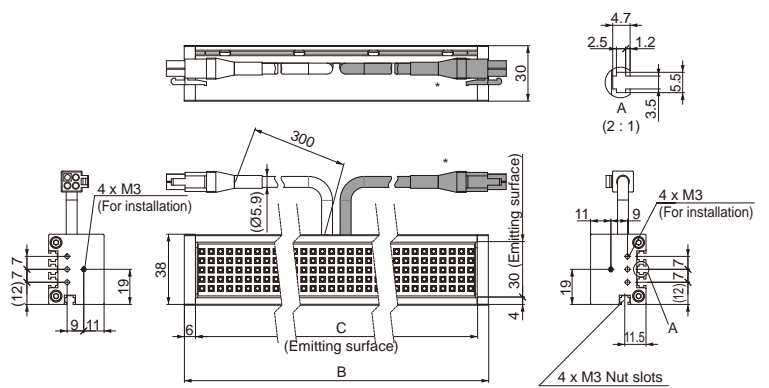
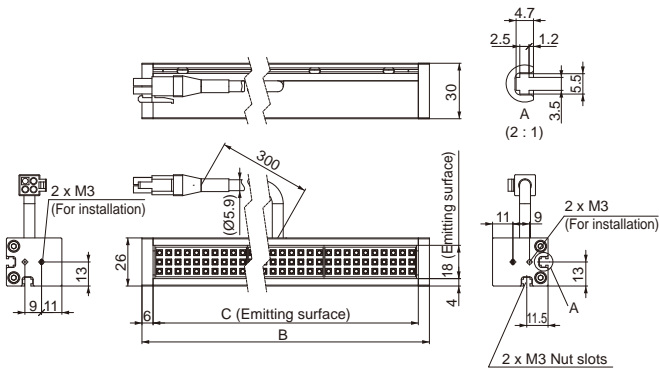
### Bar Type

Emitting width: 18 mm

Model name	B	C
LDL-PF-52X18SW/RD	64	52
LDL-PF-102X18SW/RD	114	102
LDL-PF-152X18SW/RD	164	152

Emitting width: 30 mm

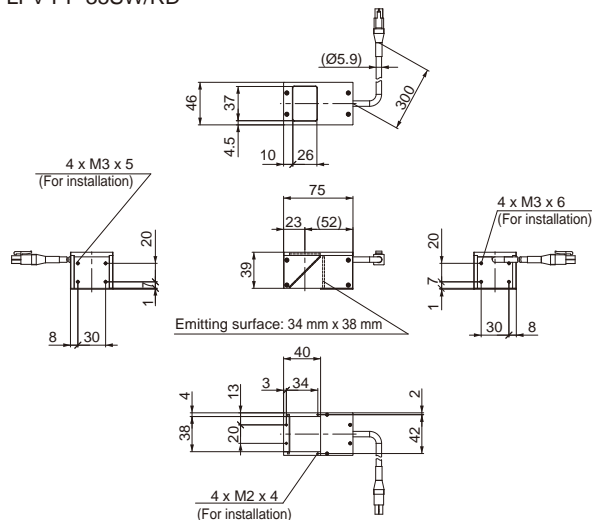
Model name	B	C
LDL-PF-52X30SW/RD	64	52
LDL-PF-102X30SW/RD	114	102
LDL-PF-152X30SW/RD	164	152



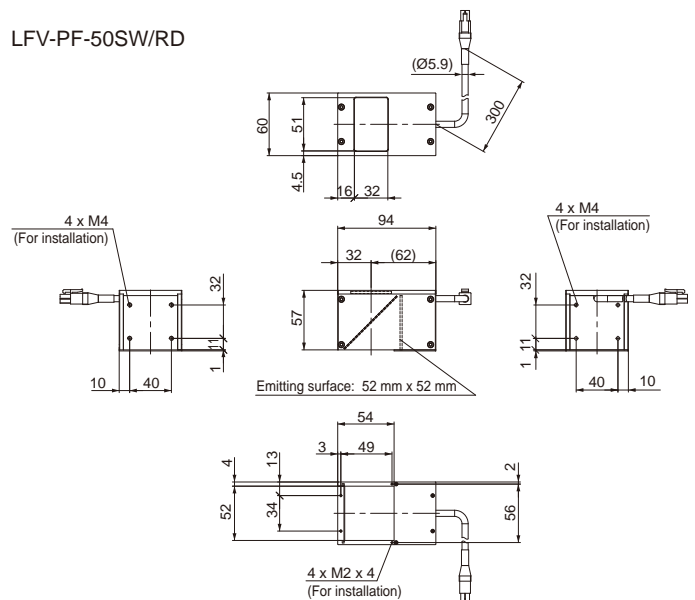
\* The LDL-PF-152X30SW/RD Light Unit has two connectors.

### Coaxial Type

LFV-PF-35SW/RD



LFV-PF-50SW/RD



# Improved line of Control Units with a new feature

## Dedicated Control Unit for High Power Strobe LED Lights (4-channel model)

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.

4-channel Control Unit  
PF-A16048-4

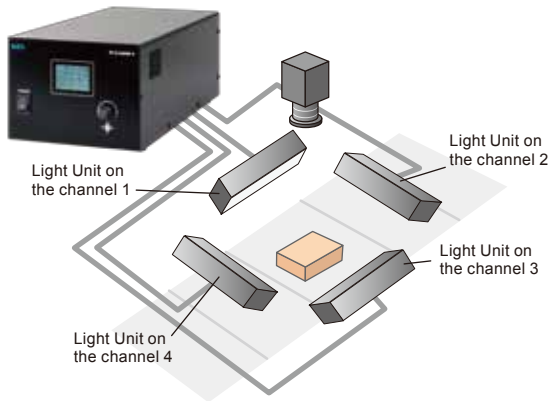


### Trigger Link Function

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.

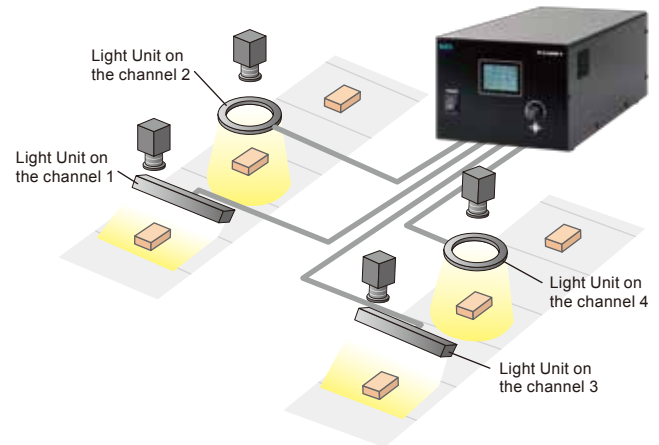
### Control Light Units installed in four directions

PF-A16048-4



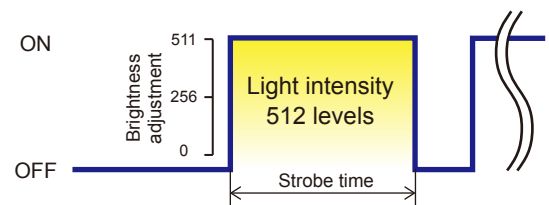
### Control multiple Light Units for inspections

PF-A16048-4



## 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%)

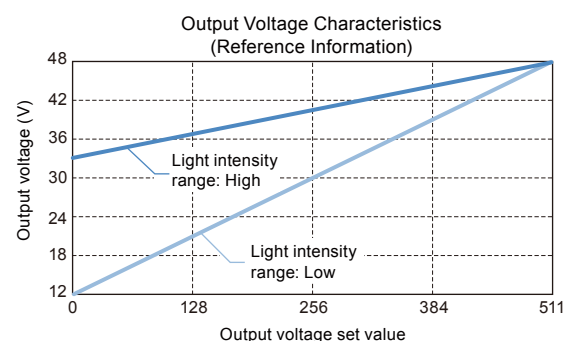
Ethernet	1 to 100 $\mu$ s (in steps of 0.1 $\mu$ s)	Parallel	Low strobe time range: 1 to 100 (in steps of 0.1 $\mu$ s)
	100.5 to 500 $\mu$ s (in steps of 0.5 $\mu$ s)		High strobe time range: 5 to 500 $\mu$ s (in steps of 0.5 $\mu$ s)

### Lighting delay: 0 to 100 $\mu$ s (in steps of 0.1 $\mu$ s)

## 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

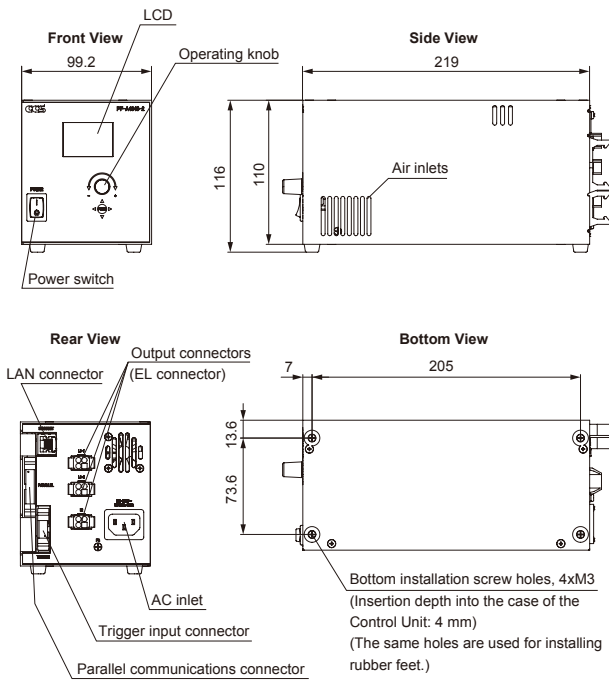
Model name	PF-A4048-2, PF-A16048-4	
Lighting method	Strobe lighting	
Drive method	Constant-voltage system	
Intensity control method	Variable-voltage control, Strobe time control	
Number of channels	PF-A4048-2: 2 channels, PF-A16048-4: 4 channels	
Number of output connectors	PF-A4048-2	L1: 2, L2: 1 PF-A16048-4: 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 comm. Signal input through parallel port
		512 levels
Strobe time settings	Manual	Operation on the front panel
	External	Command input via TCP/IP or UDP/IP comm. Signal input through parallel port
		PF-A4048-2: 1 to 100 $\mu$ s (in steps of 0.1 $\mu$ s) PF-A16048-4: 1 to 500 $\mu$ s*
Lighting delay settings	Manual	Operation on the front panel
	External	Command input via TCP/IP or UDP/IP comm. Signal input through parallel port
		0 to 100 $\mu$ s (in steps of 0.1 $\mu$ s)
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 (21.6 A/connector)	
Insulation withstand voltage (input-output, input-FG)	1500 VAC for one minute, Cutoff current: 10 mA, 500 VDC, 20 M $\Omega$ min.	
Overvoltage category	Category II	
Operating environment	Temperature: 0 to 40°C, Humidity: 20% to 85% (with no condensation) Altitude: 2,000 m max., Protective ground class: Class I, Pollution degree: 2, Indoor use only	
Storage environment	Temperature: -20 to 60°C, Humidity: 20% to 85% (with no condensation)	
Cooling method	Forced air cooling	
CE marking	Safety standard: Conforms to EN 61010-1, EMC standard: Conforms to EN61000-6-2 and EN61000-6-4	
Environmental regulations	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	

\* For Ethernet communications: 1 to 100  $\mu$ s (in steps of 0.1  $\mu$ s), 100.5 to 500  $\mu$ s (in steps of 0.5  $\mu$ s)

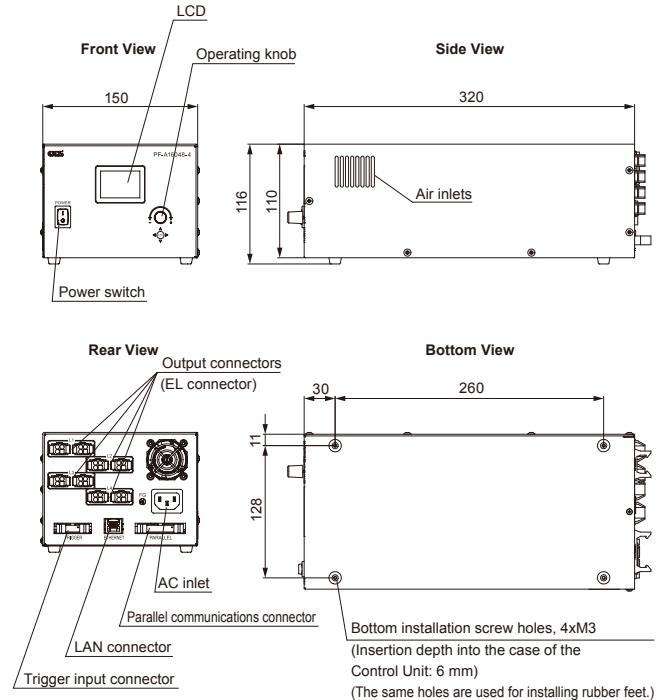
For parallel communications: Low strobe time range (1 to 100  $\mu$ s, in steps of 0.1  $\mu$ s), High strobe time range (5 to 500  $\mu$ s, in steps of 0.5  $\mu$ s)

## Dimensions (mm)

### ● PF-A4048-2 CE



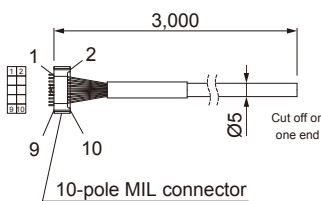
### ● PF-A16048-4 CE



## Optional Accessories (mm)

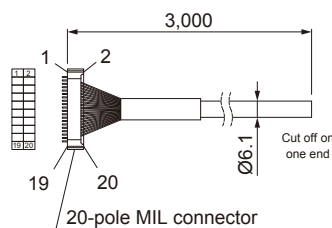
### ● Trigger Input Cable

Model name: EXCB2-M10-3



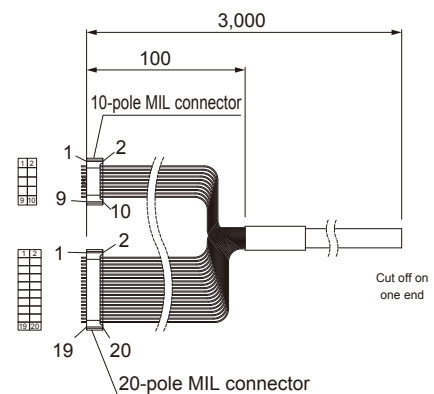
### ● Parallel Communications Cable

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
DF-LDR-PF-36	LDR-PF-36
DF-LDR-PF-54	LDR-PF-54
DF-LDR-PF-75	LDR-PF-75

An adapter is needed for attachment to the Light Unit.

Bar type units



Model name	Applicable Light Unit
DF-LDL-PF-52X18	LDL-PF-52X18
DF-LDL-PF-102X18	LDL-PF-102X18
DF-LDL-PF-152X18	LDL-PF-152X18
DF-LDL-PF-52X30	LDL-PF-52X30
DF-LDL-PF-102X30	LDL-PF-102X30
DF-LDL-PF-152X30	LDL-PF-152X30

Light-color



Transmission: High

Dark-color



Transmission: Low

These are the same Diffusion Plates as those installed at the factory.

Model name	Applicable Light Unit	Model name	Applicable Light Unit
DF-LFV3-35	LFV-PF-35	DF-LFV3-35-UF	LFV-PF-35
DF-LFV3-50	LFV-PF-50	DF-LFV3-50-UF	LFV-PF-50

**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.

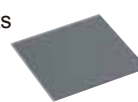
Bar type units



Model name	Applicable Light Unit
PL-LDL-PF-52X18-△△	LDL-PF-52X18
PL-LDL-PF-102X18-△△	LDL-PF-102X18
PL-LDL-PF-152X18-△△	LDL-PF-152X18
PL-LDL-PF-52X30-△△	LDL-PF-52X30
PL-LDL-PF-102X30-△△	LDL-PF-102X30
PL-LDL-PF-152X30-△△	LDL-PF-152X30

△△ : Polarizing direction  
 HO: Light is polarized parallel to the longer edge of the plate.  
 VE: Light is polarized parallel to the shorter edge of the plate.

Coaxial type units



Model name	Applicable Light Unit
PL-LFV3-35	LFV-PF-35
PL-LFV3-50	LFV-PF-50

**Polarizing Filters**

For use with camera lenses



Model name	Notes
PL-25	M25.5 P0.5
PL-25-NL	M25.5 P0.5
PL-27	M27.0 P0.5
PL-27-NL	M27.0 P0.5
PL-30	M30.5 P0.5
PL-30-NL	M30.5 P0.5
PL-40	M40.5 P0.5
PL-40-NL	M40.5 P0.5
PL-46	M46.0 P0.75

Note: "NL" models have a lock.

**Light Control Films**

Improves parallelism of light to reduce light diffraction.



Coaxial type units

Model name	Applicable Light Unit
LC-LFV3-35	LFV-PF-35
LC-LFV3-50	LFV-PF-50

**Adapters**

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

Ring type units

Model name	Applicable Light Unit
AD-LDR-PF-36	LDR-PF-36
AD-LDR-PF-54	LDR-PF-54
AD-LDR-PF-75	LDR-PF-75



**Brackets**

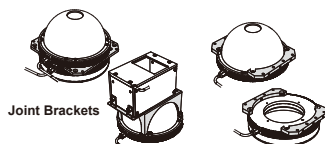
Secures Light Units. Bar type units



Model name	Applicable Light Unit
BK-LDL-PF	LDL-PF-52X18
	LDL-PF-102X18
	LDL-PF-152X18
	LDL-PF-52X30
	LDL-PF-102X30
	LDL-PF-152X30



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



Joint Brackets

Expansion Mounting Brackets

**Light Joint Brackets**

Model name	Applicable units 1	Applicable units 2
BK-75-JO	HPD-PF-75	HPR-PF-75
BK-100-JO	HPD-PF-100	HPR-PF-100
BK-150-JO	HPD-PF-150	HPR-PF-150
BK-200-JO	HPD-PF-200	HPR-PF-200

**Coaxial Light Joint Brackets**

Model name	Applicable units 1	Applicable units 2
BK-HPD2-75-LFV	HPD-PF-75	LFV-PF-35
BK-HPD2-100-LFV	HPD-PF-100	LFV-PF-50
BK-HPD2-150-LFV	HPD-PF-150	

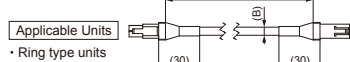
**Expansion Mounting Brackets**

Model name	Applicable Light Units
BK-75-CI	HPD-PF-75 HPR-PF-75
BK-100-CI	HPD-PF-100 HPR-PF-100
BK-150-CI	HPD-PF-150 HPR-PF-150
BK-200-CI	HPD-PF-200 HPR-PF-200

**Cables**

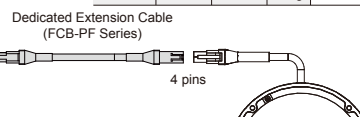
Connects a Light Unit and Control Unit.

**Extension Cables**



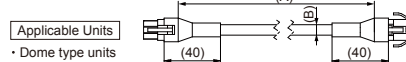
- Ring type units
- Bar type units
- Coaxial type units
- Dome type units (75 and 100 sizes)
- Ring type units for diffused lighting (75 and 100 sizes)

Model name	Dimension A	Dimension B	Weight	Permitted bending radius
FCB-1-PF	1,000		100 g	
FCB-2-PF	2,000	Ø5.9	150 g	35.4 mm
FCB-3-PF	3,000		200 g	
FCB-5-PF	5,000	Ø7	450 g	42.0 mm



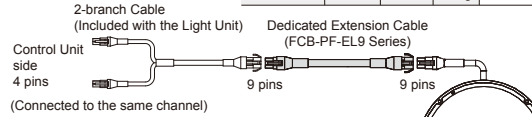
These cables are dedicated for HPD-PF-150, HPD-PF-200, HPR-PF-150, and HPR-PF-200.

**Extension Cables**



- Dome type units (150 and 200 sizes)
- Ring type units for diffused lighting (150 and 200 sizes)

Model name	Dimension A	Dimension B	Weight	Permitted bending radius
FCB-1-PF-EL9	1,000		100 g	
FCB-2-PF-EL9	2,000	Ø7.4	190 g	44.4 mm
FCB-3-PF-EL9	3,000		270 g	
FCB-5-PF-EL9	5,000	Ø9.1	680 g	54.6 mm



Polarizing Plates and Diffusion Plates are wear and tear items. Please inspect them periodically and replace them if they are discolored or deformed. For optional accessories, we recommend keeping several to use as replacement parts.

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## 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 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. 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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