CREATING CUSTOMER SATISFACTION

High Power Strobe LED Light Units
LDR-PF-LA / LFV-PF Series

Realizes High-Speed and Accurate Inspection

Low-Angle Ring Lights Are Now Available NEW
Ultra-High Output Power Required for Dark Field Lighting

LDR-PF-LA Series

Brightness *1
31 X
That of Conventional Products

10 Million lx

Peak illuminance of LDR-PF-75SW-LA (Illuminating distance: 10 mm)

Expanded Line of Coaxial Lights Now Applicable to Large Workpieces

Brightness *2
26 X
That of Conventional Products

LFV-PF Series

3.7 Million lx

Peak illuminance of LFV-PF-100SW (Illuminating distance: 10 mm)

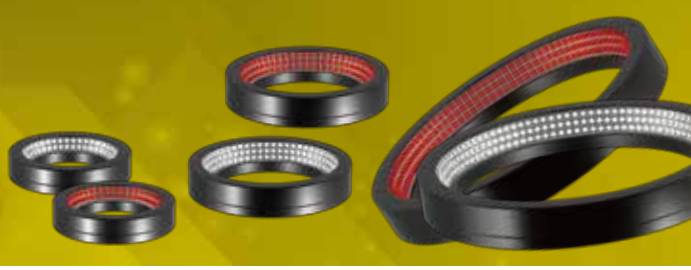
*1 Comparison of the peak radiances between the following pairs of products:
- Conventional LDR2-74SW2-LA Light Unit and the POD-series Overdrive Control Unit
- LDR-PF-75SW-LA and the Dedicated Control Unit

*2 Comparison of the peak irradiances between the following pairs of products:
- Conventional LFV3-100SW Light Unit and the POD-series Overdrive Control Unit
- LFV-PF-100SW and the Dedicated Control Unit

LIGHTING SOLUTION
CCS Inc.

High Power Strobe　Low-Angle Ring Lights

LDR-PF-LA NEW series

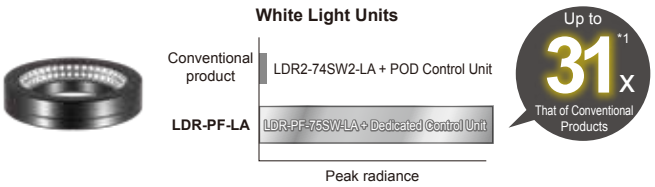


Making High-Speed Inspection Possible

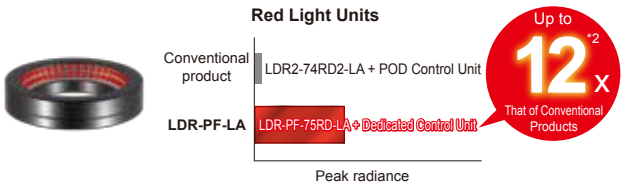
In order to speed up a production line, it is essential to improve the processing speed of the inspection system. Remarkably high brightness of the High Power Strobe Lights enables high-speed and accurate inspections.

Brightness Up to 31x That of Conventional Products

Comparison of the Peak Radiance



*1 Comparison of the peak radiances between the following pairs of products:
- Conventional LDR2-74SW2-LA Light Unit and the POD-series Overdrive Control Unit
- LDR-PF-75SW-LA and the Dedicated Control Unit

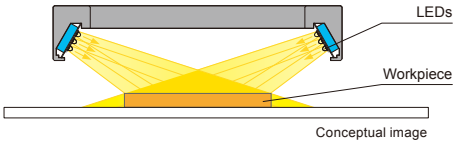


*2 Comparison of the peak radiances between the following pairs of products:
- Conventional LDR2-74RD2-LA Light Unit and the POD-series Overdrive Control Unit
- LDR-PF-75RD-LA and the Dedicated Control Unit

The data current as of July 2018. Comparison using our measurement conditions. The data included is for reference only. Actual values may vary.

High Power Direct-Light from a Low Angle

Effective for edge detection and observing shallow scratches on the surface of a workpiece. Extremely strong direct-light from the LDR-PF-LA-series Light Unit enables you to capture the irregularities of the workpiece.



Imaging Glass Scratches

Extremely strong light from a low angle is also applicable to dark field illumination.
This is well-suited for imaging shallow scratches on the glass surface.

LDR2-100SW2-LA + POD Control Unit

It is difficult to capture the scratch with a combination of conventional Light Unit and Overdrive Control Unit.

LDR-PF-100SW-LA + Dedicated Control Unit

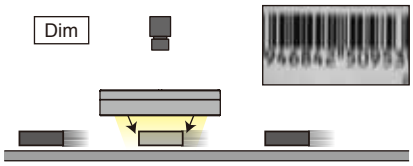
Extremely strong strobe light makes it possible to clearly highlight the scratch.

Imaging Conditions
FOV: 30 mm, Shutter speed:1/18000 s, f-stop: F16, Strobe time: 31 µs, Light intensity: Maximum

Short Exposure Time

Conventional Products

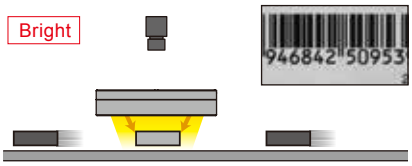
Long exposure time due to lack of brightness leads to image blurring.



Difficult to increase inspection speed.

LDR-PF-LA Series

High brightness allows for short exposure time and reduces blur.

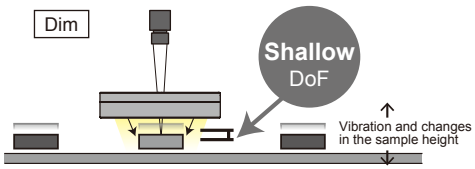


Inspection speed can be increased.

Depth of Field

Conventional Products

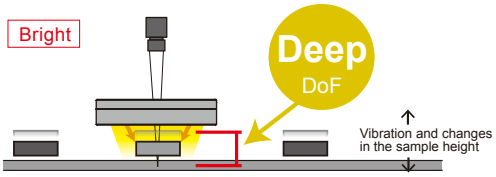
Wide lens aperture due to lack of brightness leads to decrease in the depth of field.



It is difficult to detect edges and observe shallow scratches. Vibration and changes in the height of the workpiece affect the image.

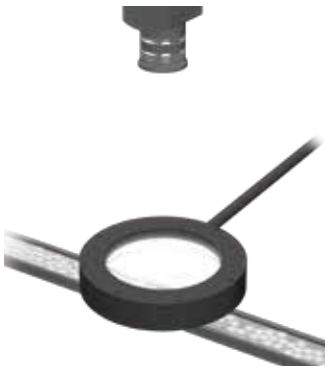
LDR-PF-LA Series

High brightness allows for small lens aperture and increases the depth of field.



Edges and shallow scratches are clearly imaged. Vibration and changes in the height of the workpiece will not affect the image.

Comparison of Images



Imaging the Appearance of Medicine Tablets with Imprinted Text

Workpiece

LDR2-100SW2-LA +
POD Control Unit

It is difficult to capture the workpiece with a combination of conventional Light Unit and Overdrive Control Unit.

LDR-PF-100SW-LA +
Dedicated Control Unit

Extremely strong strobe light allows you to capture the workpiece.

Imaging Conditions
FOV: 30 mm, Shutter speed:1/18000 s, f-stop: F22, Strobe time: 31 µs, Light intensity: Maximum

Application Examples

Inspection for engravings, damage, or stains on metal surfaces; edge detection; appearance inspection of medicine; inspection for foreign material mixed with medicine; inspection for scratches on glass surface; etc.

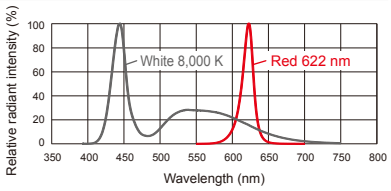
Product Lineup

LDR-PF-75RD-LA / SW-LA

LDR-PF-100RD-LA / SW-LA

LDR-PF-150RD-LA / SW-LA

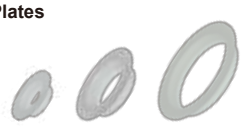
Light Unit Specifications

Model name	LED color	Peak current	Peak wavelength / correlated color temperature	Optional accessories	Extension cables	Dedicated Control Units	Weight	Light spectrum
LDR-PF-75RD-LA	Red	16.2 A	622 nm	Diffusion Plate Mounting Adapter	FCB-PF Straight Cable (Dedicated cable)	PF-A4048-2 PF-A16048-4	125 g	
LDR-PF-75SW-LA	White		8,000 K					
LDR-PF-100RD-LA	Red	28.8 A	622 nm		FCB-PF-EL9 Straight Cable (Dedicated cable)		200 g	
LDR-PF-100SW-LA	White		8,000 K					
LDR-PF-150RD-LA	Red	42.0 A	622 nm				350 g	
LDR-PF-150SW-LA	White		8,000 K					

The data included is for reference only. Actual values may vary.

Optional Accessories (Sold Separately)

Diffusion Plates



Reduces glare, especially problematic in the imaging of glossy workpiece.

Model name	Applicable Light Unit (Common for all colors)
DF-LDR-PF-75-LA	LDR-PF-75-LA
DF-LDR-PF-100-LA	LDR-PF-100-LA
DF-LDR-PF-150-LA	LDR-PF-150-LA

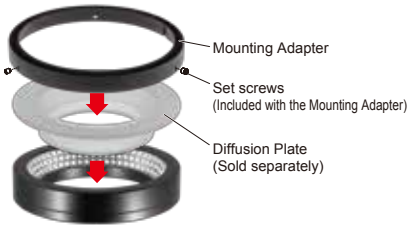
Use a Mounting Adapter to install the Diffusion Plate.

Mounting Adapters

Necessary for mounting a Diffusion Plate on the Light Unit.

Model name	Applicable Light Unit (Common for all colors)
AD-LDR-PF-75-LA	LDR-PF-75-LA
AD-LDR-PF-100-LA	LDR-PF-100-LA
AD-LDR-PF-150-LA	LDR-PF-150-LA

Installing the Diffusion Plate

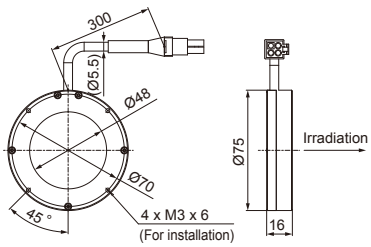


Periodically inspect optional accessories such as polarizing and diffusion plates as all of these are consumables. Replace any parts that show discoloration or deformation during inspection. CCS recommends maintaining extra optional accessories on-hand in order to be prepared for replacement.

Dimensions

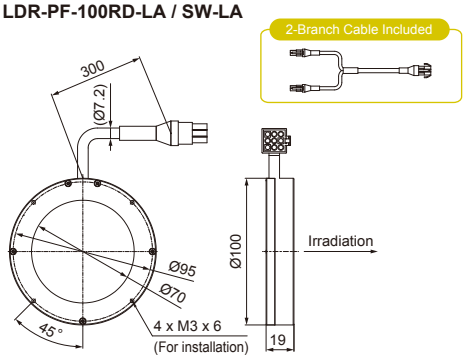
(mm)

LDR-PF-75RD-LA / SW-LA



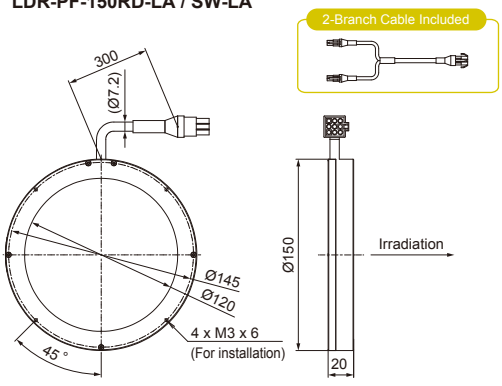
Cable permitted bending radius: 22 mm

LDR-PF-100RD-LA / SW-LA



Cable permitted bending radius: 43.2 mm

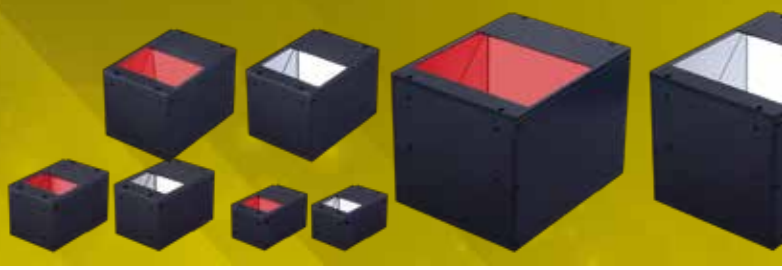
LDR-PF-150RD-LA / SW-LA



Cable permitted bending radius: 43.2 mm

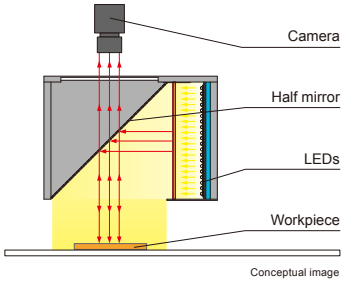
High Power Strobe Coaxial Lights

LFV-PF series



Expanded Line of the Coaxial Lights LFV-PF Series

Illuminating Mechanism of LFV-PF-100



Conceptual image

Diffused light from the LEDs is reflected on the half mirror and directed vertically downward on the same axis as the camera axis. This evenly illuminates glossy surfaces and mirrors so that the irregularities of the workpiece will be highlighted in the image.

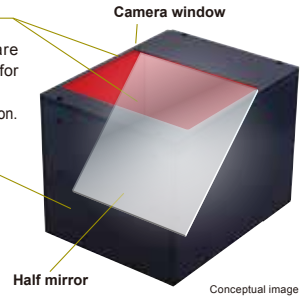
Structure of the LFV-PF Series

Optical glass

The camera window and half mirror are made of optical glass that is also used for laser light source interferometry.
Surface roughness of 0.3 µm in our evaluation.

Aluminum alloy case

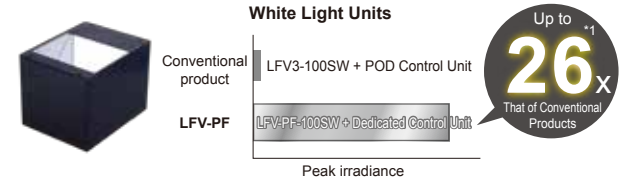
Achieved excellent heat dissipation and robustness.



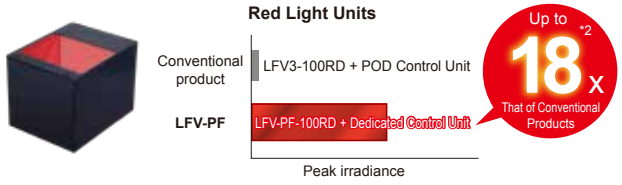
Conceptual image

Brightness Up to 26x That of Conventional Products

Comparison of the Peak Irradiances



*1 Comparison of the peak irradiances between the following pairs of products:
- Conventional LFV3-100SW Light Unit and the POD-series Overdrive Control Unit
- LFV-PF-100SW and the Dedicated Control Unit



*2 Comparison of the peak irradiances between the following pairs of products:
- Conventional LFV3-100RD Light Unit and the POD-series Overdrive Control Unit
- LFV-PF-100RD and the Dedicated Control Unit

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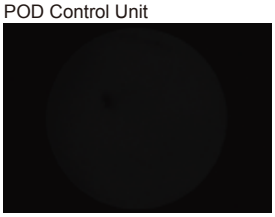
Comparison of Images

Appearance Inspection of Cans

Workpiece

LFV3-100SW + POD Control Unit



Insufficient brightness of the conventional Light Unit makes it difficult to capture the workpiece.

LFV-PF-100SW + Dedicated Control Unit

High brightness of High Power Strobe Light allows you to capture the workpiece.

Imaging Conditions
FOV: 85 mm, Shutter speed:1/18000 s, f-stop: F16, Strobe time: 31 µs, Light intensity: Maximum

Application Examples

Inspection for fault, damage, scratches, engravings, or dents on glossy surfaces or mirrors; appearance inspection of automobile components, beverage containers, and food; inspection for damage and dents on resin molded products; etc.

Product Lineup

Two New Sizes Are Now Available. Large Sizes Offering a Wide Field of View.

LFV-PF-35RD / SW

Popular

LFV-PF-50RD / SW

Popular

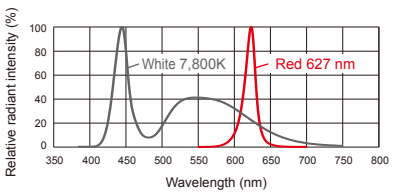
LFV-PF-70RD / SW

New Size Available

LFV-PF-100RD / SW

New Size Available

Light Unit Specifications

Model name	LED color	Peak current	Peak wavelength / correlated color temperature	Optional accessories	Extension cables	Dedicated Control Units	Weight	Light spectrum
LFV-PF-35RD	Red	10.8 A	627 nm	Diffusion Plate Polarizing Plate Light Control Film	FCB-PF Straight Cable (Dedicated cable)	PF-A4048-2 PF-A16048-4	230 g	
LFV-PF-35SW	White	14.4 A	7,800 K					
LFV-PF-50RD	Red	18 A	627 nm				400 g	
LFV-PF-50SW	White	21.6 A	7,800 K					
LFV-PF-70RD	Red	37.8 A	627 nm		FCB-PF-EL9 Straight Cable (Dedicated cable)		800 g	
LFV-PF-70SW	White	37.8 A	7,800 K					
LFV-PF-100RD	Red	48.6 A*1	627 nm			PF-A16048-4	1,400 g	
LFV-PF-100SW	White	64.8 A*2	7,800 K					

*1 L1 connector: 25.2 A, L2 connector: 23.4 A
*2 L1 connector: 32.4 A, L2 connector: 32.4 A

The data included is for reference only. Actual values may vary.

Optional Accessories (Sold Separately)

Diffusion Plates

Light Color Type
Transmission: High
Factory-installed

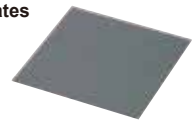
Deep Color Type
Transmission: Low
End of the model name: -UF

Replace the factory-installed Diffusion Plate if you want to change the transmission.
For the LFV-PF-70/100 Light Units, you can adjust the position of the Diffusion Plate.

Model name	Applicable Light Unit (Common for all colors)
DF-LFV3-35	LFV-PF-35
DF-LFV3-50	LFV-PF-50
DF-LFV3-70	LFV-PF-70
DF-LFV3-100	LFV-PF-100

Model name	Applicable Light Unit (Common for all colors)
DF-LFV3-35-UF	LFV-PF-35
DF-LFV3-50-UF	LFV-PF-50
DF-LFV3-70-UF	LFV-PF-70
DF-LFV3-100-UF	LFV-PF-100

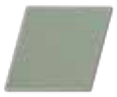
Polarizing Plates



Reduces glare when used in combination with a polarizing filter on the camera.

Model name	Applicable Light Unit (Common for all colors)
PL-LFV3-35	LFV-PF-35
PL-LFV3-50	LFV-PF-50
PL-LFV3-70	LFV-PF-70
PL-LFV3-100	LFV-PF-100

Light Control Films



Improves parallelism of light to reduce light diffraction so that the outline of the workpiece will be clearly imaged in the appearance inspection.

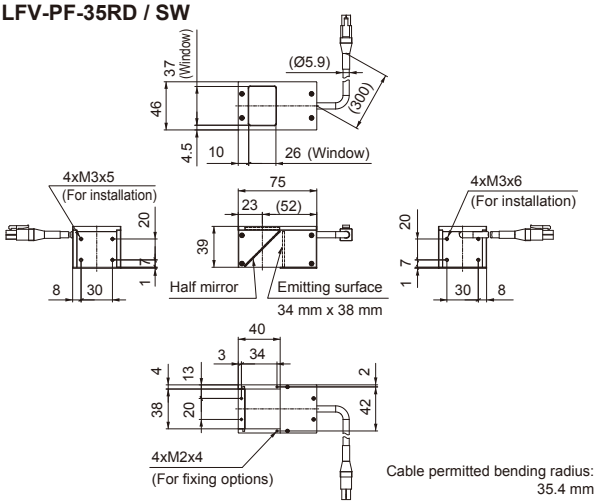
Model name	Applicable Light Unit (Common for all colors)
LC-LFV3-35	LFV-PF-35
LC-LFV3-50	LFV-PF-50
LC-LFV3-70	LFV-PF-70
LC-LFV3-100	LFV-PF-100

Periodically inspect optional accessories such as polarizing and diffusion plates as all of these are consumables. Replace any parts that show discoloration or deformation during inspection. CCS recommends maintaining extra optional accessories on-hand in order to be prepared for replacement.

Dimensions

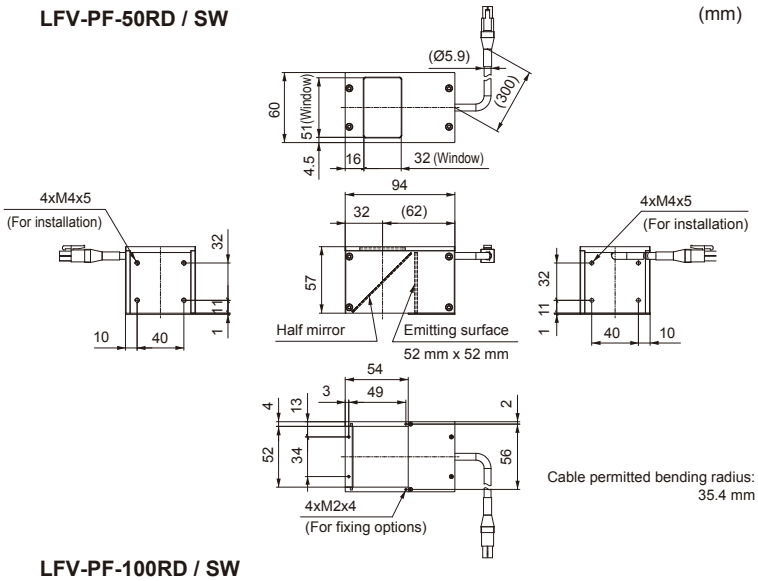
(mm)

LFV-PF-35RD / SW



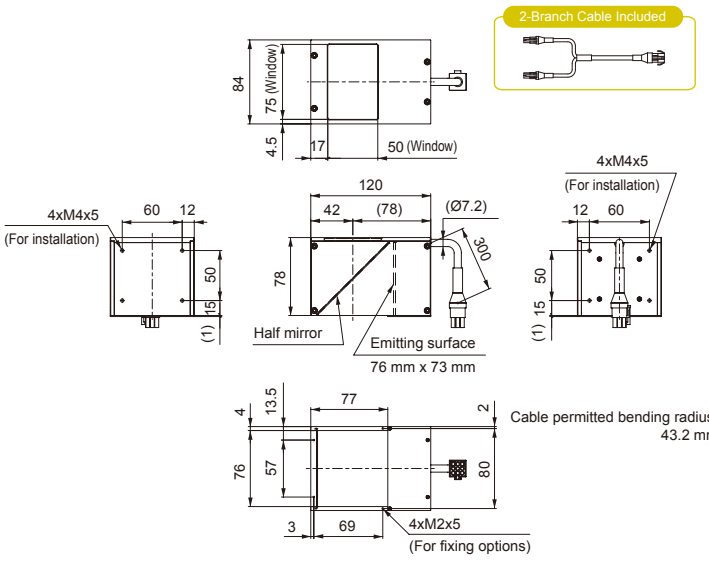
Cable permitted bending radius: 35.4 mm

LFV-PF-50RD / SW



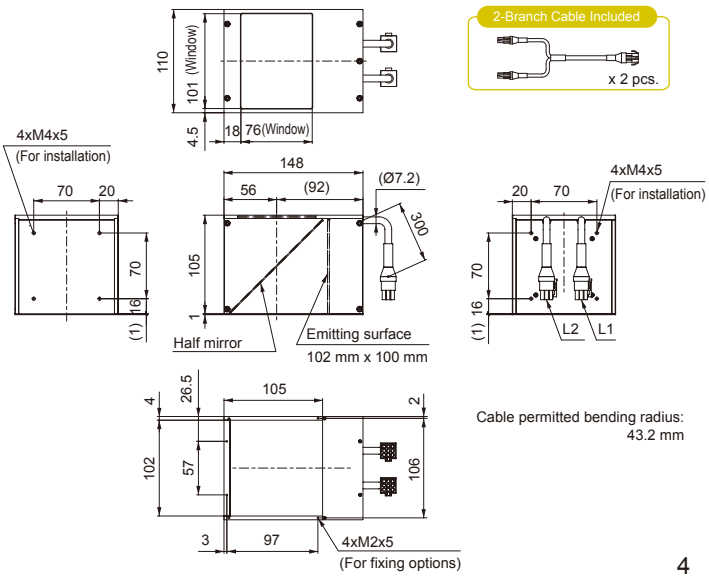
Cable permitted bending radius: 35.4 mm

LFV-PF-70RD / SW



Cable permitted bending radius: 43.2 mm

LFV-PF-100RD / SW

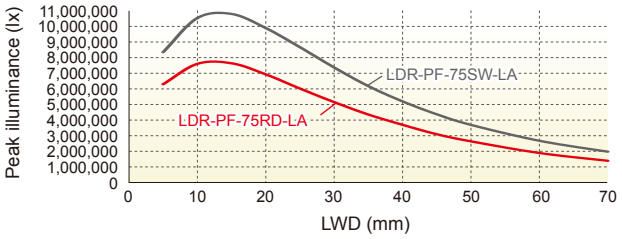


Cable permitted bending radius: 43.2 mm

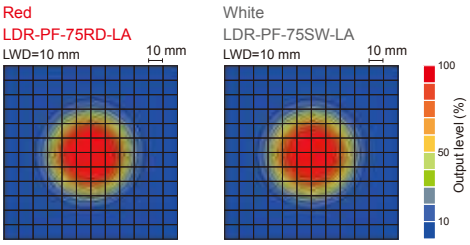
Low-Angle Ring Lights LDR-PF-LA Series

LDR-PF-75RD-LA / SW-LA

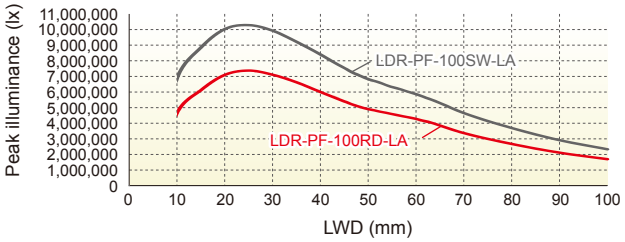
LWD Characteristics

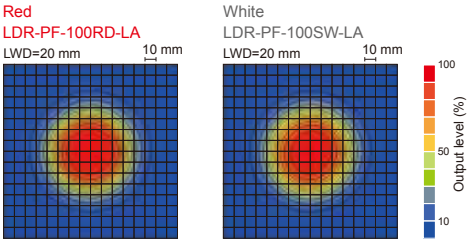


Uniformity

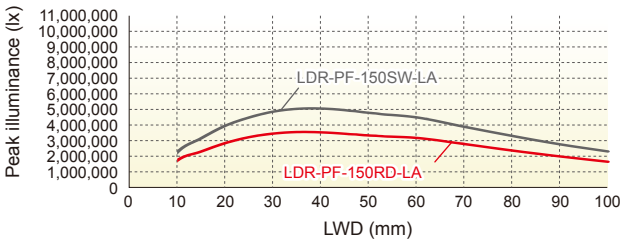


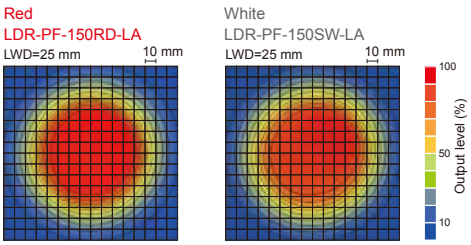
LDR-PF-100RD-LA / SW-LA





LDR-PF-150RD-LA / SW-LA



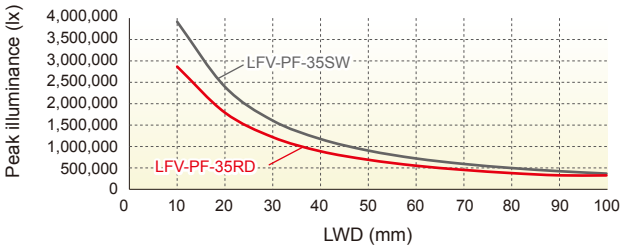


The data included is for reference only. Actual values may vary.

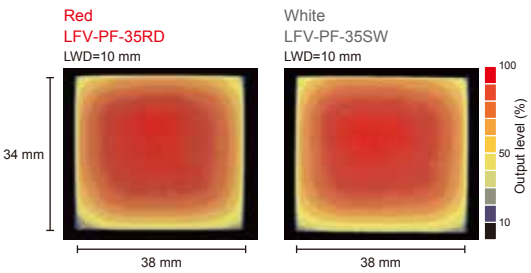
Coaxial Lights LFV-PF Series

LFV-PF-35RD / SW

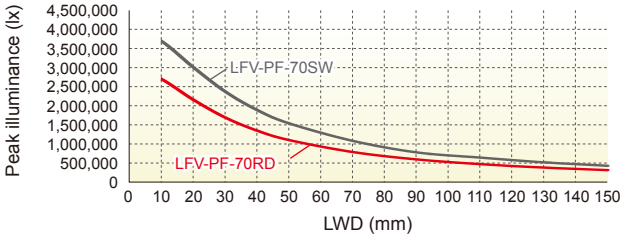
LWD Characteristics

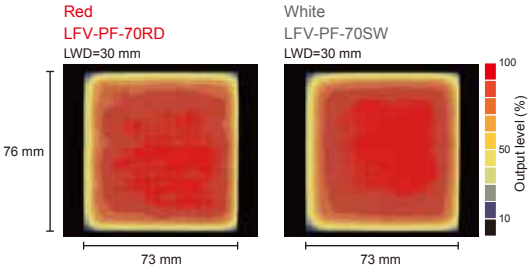


Uniformity

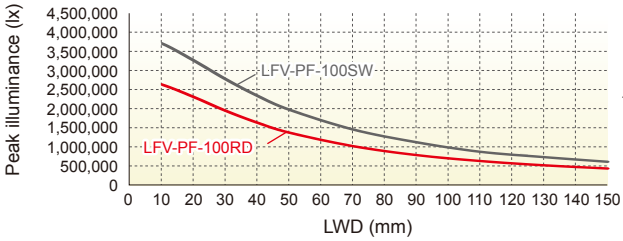


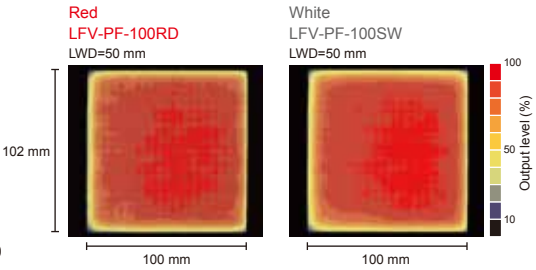
LFV-PF-70RD / SW





LFV-PF-100RD / SW





The data included is for reference only. Actual values may vary.

Maximize the Performance of High Power Strobe Light Units

PF-A4048-2 (2 channels)

- Light intensity: 512 levels
- Strobe time: 1 to 100 µs
- Lighting delay: 0 to 100 µs (in steps of 0.1 µs)
- Compatible with Ethernet and parallel communications
- Selectable light intensity ranges, etc.

PF-A16048-4 (4 channels)

- Light intensity: 512 levels
- Strobe time: 1 to 500 µs*
- Lighting delay: 0 to 100 µs (in steps of 0.1 µs)
- Compatible with Ethernet and parallel communications
- Selectable light intensity ranges
- Trigger link, etc.

  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.

* For the detailed information, refer to the note on the specification table below.

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*1	PF-A4048-2	L1: 2, L2: 1	
	PF-A16048-4	L1: 2, L2: 2, L3: 2, L4: 2	
Applicable Light Units	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	PF-A4048-2: 1 to 100 µs (in steps of 0.1 µs) PF-A16048-4: 1 to 500 µs*2
	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 µs (in steps of 0.1 µs)
	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.)	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 MΩ 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 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

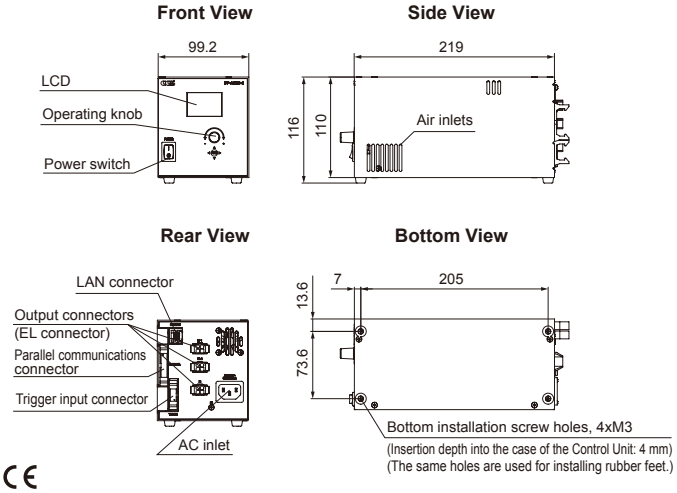
*1 The Light Units connected to the connectors on the same channel behave in the same way.

*2 For Ethernet communications: 1 to 100 µs (in steps of 0.1 µs), 100.5 to 500 µs (in steps of 0.5 µs)
For parallel communications: Low strobe time range (1 to 100 µs, in steps of 0.1 µs), High strobe time range (5 to 500 µs, in steps of 0.5 µs)

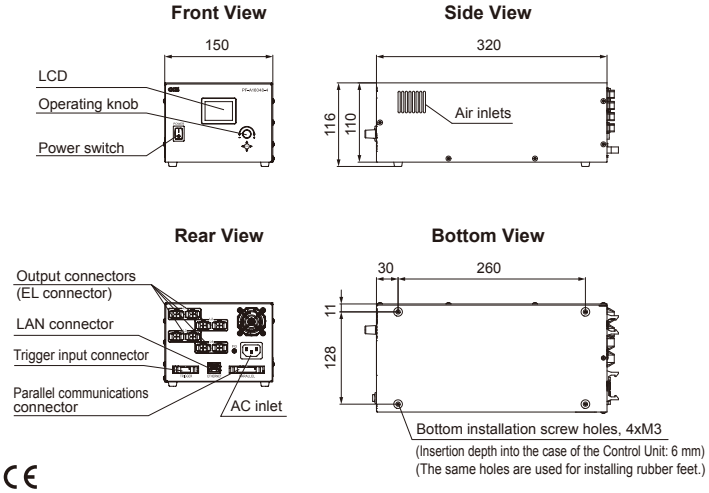
Dimensions

(mm)

PF-A4048-2



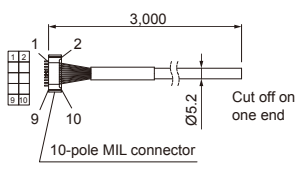
PF-A16048-4



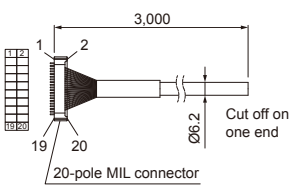
Optional Accessories (Sold Separately)

(mm)

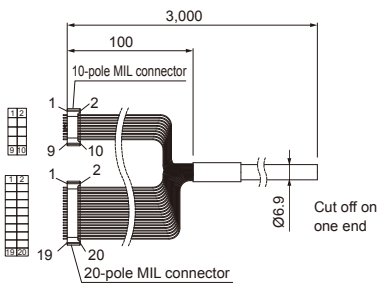
Trigger Input Cable EXCB2-M10-3



Parallel Communications Cable EXCB2-M20-3



Parallel Communications and Trigger Input Branch Cable EXCB2-M10M20-3



Product Lineup of High Power Strobe Light Units

Covering a Wide Range of Uses with Various Types of Lights

Ring Lights
LDR-PF Series

Popular

3 sizes and 6 models

Ring Lights for Diffused Lighting
HPR-PF Series

Popular

4 sizes and 8 models

Bar Lights
LDL-PF Series

Popular

6 sizes and 12 models

Dome Lights
HPD-PF Series

Popular

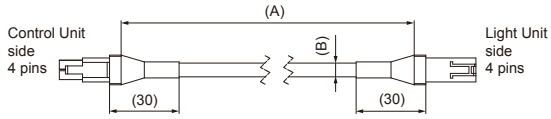
4 sizes and 8 models

Optional Accessories (Sold Separately)

Dedicated Extension Cables

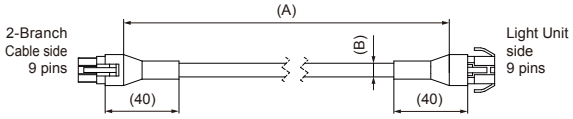
(mm)

Applicable models: LDR-PF-75-LA and LFV-PF-35/50 series



Model name	Dimension A	Dimension B	Permitted bending radius*	Weight
FCB-1-PF	1 m	Ø5.9	35.4 mm	100 g
FCB-2-PF	2 m			150 g
FCB-3-PF	3 m			200 g
FCB-5-PF	5 m	Ø7.0	42.0 mm	450 g

Applicable models: LDR-PF-100-LA / 150-LA and LFV-PF-70/100 series

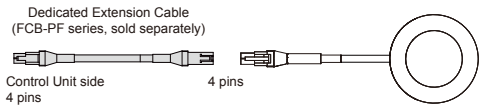


Model name	Dimension A	Dimension B	Permitted bending radius*	Weight
FCB-1-PF-EL9	1 m	Ø7.4	44.4 mm	100 g
FCB-2-PF-EL9	2 m			190 g
FCB-3-PF-EL9	3 m			270 g
FCB-5-PF-EL9	5 m	Ø9.1	54.6 mm	680 g

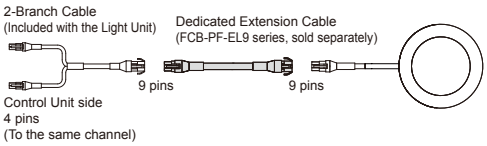
* These cable permitted bending radii are for reference only. Actual values may vary.

How to Connect the Extension Cables

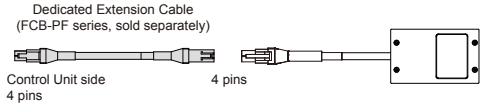
For LDR-PF-75-LA



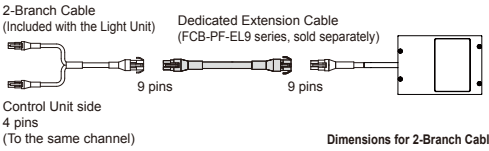
For LDR-PF-100-LA / LDR-PF-150-LA



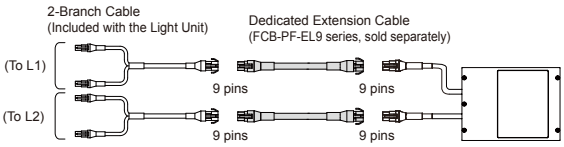
For LFV-PF-35 / LFV-PF-50



For LFV-PF-70

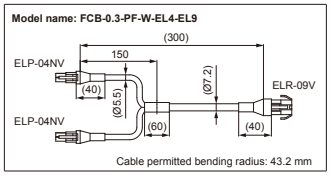


For LFV-PF-100



PF-A16048-4 Control Unit side, 4 pins

Dimensions for 2-Branch Cable (Included with the Light Unit)



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 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. The sample workpieces used in this brochure have been processed specifically for sample imaging. They are not intended to represent product quality and performance.

CCS Inc.

For information on your nearest CCS office, refer to our website.
https://www.ccs-grp.com/office/

Headquarters (Kyoto, Japan)
TEL: +81-75-415-8284, FAX: +81-75-415-8278
E-mail: sales@ccs-inc.co.jp
http://www.ccs-grp.com/

CCS America, Inc. (USA)
TEL: +1-781-272-6900, FAX: +1-781-272-6902
Email: info@ccsamerica.com
http://www.ccsamerica.com/

CCS Europe N. V. (Belgium)
TEL: +32-(0)2-333-0080, FAX: +32-(0)2-333-0081
Email: info@ccseu.com

CCS Asia PTE. LTD. (Singapore)
TEL: +65-6363-1180, FAX: +65-6363-1236
Email: sales@ccs-asia.com.sg
http://www.ccs-asia.com.sg/

CCS China Inc. (Shenzhen)
TEL: +86-755-8279-0477, FAX: +86-755-8279-0478
Email: ccschina@ccs-inc.co.jp
http://www.ccs-inc.cn/

Taiwan Office
TEL: +886-2-2581-7676, FAX: +886-2-2581-7662
Email: taiwan-tr@ccs-inc.co.jp

Korea Office
Email: ccskorea@ccs-inc.co.jp

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