

# LFXV-PF Series Instruction Guide



Thank you for purchasing a CCS product. To ensure proper use of the product, please read this instruction guide before use and keep it for your future reference.

## 1 Important Information for Equipment Safety - Read Before Use -

These products have been designed with full consideration of safety. However, incorrect usage of the products may result in fire, electric shock, or other serious damages. Please ensure to follow the conditions below.

The following symbols are used in this instruction guide to indicate and classify the relative importance of warnings and cautions.

	<b>Warning</b> Indicates that incorrect usage may result in serious injury or death.		<b>Caution</b> Indicates that incorrect usage may result in injury or property damage.
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The following symbols in the Instruction Guide indicate and classify the precautions.

 These symbols indicate prohibited actions.	 This symbol indicates required actions.
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<b>Warning</b>	
Do not disassemble or modify the Light Unit. Doing so may result in fire or electric shock.	LED light radiation may cause corneal or retinal abnormalities if you look directly at the light. To prevent harmful light exposure, never look directly at the LED light.
Do not touch the Light Unit with wet hands. Doing so may result in electric shock.	To use the Light Unit, connect it to a High Power Strobe Control Unit from CCS. Using any power supply other than a High Power Strobe Control Unit may result in fire or Light Unit failure.
Make sure that the Light Unit is free of moisture or any liquid. Exposure to water may result in fire or electric shock.	Connect or disconnect the light cable only after turning off the High Power Strobe Control Unit. Failure to do so may result in circuit damage, fire caused by a minute spark, or electric shock.
These Light Units generate high temperatures. Do not touch the Light Unit while it is turned on or immediately after it is turned off, or burning may result. Provide cooling with a fan or other ventilation if the Light Unit is to be used in a closed space.	If abnormal condition occurs such as fuming, heat, smell, noise, or so on, stop using the Light Unit immediately, turn OFF the Control Unit and unplug the power cord. A fire or electric shock may result if the Light Unit is kept used.

<b>Caution</b>	
Do not use user-made cables. Doing so may cause Light Unit failure. Use the CCS extension cable if it is necessary to extend the distance between the Light Unit and the Control Unit.	Do not drop the Light Unit or subject it to impact. Doing so may cause the Light Unit to malfunction.
Be careful of static electricity. Damage to the LED light may occur, if a person charged with static electricity touches it. Keep the Light Unit away from all items charged with static electricity.	Use the High Power Strobe Extension Cables (5 m or shorter). However, if the cable is too long, the light intensity will decrease due to voltage drop caused by the DC resistance of the cable.

Do not use the Light Unit in the following situations.

- Under conditions or in an environment not described in this instruction guide.
- In nuclear energy control systems, railroad systems, aviation systems, vehicles, combustion equipment, medical equipment, amusement machines, or safety equipment.
- In applications involving serious risk to life or property, particularly applications demanding a high level of safety.

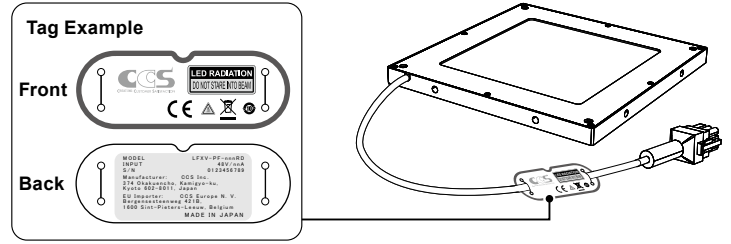
Please install the Light Unit to locations with following conditions.

Incorrect installation location may cause Light Unit failure.

- In a flat and stable location with minimal vibration.
- Well-ventilated places with minimal dust.
- Places that are not subject to sudden temperature changes.
- Places free from any water, oil, liquid, chemical, or steam.
- Places free from corrosive or combustible gas.
- Places away from water faucets, boilers, humidifiers, air conditioners, heaters, or stoves.

## 2 Confirming Product Information

The following tag is attached to the cable on the LED Light. The color of the label indicates the luminescence color of the Light Unit. The back of the tag there is a name label that gives the model number, peak current, and serial number. Be sure to check the contents before using the Light Unit and handle the label with care. If the label is missing or damaged and the contents cannot be checked, please contact CCS Inc.



## 3 Features

This Light Unit has both dome illumination and coaxial illumination characteristics. To obtain the optimum images, refer to the following.

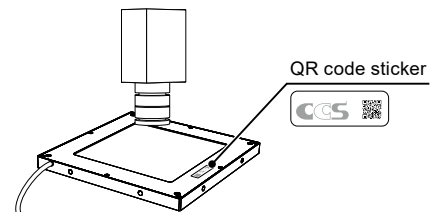
<b>Characteristics for Dome Illumination</b> Use of diffused light eliminates shadows in curved surfaces or parts.	<b>Characteristics for Coaxial Illumination</b> Highly reflective surface is uniformly illuminated.
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## Recommended Applications

Category	Recommendation	Application
Visual inspection	Optimal	Inspecting the appearance of curved, irregular, or flat glossy objects (detecting scratches, dirt, scorching, breaking, or chipping, distinguishing different shapes and presence/absence, inspecting surface conditions)
Character recognition	Suitable	Character recognition on glossy objects. Bar codes and 2-dimensional codes.
Measurement	Usable	Dimensional measurement

## 4 Installation

This Light Unit has two faces. The surface affixed with a QR code sticker must face the camera when you install the Light Unit. Also, these two surfaces are identified by the difference in the position of the screws. For information on the dimensions of each part, refer to 9. Dimensions.



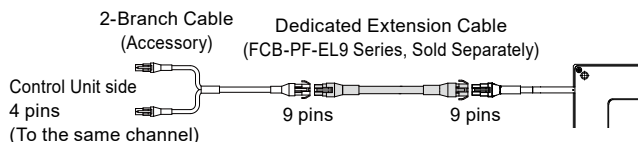
## 5 Operating Instructions



Make sure that the High Power Strobe Control Unit is turned OFF before you connect the Light Unit.

### 1 Connect the light cables to a High Power Strobe Control Unit.

- Connect the light cable to a High Power Strobe Control Unit. The High Power Strobe Control Unit must be equipped with **ELR-04NV** connectors for power output.
- Use a 2-branch cable that comes with the Light Unit and connect the Light Unit and a High Power Strobe Control Unit. Connect both of the 4-pin connectors of the 2-branch cable to the output connectors that supply power on the same channel of a Control Unit. For example, connect the 4-pin connectors to the L1-1 and L1-2 output connectors on a PF-A4048-2 Control Unit.



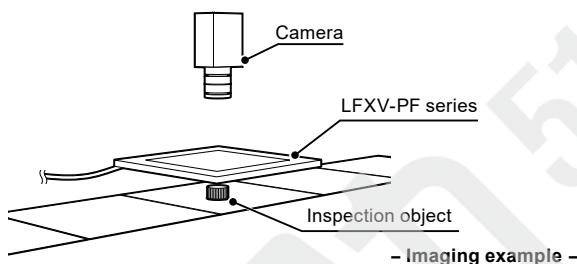
#### Warning

Make sure to connect both of the 4-pin connectors of the 2-branch cable that comes with the Light Unit to the output connectors that supply power on the same channel of a Control Unit. Connecting the 4-pin connectors to the output connectors that supply power on the different channels may result in fire or High Power Strobe Control Unit failure.

- Insert the plug all the way into the connector.
- Dedicated Extension Cables are optionally available for the Light Units. For details, refer to 7. *Dedicated Extension Cables FCB-PF-EL9 Series (Sold Separately)*.

### 2 Turn ON the High Power Strobe Control Unit, and then turn ON the Light Unit.

### 3 Adjust the illuminating distance and radiant quantity to optimize images.



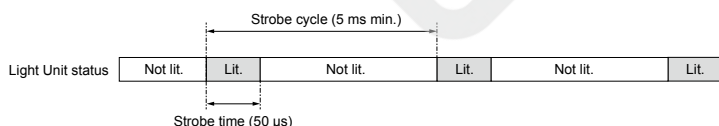
- Imaging example -



#### Warning

Use the Light Unit within the lighting conditions (maximum strobe time and maximum duty cycle\*). Exceeding the lighting conditions, such as performing continuous lighting using a power supply other than a High Power Strobe Control Unit, may result in fire or Light Unit failure. For the lighting conditions, refer to 8. *Main Specifications*.

- \* The duty cycle is the strobe operation ratio expressed by the following equation:  
 Duty cycle (%) = 100 X Strobe time / Strobe cycle  
 For example, if you want to restrict the duty cycle to 1% or less when the strobe time is 50 μs, you must make the Light Unit flash with a cycle of 5 ms or longer.



## To Obtain the Optimal Image

- When the ambient light is reflected from the surface of the Light Unit or the surface of the inspection object, the captured image may be affected.

#### Methods for preventing the effects of ambient light

- Prevent ambient light from entering with a hood or the like.
- If using red light, equip a Sharp-cut Filter to the lens.
- Increase the camera's shutter speed. (Increase the Light Unit intensity somewhat.)

- Dirt or dust on the surface of the Light Unit may affect the captured image.

#### Dirt and dust removal methods

- Handle the Light Unit with care. Make sure no dirt, dust, or fingerprints get on the Light Unit.
- Remove dirt and dust by blowing air rather than by hand.
- Use a soft, finely woven cloth to wipe away any marks such as fingerprints.
- Use diluted neutral detergent to remove any heavy dirt. Do not use chemicals such as alcohol for the emitting surface.

## 5 Operating Instructions (Continued)

- Image irregularities and moire\* may occur due to the dot pattern on the light-guiding diffusion plate.

\* moire: A periodic stripe pattern made as a result of mutual interference between the geometric dot pattern of the Light Unit and the pixel pattern of the light receiving element in the camera.

#### How to decrease image irregularities and luminescent spots caused by the dots

- Open the lens somewhat wider than the normal.
- Match the focus to the target inspection object.
- Adjust the position of the Light Unit (set outside of the depth of field).
- Adjust the Light Unit intensity (prevent reflection and glare).
- If there is too much light, increase the camera's shutter speed.

Luminescent spots may result from foreign matter contained in the light-guiding diffusion plate, but these are within the CCS inspection range and do not constitute a malfunction.

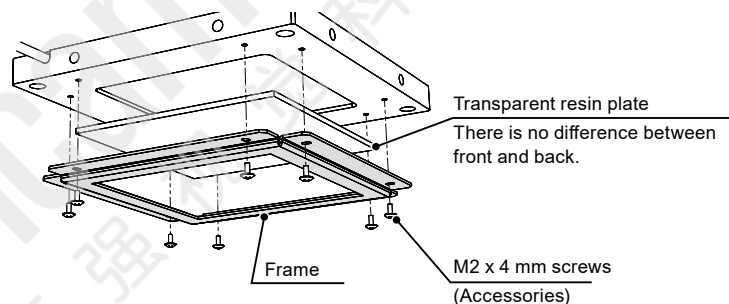
## 6 Optional Accessories (Sold Separately)

The following products are available for the LFXV-PF-series Light Units. Obtain the required product.

#### Protective Plate PR-LFXV Series

Protects the light-guiding diffusion plate of the Light Unit. It is not available to use this product for protection use from any damages caused by dust, water and etc.

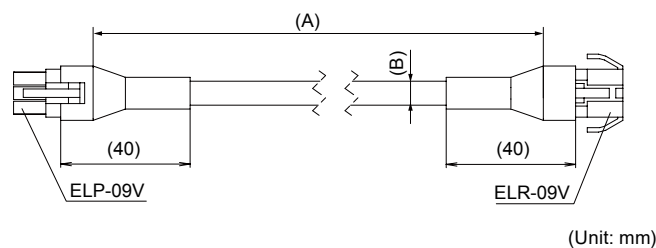
Model name	Applicable Light Units	Frame dimensions	Weight	Accessories
PR-LFXV-100	LFXV-PF-100 series	136 x 136 x 3.5 mm	60 g	M2 x 4 mm screws x 13 pcs.



## 7 Dedicated Extension Cables FCB-PF-EL9 Series (Sold Separately)

These extension cables are used for connecting the LFXV-PF-100-series Light Unit and the High Power Strobe Control Unit.

#### FCB-1-PF-EL9 / 2-PF-EL9 / 3-PF-EL9 / 5-PF-EL9



(Unit: mm)

Model name	FCB-1-PF-EL9	FCB-2-PF-EL9	FCB-3-PF-EL9	FCB-5-PF-EL9
Dimension A	1,000	2,000	3,000	5,000
Dimension B	∅7.4	∅7.4	∅7.4	∅9.1
Weight	100 g max.	190 g max.	270 g max.	680 g max.
Permitted bending radius	44.4 mm	44.4 mm	44.4 mm	54.6 mm





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