



LUMINESCENT IMAGE ANALYZER

LAS-3000

OPERATION GUIDE

Introduction

Thank you for purchasing the FUJIFILM Luminescent Image Analyzer LAS-3000.

This guide is used for explanation of the equipment. Therefore, this guide simply describes each function and usage. Please see the Operation Manual for more detailed informations.

Index

1	Features of the Luminescent Image Analyzer	3
2	System Configuration and Parts Identification	3
3	Preparation for Exposure	6
1	Activation	6
2	Setting of Samples	6
4	Exposure of Samples (Lite mode)	7
1	Setting of Mode	7
2	Method and Tray position Setting	7
3	Adjustment of Focus	8
4	Exposure Type and Exposure Time Setting	8
5	Setting of Sensitivity	8
6	Exposure	9
7	Saving the Exposed Image	9
8	Printing the Exposed Image	10
9	Termination	10
5	Exposure of Samples (Pro mode)	11
6	Cautions on Use	12
1	Sample Tray	12
Appendix		12
■	Exposure Type	12
■	Operation required to be carried out for exposure with green and red LED incident light sources (Optional)	13
■	Detection Sensitivity and Number of Pixels	14
■	Detection Reagents and Settings of LAS-3000	14

* In LAS-3000, the excitation light (incident/transmitted light), filter, lens, and the components of the analytic part vary depending on the system you are using. Please confirm each system. The basic system of "LAS-3000" is described in this Operation Guide.

1 Features of the Luminescent Image Analyzer

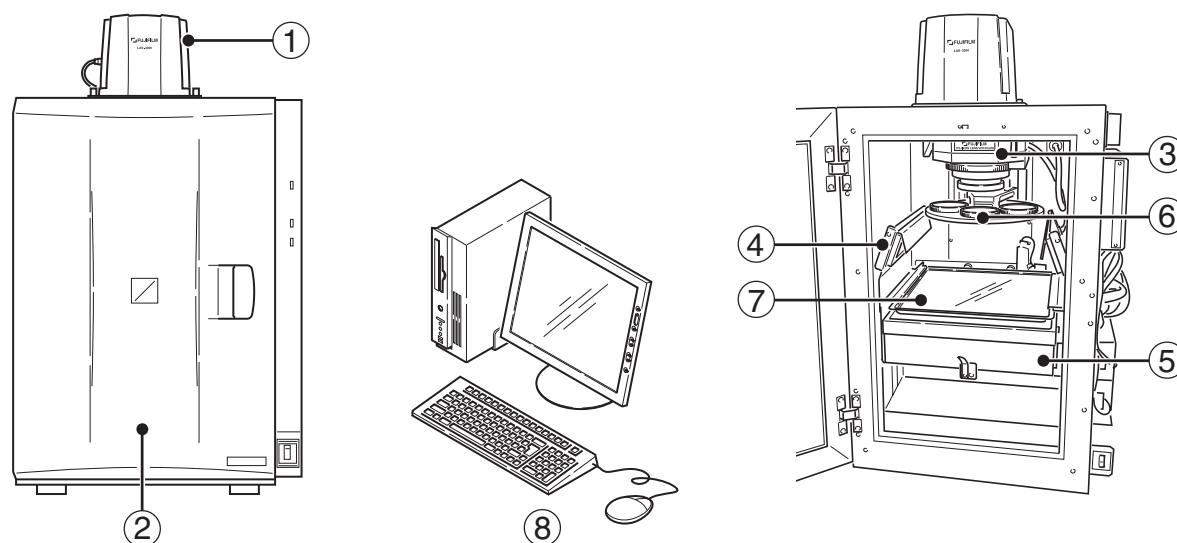
In LAS-3000, chemiluminescent and fluorescent samples can be detected in high sensitivity, Dark frame correction and Flat frame correction are equipped for the quantitative analysis of the images. A digitized image of stained gel, membrane or film can be obtained by white light illumination.

- A super CCD camera of 3,200,000 pixels is employed. A high-resolution image of 6,300,000 pixels is obtained by the special image processing procedure.
- A newly designed lens of F0.85 with remote focus and remote iris is mounted.
Chemiluminescence can be detected in high sensitivity through use of a four-step pixel binning function.
- Fluorescence can be detected in high sensitivity using a UV transmitted illuminator and incident blue LED.
- Wider range of fluorescent reagents can be detected by the use of green and red incident LEDs in addition to the blue one (Optional).
- The operability is remarkably improved by the newly designed Image Reader software.

2 System Configuration and Parts Identification

< System configuration of LAS-3000: An Example >

< Internal view of intelligent dark box (IDX) >



Name	Description
① Camera head	CCD cooling function and image data output USB port
② Intelligent dark box (IDX)	Dark box
③ Lens unit	F0.85/43mm
④ Incident light source	Blue LED (460nm) incident light sources White LED incident light sources Green LED (520nm) incident light sources (Optional) Red LED (630nm) incident light sources (Optional)
⑤ Transmitted light source	312nm UV light source or White transmitted light source

⑥ Filter	Y515Di (filter for blue LED) 605DF40 (EtBr detecting filter) 510DF10 (GFP detecting filter) 575DF20 (filter for green LED) (Optional) R670 (filter for red LED) (Optional)
⑦ Sample tray	EPI tray (for chemiluminescence and incident light source) DIA tray (for transmitted light source) NP tray (for titer plate) DIA-UV tray (for UV transmitted light source)
⑧ Computer	Exposure operation and analysis work
● Pictography	High quality digital color printer

Image Reader Software

The Image reader software consists of Lite and Pro modes. In the Lite mode, luminescence can be easily detected because a detection method has been set. In the Pro mode, advanced combination can be set.

< Screen in Lite mode >

Menu

- Exposure Type**
Sets the exposure method.
- Exposure Time**
Sets the exposure time.
- Sensitivity**
Sets the sensitivity.
- Image acquire & Digitize**
A digitized image is also exposed consecutively with a Chemiluminescence image (only when the method is Chemiluminescence).
- The setting state such as the temperature condition of CCD is displayed.
- The tray position and light conditions in the intelligent dark box (IDX) is displayed.

Pro mode selector button
Press this button to switch to the Pro mode.

Method/Tray position
Sets the detection method and tray position.

Focusing
Adjusts the focusing.

Start
Starts the exposure.

< Screen in Pro mode >

Menu

- Exposure Type**
Sets the exposure method.
- Exposure Time**
Sets the exposure time.
- Sensitivity/Resolution**
Sets the sensitivity and resolution.
- Invert Pixels**
Exposes the image whose concentration value is inverted.
- The setting state such as the temperature condition of CCD is displayed.
- The tray position and light conditions in the intelligent dark box (IDX) is displayed.

Lite mode selector button
Press this button to switch to the Lite mode.

Darkbox option setting
Sets the light source, filter, and tray position.


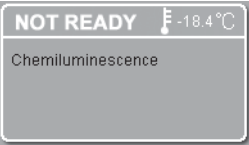
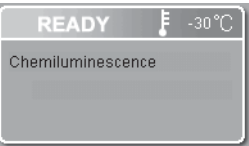
Focusing
Adjusts the focusing.

Start
Starts the exposure.

*Please use the Pro mode, in case of using green LED or red LED incident light source. Please use the Lite mode for imaging of chemiluminescence, digitizing, EtBr detection by UV light source, fluorescence detection by blue LED, using the preset conditions.

3 Preparation for Exposure

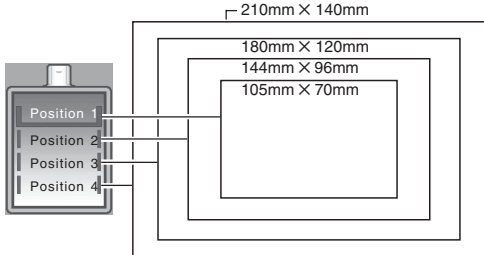
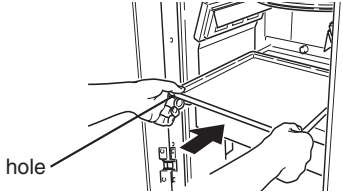
1 Activation

Step	Operation
1	Turn ON the power switches of IDX, computer and peripheral equipments.
2	Start up reading software LAS-3000 ImageReader. → A message is displayed until the LAS-3000 is prepared. 
3	Confirm that the temperature setting state of the CCD is ready. < Not Ready state >  < Ready state > 

- Tips**
- After a few minutes, the LAS-3000 will be able to be in readable state. In the readable state, only the power LED light is lit in green.
 - In the normal state, the cooling temperature of a CCD camera is set to -30°C .
 - Method/Tray position and Dark box option setting can be executed even if the temperature setting state of CCD is Not Ready. A sample can be set during the time required for the temperature change.

- Note**
- The power switches of the IDX and personal computer can be turned ON in any order. Turn ON the power of the pictography first when a pictography printer is connected by SCSI.
 - The ready state is entered when the cooling temperature is stabilized at -30.0°C .

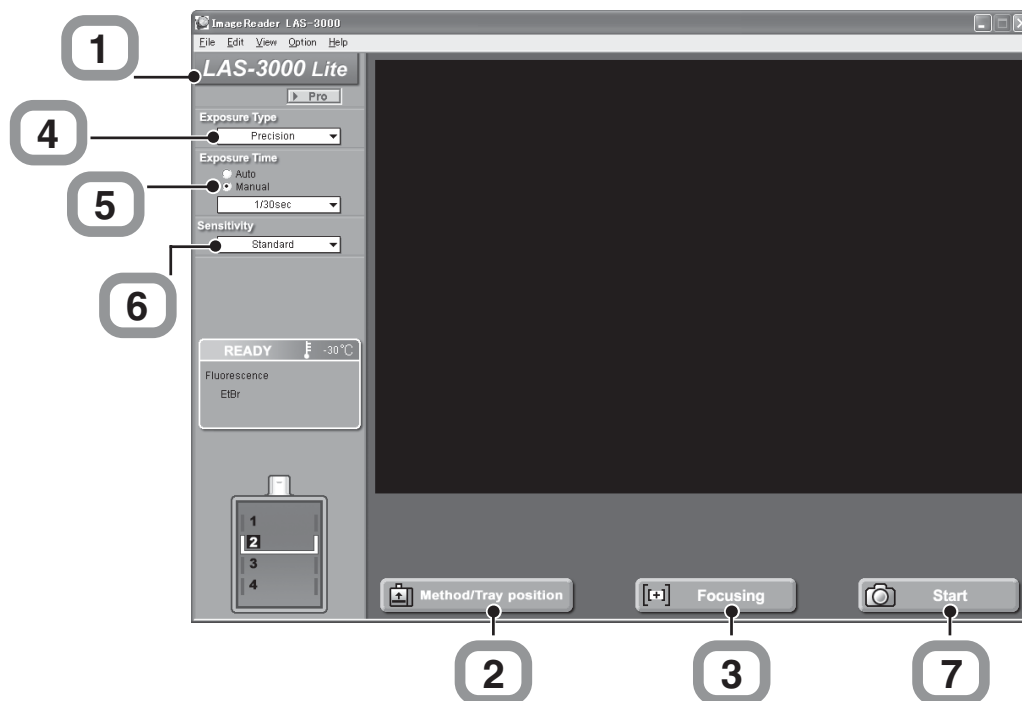
2 Setting of Samples

Step	Operation																		
1	Select a tray corresponding to the sample to be detected. <table border="1"> <thead> <tr> <th>Detection</th> <th>Samples</th> <th>Trays</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Chemiluminescence</td> <td>Membrane</td> <td>EPI tray</td> </tr> <tr> <td>Titer plate</td> <td>NP tray</td> </tr> <tr> <td rowspan="2">Fluorescence</td> <td>Gel (UV detection)</td> <td>DIA-UV tray</td> </tr> <tr> <td>Gel (LED detection)</td> <td>EPI tray</td> </tr> <tr> <td rowspan="2">Digitize</td> <td>Membrane</td> <td>EPI tray</td> </tr> <tr> <td>Gel (CBB, silver stain)</td> <td>DIA tray</td> </tr> </tbody> </table>	Detection	Samples	Trays	Chemiluminescence	Membrane	EPI tray	Titer plate	NP tray	Fluorescence	Gel (UV detection)	DIA-UV tray	Gel (LED detection)	EPI tray	Digitize	Membrane	EPI tray	Gel (CBB, silver stain)	DIA tray
Detection	Samples	Trays																	
Chemiluminescence	Membrane	EPI tray																	
	Titer plate	NP tray																	
Fluorescence	Gel (UV detection)	DIA-UV tray																	
	Gel (LED detection)	EPI tray																	
Digitize	Membrane	EPI tray																	
	Gel (CBB, silver stain)	DIA tray																	
2	Place a sample on the sample tray. The reading size varies depending on the tray position. Therefore, place the tray in the position corresponding to the sample size. < Reading size and tray position > (For EPI tray and DIA tray) 																		
3	Open the IDX door and set the tray. Set the EPI tray and the DIA tray with the holed side placed toward you. 																		
4	Close the IDX door.																		

- Tips**
- On the EPI tray, there are round dents for size adjustment for each tray position. Put a sample using the dent as reference.

4 Exposure of Samples (Lite mode) The light source and filter are set by the pre-determined combination.

*Please use the Lite mode for imaging of chemiluminescence, digitizing, EtBr detection by UV light source, fluorescence detection by blue LED, using the preset conditions. Please use the Pro mode, in case of using green LED or red LED incident light source. (See Page 11 of this Operation Guide)



1 Setting of Mode

Step	Operation
1	Confirm that the state is in the Lite mode.

2 Method and Tray position Setting

Click the Method/Tray position button.

(1) Select the Method.

Detection	Method
Chemiluminescence and bioluminescence	Chemiluminescence
Fluorescence using the UV light source (of 312 nm)	Fluorescence:EtBr
Fluorescence using blue LED incident light source (of 460 nm)	Fluorescence:SYBRGreen,GFP
Digitization using white incident light source	Digitize:EPI
Digitization using white transmitted light source	Digitize:DIA

(2) Select Tray Position according to the sample used.

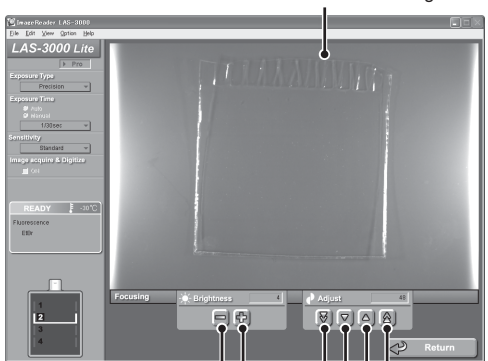
(3) Click the OK button.

* See Page 14 of this Operation Guide.

3 Adjustment of Focus

Click the Focusing button.

Click on the screen for Zooming.



3

The brightness of viewing becomes dark.

The brightness of viewing becomes light.

Adjusts the focus. Click these buttons to perform coarse adjustment.

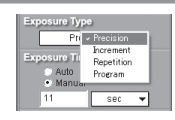
Performs precise focus adjustment.

Confirm the sample position and focus. Click the Return button.

Note The adjustment of brightness does not influence the actual exposure.

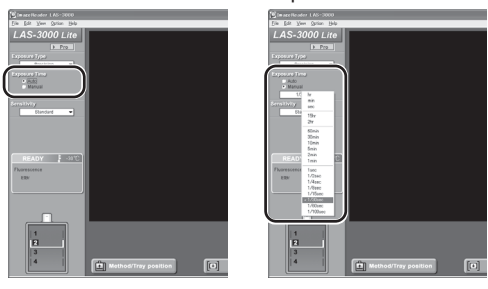
4 Exposure Type and Exposure Time Setting

Select Precision for Exposure Type.



4

Check Auto or Manual for Exposure Time.



5

< For setting of Auto > Automatic exposure is done after pre-exposure.

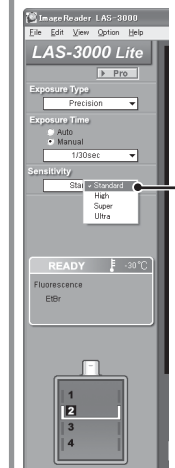
< For setting of Manual > Select an exposure time from the list or enter the exposure time using a numeric value.

* See Page 12 of this Operation Guide.

Tips Upper limit of the Manual Setting sec. (-1999) min. (-1800) hr. (-30)

5 Setting of Sensitivity

Select Sensitivity. Click here and select the sensitivity for the list.



6

Tips The sensitivity is improved by binning multiple pixels into one big pixel. Smoothing by the interpolation of pixels causes the numbers of pixels to increase. The sensitivity becomes higher in the order of Standard, High, Super and Ultra.

Sensitivity	Original pixels (W×H)	Number of pixels(W×H)
Standard	1536×1024	1536×1024
High	768×512	1536×1024
Super	384×256	1536×1024
Ultra	192×128	1536×1024

* See Page 14 of this Operation Guide.

Tips Only in the Chemiluminescence mode, Image acquire & Digitize function can be used. This function can expose chemiluminescence and digitize images consecutively at one click.

6 Exposure

7

Click the Start button.
Exposure is started.
→The orange Busy LED lights during exposure.

7 Saving the Exposed Image

Step 1

Operation

Click the Save button or select the Save function in the File menu.
< Screen state after exposure >

< Save function is also in the File menu >

Save button

2

Set the folder for saving a file, the file name, and the file type then click the Save button.
< For Windows® >

The file name is automatically set, but it can also be changed.
(Example)
20021010_1300
↑ Date ↑ Time
Select the file format.

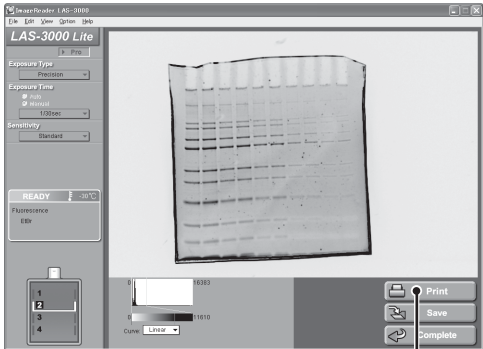
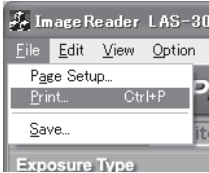
< For Macintosh™ >

For FUJI Img/Inf format, you can enter a comment.

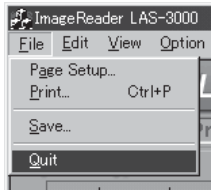
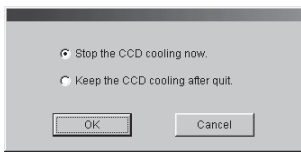
< File format >

- Fuji Img/Inf format
This is a file format developed exclusively by FUJIFILM. This format is suitable for the analysis in which the quantitative performance was maintained.
- 16 bit Linear Tiff
This is 16-bit Tiff format. This format enables the analysis in other software.
- 8bit Color Tiff
This is a Tiff format having eight-bit color gradation. The changed gradation can be saved as it is.

8 Printing the Exposed Image

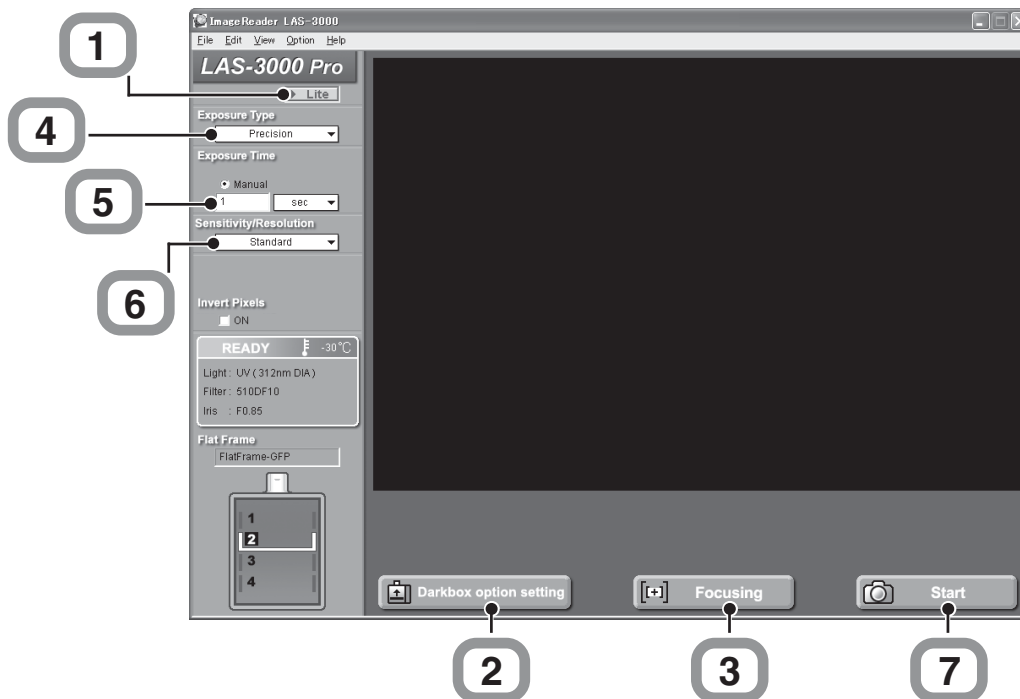
Step	Operation
1	<p>Click the Print button or select the Print function in the File menu. < Screen state after exposure ></p>  <p>< Print function is also in the File menu ></p>  <p>Print button</p>
2	<p>< For Windows® > Select the output setting of a printer and the type (full-scale print or screen print) of a print to be output. Click the OK button. For the screen print, display the screen you wish to output. → The image is printed.</p> <p>< For Macintosh™ > Select the type (full-scale print or screen print) of a print to be output. Click the OK button. For the screen print, display the screen you wish to output.</p> <p>Click the Print button. → The image is printed.</p>
3	<p>Click the Complete button. → The current display returns to the initial screen.</p>

9 Termination

Step	Operation
1	<p>Select Quit from the File menu.</p> 
2	<p>Select whether to keep or stop the CCD cooling. Click the OK button.</p> 
<p>6 Tips Select "keep the CCD cooling after quit". The cooling temperature of CCD then remains kept. As a result, the LAS-3000 can be immediately used without waiting for the temperature to be cooled.</p>	
3	<p>Terminate the personal computer.</p>
4	<p>Turn OFF the IDX power switch.</p>

5 Exposure of Samples (Pro mode) The desired light source and filters can be selected for exposure.

*Please use the Pro mode, in case of using green LED or red LED incident light source. Please use the Lite mode for imaging of chemiluminescence, digitizing, EtBr detection by UV light source, fluorescence detection by blue LED, using the preset conditions.



Step	Operation
1	Click the Lite/Pro selector button to enter the Pro mode.
2	Click the Dark box option setting button. <div style="text-align: center;"> </div> <ol style="list-style-type: none"> (1) Select the light source. Light: None (No light source provided) UV (312 nm transmitted light) Blue (460 nm incident light) Green (520 nm incident light) (Optional) Red (630 nm incident light) (Optional) EPI-White (White incident light) DIA-White (White transmitted light) (2) Select the filter. Filter: 1 Through (No filter provided) 2 605DF40 (EtBr detection) 3 Y515Di (for blue LED) or 510DF10 (for GFP) 4 575DF20 (for green LED) (Optional) 5 R670 (for red LED) (Optional) * The setting can be changed. (3) Select the iris. Iris: F0.85 (For blue, green, red, white-EPI) F2.8 (For UV, white-DIA)

(4) Select Tray Position according to the size of a sample.

(5) Click the Next button.

(6) Select the FlatFrame file made for the selected conditions.
 (7) Click the OK button.

Tips FlatFrame is a correction file required to correct the characteristics of a lens. It can be created by FlatFrame Calibration in the Option menu.

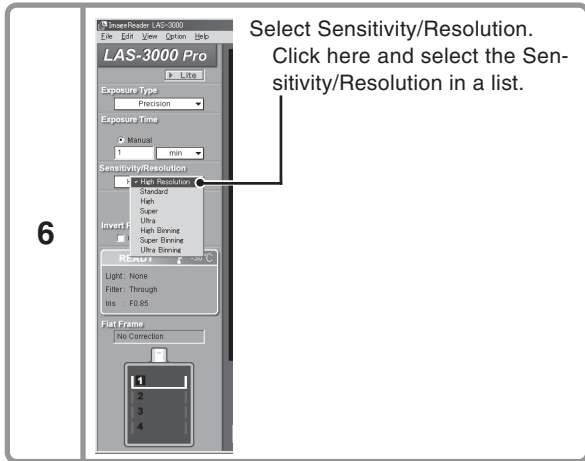
* *See Pages 133 and 134 of the Operation Manual.

3	See Page 8. 3. Adjustment of Focus 3.
4	See Page 8. 4. Exposure Type and Exposure Time Setting.
5	See Page 8. 4. Exposure Type and Exposure Time 5.

6 Caution on Use

1 Sample Tray

1. We recommend the use of a hybridization bag to prevent the membrane from being dried. In such a case, fix the portion, not covered with the membrane, to the tray using a seal so as to keep the membrane flat. A sharp image can be obtained.
2. Wash the sample tray with water and dry it sufficiently before use when it is unclear.



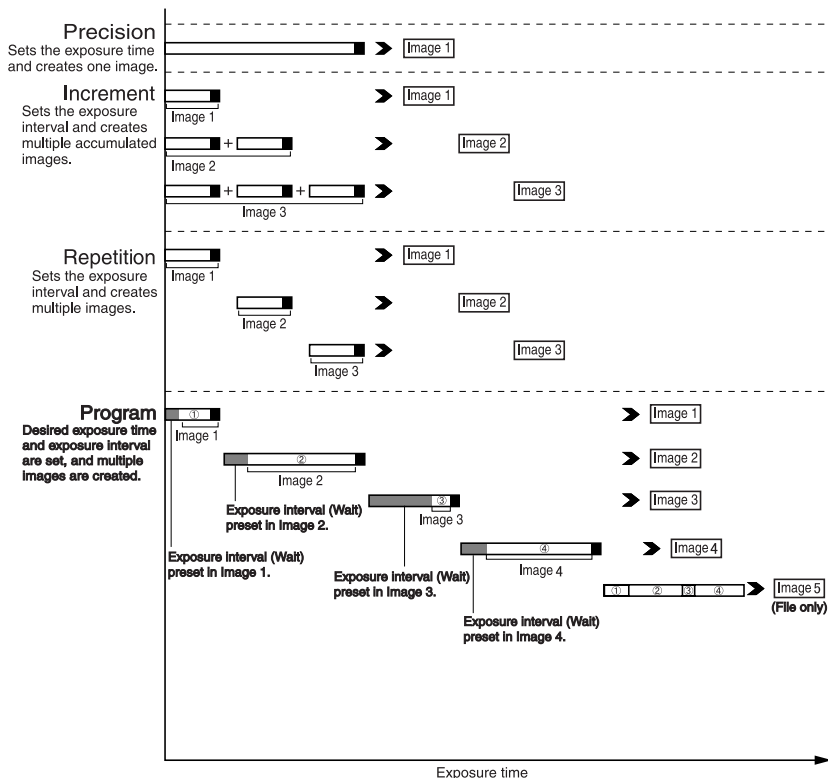
6 Tips In the Pro mode, the detection of a binning image (High binning, Super binning, and Ultra binning) and High resolution image can also be selected in addition to Standard, High, Super, and Ultra. See Page 13 of this Operation Guide for the relationship between the sensitivity and the number of pixels.

7 See Page 9. 6. Exposure 7.

Appendix

■ Exposure Type

- Precision Exposes for the entire time set in Exposure Time.
- Increment Exposes for each time set in Interval Time and accumulates the images.
- Repetition Exposes for each interval time set in Interval Time and displays images for each section.
- Program Exposure time and interval time can be set. Each image file and integrated image files can be generated and saved.



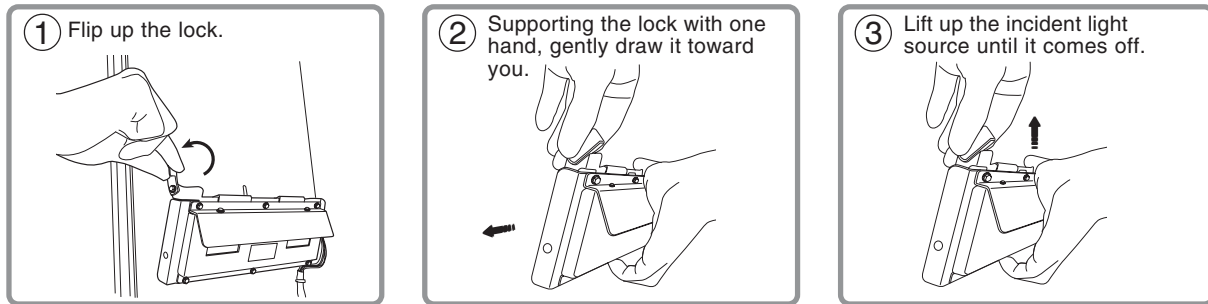
■ **Operation required to be carried out for exposure with green and red LED incident light sources (Optional)**

1. Changing the LED incident light sources

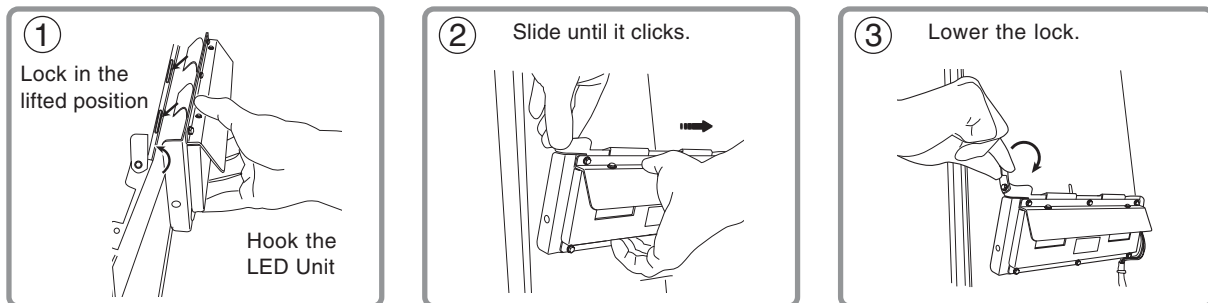
This operation should be carried out with Tray placed in position 4.

The same procedure should be carried out respectively for the right and left sides.

(1) Removing the incident light source * See Page 7 of this Operation Guide 2 (2).



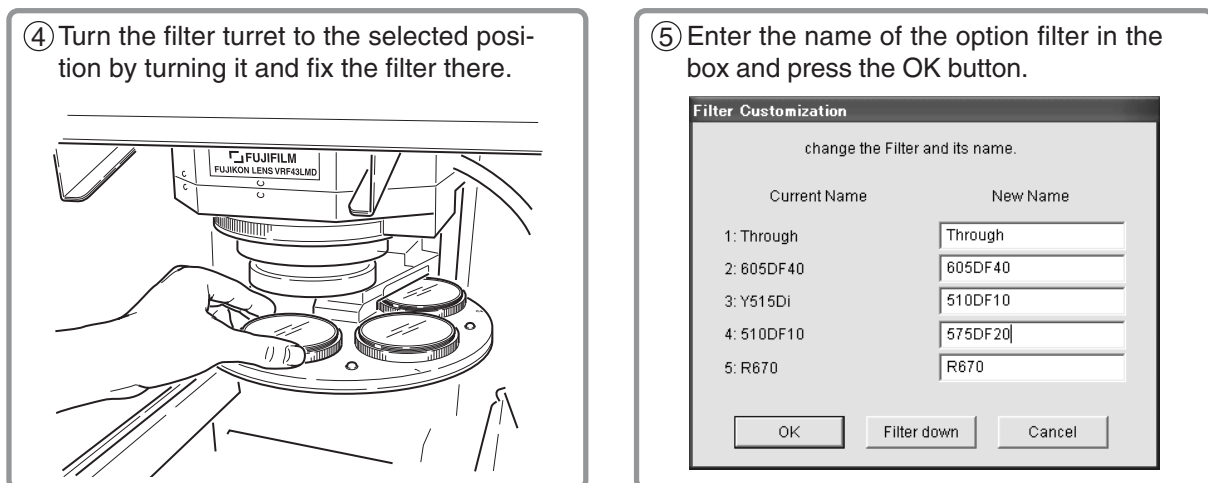
(2) Installing the incident light source



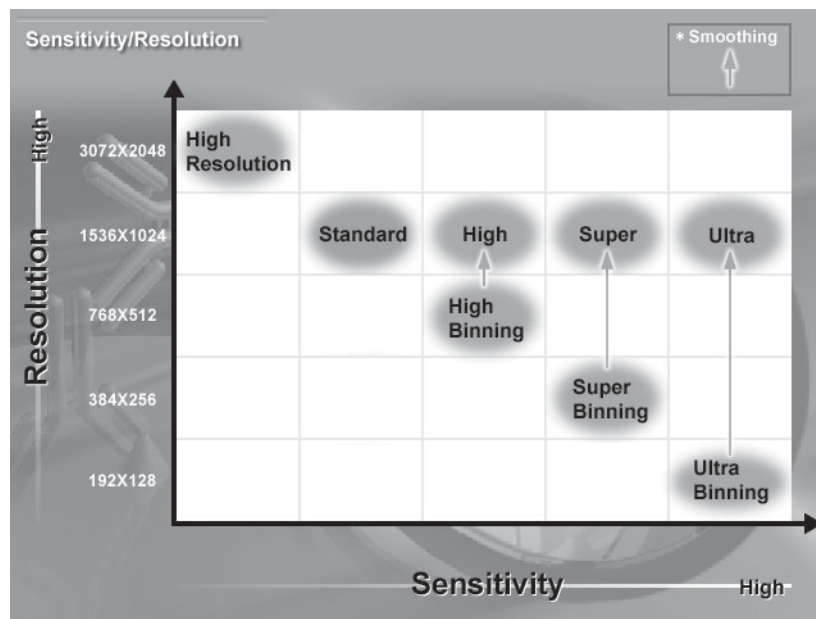
Tip Blue LED unit can be handled by the same way.

2. Installing the optional filter.

- ① Select Filter Customization from Option menu with the IDX door closed.
- ② Click "Filter down" button.
- ③ Open the IDX door after the filter changer has come down.



■ Detection Sensitivity and Number of Pixels



Sensitivity	Number of pixels (W×H)	Image file size
High Resolution	3072 × 2048	12.6 MB
Standard	1536 × 1024	3.15 MB
High	1536 × 1024	3.15 MB
Super	1536 × 1024	3.15 MB
Ultra	1536 × 1024	3.15 MB
High Binning	768 × 512	786 KB
Super Binning	384 × 256	197 KB
Ultra Binning	192 × 128	49.2 KB

■ Detection Reagents and Settings of LAS-3000

Classification	Reagent name	Setting of LAS-3000			
		Lite mode		Pro mode	
		Method	Light	Filter	Iris
Chemiluminescence	ECL	Chemiluminescence	none	Through	0.85
	ECL Plus	Chemiluminescence	none	Through	0.85
	Lumi-Light Plus	Chemiluminescence	none	Through	0.85
	Renaissance	Chemiluminescence	none	Through	0.85
	Super Signal®	Chemiluminescence	none	Through	0.85
	Bright-Star	Chemiluminescence	none	Through	0.85
	CDP-Star	Chemiluminescence	none	Through	0.85
CSPD	Chemiluminescence	none	Through	0.85	

Classification		Reagent name	Setting of LAS-3000			
			Lite mode		Pro mode	
			Method	Light	Filter	Iris
Fluorescence dye	Intercalate	SYBR® Green I	Fluorescence:SYBR Green	Blue(460nmEPI)	Y515-Di	0.85
		SYBR® Green II	Fluorescence:SYBR Green	Blue(460nmEPI)	Y515-Di	0.85
		SYBR® Gold	Fluorescence:SYBR Green	Blue(460nmEPI)	Y515-Di	0.85
		EtBr	Fluorescence:EtBr	UV(312nmDIA)	605DF40	2.8
		TOTO-3	-	Red(630nmEPI)	R670	0.85
	Protein stain	SYPRO® Ruby	Fluorescence:SYBR Green	Blue(460nmEPI)	Y515-Di	0.85
		SYPRO® Orange	Fluorescence:SYBR Green	Blue(460nmEPI)	Y515-Di	0.85
		SYPRO® tangerine	Fluorescence:SYBR Green	Blue(460nmEPI)	Y515-Di	0.85
		Deep Purple	-	Green(520nmEPI)	605DF40	0.85
		SYPRO® Red	-	Green(520nmEPI)	605DF40	0.85
		Pro-Q Diamond	-	Green(520nmEPI)	575DF20	0.85
		Labeling	FITC	Fluorescence:SYBR Green	Blue(460nmEPI)	Y515-Di
	FAM™		Fluorescence:SYBR Green	Blue(460nmEPI)	Y515-Di	0.85
	Alexa® 488		Fluorescence:SYBR Green	Blue(460nmEPI)	Y515-Di	0.85
	Cy2™		Fluorescence:SYBR Green	Blue(460nmEPI)	Y515-Di	0.85
	Cy3™		-	Green(520nmEPI)	575DF20	0.85
	HEX™		-	Green(520nmEPI)	575DF20	0.85
	NED		-	Green(520nmEPI)	605DF40	0.85
	Tetramethylrhodamine		-	Green(520nmEPI)	575DF20	0.85
	R-phycoerythrin		-	Green(520nmEPI)	575DF20	0.85
	TAMRA™		-	Green(520nmEPI)	575DF20	0.85
	BODIPY 576/589		-	Green(520nmEPI)	605DF40	0.85
	Rhodamine Red		-	Green(520nmEPI)	605DF40	0.85
	5-ROX™		-	Green(520nmEPI)	605DF40	0.85
	Alexa® 514 532 546 555		-	Green(520nmEPI)	575DF20	0.85
	Alexa® 568 594		-	Green(520nmEPI)	605DF40	0.85
	DiD		-	Red(630nmEPI)	R670	0.85
	BODIPY		-	Red(630nmEPI)	R670	0.85
	Cy5™		-	Red(630nmEPI)	R670	0.85
	Alexa® 633 635 647		-	Red(630nmEPI)	R670	0.85
	Alexa® 660 680		-	Red(630nmEPI)	R670	0.85
	Fluorescent protein	EGFP	Fluorescence:GFP	Blue(460nmEPI)	510DF10	0.85
		ECFP	Fluorescence:GFP	Blue(460nmEPI)	510DF10	0.85
		RFP	-	Green(520nmEPI)	605DF40	0.85
	Chemifluorescence	Attophos *1	Fluorescence:SYBR Green	Blue(460nmEPI)	Y515-Di	0.85
		ECL Plus	Fluorescence:SYBR Green	Blue(460nmEPI)	Y515-Di	0.85
		HNPP	-	Green(520nmEPI)	575DF20	0.85
		DDAO phosphate®	-	Blue(460nmEPI)	R670	0.85
	Digitize	Silver stain	Digitize:DIA	White(DIA)	Through	2.8
		CBB stain	Digitize:DIA	White(DIA)	Through	2.8
		X-ray film	Digitize:DIA	White(DIA)	Through	2.8
		NBT/BCIP	Digitize:DIA	White(DIA)	Through	2.8

*1: Attophos cannot be used for detecting the nucleic acid on Nylon membrane.

Note) The pre-label method detection by UV illumination is not licensed.

Support services of LAS-3000 is provided by your local supplier.

LIFE SCIENCE, INFORMATION PRODUCTS
MARKETING DIV.

FUJI PHOTO FILM CO.,LTD.

PHONE:+81-3-3406-2201

FAX:+81-3-3406-2158

e-mail:sginfo@tokyo.fujifilm.co.jp

URL:<http://home.fujifilm.com/products/science/index.html>