JuLI™ *FL*

Fluorescence Cell History Recorder

C€

User Manual

Nano**EnTek**

NanoEnTek Inc. (HQ)

12F, 5, Digital-ro 26-gil, Guro-gu, Seoul, 08389, Korea

Tel. +82-2-6220-7940
Fax. +82-2-6220-7721

NanoEnTek USA Inc.

5627 Stoneridge Drive Suite 304, Pleasanton, CA 94588, USA

Tel : +1-925-225-0108, +1-888-988-0108(Toll free)

Fax : +1-925-225-0109

Email

sales@nanoentek.com

Website

www.nanoentek.com

Nano**EnTek**

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Product components

JuLI™ FL is shipped with the following components.
Please check all components listed below when an instrument was delivered.
If any item is missing or damaged, contact your local distributor or e-mail
sales@nanoentek.com.

Scope unit
JULI-FGSC or JULI-FRSC
1 EA

Station unit
JULI-BFST
1 EA
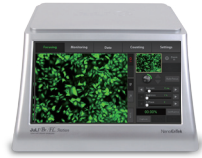
Power cord
4 pcs/set, for U.S./Canada/
Taiwan/Japan, Europe or UK
1 SET

Connection cable
3 M
1 EA

Counting slide holder
1 EA

Cell counting slide
(with 1.5 mL of trypan blue (0.4%))
1 Box

A   B

Cat No. JULI-BRS50

USB drive
4 GB
1 EA

User manual
1 EA

User Manual

Quick manual
1 EA

Quick Manual

1   2   3

· Model JULI-FGSC or JULI-FRSC <Scope unit> are only used in conjunction with the JULI-BFST <Station unit>.

Product overview

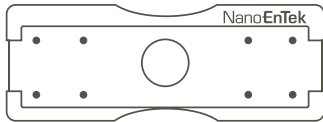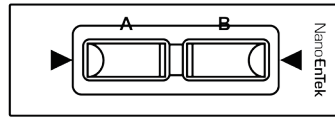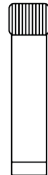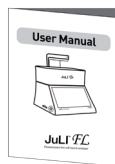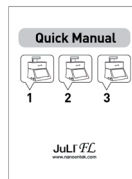The JuLI™ FL uses states-of-the-art optics to get live-cell images from various cell culture dishes and can perform cell-based assays, including cell counting, cell viability, and quantitative analysis of GFP/RFP expression. It is able to detect the quantified cell confluence results with low variation and make a growth curve using image based analysis.

JuLI™ FL is able to capture sequential time-lapse images which can be converted to movie files (.avi) automatically. The compact design allows you to install the system in your cell-culture incubator easily. It can be used to compare the control and the experimental samples using the dual systems (*optional) concurrently.

Features of JuLI™ FL, Fluorescence live cell movie analyzer:

Versatility
- Time-lapse image capturing & making a movie
- Cell counting and viability
- GFP or RFP expression level checking
- Dual system available for comparative cell analysis (*optional)

Accuracy
- Automated confluence detection & growth curve
- Semi auto-focusing with low variations

Ease of use
- Intuitive graphic user interface & LCD touch screen
- Compact size optimized for an cell culture incubator
- Simple steps for the system setups and the operations
- No calibration & maintenance required

Installation

Installing JuLI™ FL

Live-cell images from various cell culture dishes are directly captured in a cell culture incubator.

This compact design allows an instrument to be installed in an incubator, and prevents the contamination by maintaining a sterile environment. Also, the intuitive graphic user interface provides quick and convenient use in a cell culture incubator while capturing time-lapse imaging.

Dimensions of Scope unit	Size
Width	300 mm
Depth	190 mm
Height	188 mm
Weight	4.5 kg

Scope unit

Station unit
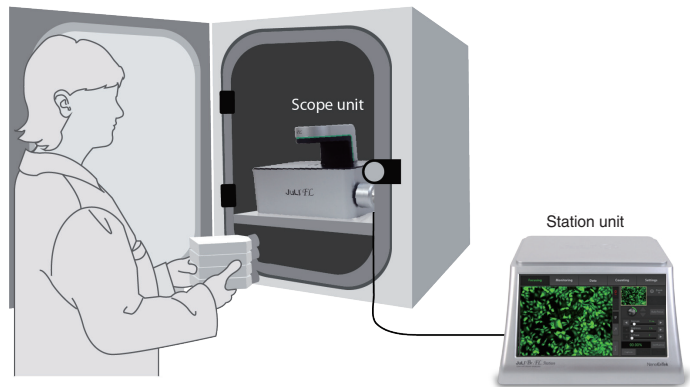
⚠ IMPORTANT

JuLI™ FL is optimized into standard size of cell culture incubator.

It is recommend that the temperature should be stabilized in case of a small size incubator before using the instrument.

Avoid exposing JuLI™ FL to UV light.

UV light may degrade components, including plastics. Damage from UV exposure is not covered under the manufacturer's warranty.

Always wipe surfaces with ethanol-soaked paper towels.

*Do not directly spray ethanol anywhere on JuLI™ FL.*

Installation

Installing JuLI™ FL

1. Place the instrument on a flat, dry, and level surface after unpacking the instrument. Allow at least 10 cm (4 inches) of free space at the back of JuLI™ FL for the proper ventilation and the prevention of overheating of electronic components.

2. Plug the supplied power cord into the station unit of JuLI™ FL.

3. Connect a scope unit to a station unit using the supplied connection cable.
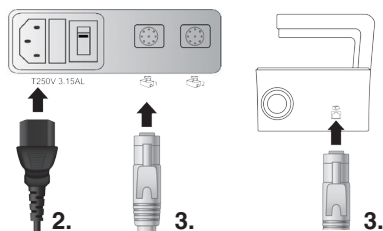
(* For dual monitoring, the 2nd scope unit also should be connected to the station unit.)

⚠ IMPORTANT

Connect to the 2nd scope unit after connecting to the 1st scope unit completely.

4. Plug the power cord into the electrical outlet. Be sure to only use the power cord supplied with the instrument. Powering the instrument with an unapproved power cord may damage the instrument.
5. When JuLI™ FL is ready to use, start JuLI™ FL by turning the ON/OFF switch on and pressing the **Power button** on the station unit.
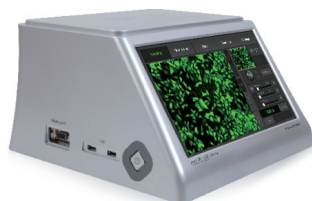
Description

Front view

<Scope unit>

Focus knob
 : is used to adjust the image quality to obtain better cell images.

Stage
 : place sample here.

LED
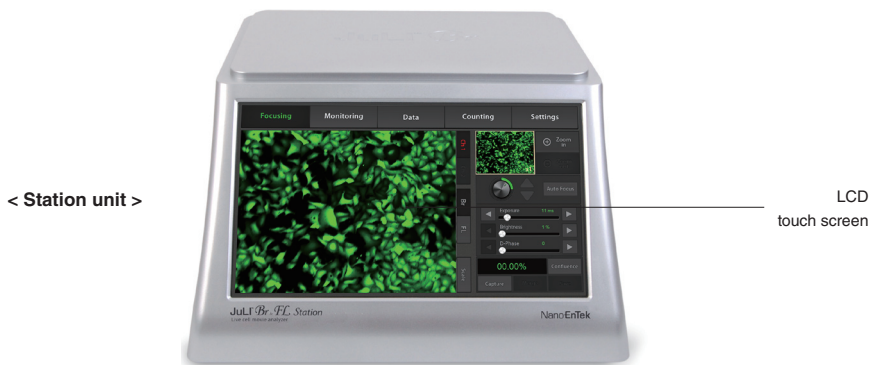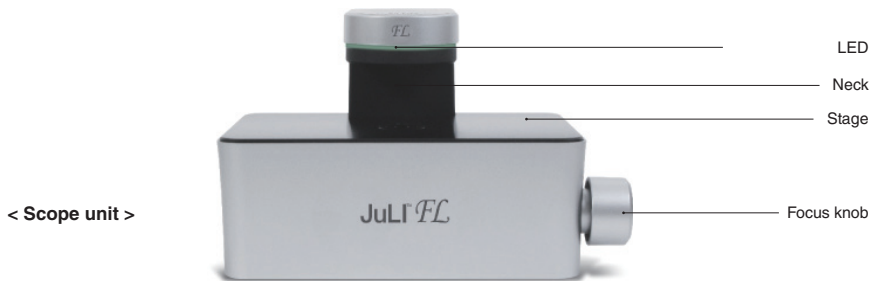 : JULI-FLG04 : Green, Bright
 : JULI-FLR04 : Red, Bright

<Station unit>

LCD touch screen
 : Contains buttons for necessary functions and displays the images.

< Scope unit >

LED

Neck

Stage

Focus knob

< Station unit >

LCD
touch screen

Description

Side view

<Scope unit>

Connection port
 : connects scope unit with station unit.

<Station unit>

Power button
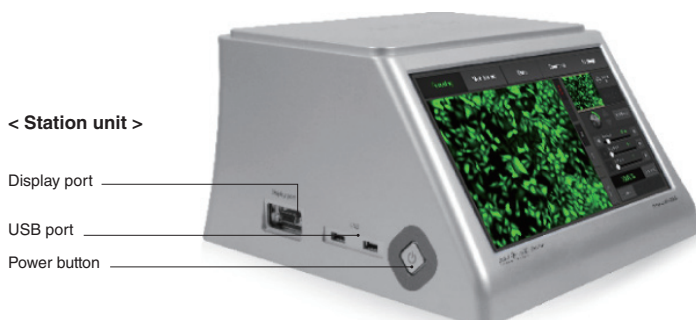 : turn an instrument on and off by pressing the Power button.

USB Port
 : Connect a USB drive to save and transport images to PC.

Display port (CRT port)
 : connect to external monitor. (resolution: 1366 X 768 pixels)
 : make sure to turn off an instrument before connecting.

< Scope unit >

Connection port

< Station unit >

Display port

USB port

Power button

Description

Rear view

<Scope unit>

Fan

: is machinery cooling system.

<Station unit>

Power inlet

: connects JuLI™ FL to an electrical outlet using the supplied power cord and the appropriate plug (based on the electrical outlet configuration in your country).

On/off switch

: is main power switch. It is not necessary to use the on/off switch for day-to-day operation of the instrument.

Connection port

: connects the scope unit with the station unit.

< Scope unit >

Fan

< Station unit >

Connection port

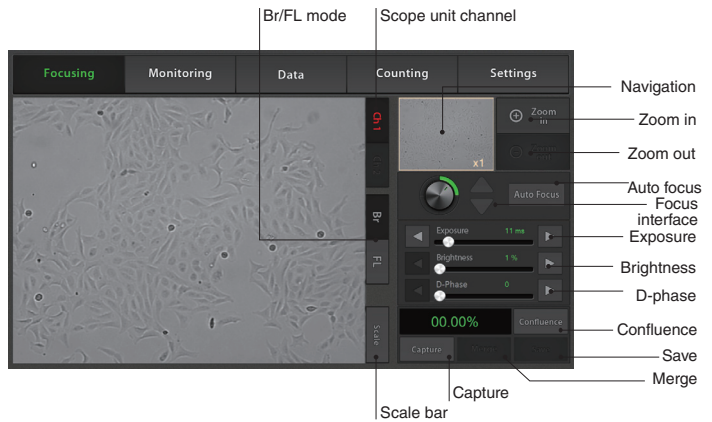On/off switch

Power inlet

T250V 3.15AL

Description

User interface
Focusing menu

The user interface of JuLI™ FL, a fluorescence live cell movie analyzer, provides new tools to expand cellular research through proprietary software. Insightful data can be acquired, such as proliferation assays.
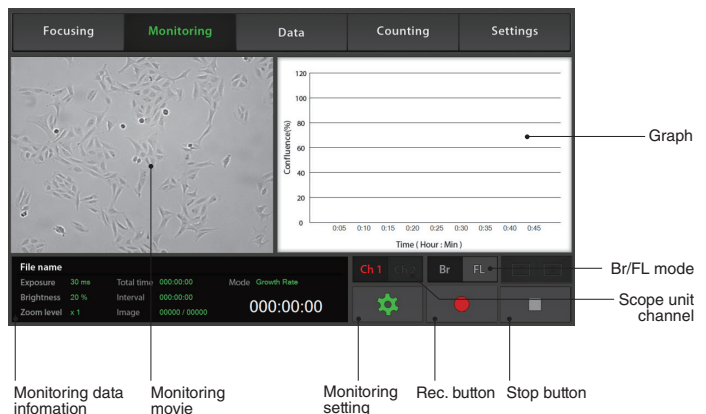
Focusing menu

User interface
Monitoring menu

Monitoring menu

Description

Data menu

Monitoring movie

| Focusing | Monitoring | Data | Counting | Settings |

Data list
Graph

Captured Images
NET_U-2 OS_wound h
NET_U-2 OS RFP exp
NET_U-2 OS GFP exp
NET_I
NET1
sion cell line_140hr_1
Wound ZnO_HaCat_N
NET_U2OS_RFP
NET_U2OS_GFP
NanoEnTek_NIH-3T3

Multi select | Rename
Delete | Save to USB

Rename button
Multi select button

File name   0917_U-2 os_expression cell line_140hr_1
Exposure   5 %   Total time 140:00:00   Mode   Growth Rate
Brightness 4 %   Interval   000:20:00
Zoom level x 1   Image   00415   00.00 %

Screen shot

Monitoring data information   Zoom bar   Screen shot   Delete button   Save to USB button

Settings menu

Scope unit channel   Sensitivity & Background level   LED power

| Focusing | Monitoring | Data | Counting | Settings |

Ch1

Parameter setting
Sensitivity
1 2 3 4 5 6 7 8 9 10

Background level
1 2 3 4 5 6 7 8 9 10

Protocol   A   B   C

LED power
Bright
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Default

Fluorescence
1 2 3 4 5 6 7 8 9 10
Default

Date   08   Oct   2013
       DD   MM   YYYY
Time   11   02
       HH   mm

Dilution factor
Bright   2
Fluorescense   1
Set

Image format
☑ JPEG
☐ BMP
☐ TIFF
☐ PNG

Software
1.0.0

Firmware
1.0.1

OS
1.0.1

Station S/N
ST001304-001

Disk space
Total Space: 334,783,484 MByte
Free Space: 286,000,024 MByte
Usage Space: 14.57 %

Dilution factor   Image format   S/W version   F/W version   OS version   Disk space   Date & Time information

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Description

User interface
Counting menu

Counting menu is a JuLI™ FL Counting software which can be used with various cell types giving the accurate and fast counting results in both the bright and the fluorescence modes.

1. Bright counting : to check for the cell viability by trypan blue staining method.
2. Fluorescence counting : to check for the rate of the fluorescence expression to the whole cells.

Counting menu
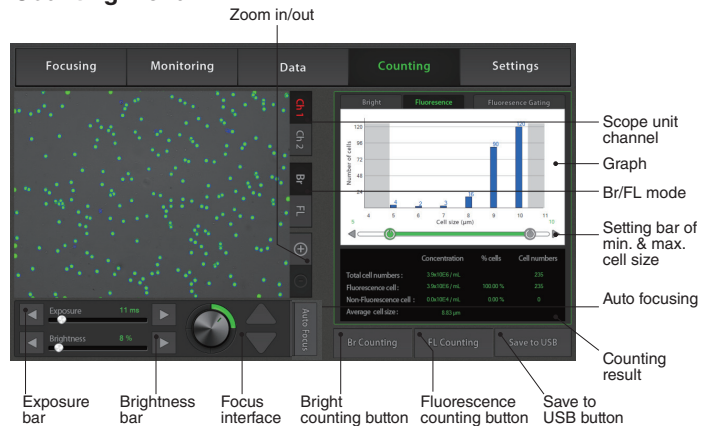
Features of JuLI™ FL Counting S/W:

Applicable for broad range of cell sizes and types:

Provides data on cell size and is compatible with a wide variety of eukaryotic cells without the need for any special changes between large or small sizes.
Measures cell measurement ranging from 1×10^{4} to 1×10^{7} cells/mL, optimal measurement range from 1×10^{5} to 4×10^{6} cells/mL, and cells with sizes ranging from 5 µm to 60 µm.

Innovative Auto focusing technology:

Allows to get the optimized focus without variation of manual focus.

Accurate and fast counting result:

Provides **counting result** without focus variation and regardless of clumped cells in **less than 10 seconds**
(Guaranteed the results and counting time using Auto focus function.).

Operation

Focusing
Adjust the focus

1. Press the **Power button** to start JuLI™ FL.
The main screen will be displayed.
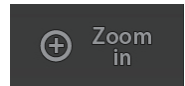
2. Place the sample on the stage.
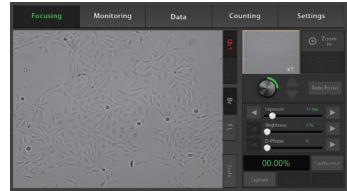
3. Check the channel by pressing the **Channel tab** if the 2nd scope is connected. Select the **Bright** or the **Fluorescence** mode.
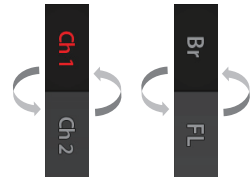
4. To adjust illumination intensity, use the **Exposure** and **Brightness bar** on the touch screen.
Touch the arrow button (◄ | ►) for more minute adjustment.

5. If necessary, use the **Zoom in button** to magnify the desired region.

*(» The scale of enlargement can be checked by pressing **Scale button**.)*

6. Tap a point on the navigation window or drag preview window to move the viewing region.

Operation

Focusing
Adjust the focus

7. While viewing cells, adjust the focus using the **Focus knob** or **Focus interface**.

| < coarse focus interface > | < fine focus interface > |
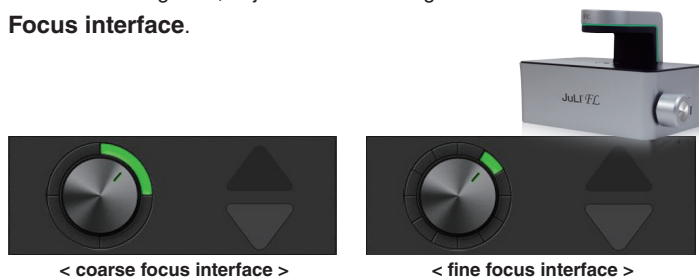
· Type of the focus interface would be switched by tapping the circle point.

· Coarse focus is a larger knob which moves up or down rapidly to get the sample into coarse focus. Fine focus is a smaller knob which moves short distances slowly and is used to get the sample in sharp focus.

The images below show the reference images to adjust focus.

Du-145 / Parameter A

Good setting — Exposure 4 / Brightness 1

Normal setting — Exposure 6 / Brightness 3

Bad setting — Exposure 6 / Brightness 5
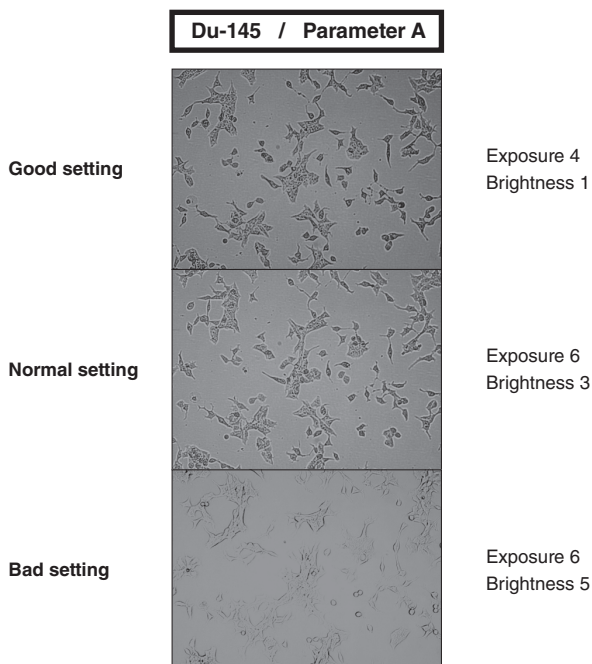
Operation

Focusing

Auto focus

1. Adjust the focus of JuLI™ FL (Refer to page 14 - 15)

2. After adjusting focus, press the Auto focus button to get more accurate focus without individual variations
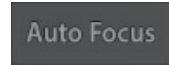
· The Auto focus is the auto-focusing function which automatically senses the focus optimized for the analysis software of the JuLI™ FL

⚠ **IMPORTANT**

It is strongly recommended to use Auto focus function after adjusting a focus. If not, it might be the cause of, incorrect counting results or viability

Operation

Focusing
ROI Auto focus

1. Adjust the focus of JuLI™ FL (Refer to page 14 - 15)

2. Touch the region of interest cell by hand on the screen
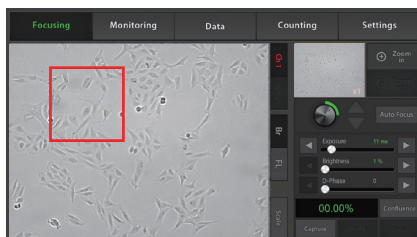
·   The ROI Auto focus is the auto-focusing function which automatically
    senses the focus optimized for the analysis software of the JuLI™ FL

⚠ IMPORTANT

*It is strongly recommended to use ROI Auto focus function after adjusting a focus. If not, it might
be the cause of, incorrect counting results or viability*

Operation

Focusing
Confluence
(Bright mode only)

1. Adjust the focus of JuLI™ FL (Refer to page 14-15).

2. Press the **Confluence button** (Bright mode only).

3. Value of confluence would be shown.
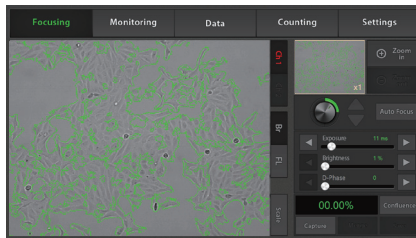
· If the value of confluence should be more accurate, try again after adjusting
 parameters in the **Setting menu** (Refer to page 40).

The parameter is the recommended values for corresponding to cell line.

The default value is A.

· To recalculate, press the **Confluence button** after pressing **Preview button** first.

4. If necessary, press the **Save button** to save the captured
image. Type the file name in the blank.
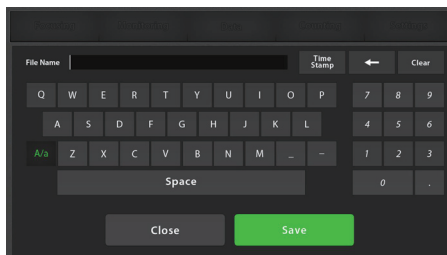
Operation

Focusing
Confluence
(Bright mode only)

5. Check the confirmation message **'Capture complete'**.
Saved data can be checked in the **Data menu** (Refer to page 27).

Capture complete

OK

OK
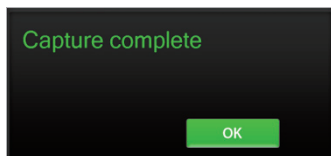
The images below show the guidelines for the focus to obtain an accurate cell confluence. (Bright mode only)

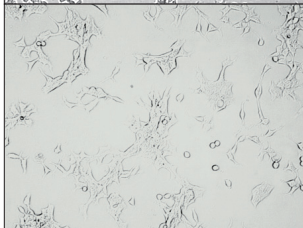| Du-145 / Parameter A |
| --- |
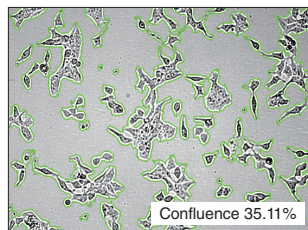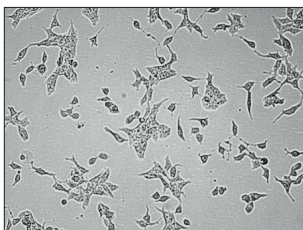
Good setting

Exposure 4
Brightness 1

Confluence 35.11%

Normal setting

Exposure 6
Brightness 3

Confluence 36.22%

Bad setting

Exposure 6
Brightness 5

Confluence 43.03%
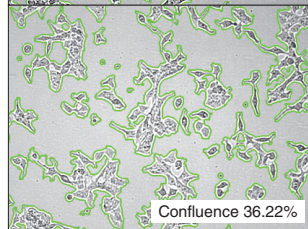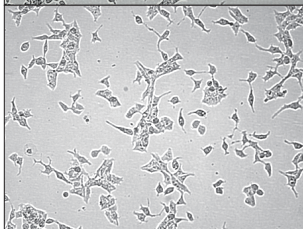
Operation

Focusing
Bright image capture

1. Adjust the focus of JuLI™ FL (Refer to page 14-15).

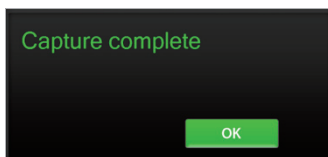2. Press the **Br button** and the **Capture button** to acquire an image.

· Press the Preview button to recapture if necessary.

3. If necessary, press the **Save button** to save the captured image. Type the file name in the blank.
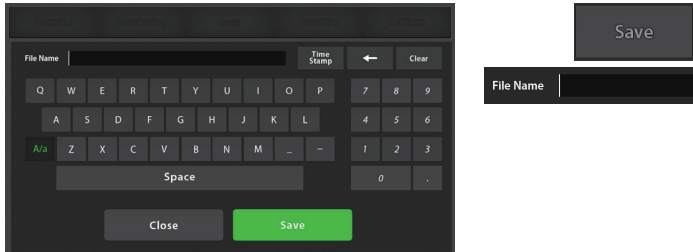
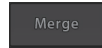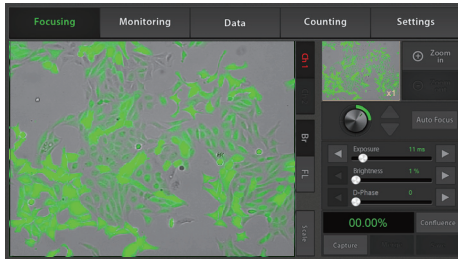4. Check the confirmation message 'Capture complete'. Press the **OK button.**

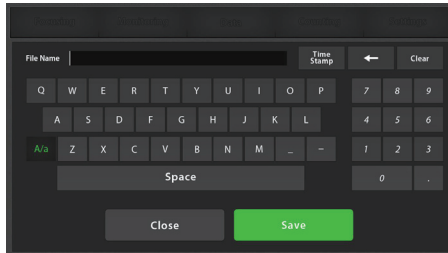5. Saved data can be checked in **Data menu** (Refer to page 27).

Operation

Focusing

Fluorescence image capture

1. Adjust the focus (Refer to page 14-15).

2. Press the **FL button** and the **Capture button** to acquire an image.
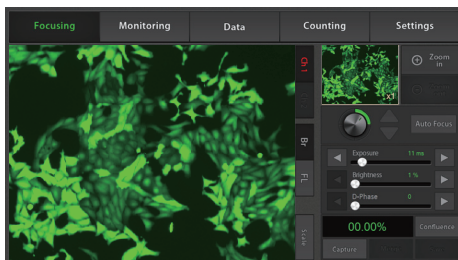
· Press the **Preview button** to recapture if necessary.

3. If necessary, press the **Save button** to save the captured image. Type the file name in the blank.
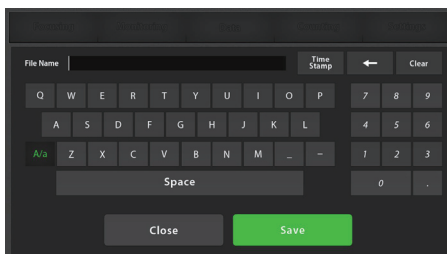
4. Check confirmation message 'Capture complete'. Press the **OK button.**

5. The saved data can be checked in **Data menu** (Refer to page 27).

Operation
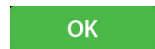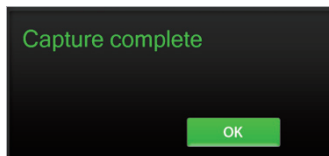
Focusing
Merged image capture

1. Capture the bright image and the fluorescence image (Refer to page 20-21).

2. Press the **Merge button** to show the merged color image.

3. If necessary, press the **Save button** to save the merged image. Type the file name in the blank.

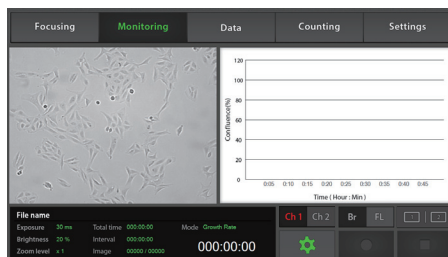4. Check the confirmation message 'Capture complete'. Press the **OK button**.

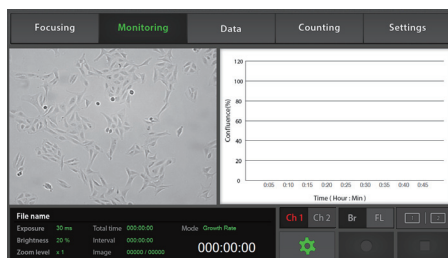5. The saved data can be checked in **Data menu** (Refer to page 27).
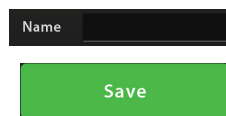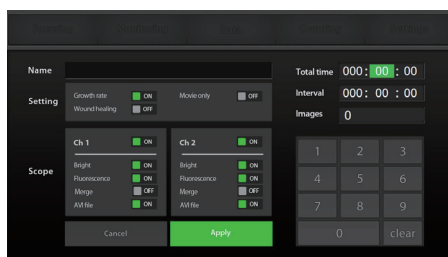
Operation

Monitoring

1. Each scope channel can be viewed by pressing the **Channel tab** if 2nd scope unit is connected to station unit.

2. Adjust the focus of JuLI™ FL and select the region that should be monitored (Refer to page 14-15). Press the **Setting button**.
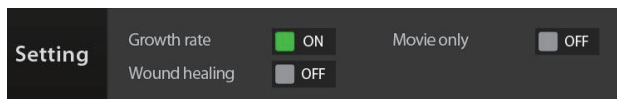

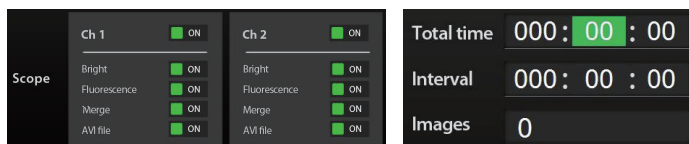3. Type the file name in the blank and the press the **Save button**.

Operation

Monitoring

4. Choose the monitoring mode among the **Growth rate**, the **Wound healing** and the **Movie only**.

Setting	Growth rate	ON	Movie only	OFF
	Wound healing	OFF		

· Movie only means just monitoring cells without calculating the cell confluence value.

5. After choosing channel 1or channel 2, set movie options (Choose both channel 1 and channel 2 in case of dual monitoring.). Edit the **Total time** and the **Interval** to set the total running time and the time interval.

Scope	Ch 1	ON	Ch 2	ON
	Bright	ON	Bright	ON
	Fluorescence	ON	Fluorescence	ON
	Merge	ON	Merge	ON
	AVI file	ON	AVI file	ON

Total time	000 : 00 : 00
Interval	000 : 00 : 00
Images	0

· The number of total images will be displayed automatically when data value of "Total Time" and "Interval" are set up.

> · **Minimum interval**
> Movie only : **30 sec** (1 or 2 scopes)
> Growth rate/ Wound healing : **1 min** (1 scope), **5 min** (2 scopes)
> *** The 15 minutes time intervals are recommended to prevent the cell damage when using the fluorescence sample.**

⚠ IMPORTANT!

Warm up scope unit for 1 hour in incubator before making a movie. If not, it might be the cause of uncertain data or unclear movies.
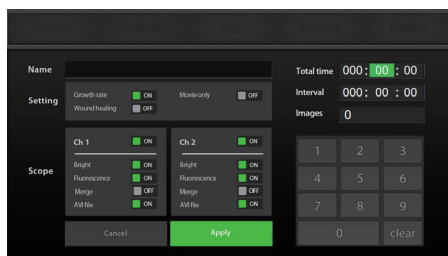
⚠ IMPORTANT!

Cell culture flask should be wetted by the culture media before making a movie.
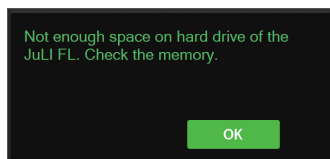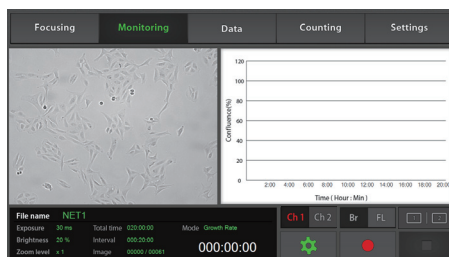
Operation

Monitoring

6. Press the **Apply button** to save all options.

· If the disk volume of the instrument is not enough for making a time-lapse movie, the error message as below will be shown. Please try again after deleting data in **Data menu** (Refer to page 32).

Not enough space on hard drive of the JuLI FL. Check the memory.

OK

7. Press the **Rec. button** to begin making a time-lapse movie. JuLI™ FL displays live cell images continuously during recording.
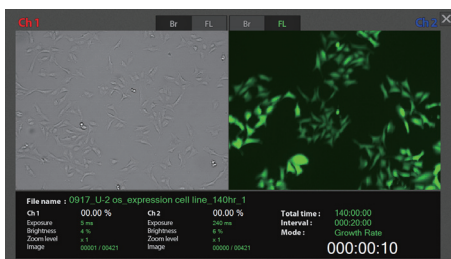

· If necessary to adjust the focus during monitoring, press the **Pause button**, and change the focus, the exposure and the brightness in the **Focusing menu.**
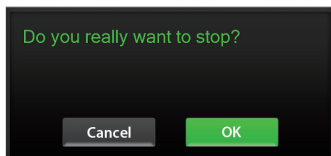
Operation

Monitoring

· Dual scope channel can be checked at once by pressing the **Dual view button** when 2nd scope unit is connected to the station unit. To close dual view mode, double click it. (or press the **Close button**.)


· If the movie should be finish press the **Stop button**, while making a movie.

· Then the confirmation message as below will be shown. Press the **OK button**.

OK

· Unexpected problems such that the power is off suddenly or the scope unit is not connected to station unit could be happened during making a movie. Then the error message as below would be shown after restarting the instrument.

OK
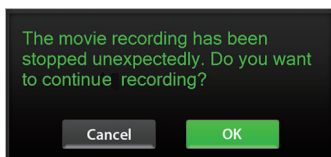
· Recorded data before getting in problem is saved in the disk of instrument temporarily. So press the **OK button** to continue making a movie.

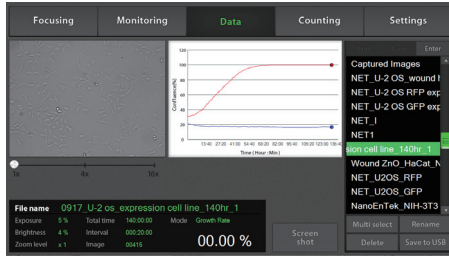8. Recorded data can be checked in **Data menu** (Refer to page 27).

Operation
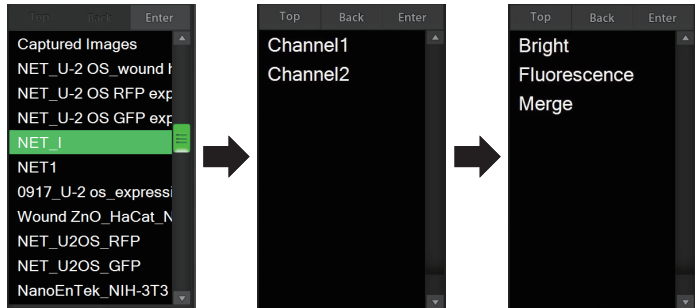
Data
Open data

1 All saved data could be checked in **Data menu.**

· Monitoring data including movie files and time-lapse images were saved in each of folder set up by user. And other data except monitoring are saved in default folder, 'Captured Images'.
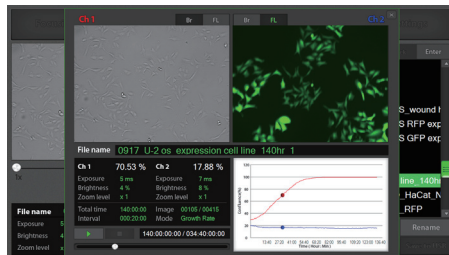

2. Each channel folder has subfolders. (ex. Bright, Fluorescence, and Merge) The control sample and experimental sample data can be found in the subfolders.

< Data category>

· If you double tap main folder of dual monitoring data, summary data view will show up.
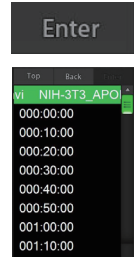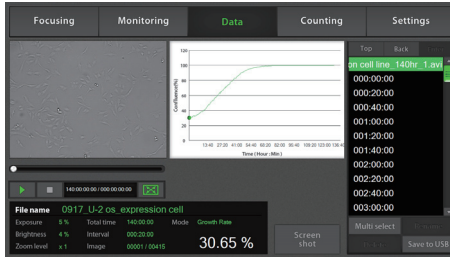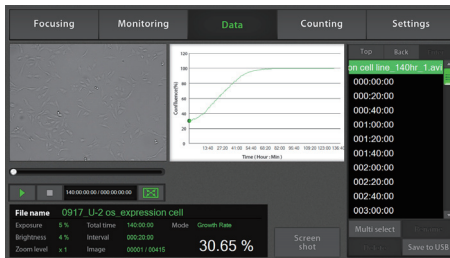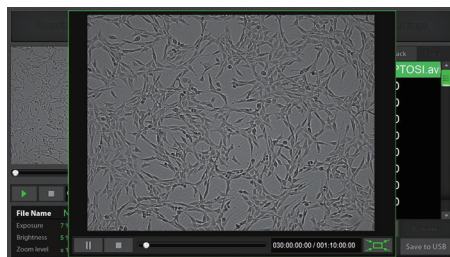
Operation

Data
Open data

3. Data can be opened or shown by double tapping folder name in **Data list** or pressing the **Enter button**.

4. The captured image can be shown by tapping its file name. The images can be checked by pressing the **Play button**.

5. Magnify movie screen or image screen widely for convenient.

Operation

Data
Screenshot

1. Connect a USB drive to the station unit.
· If a USB drive is not connected to the station unit, screenshot function can not be used.

2. Press the **Screenshot button.**

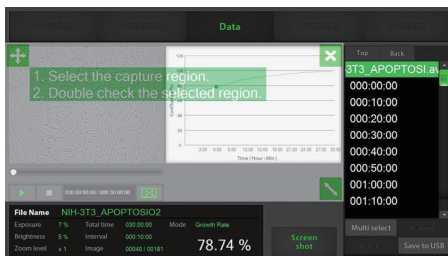3. Select the desired capture region by the **Moving icon**.

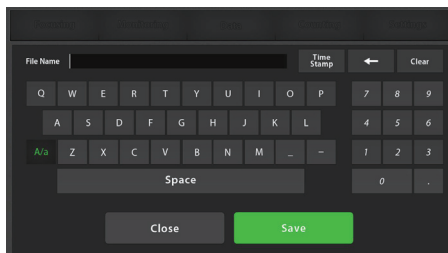4. Select the screen size of snapshot using the **Size icon**.
· Snapshot capturing process can be canceled by pressing the **Cancel icon**

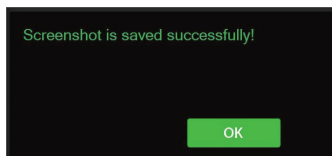5. After that, double tap to save the selected region.

6. Type the name in the blank, then press the **Save button**.

7. Check the confirmation message 'Screenshot is saved successfully!' . Press the **OK** button.
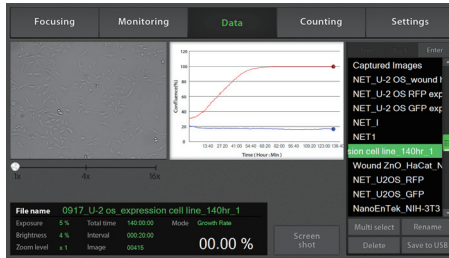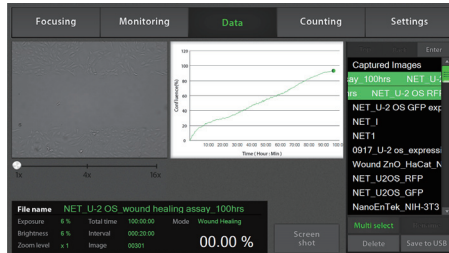
Operation

Data
Save to USB

1. Connect the USB drive to the station unit.
· The **Save to USB button** will be activated by connecting USB drive to the station unit.

2. Select the folder or file by tapping it once.

3. Several folders or files can be selected at once using the **Multi select button.** If the wrong file is selected, press the Multi select button or select the wrong file name you selected again.

4. Press the **Save to USB button.**
· Only main folder can be saved, not sub folders individually.
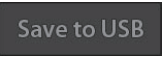
5. If the confirmation message 'Save complete' is shown, saving process is completed. Press the **OK** button.

Operation

Data
Rename

1. If you want to change folder or file name, tap the file or folder.

2. Press the **Rename button.**

· Only main folder can be renamed, not sub folders individually in case of dual monitoring data.

3. Type new name of folder or file in the blank. Then press the **Save button.**

4. Check the confirmation message 'Rename complete' and the press the **OK button.**
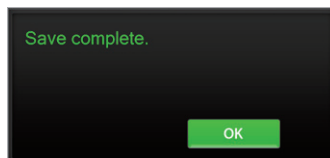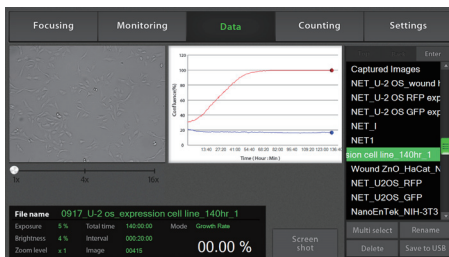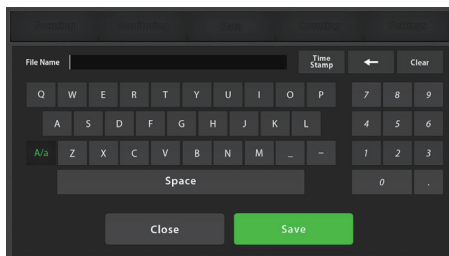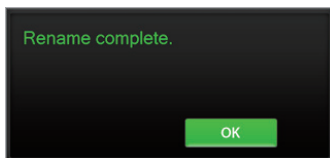
Operation

Data
Delete

1. Select folder or file that should be deleted from the instrument.
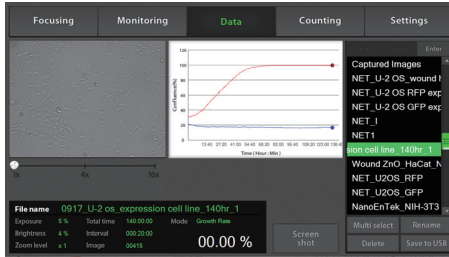
Multi select

· To delete several folders or files at once, select all of them using the **Multi select button.**

2. Press the **Delete button** to delete selected folders or files.

Delete

· If 'Captured Images' folder is selected, all image files in the folder will be deleted.
· Only master folder can be deleted, not sub folders individually.

3. Press the **OK button** when the confirmation message shows up.

OK
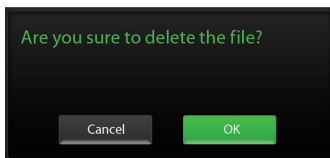
Operation

4. Check the confirmation message 'Delete complete'.
Press the **OK button.**

Delete complete.

OK

OK
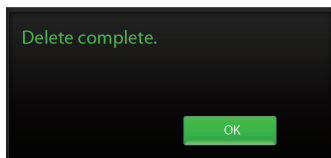
Operation

Counting

Sample-
preparation

- Mix well 10 μL of sample and the 10 μL of 0.4% trypan blue stain (Bright mode).
- Place the Fluorescence sample on the scope unit (Fluorscence mode).

1. Load 10 μL of sample mixture on the counting slide (side A) using a pipette. The two chambers of the slide are labeled as "A" and "B" for easy tracking of your samples. Each chamber is counted separately.
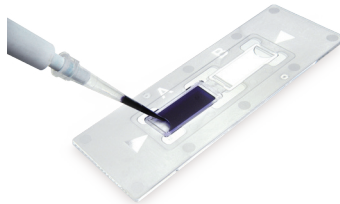
2. Put the counting slide with the slide holder on the scope unit.

Operation

Counting
Auto focus

1. Adjust the focus of JuLI™ FL (Refer to page 14-15).

2. After adjusting focus, press the **Auto focus button** to get more accurate focus without individual variations.

Auto Focus

· The **Auto focus** is the auto-focusing function which automatically senses the focus optimized for the analysis software of the JuLI™FL and provides the precise and rapid counting results.

· The example images of HeLa cells show the reference value for adjusting focus.
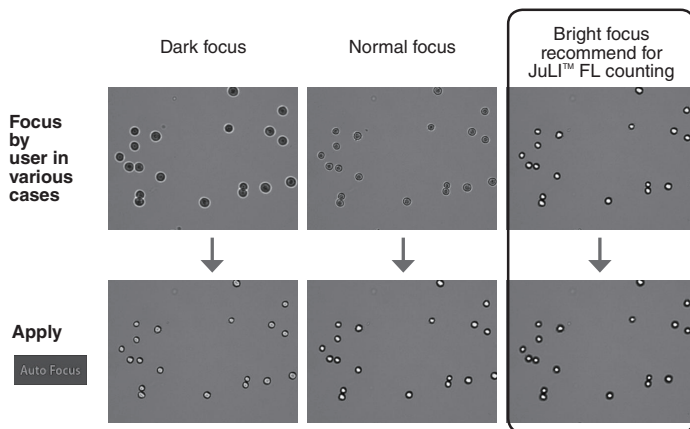
| | Dark focus | Normal focus | Bright focus recommend for JuLI™ FL counting |

Focus by user in various cases

↓ ↓ ↓

Apply

Auto Focus

⚠ IMPORTANT!

It is strongly recommended to use Auto focus function after adjusting a focus. If not, it might be the cause of,

- taking more time for counting (more than 10 seconds)
- incorrect counting results or viability

Operation

Counting

Bright counting
(Stained by trypan blue)

1. Adjust the focus of JuLI™ FL (Refer to page 14-15).
If necessary, press the **Auto focus** to get more accurate focus without individual variations.

2. Press the **Br Counting button** for the cell counting.

Br Counting

· The Br counting button and the FL counting button are activated in the Bright mode.
· If necessary, set the **dilution factor** corresponding to the experiment condition (Refer to page 44).

3. The counting results including the total cell, live cell, dead cell, and average cell size show up on the **Bright tap.**

- Bright counting result tap
- Graph
- Gating background
- Dead cell (red bar)
- Live cell (blue bar)
- Cell size gating bar
- Counting results

Operation

Counting
Bright counting
(Stained by trypan blue)

4. Determine the value for the **minimum cell size** and the **maximum cell size** touching the control button (◀|▶) to adjust minutely. The set-value will be immediately reflected in the **Counting result**.

· **Minimum cell size** is used to determine the low range of cell size within the measurement. The algorithm first identifies all objects and calculates the average size. From the percent of average size setting, the algorithm calculates the smallest object size to include in the final measurement. Adjusting the number up, increases inclusiveness thereby decreasing the lower cell size range.

· **Maximum cell size** is used to determine the high range of cell size within the measurement. The algorithm first identifies all objects, then calculates the average size. From the percent of average size setting, the algorithm calculates the largest object size to include in the final measurement.

5. Cell counting result will be shown with cell size distribution graph. If you are not satisfied with the result, then try again after adjusting minimum and maximum cell size.

Operation

Counting
Fluorescence counting
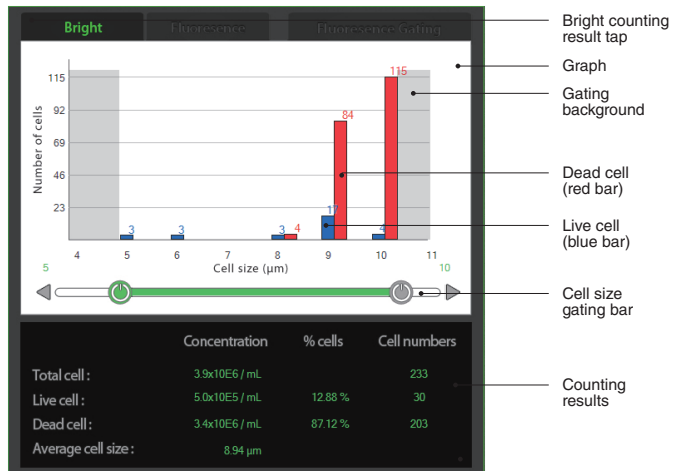
1. Adjust the focus of JuLI™ FL (Refer to page 14-15). If necessary, press the **Auto focus** to get more accurate focus without individual variation.

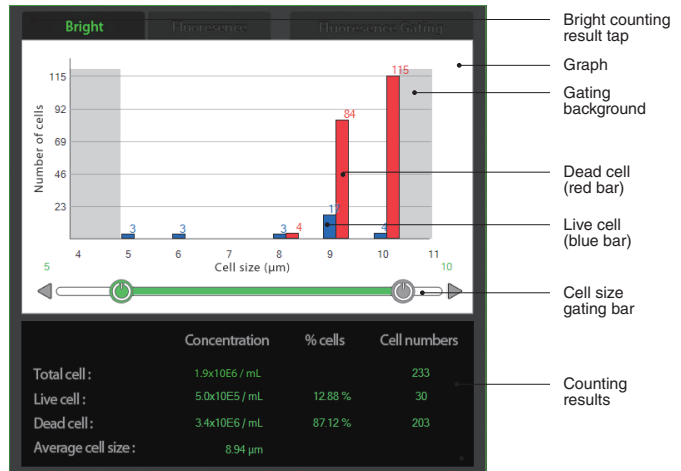2. Press the **FL Counting button** for the cell counting.

FL Counting

· The Br counting button and the FL counting button are activated in the **Bright mode**.

· If necessary, set the **dilution factor** corresponding to the experiment condition (Refer to page 44).
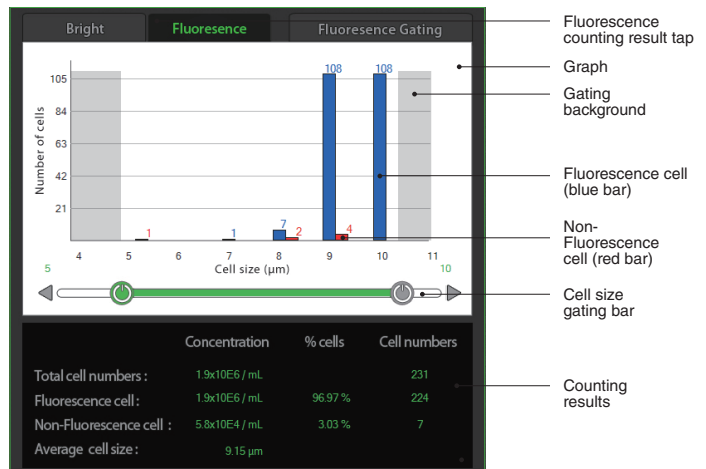
Operation

Counting
Fluorescence counting

3. The counting results including total cell, live cell, dead cell, and average cell size show up on the **Bright tap.**
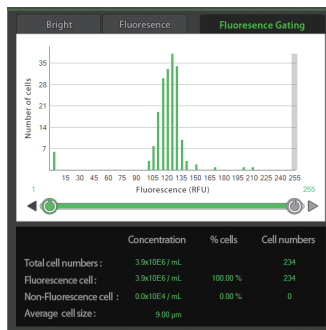

Bright counting result tap

Graph

Gating background

Dead cell (red bar)

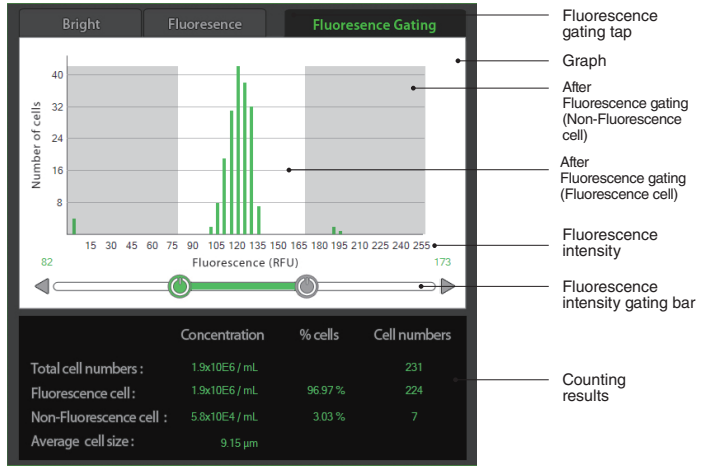Live cell (blue bar)

Cell size gating bar

Counting results

4. The counting results including the total cell, fluorescence cell, average cell size show up on the **Fluorescence tap.**

Fluorescence counting result tap

Graph

Gating background

Fluorescence cell (blue bar)

Non-Fluorescence cell (red bar)

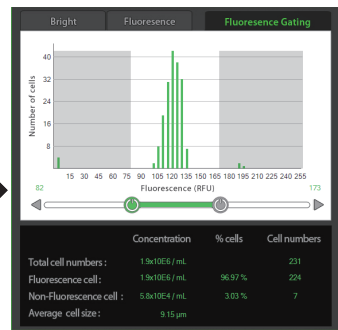Cell size gating bar

Counting results

Operation

Counting
Fluorescence counting

5. The counting results including the total cell, fluorescence cell, non-fluorescence cell, average cell size show up on the **Fluorescence Gating tap**.

- Fluorescence gating tap
- Graph
- After Fluorescence gating (Non-Fluorescence cell)
- After Fluorescence gating (Fluorescence cell)
- Fluorescence intensity
- Fluorescence intensity gating bar
- Counting results

<Before fluorescence gating>

<After fluorescence gating>

· The graph shows each counting results by the fluorescence intensity. The set-value will be immediately reflected in the **Counting results.**

6. The cell counting result will be shown with the cell size & distribution graph. If you are not satisfied with the result, then try again after adjusting the minimum, the maximum cell size, and the fluorescence intensity.
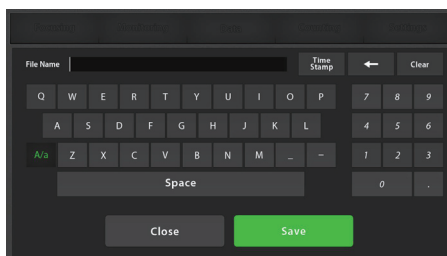
Operation

Counting
Save to USB

1. Connect USB drive to the station unit.

· If a USB drive is not connected to the station unit, you can not use this function.

2. Press the **Save to USB button.**



3. Type the folder name in the blank. Then press the **Save button.**

· When a user presses the Save button, the user will acquire the images and the counting result file for **one folder automatically.** In a folder, there are one original cell image, one cell counting image marked with different color for the viable and dead cells, one screen shot image with cell counting result data and also, one csv file of counting result data.
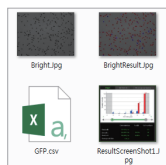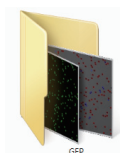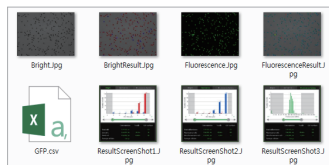
< Bright counting result save >   < Fluorescence counting result save >

4. If the confirmation message is shown, the saving process is completed.
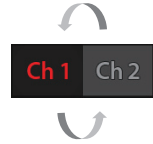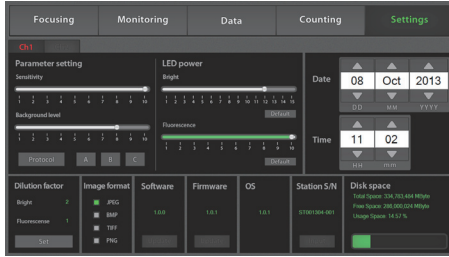

Screenshot is saved successfully!

OK

Operation

Settings

Settings menu works for each scope unit if 2nd unit is connected to the station unit. Press the **Channel tab** to select each scope unit.



Settings
Set up parameter

Set the recommended parameter values for corresponding to cell line. The default value is **A (Bright mode only).**

Sensitivity :
Refers to the contrast of the objects from the background. The increased sensitivity provides better recognition of fainter objects in the Bright mode.

Background level:
The decreased background level provides better recognition of fainter objects in Bright mode.
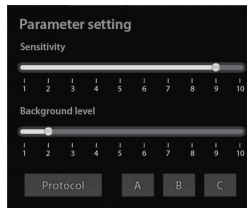
Parameter	Cell line	Recommendation
A(Default)	HepG2, GH3, Hep3B, A549, MCF7, SH-SY5Y, SCN2.2, NIH-3T3, F9, HeLa, DU-145	Sensitivity level 9 Background level 2
B	LNCaP	Sensitivity level 10 Background level 2
C	U-2 OS ADSC	Sensitivity level 10 Background level 8

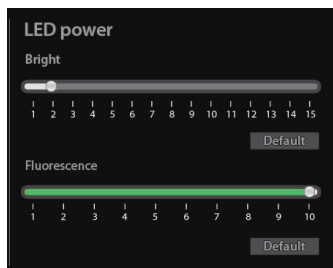· Press the Protocol button to create the new protocol or edit existing one.
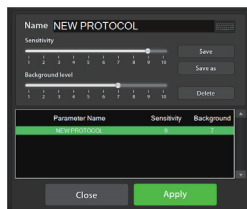
Operation

Setting
Control LED power

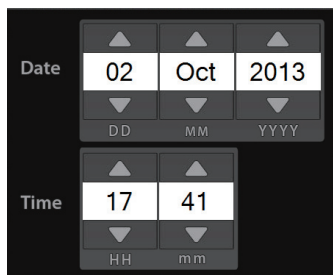Adjust the **LED power intensity** tapping the bar.
Default LED powers are set in 2 for the Bright mode and in 10 for the fluorescence mode.
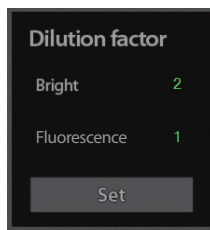
Setting
Date & Time

Set up the local date and time using the **Up & Down button.**

Setting
Set up dilution factor

Press the **Set button,** if necessary to change the dilution factor, when using the counting function. The Default value is **2 for the bright counting** using the trypan blue staining method and **1 for the fluorescence counting.**

Operation
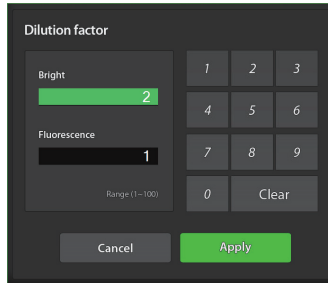
Set the dilution factor corresponding to the experiment condition and the **Apply button.**

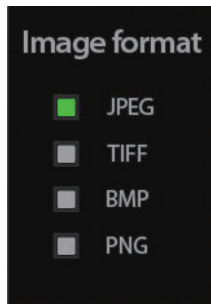The JuLI™ FL supports various image formats including JPEG, BMP, TIFF, and PNG. Select one as mostly utilized format. The default format is **JPEG**.

Operation

Setting

Update
software & firmware

1. Periodically, Nanoentek adds functionality and other improvements to JuLI™ FL user interface. We recommend keeping your JuLI™ FL update with the latest software and firmware using the Update button.

If you have any questions about the software updates, contact **sales@nanoentek.com.**

2. Visit JuLI™ FL website at **www.nanoentek.com** to download updated software which will be supplied as a .zip file to your desktop.

3. Unzip the JuLI™ FL Update.zip file and save the software in a USB drive.

JuLI_FL.exe

4. Connect the JuLI™ FL USB drive, provided with JuLI™ FL to the station unit of the JuLI™ FL.

5. Check if the version of software and firmware are the latest one. Press **Update button.** The update process takes a few seconds.

Update

Software	Firmware	OS
1.0.0	1.0.1	1.0.1
Update	Update	

6. After updating, press the **OK button** to restart the JuL™ FL automatically.

OK

Software update complete. Restart the system now, click the "OK" botton.

OK
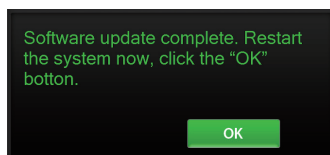
Operation

Check the disk space of JuLI™ FL.

If no disk space left, the saved data should be deleted in **Data menu** (Refer to page 32).

Disk space
Total Space: 334,783,484 MByte
Free Space: 285,703,772 MByte
Usage Space: 14.66 %

Operation

PC software
Introduction

PC software is designed to manage data from JuLI™ FL.

· User can review the saved image from JuLI™ FL in the PC.
· User can recalculate cell confluence of all images and edit movies.
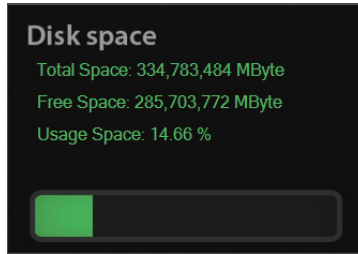· It is recommended to operate in the system administrator mode if the
  operation system of your PC is upper version of Windows or Vista.

PC software
Installation
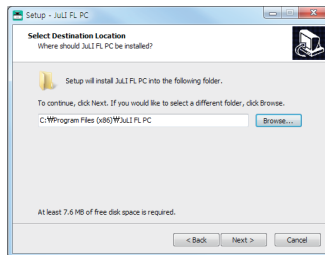
To install PC software, follow the directions as below ;
Check to ensure that your PC is connected to Internet before
installing the JuLI™FL PC Software.

1. Connect the supplied USB drive to the computer. Then open the file "**JuLI™ FL PC Setup**".

2. The start-up dialogue of the software, as shown like left image, will appear.

3. Press the **Next button** to start installation.

Operation

PC software
Installation
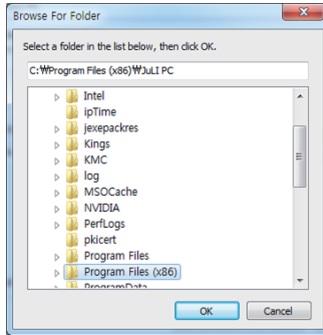
4.   If you want to change installation folder, press the **Browse button** and choose the location that you want.
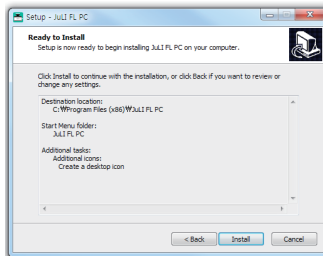
5.   After choosing the installation folder, press the **Install button** to proceed with the installation.
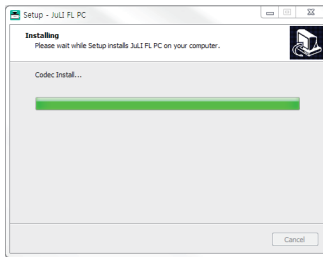
6.   The PC activates the **"Installation of the Software"**

JuLI FL PC

7.   If the installation was successfully completed,the PC Software program icon will appear on your desktop.

Operation

PC software
Function guide

When PC Software program starts, the interface as below image will be shown.

Home　Confluence　Movie　Counting　Dual view　Open　Save as

Export

Dual project creation

Data list

Graph

Preview window　Zoom bar　Image information　Save with scale bar　Insert scale bar
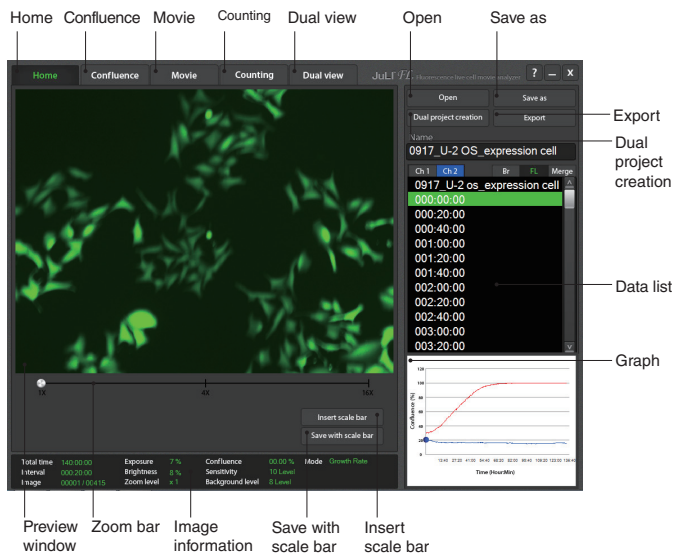
Operation
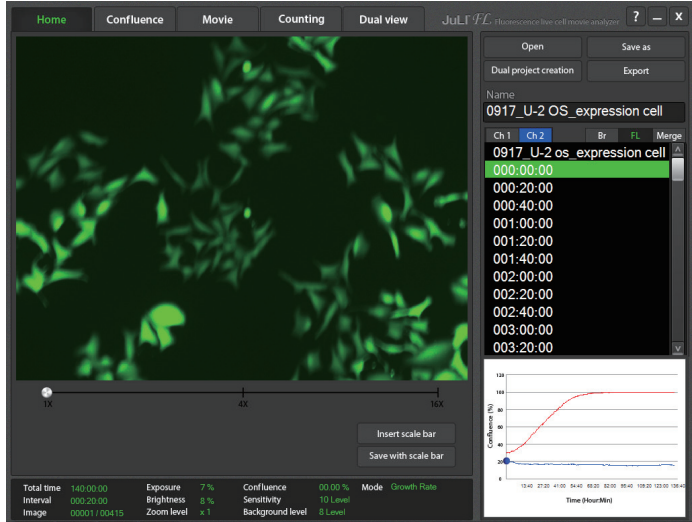
PC software
Home

PC software
Open data

1. Press the **Open button.**

· Folders and files can be opened by dragging and dropping on data list window directly.
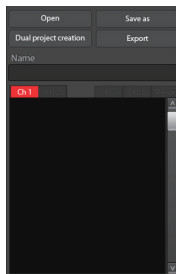
2. Browse the folder and select it.
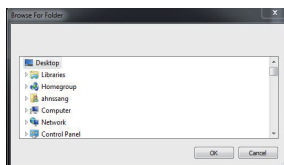
Operation

PC software
Open data

3. If data is opened successfully, data list can be checked as below image.
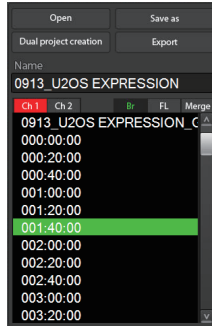
4. Select the name of image in the data list. The preview window will show the image and movie you selected.
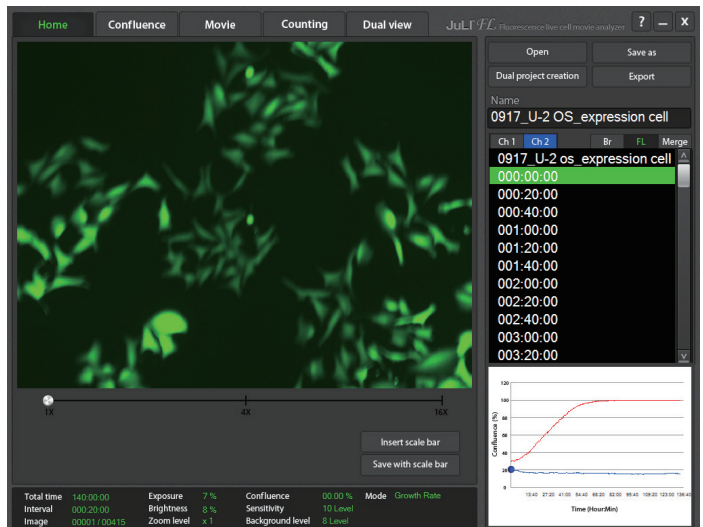
• In the case of dual monitoring data, control sample folder and experimental sample folder can be checked easily using the **Channel tab.**

Operation

5. The image can be magnified using the **Zoom bar.**

6. Select the viewing region by dragging the preview window.
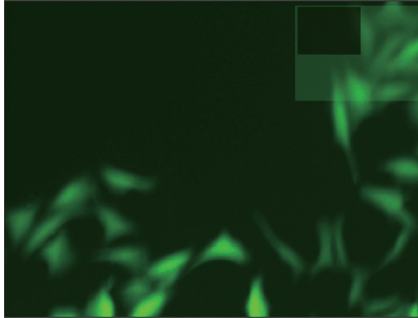
7. Press the Insert scale bar button to activate the scale bar on the preview window, if necessary.

• Press the Save with scale bar button to save an image with scale bar information.

Operation

PC software
Dual project creation

1. Individual movie files from 2 different single monitoring data folder can be made into one monitoring folder using the Dual project creation function. Press the **Dual project creation button** in the **Home menu.**

Dual project creation

2. Select 2 different single monitoring data folder.
· Selected movie files should have been monitored under the same interval and total time.
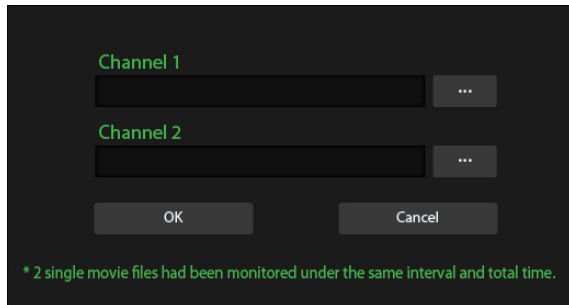
3. Press the **Make New Folder button** and type the folder name of the dual project.
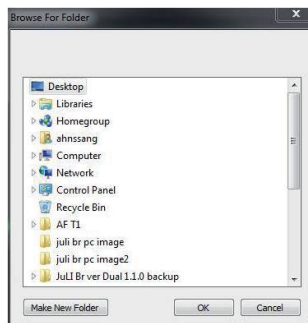
Make New Folder

4. The dual project folder will be created after working process is done.

Work in progress.(00123/06367)   Cancel
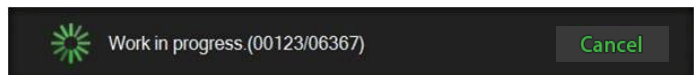
Operation

Export data

1. Press the **Export button.** Information of each image in folder can be exported.
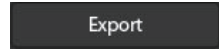
Export

2. Select the folder where exported file should be saved.Type the file name for saving exported file.
☞The file will be saved as csv file, which is compatible with Excel and Notepad programs.
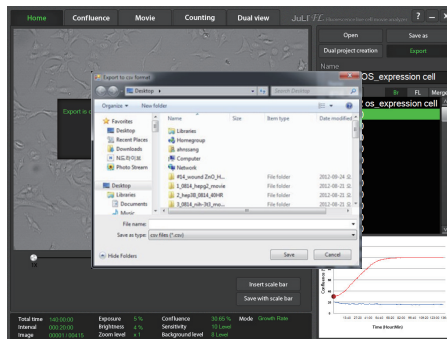
3. Select the check box of each channels in the case of dual monitoring data and the press the **OK button**.
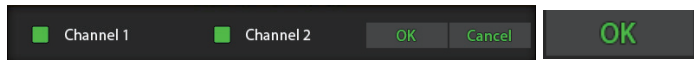
4. Press the OK button when the confirmation message shows up.
The exported file can be found in the selected folder.
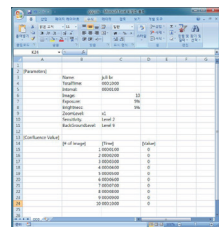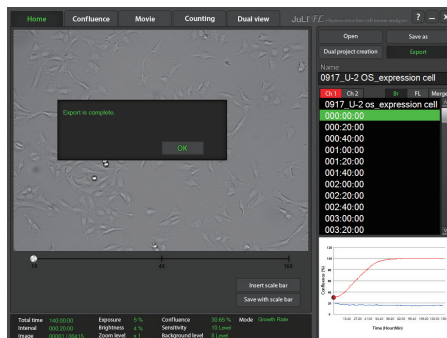
Operation

PC software

Confluence
(Bright mode only)

1. Press the **Confluence menu**.

2. Select one image (Bright image) file whose confluence value should be recalculated.

3. Adjust the image by changing parameters.
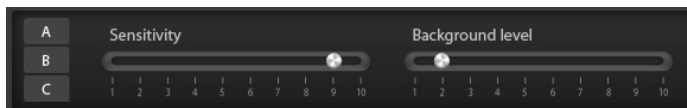
- Refer to the recommended sensitivity and background corresponding to cell line.

Parameter	Cell line	Recommendation
A(Default)	HepG2, GH3, Hep3B, A549, MCF7, SH-SY5Y, SCN2.2, NIH-3T3, F9, HeLa, Du-145	Sensitivity level 9 Background level 2
B	LNCaP	Sensitivity level 10 Background level 2
C	U-2 OS, ADSC	Sensitivity level 10

4. Press the **Confluence button**. The confluence value would be recalculated by new sensitivity level and background level.

· If the confluence value from step 4 is good enough to use, then check the **Apply box** to apply new sensitivity and background level to the rest of images in the same folder.

Check the channels **(Channel 1 or Channel 2)** and press the **OK button** to get new confluence value.
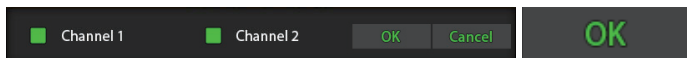
5. Confluence graph would be redrawn.
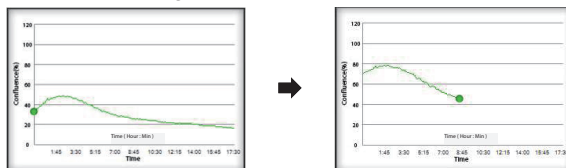
6. Press the **Save as button** to save the images with the new confluence values.

Operation

PC software
Edit movie file

1. Press the **Movie menu.**

2. Recorded movie can be shortened easily through the JuLI™ FL PC Software. Set the start point and end point by moving the bar.
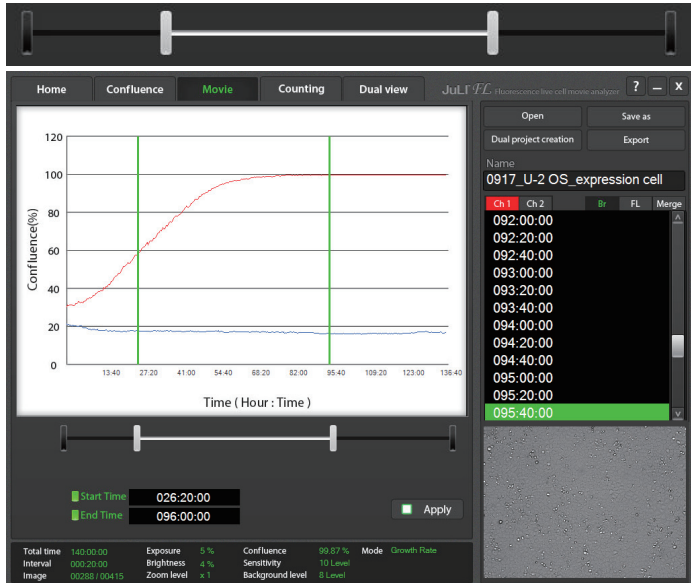
3. Check the **Apply box** to edit the movie.

4. Press the **Save as button** to save the edited movie.

5. Select the folder in which the edited movie should be saved and press the **OK button.**

6. Select the channel you want to apply.

Operation

PC software

Recount bright data

1. Press the **Counting menu.**
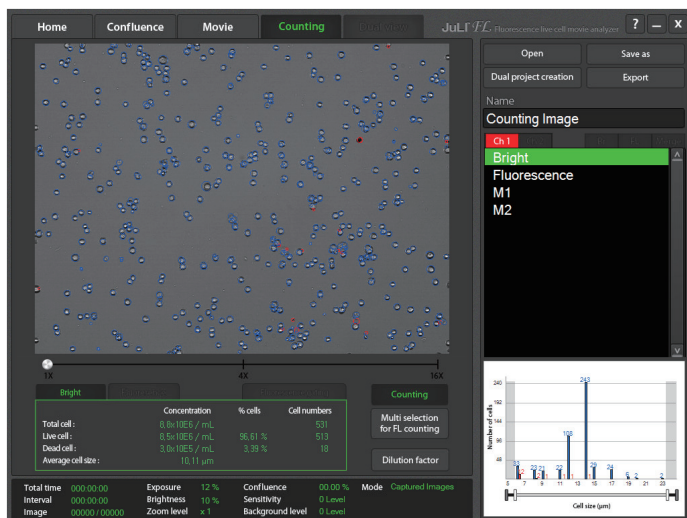
2. Press the **Dilution factor button** to change the dilution factor according to the experiment conditions, if necessary (Refer to page 44).

· The dilution factor is set as **"2"** in this sample data.

3. Select a **File name of the bright image** in the data list and press the **Counting button** to recalculate.

4. The counting results including the total cell, live cell, dead cell, and average cell size show up on the **Bright tap.**
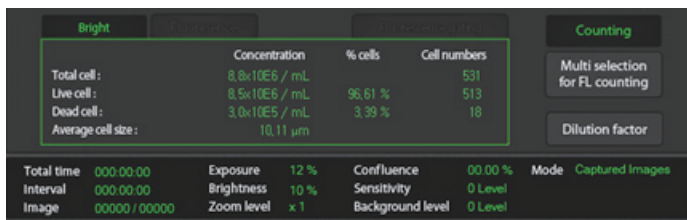
Operation

PC software

Recount bright data

5. Determine the value for the **minimum cell size** and the **maximum cell size** touching the control bar (◀|▶) to adjust minutely.
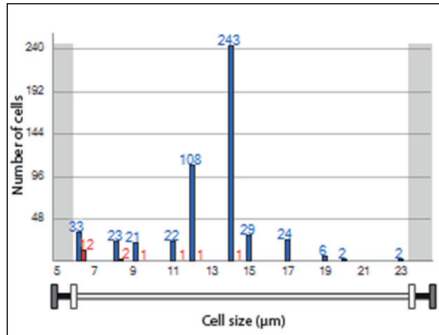
· The set-value will be immediately reflected in the **Counting results**.

Operation

PC software

Recount
fluorescence data

1. Press the **Counting menu.**
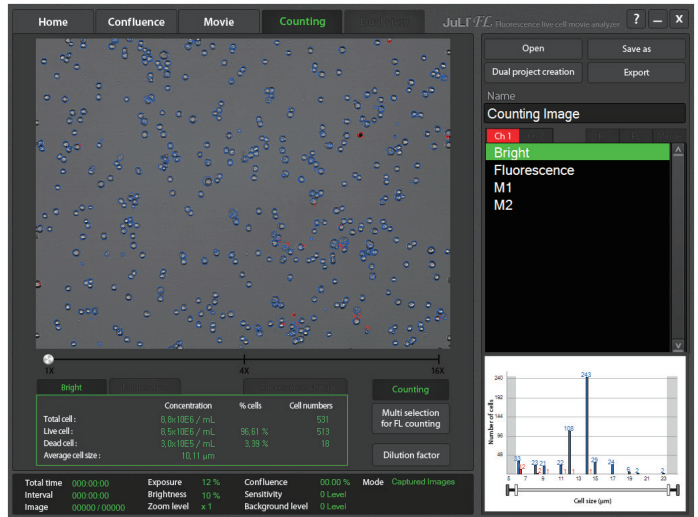
2. Press the **Dilution factor button** to change the dilution factor according to the experiment conditions, if necessary (Refer to page 44).

· The dilution factor is set as **"1"** in this sample data.

3. Press the **Multi selection for FL counting button** and select a pair of data including one **bright image** and one **fluorescence image.**

4. Press the **Counting button** to recalculate.

Operation

5. The counting results including the total cell, live cell, dead cell, and average cell size show up on the **Bright tap.**

6. The counting results including the total cell, fluorescence cell, non-fluorescence cell and average cell size show up on the **Fluorescence tap.**

7. The counting results including the total cell, fluorescence cell, non-fluorescence cell, average cell size show up on the **Fluorescence gating tap.**

Operation

PC software
Recount
fluorescence data

8. The counting results including the total cell, fluorescence cell, non-fluorescence cell and average cell size show up on the **Fluorescence tap.**

<Before fluorescence gating>   <After fluorescence gating>
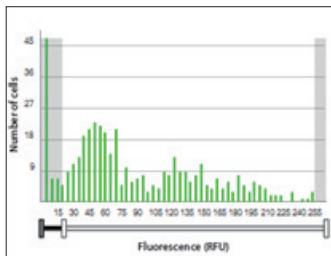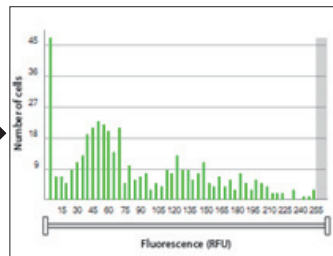
· The set-value will be immediately reflected in the **Counting results.**

Operation

PC software
Dual view

1. Dual monitoring data can be checked at once in the Dual view menu. Press the **Dual view menu.**

Dual view

2. Summary of the dual monitoring will be shown.
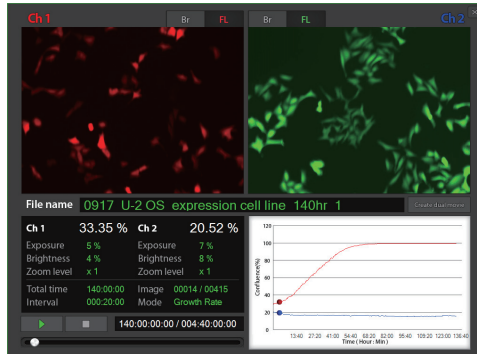
3. Select the modes (Br or FL) of each channel.

Br   FL
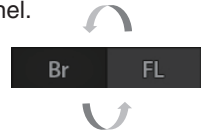
· The JuLI™ FL supports the dual monitoring function that enables a user to compare the GFP-RFP samples, and Bright samples at the same time.

4. Press the **Create dual movie button** to make the control sample and the experimental sample data in a single movie.

Create dual movie

Operation

PC software
Dual view

5. Type a file name of the merged movie and press the **Save button.**
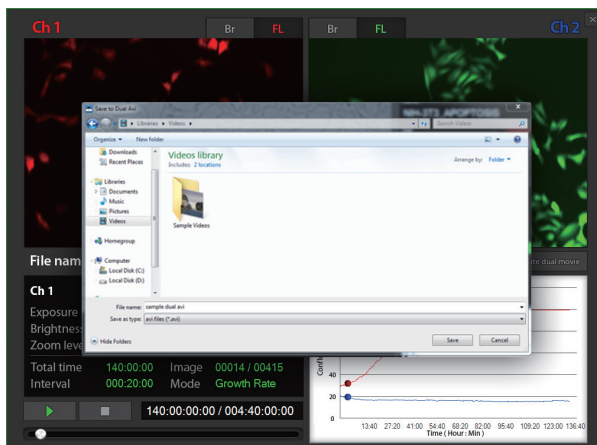
6. The merged movie file will be created after merging process is done.
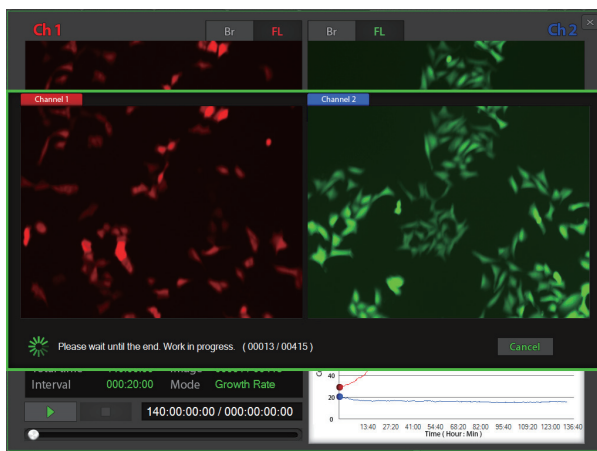
Cleaning & maintenance

Clean the surface of JuLI™ FL instrument with a damp cloth.
To clean the LCD screen, turn off JuLI™ FL instrument, disconnect the power cable, and clean the LCD screen with a soft cloth lightly moistened with LCD cleansing detergent. Cleaning the screen with excessive force can damage the LCD screen.

If liquid spills on JuLI™ FL, turn off the power immediately and wipe dry.

JuLI™ FL does not need regular maintenance. To troubleshoot problems with JuLI™ FL, contact Technical Support (Refer to page 72).

⚠ IMPORTANT

Never disassemble or service JuLI™ FL by yourself.
   *Unauthorized repairs may damage JuLI™ FL or alter its functionality, which will void your warranty. Contact **sales@nanoentek.com** or your local JuLI™ FL distributor to arrange for service.*

Always wipe surfaces with ethanol-soaked paper towels.
   Do not directly spray ethanol anywhere on JuLI™ FL.

Avoid exposing JuLI™ FL to UV light
   UV light may degrade components, including plastic. Damage from UV exposure is not covered under the manufacturer's warranty.

Troubleshooting

Installation	
JuLI™ FL does not power up	· Check on/off switch on back side of station unit.
	· Check power source or contact your distributor.
LCD screen is black	· Touch the LCD screen with your finger.
	· Check if power supply is connected and power switch is on.
	· Reset the power button.
Focusing and Monitoring menu are not activated	· Check if the scope unit and station unit are connected properly.
Get an error message while connecting the 2nd scope unit	· Connect the 2nd scope unit to the station unit after connecting the 1st scope unit first using the connection cable.

Focus	
Focus knob or focus interface doesn't work	· Check if the focus interface is inactive or not.
	· Move the focus knob to the opposite side.

Monitoring	
Poor image (Too dark and too bright)	· Re-optimize the brightness and the exposure value.
	· Reset the power button
Dirty image	· Swipe the stage with cotton swab carefully.
	· Eliminate any dust on the culture dish.
	· Check for and remove any condensation on the lid of the culture dish.
Time-lapse images become dark or bright	· Warm up the instrument for 1 hour before monitoring (The power should be on when warming up the instrument.).
	· Cell culture flask should be wetted by the culture media before making a movie.
	· Eliminate any dust on the culture dish.
	· Remove any condensation on the lid of the culture dish.
	· To prevent any problem such as shaking of culture dish or inflowing light, pay special attention when you open or close an incubator door during monitoring.
Can't set the interval	· Check the minimum interval (Refer to page 24).
Problem for saving movie file	· Check available volume of the hard disk.

Troubleshooting

Monitoring	
Can not continue recording. Do you want to save the recording files	· Recording files are going to be saved as the last state before recording stopped.
Data	
Can not play the movie properly.	· Create movie file with time-lapse images using JuLI™ FL PC software.
Setting	
'JuLI FL Update' folder does not exist in the USB drive.	· Download 'JuLI FL Update' folder on NanoEnTek website (www.nanoentek.com).
The update files do not exist in the USB drive.	· Check the files as below image. Then download 'JuLI FL Update' folder on NanoEnTek website. (www.nanoentek.com) JuLI_FL.exe

PC software	
Movie doesn't play	· Load the full folder to PC program, not just avi file.
Can't create the dual movie using 2 different single monitoring data	· Check the interval and total time and match them with same conditions.
Graph is not be shown on the movie tap	· Confluence is not measured on movie only mode. However, movie can be edited using PC program.
ETC	
Fail to capture	· Check if the scope unit and the station unit are connected properly.
Movie does not play on windows media player.	· Install the codec provided JuLI FL USB drive or NanoEnTek website.
Can not transmit the screen to external monitor through display port	· Check the resolution of the outer monitor (resolution 1366 X 768 pixels). · Make sure to turn off instrument before connecting.

Warranty

NanoEnTek provides 1-year warranty service for defects of material and workmanship.

If any defects occur in JuLI™ FL, NanoEnTek provides free repair service for the defective parts at its discretion.

The following defects, however, are specifically excluded:

1. Defects caused by improper operation.
2. Repair or modification done by anyone other than NanoEnTek or an authorized agent.
3. Damage caused by substituting alternative parts.
4. Use of fittings or spare parts supplied by anyone other than Nanoentek.
5. Damage caused by accident or misuse.
6. Damage caused by disaster.
7. Corrosion caused by improper solvent or sample.

For your protection, JuLI™ FL units being returned must be insured against possible damage or loss. NanoEnTek cannot be responsible for damage incurred during shipment of a defective instrument. It is recommend that you save the original packing material in which the instrument was shipped. This warranty is limited to the replacement of defective products.

For any inquiry or request for repair service,
contact **sales@nanoentek.com** or your local distributor.

Safety precautions

Review and follow the safety instructions below :

· If water or other material enters the instrument, adaptor, or power inlet, disconnect the power cord and contact a service person. For operating environment, Check product Specifications (Refer to page 70).

· Do not touch the main plug or power cord with wet hands.

· Always ensure that the power supply input voltage matches the voltage available at your location.

· This instrument is air-cooled and its surfaces may become hot during operation. During installing, leave a space of more than 10 cm (4 inches) around the instrument and do not place any objects between the instrument and the walls.

· Do not install an instrument on a slant or a place prone to vibrations, which induces the risk of malfunction or damage of the instrument.

· Never insert any objects into the air vents of the instrument as this could result in electrical shock, personal injury, and equipment damage.

· Plug the power cord firmly into the wall outlet and AC adapter.

· To avoid potential shock hazard, make sure that the power cord is properly grounded.

· Be sure to position the equipment such that it is easy to disconnect.

· Turn off the instrument before unplugging the power cord and/or moving the instrument.

· If the instrument is dropped or broken, disconnect the power cord and contact a service person. Disassembly of case will void warranty.

· Use only authorized accessories (adaptor, power cord, and USB drive).

⚠️Warning

Class A equipment is intended for use in an industrial environment. In the documentation for the user, a statement shall be included drawing attention to the fact that there may be potential difficulties in ensuring electromagnetic compatibility in other environments, due to conducted as well as radiated disturbances.

Safety precautions

Review and follow the safety instructions below :

Symbol	Meaning
⚠	Caution & Warning
⏚	Protective earth (Ground)
CE	This instrument and consumables conforms to the Declaration of Conformity.
FCC Compliance	This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.
🗑	Disposal of your old appliance 1. When this crossed-out wheeled bin symbol is attached to a product it means the product is covered by the European Directive 2012/19/EU. 2. All electrical and electronic products should be disposed of separately from the municipal waste stream via designated collection facilities appointed by the government or the local authorities. 3. The correct disposal of your old appliance will help prevent potential negative consequences for the environment and human health. 4. For more detailed information about disposal of your old appliance, please contact your city office, waste disposal service or visit our web-site, www.nanoentek.com.

Product specifications

Environmental conditions

Electrical input	AC 100 - 240Va.c., 1.9A, 100W
Frequency	50 / 60 Hz
Installation site	Indoor use only
Operating temperature	5 - 40 °C
Maximum relative humidity	20 - 95 %

Instrument

Magnification	4 X and digital zoom (~ 450 X)
Image resolution	1280 x 960 pixels (1.3 M)
Exported formats	JPEG, TIFF, BMP, PNG (image), AVI (movie), CSV (raw data)
Display	10.1" LCD touch screen
Light source	GFP channel (JULI-FLG04): Blue LED
	RFP channel (JULI-FLR04): Green LED
Optical filter	GFP channel (JULI-FLG04): Excitation 466/40 nm, Emission 525/50 nm
	RFP channel (JULI-FLR04): Excitation 525/50 nm, Emission 580LP
Dimension & weight	Scope unit : 300 x 190 x 188 mm, 4.5 kg
	Station unit : 282 x 285 x 160 mm, 3.2 kg
Storage	320 GB Hard disk drive, 4 GB USB drive
Power	AC100 - 240Va.c.,, 1.9A, 100w, 50/60 Hz
Operating Environment	5 - 40 °C, 20 - 95 %

Counting function

Counting time	< 10 seconds
Cell measurement range (cells/mL)	$1 \times 10^4 – 1 \times 10^7$
Optimal measurement range (cells/mL)	$1 \times 10^5 – 4 \times 10^6$
Cell size range	5 ~ 60 µm
Sample volume	10 µL

Ordering information

Cat. No.	Description	
Device		
JULI-FLG04	JuLI FL (Single set)	
JULI-FLGD04	JuLI FL (Dual set)	For GFP channel
JULI-FGSC	Scope unit of JuLI FL	
JULI-FLR04	JuLI FL (Single set)	
JULI-FLRD04	JuLI FL (Dual set)	For RFP channel
JULI-FRSC	Scope unit of JuLI FL	
Accessories		
JULI-BRTB	XY stage	
Disposable		
JULI-BRS50	Cell counting slide	50 slides (100 counts)
JULI-BRS1000	Cell counting slide	1,000 slides (2,000 counts)
JULI-BRS5000	Cell counting slide	5,000 slides (10,000 counts)

Technical support

Visit our Website at **www.nanoentek.com** for :

· Technical resources, including manuals, FAQs, etc.
· Technical support contact information
· Additional product information and special offers.

For more information or technical assistance, please call or email.

NanoEnTek Inc. (HQ)
12F, 5, Digital-ro 26-gil, Guro-gu, Seoul, 08389, Korea
Tel : +82-2-6220-7940
Fax : +82-2-6220-7721

NanoEnTek USA Inc.
5627 Stoneridge Drive Suite 304, Pleasanton, CA 94588, USA
Tel : +1-925-225-0108, +1-888-988-0108(Toll free)
Fax : +1-925-225-0109

Email
sales@nanoentek.com

Website
www.nanoentek.com

JuLI™ FL User Manual
Website : www.nanoentek.com
E-mail : sales@nanoentek.com

The information in this manual is described
as accurately as possible.
The changes involved in firmware and software may be
applied without notification.