

High Power Strobe LED Light Units/Control Unit PF Series



Extreme Power Strobe Lights Seven Million lx

Peak illuminance of LDL-PF-152X30SW (LWD=30 mm)



Applications

- Appearance inspection of electronic components
- Defect inspection of metal parts
- Inspection of paper label position
- Appearance inspection of printings

PF Series



“Extreme Power” Strobe Lights

only made possible by mastering LEDs.

Peak illuminance: 7 million lx
 Measured using LDL-PF-152X30SW (LWD=30 mm)

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

Results for individual products may vary.

High Power Strobe Light enables further acceleration of fast moving production lines.

Conventional product

Dim

Line speed: 1x

Strobe time: 56 μs

PF Series

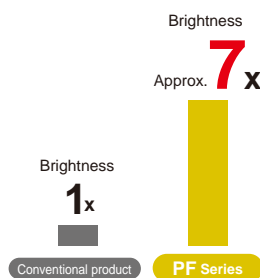
Bright

Line speed: **14 x**

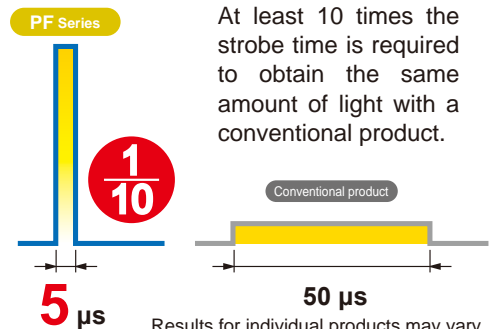
Strobe time: **4 μs**

Comparison between the LDR-PF-36SW and LDR2-32SW2, a conventional product.

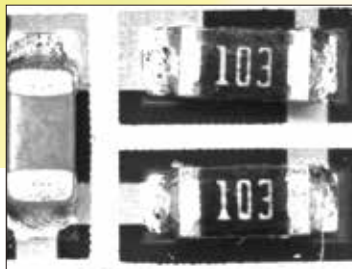
Improving productivity through increased inspection speed.



Comparison between the LDL-PF-52X30SW and LDL2-74X30SW2, a conventional product. (LWD=100 mm)

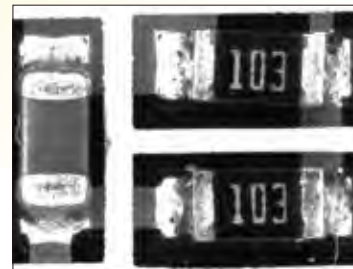


Brightness comparable to xenon flash lamps



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

Inspection of
chip component



High Power Strobe Light Unit
Strobe time: 15 μ s

Achieved the same inspection speed made possible by xenon lamps.

Common problems
with xenon lamps

Solution with LEDs

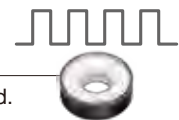
► Brightness

Fluctuant

Inspection accuracy is affected.
Flashing sometimes fails.

Stable

Inspection accuracy is not affected.
Flashing does not fail.



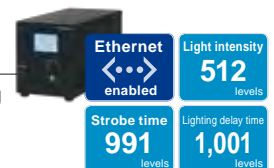
► Available light control features

Scarce

Light intensity control is available,
but with a fixed strobe time.

Abundant

Light intensity, strobe time, and lighting
delay can be set through various
external control methods.



► Operational lifetime

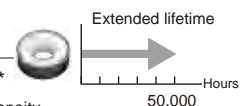
Short

General xenon lamp: 3,000 hours

Long

Long lifetime of 50,000 hours*

* Expected lifetime for 100% light intensity,
50 μ s strobe time, and 5 ms strobe interval
(1% duty ratio). Actual lifetimes may vary.



► Design variations

Few

Only white light sources are available.
Filters must be used to change the color.

Many

The product lineup includes white and red.
We accept custom orders for other colors.



► Environmental impact

Large

Xenon lamps use mercury.
Special care is required to
dispose of used xenon lamps.

Small

Good for CO₂ reduction and energy conservation.



► Operating noise

Abrasive

A distinctive noise is made
upon flashing.

Quiet

No noise is made.



► Number of channels

One

Additional fiber cables and light sources
are required to conduct multiple inspections
at the same time.

Two

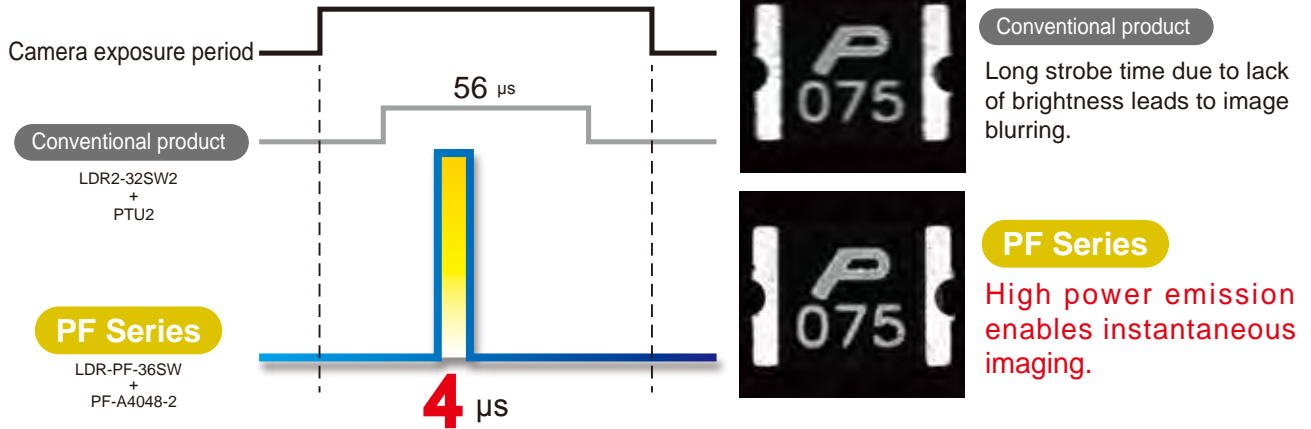
Two channels are provided.
Multiple Light Units can be controlled
with just one Control Unit.



Innovative Applications

1 Using the flash as a camera shutter

Example

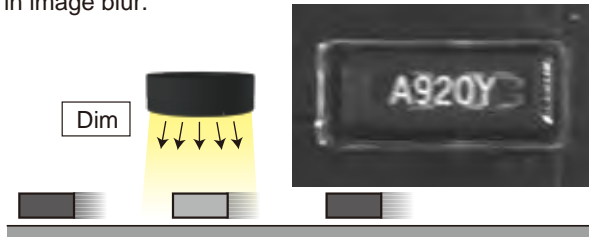


2 Eliminating image blur

● Horizontal blur

Conventional product

Long exposure period and insufficient brightness result in image blur.



When used for a fast moving production line, image blurring results.

PF Series

The shortened exposure time reduces blur.

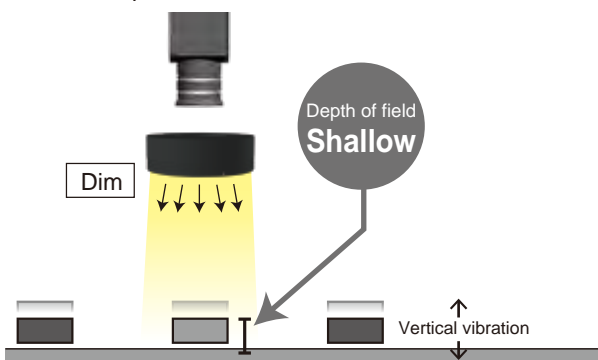


Applicable for fast moving production lines.

● Vertical blur

Conventional product

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



Vibration causes image blur.

PF Series

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

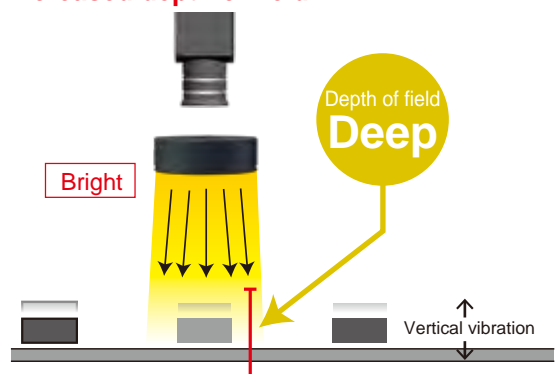


Image unaffected by vibration.

Other Features

1 Wide variety of available Light Units

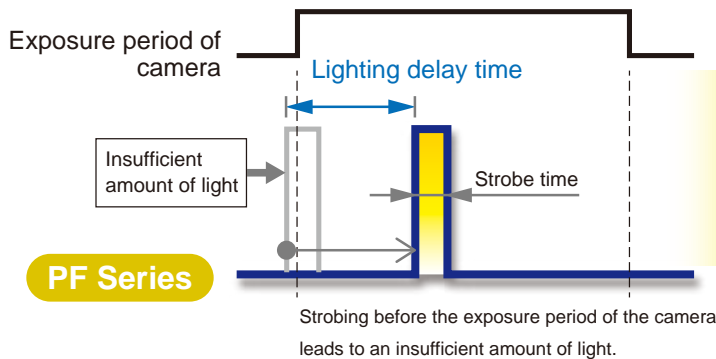
Choose the appropriate Light Unit according to the type of workpiece and inspection.
The product lineup includes a total of 22 models.

Two colors of LEDs available: **white and red.**



2 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 Unit PF-A4048-2



Light intensity: 512 levels

Duty ratio: 1% max.

Strobe time: 1 to 100 μ s

Adjustable within 991 levels (0.1 μ s increments)

Lighting delay time: 0 to 100 μ s

Adjustable within 1001 levels (0.1 μ s increments)

Applications

Introducing Various Examples Obtained by Using Extreme Power Strobe Lights

Usage examples

Appearance inspection for metal parts, printings, electronic components including printed characters on them, beverage containers, paper labels, etc.

Metal Parts Industry

Imaging Drill Tips



Workpiece



Drill

Captured image



Strobe time
14 μ s

Light Unit in use:
LDR-PF-54RD (Red)



Printing Industry

Imaging the External Appearance of Playing Cards

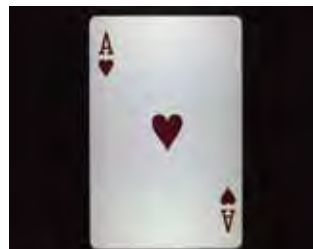


Workpiece



Playing card

Captured image



Strobe time
26 μ s

Light Unit in use:
LDL-PF-102X18SW (White)



Note: The workpiece imaging examples included in this brochure 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.

Electronic Components Industry

Imaging the External Appearance of Chip Components



Workpiece



Chip component

Captured image



Strobe time

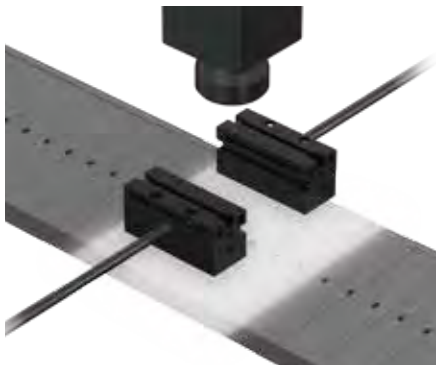
32 μ s

Light Unit in use:
LDR-PF-36SW (White)



Electronic Components Industry

Imaging the External Appearance of Electronic Components

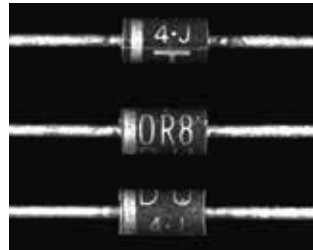


Workpiece



Electronic component

Captured image



Strobe time

38 μ s

Light Unit in use:
LDL-PF-52X18SW (White)



Food Industry

Imaging the External Appearance of Paper Label with Barcode



Workpiece



Beverage bottle

Captured image



Strobe time

100 μ s

Light Unit in use:
LDL-PF-102X18SW (White)
The polarizing plate is used.

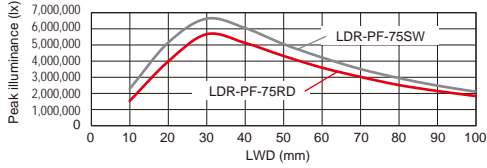


Ring Lights

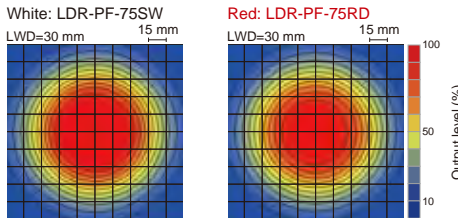


Data (representative)

LWD Characteristics



Uniformity



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

Common Specifications

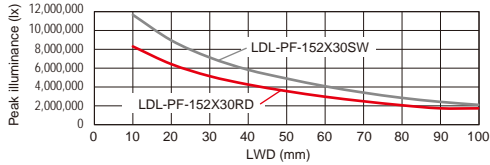
LED color	White (SW)	Red (RD)
Correlated color temp. (typ.)	7,500 K	-
Peak wavelength (typ.)	-	627 nm
Input voltage (max.)	48 VDC	
Lighting conditions	Maximum strobe time: 500 μ s, Maximum duty ratio: 1%	
Connector	EL connector (ELP-04NV)	
Cooling method	Natural air-cooling	
Operating env. (Indoors only)	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	
Light spectrum		

Bar Lights

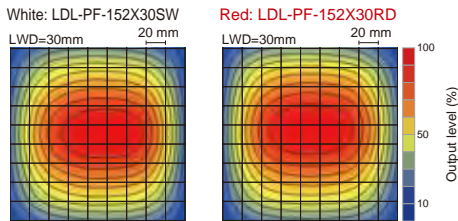


Data (representative)

LWD Characteristics



Uniformity

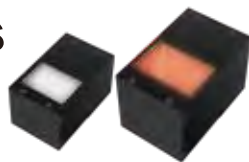


Note: The data included is for reference only. Results for individual products may vary.

Common Specifications

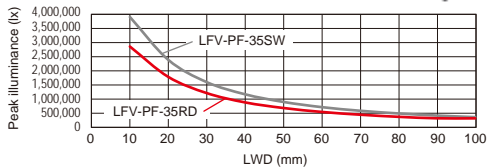
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Light spectrum		

Coaxial Lights

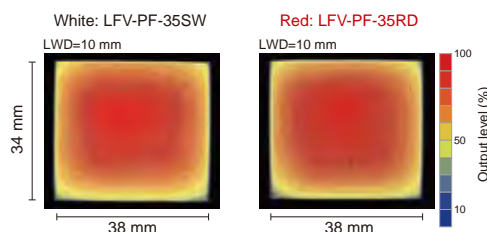


Data (representative)

LWD Characteristics



Uniformity



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

Common Specifications

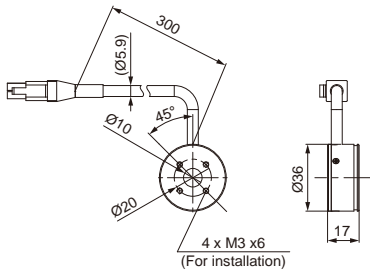
LED color	White (SW)	Red (RD)
Correlated color temp. (typ.)	7,800 K	-
Peak wavelength (typ.)	-	627 nm
Input voltage (max.)	48 VDC	
Lighting conditions	Maximum strobe time: 500 μ s, Maximum duty ratio: 1%	
Connector	EL connector (ELP-04NV)	
Cooling method	Natural air-cooling	
Operating env. (Indoors only)	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	
Light spectrum		

Specifications

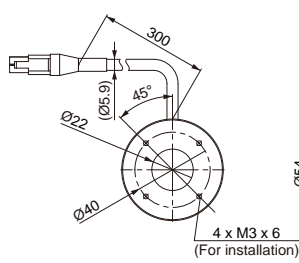
Model name	Peak current	Weight	Model name	Peak current	Weight	Model name	Peak current	Weight
LDR-PF-36SW	5.4 A	70 g	LDR-PF-54SW	10.8 A	110 g	LDR-PF-75SW	21.6 A	150 g
LDR-PF-36RD			LDR-PF-54RD			LDR-PF-75RD	18A	

Dimensions (mm)

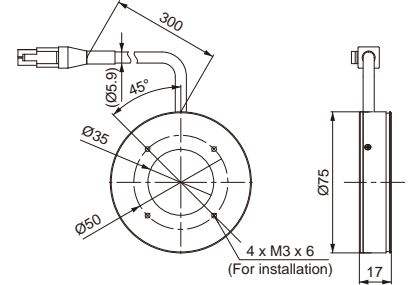
LDR-PF-36SW/RD



LDR-PF-54SW/RD



LDR-PF-75SW/RD

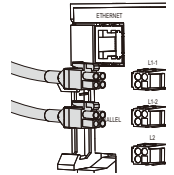


Specifications

Model name	Peak current	Weight	Model name	Peak current	Weight
LDL-PF-52X18SW	5.4 A	140 g	LDL-PF-52X30SW	9 A	180 g
LDL-PF-52X18RD			LDL-PF-52X30RD		
LDL-PF-102X18SW	10.8 A	210 g	LDL-PF-102X30SW	18 A	270 g
LDL-PF-102X18RD			LDL-PF-102X30RD		
LDL-PF-152X18SW	16.2 A	290 g	LDL-PF-152X30SW	27 A	380 g
LDL-PF-152X18RD			LDL-PF-152X30RD		

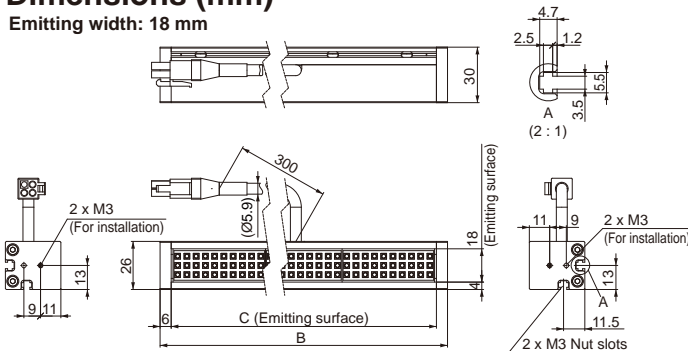
Using LDL-PF-152X30-series Light Unit

- There are two input connectors on the LDL-PF-152X30-series Light Unit. Connect these input connectors to the L1-1 and L1-2 output connectors of the PF-A4048-2 Control Unit. For details, refer to **The L1-1 and L1-2 Output Connectors** at the end of page 10.
- Use two High Power Strobe Extension Cables of the same length to connect the LDL-PF-152X30-series Light Unit. Using cables of different lengths may cause uneven light emission due to different cable specifications.



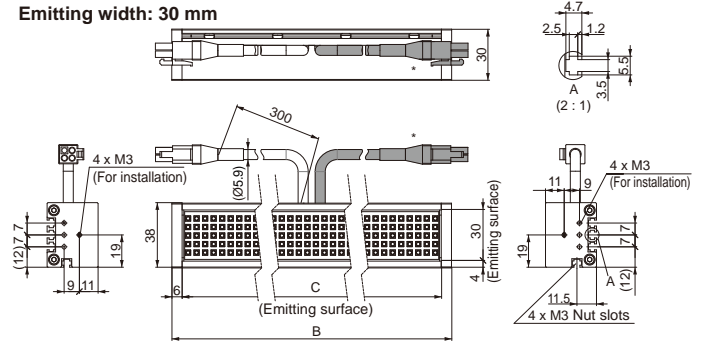
Dimensions (mm)

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



* The LDL-PF-152X30-series Light Unit has two connectors.

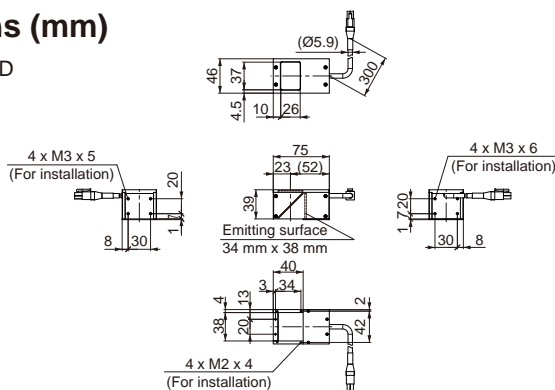
Model name	B	C
LDL-PF-52X30SW/RD	64	52
LDL-PF-102X30SW/RD	114	102
LDL-PF-152X30SW/RD	164	152

Specifications

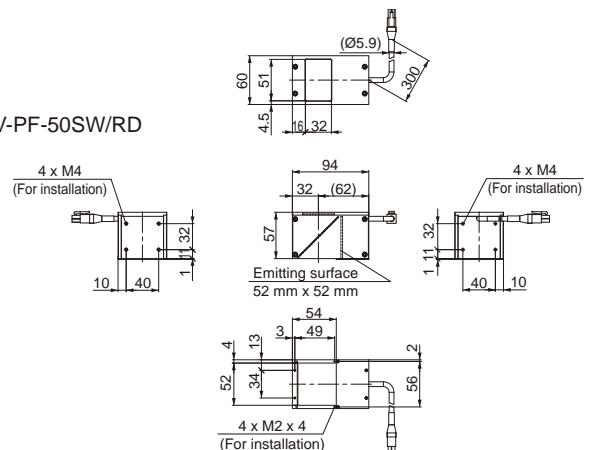
Model name	Peak current	Weight	Model name	Peak current	Weight
LFV-PF-35SW	14.4 A	230 g	LFV-PF-50SW	21.6 A	400 g
LFV-PF-35RD	10.8 A		LFV-PF-50RD	18 A	

Dimensions (mm)

LFV-PF-35SW/RD



LFV-PF-50SW/RD



Dedicated Control Unit PF-A4048-2

Maximizes performance of the High Power Strobe LED Light Units.



Front View



Rear View

Features

Brightness adjustment with fixed camera settings

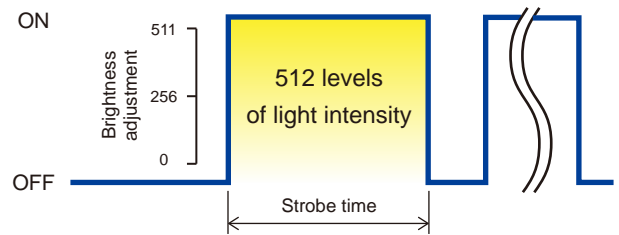
Conventional product

Brightness is controlled by adjusting the exposure period of the camera and the strobe time of the Light Unit.



You can adjust the brightness of the Light Unit holding the settings for the exposure period of the camera and the strobe time of the Light Unit.

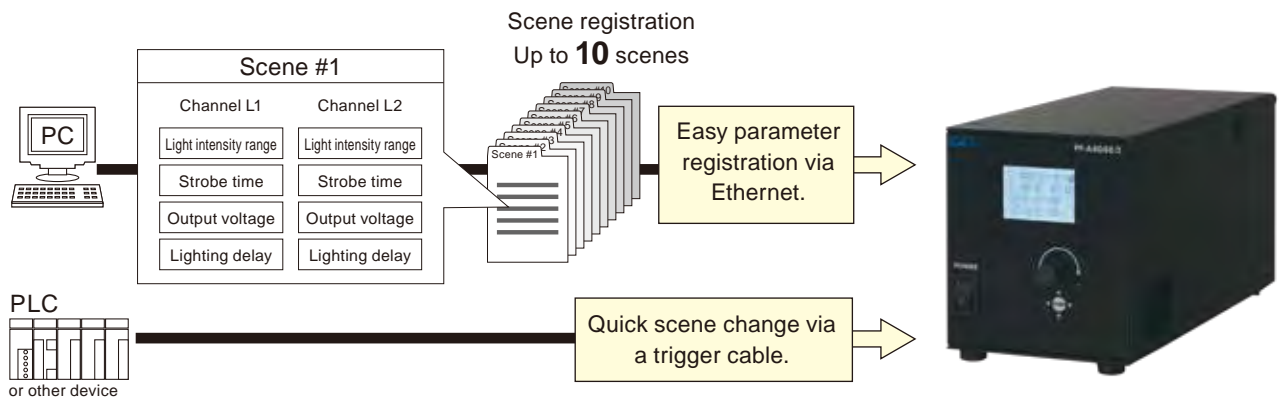
Brightness is adjusted through output voltage control.



Brightness can be adjusted without any effect on other parameters.

Parameter registration for individual inspections

You can register sets of parameters called scenes that consist of the light control settings. Applying a scene to the channels allows you to change the settings easily. Up to 10 scenes can be registered.



Conventional product

It takes time and is troublesome to change the system setup for inspections.

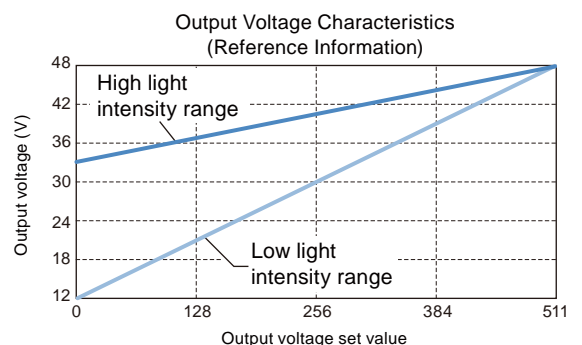


- **Switch between scenes as needed.**
- **It saves time and is helpful to change the system setup for inspections.**

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



Light intensity: 512 levels

Strobe time: 1 to 100 μ s (0.1 μ s increments)

2 channels

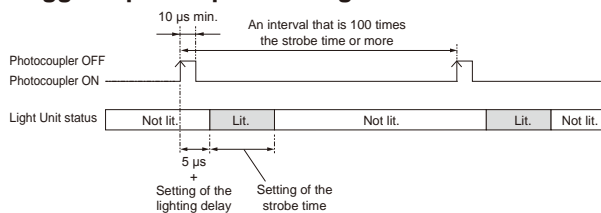
Lighting delay: 0 to 100 μ s (0.1 μ s increments)

Specifications

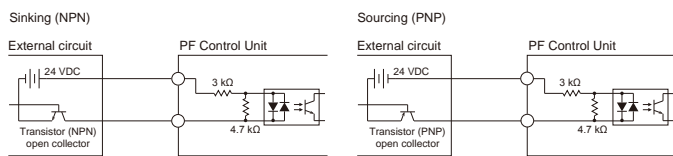
Model name	PF-A4048-2		
Lighting method	Strobe lighting		
Drive method	Constant-voltage system		
Intensity control method	Variable-voltage control, Strobe time control		
Number of channels	2 channels		
Number of output connectors	Channel L1: 2, Channel L2: 1		
Applicable Light Unit (ratings)	High Power Strobe Light Units from CCS		
Output voltage settings	Manual	Operation on the front panel	512 levels
	External	Command input via TCP/IP or UDP/IP comm.	
		Signal input through parallel port	
Strobe time settings	Manual	Operation on the front panel	1 to 100 μ s (0.1 μ s increments)
	External	Command input via TCP/IP or UDP/IP comm.	
		Signal input through parallel port	
Lighting delay settings	Manual	Operation on the front panel	0 to 100 μ s (0.1 μ s increments)
	External	Command input via TCP/IP or UDP/IP comm.	
		Signal input through parallel port	
Input power	100 to 240 VAC (+10%, -15%), 50/60 Hz		
Power consumption (typ.)	65 VA		
Inrush current (typ.)	15 A (at 100 VAC), 36 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 voltage range: 33 to 48 VDC
	Low voltage range: 12 to 48 VDC
Output current (peak)	21.6 A max. per connector
	The total output current for three connectors is limited to 43.2 A max.
Insulation withstand voltage (input-output, input-FG)	1500 VAC for one minute, Cutoff current: 10 mA,
	500 VDC, 20 M Ω 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)
Vibration resistance	Acceleration: 19.6 m/s ² , Frequency: 10 to 55 Hz, Cycles: 3 minutes, Sweep cycle: for 1 hour each in X, Y, and Z directions
Cooling method	Forced air cooling
CE Marking	Safety standard: Conforms to EN 61010-1 EMC standard: Conforms to EN61000-6-2, 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	1900 g max.
Accessories	Instruction guide, 2-m-long 3-prong AC power cord with ground terminal

Trigger Input Sequence Diagrams



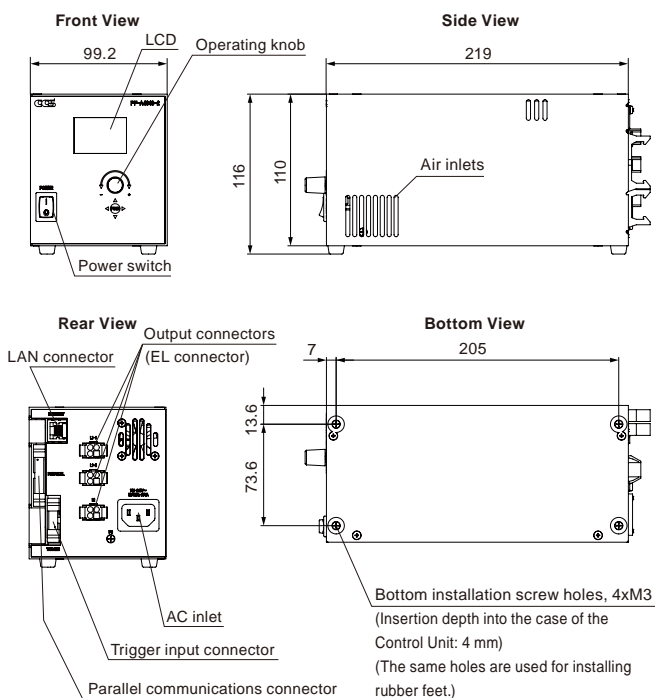
External Signal Connection Example



For detailed information, refer to the instruction guide.

Dimensions (mm)

PF-A4048-2



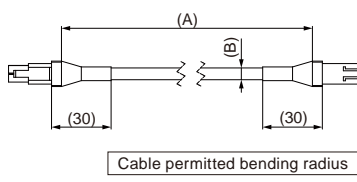
The L1-1 and L1-2 Output Connectors

The PF-A4048-2 Control Unit has three output connectors: the L1-1, L1-2, and L2 connectors. The L1-1 and L1-2 connectors correspond to the channel L1 and operate with the same settings, such as output voltage, output current, and output ON/OFF. These two output connectors behave in the same way and are mainly used for long Line Lights, such as the LDL-PF-152X30-series Light Unit, which has two input connectors.

Optional Accessories

Extension Cables (mm)

Model: FCB-n-PF (n=1, 2, 3, 5)

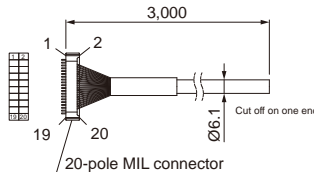


Model name	Dimension A	Dimension B	Weight
FCB-1-PF	1,000		100 g
FCB-2-PF	2,000	Ø5.9	150 g
FCB-3-PF	3,000		200 g
FCB-5-PF	5,000	Ø7	450 g

FCB-1-PF/2-PF/3-PF: 35.4 mm
FCB-5-PF: 42.0 mm

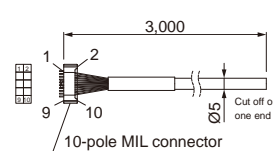
Parallel Communications Cable

Model: EXCB2-M20-3



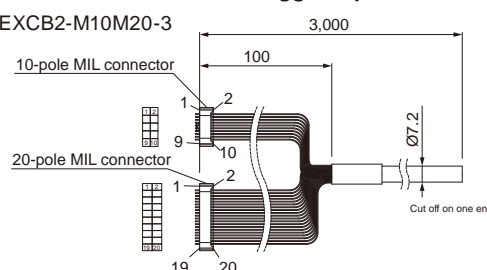
Trigger Input Cable

Model: EXCB2-M10-3



Parallel Communications and Trigger Input Branch Cable

Model: EXCB2-M10M20-3



Optional Accessories

Diffusion Plates

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

Ring Lights



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 Lights



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

Coaxial Lights



This is the same Diffusion Plate as the one 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 Lights



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 Lights

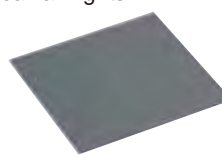


Model name	Applicable Light Unit
PL-LDL-PF-52X18-△△	LDL-PF-52X18
PL-LDL-PF-102X18-△△	LDL-PF-102X18
PL-LDL-PF-152X18-△△	LDL-PF-152X18
PL-LDL-PF-52X30-△△	LDL-PF-52X30
PL-LDL-PF-102X30-△△	LDL-PF-102X30
PL-LDL-PF-152X30-△△	LDL-PF-152X30

△△ : 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 Lights



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

Polarizing Filters

For use with camera lenses



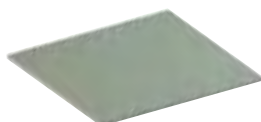
Model name	Notes
PL-25	M25.5 P0.5
PL-25-NL	M25.5 P0.5
PL-27	M27.0 P0.5
PL-27-NL	M27.0 P0.5
PL-30	M30.5 P0.5
PL-30-NL	M30.5 P0.5
PL-40	M40.5 P0.5
PL-40-NL	M40.5 P0.5
PL-46	M46.0 P0.75

Note: *-NL* models have a lock.

Light Control Films

■ Improves parallelism of light to reduce light diffraction.

Coaxial Lights



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

Brackets

■ Secures Light Units.

Bar Lights



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

Adapters

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

Ring Lights



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

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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