JuLI™ Br

Live cell movie analyzer
User Manual
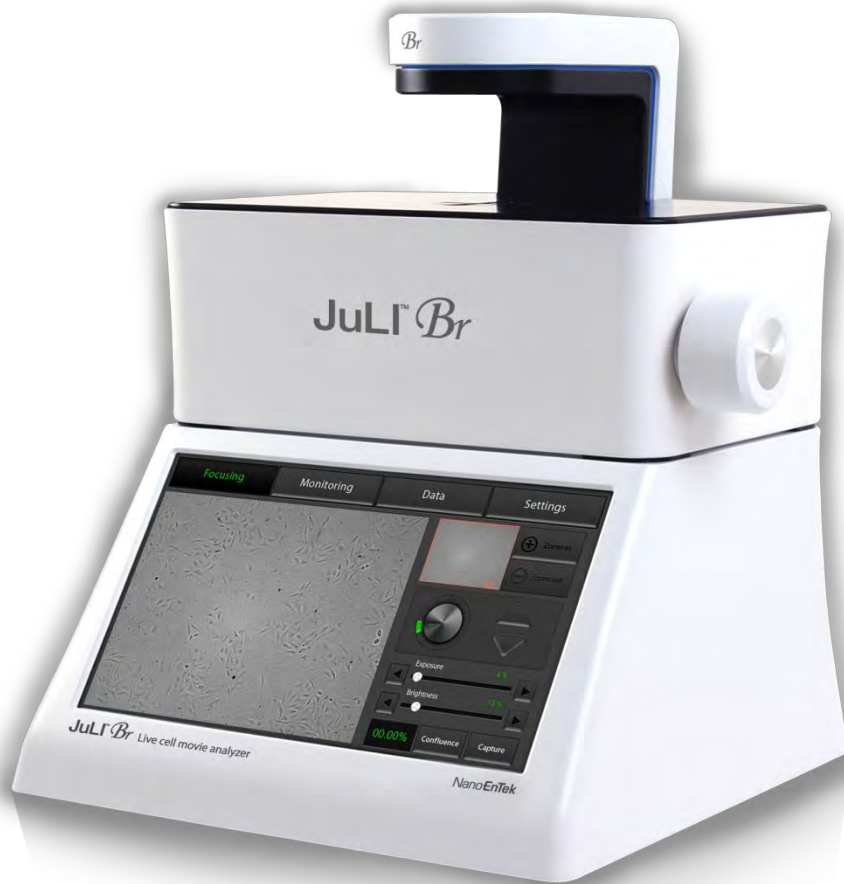
NanoEnTek

Table of Contents

Product contents

JuLI™ Br is shipped with the following components.
Please check that all items listed below were shipped, receiving the instrument.
If any items are missing or damaged, contact your local distributor or
sales@nanoentek.com

Scope unit (JULI-BRSC)	Station unit (JULI-BRST)	Power Cord (4 pcs/set, for U.S./Canada/ Taiwan/Japan, Europe or UK)	Connection cable (3 M)
1 EA	1 EA	1 EA	1 EA

USB drive (4 GB)	User manual	Quick manual
1 EA	1 EA	1 EA

*Optional items
*2nd scope unit
*Connection cable (5 M)

☞ Model JULI-BR04 <Scope unit> is only used in conjunction with the
  <Station unit>.

Product overview

Increasing number of researchers are using live-cell imaging to study cellular functions. The JuLI™ Br, a smart Bright-cell movie analyzer, was developed to enable a variety of biological experiments.

JuLI™ Br uses state-of-the-art optics to get live-cell images from various cell culture dishes. Allow to detect the quantified cell confluence results with low variation and make growth curve using image based analysis.

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

Features of JuLI™ Br, live cell movie analyzer :

- **Compatible to cell-culture incubator**
  : Operate inside cell-culture incubator with compact & compatible design

- **Time-lapse image capture & recording movie**
  : Sequential time-lapse images are stored and can be converted to movie file automatically

- **Automated quantitative cell confluence analysis**
  : Quantified cell confluence results with low variation and growth curve

- **10.1" color LCD touch screen**
  : Easy-to-use system control

- **Semi-automated focusing through LCD**
  : Focus adjustment using focus interface on LCD with knob

- **Dual system (*Optional)**
 : Compare the control & experimental data at same time

Installation

Installing JuLI™ Br

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

This compact design allows installation of device in a incubator prevents contamination by maintaining a sterile environment. And also the easily-viewed display allows quick and convenient to use in a cell culture incubator to capture time lapse imaging.

Dimensions of Scope unit	Size
Width	300 mm
Depth	190 mm
Height	188 mm
Weight	4 kg
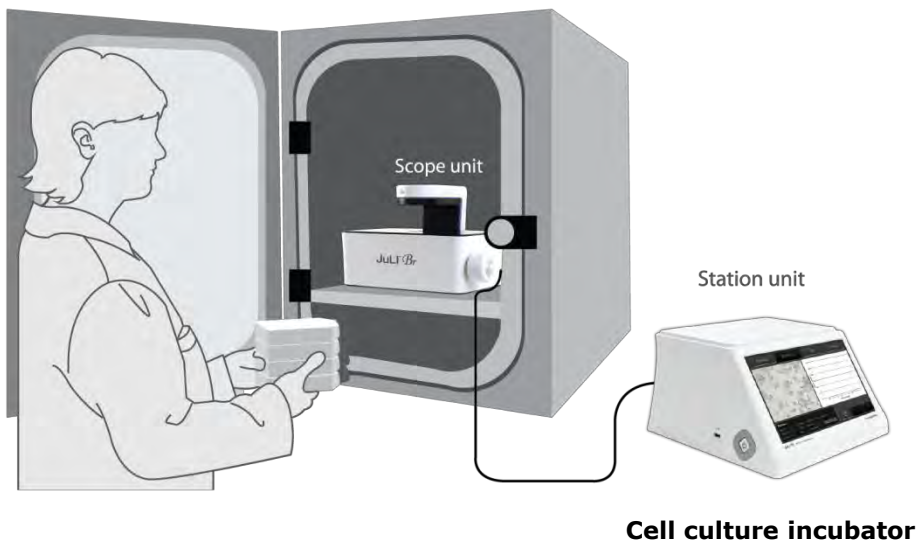
Cell culture incubator

⚠️

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

⚠️

IMPORTANT! *Always wipe surfaces with ethanol-soaked paper towels, not directly spray ethanol anywhere on JuLI™ Br.*

Installation

Installing
JuLI™ Br

1. Place the instrument on a flat, level and dry surface after unpacking the instrument. Allow at least 10 cm (4 inches) of free space at the back of JuLI™ Br to allow for proper ventilation and prevent overheating of electronic components.
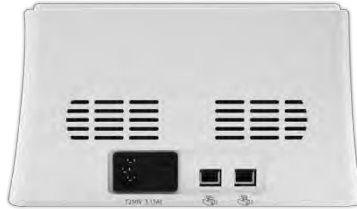
2. Plug the supplied power cord into JuLI™ Br.

3. Connect scope unit to station unit using supplied connection cable.
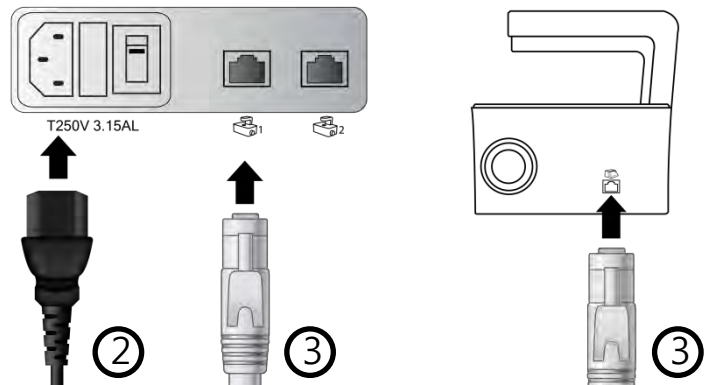
4. Plug the power cord into the electrical outlet. Be sure to only use the power cord supplied with the instrument. Powering the instrument with an unapproved power cord may damage the instrument.

5. When JuLI™ Br is ready to use, start JuLI™ Br by pressing the **Power button** on the station unit.

Description

<Station unit>
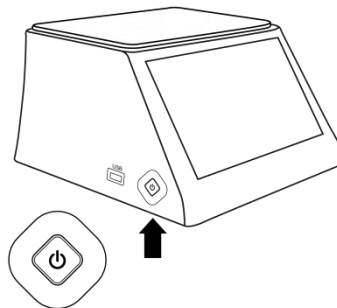
· **LCD touch screen**

  : located at the front of the instrument contains buttons for necessary functions and displays bright field images.

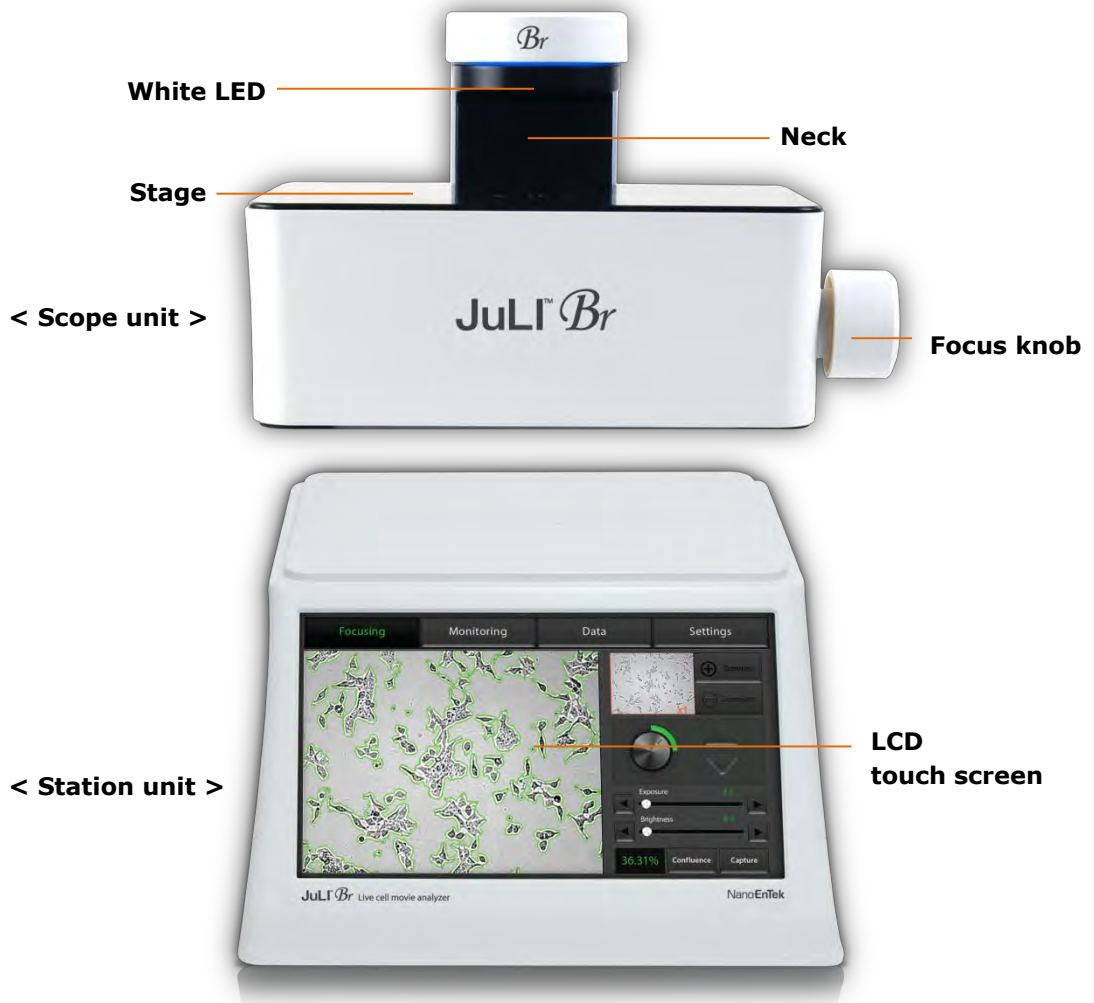**<Scope unit>**

· **Focus knob**

  : used to adjust the image quality to obtain better bright cell images.

· **Stage**

  : used to place sample here.

· **White LED**

  : used for bright image viewer.

White LED ——————

————————— Neck

Stage ——————

< Scope unit >

—————— Focus knob

< Station unit >

—————— LCD touch screen

Description

<Station unit>

· **Power button**

: used to turn the instrument on and off.

· **USB Port**

: insert a USB drive to save and transport images to PC.

<Scope unit>

· **Connection port**
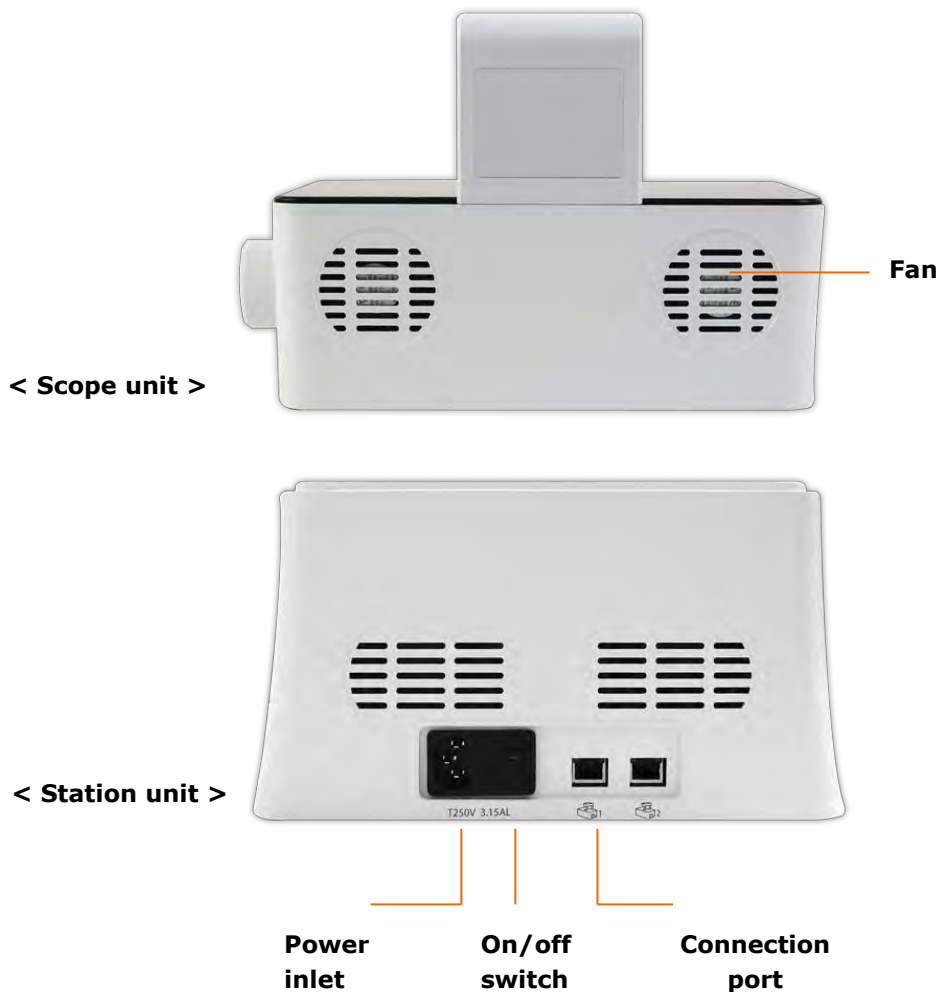
: port to connect scope unit with station unit .

< Scope unit >   Connection port

USB port

Power button

< Station unit >

Description

<Station unit>

· **Power inlet**
: connects JuLI™ Br 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**
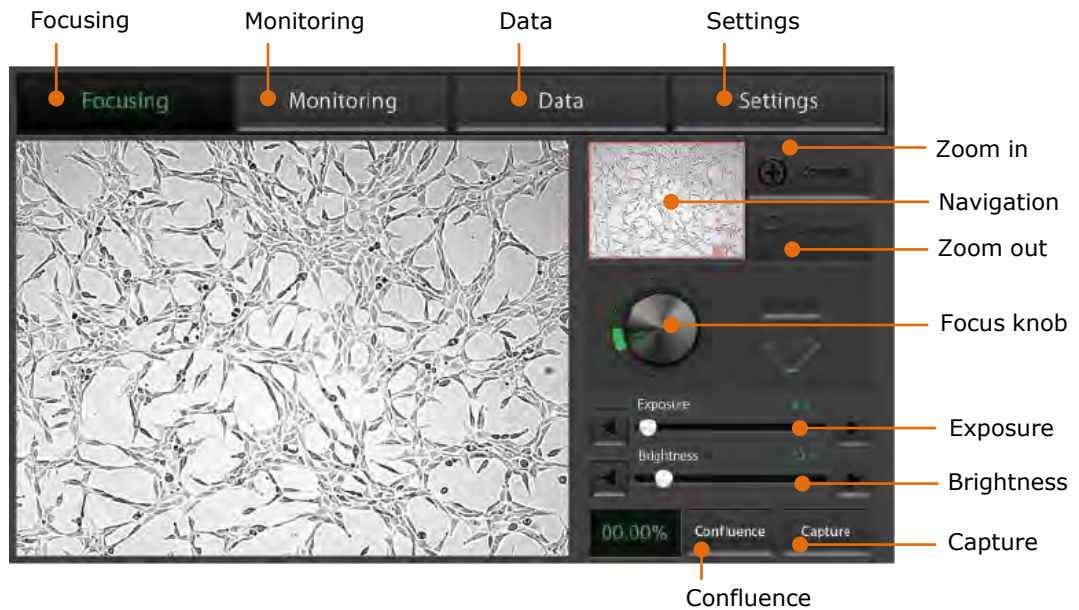: the main power switch. It is not necessary to use the on/off switch for day-to-day operation of the instrument.

<Scope unit>

· **Fan**
: machinery cooling system.

Fan

< Scope unit >

< Station unit >

T250V 3.15AL

Power inlet   **On/off switch**   **Connection port**

Description

User interface

Focusing   Monitoring   Data   Settings

Zoom in

Navigation

Zoom out

Focus knob

Exposure

Brightness

Capture

Confluence

The touch screen user interface of JuLI™ Br, Live cell movie analyzer provides new tools to expand cellular research through proprietary software. Insightful data can be acquired, such as proliferation assays.
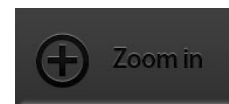
Operation

1. Press the **Power button** to start JuLI™ Br.
   The main screen will be displayed.

2. Place the sample on the stage.

3. To adjust Illumination intensity, use the **Exposure** and **Brightness bar** on the touch screen.
   Touch the arrow button (◄ | ►) for adjusting more minutely.

4. If it is necessary, use **Zoom button** to magnify the desired region.

5. And if focus of viewing region should be moved, tap a point on navigation window or drag preview window.

6. While viewing cells, use the **Focus knob** or **Focus interface** to further adjust the focus.

Operation

Focusing
: Adjust the focus

< coarse focus interface >

< fine focus interface >

☞ Type of focus interface would be switched by tapping circle point.

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

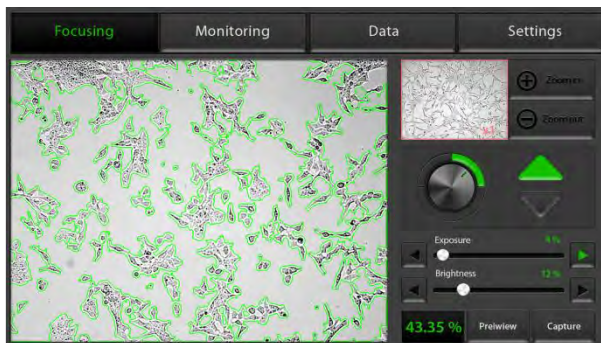The images below show the reference images to adjust focus.

Du-145 / Parameter A

Good setting

Exposure 4
Brightness 1

Normal setting

Exposure 6
Brightness 3
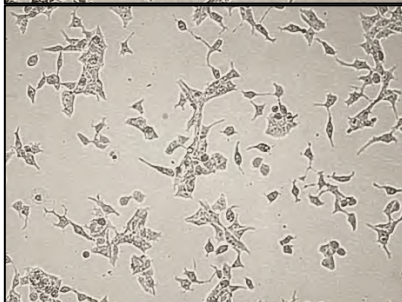
Bad setting

Exposure 6
Brightness 5

Operation

Focusing

: Confluence

1. Adjust the focus of JuLI™ Br using **Focusing menu**. (**on page 11 - 12**)

2. Press **Confluence button**.

   Confluence

3. Value of confluence would be shown.

   ☞ If the value of confluence should be more accurate, try again after adjusting parameter in **Setting menu.** (**on page 26**)
   Parameter is the recommended value for corresponding to cell line.

   ☞ If confluence should be recalculated, press **Confluence button** after pressing **Preview button** first.

   Preview

4. Press the **Capture button** to acquire image with confluence.

   Capture

5. Type the name of image that should be saved. Then, press **Save button**.

   Save

Operation

Focusing

: Confluence

6. Check confirmation message **'Capture complete'**.
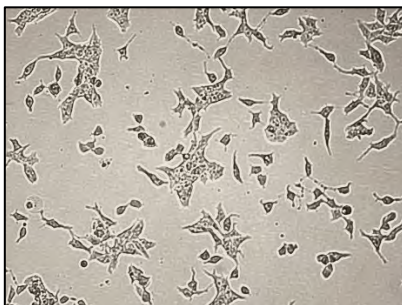   Saved data can be opened in Data menu. (**on page 20**)

The images below show the guideline for focus to obtain accurate the cell confluence.
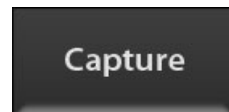
Du-145 / Parameter A

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

1. Adjust the focus of JuLI™ Br using **Focusing menu**. (**on page 11 - 12**)

2. Press the **Capture button** to acquire the image.

3. Type the name of image that should be saved. Then, press **Save button.**

4. Check confirmation message 'capture complete'. Press **OK button.**
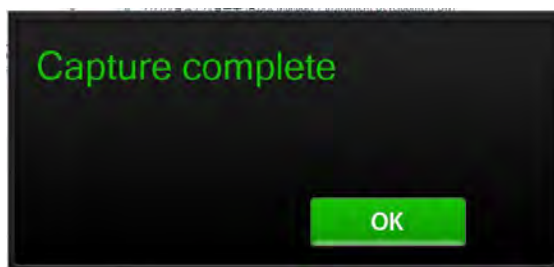
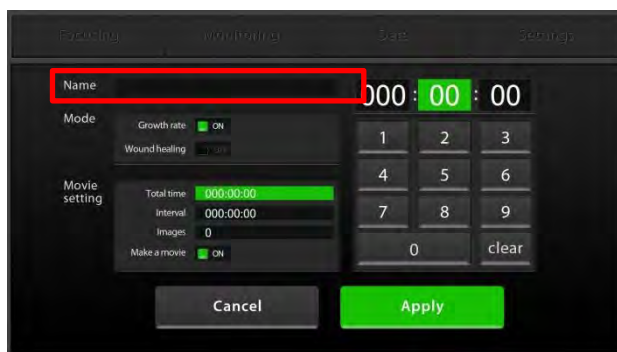5. Saved data can be opened in Data menu. (**on page 20)**

Operation

Monitoring

1. Adjust the focus of JuLI™ Br and select the region that should be monitored using **Focusing menu**. **(on page 11~12)**
   After then, press **Setting button**.

2. Press the **Name form** to type file name for saving images or movie.
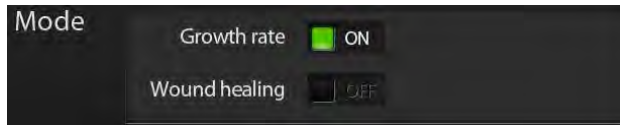   And press **Save button**.

⚠️

*IMPORTANT! **Warm up scope unit during 1 hour** in incubator before making a movie. If not, it might be caused of uncertain data or unclear movie.*

Operation

Monitoring

3. Choose the monitoring type among Growth rate, Wound healing rate and movie only.

☞ Movie only means just monitoring cells without graph information.
For choosing movie only, select 'off' for both growth rate and wound healing rate.

4. Press the **Total time** to set up the total running time.
Press the **Interval** to set the time interval.
For **making a movie**, select 'on' if a movie file should be created with time lapse images.
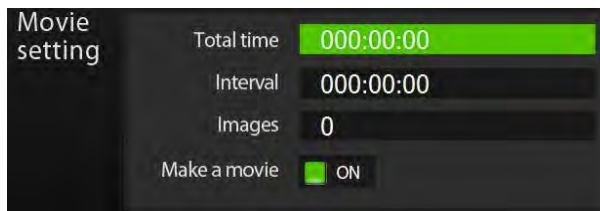
☞ time interval should be set up more than 1 minute for the best quality result in case of monitoring growth rate and wound healing rate.
In case of movie only, It is recommended 30 seconds.

☞ the number of total images would be displayed automatically when data value of "Total Time" and "Interval" is set up.
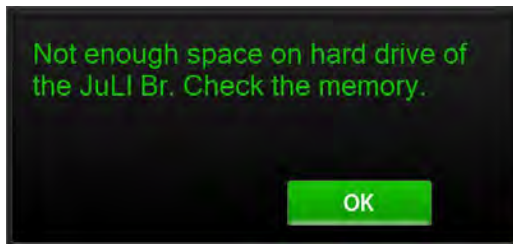

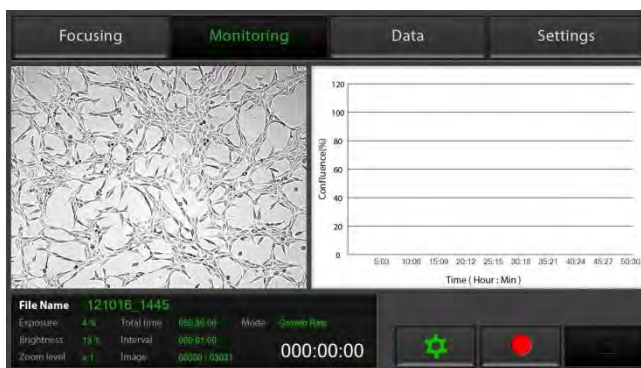5. Press the **Apply button** for saving all of options.

Operation

Monitoring

☞ If a disk volume of the instrument is not enough to save recording data, then the error message as below would be shown.
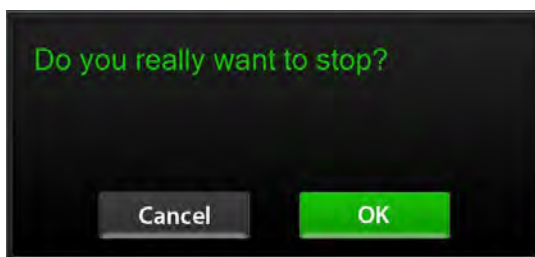Please try again after delete data in **Data menu**. (**on page 20**)

6. Press the **Rec. button** to begin recording.
JuLI™ Br displays live cell images continuously during recording.

☞ If the movie should be finished while recording, press **stop button.**
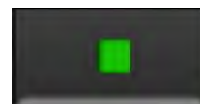
then, the confirmation message as below would be shown up. Press **OK button**.

⚠

IMPORTANT! *Warm up scope unit during 1 hour*
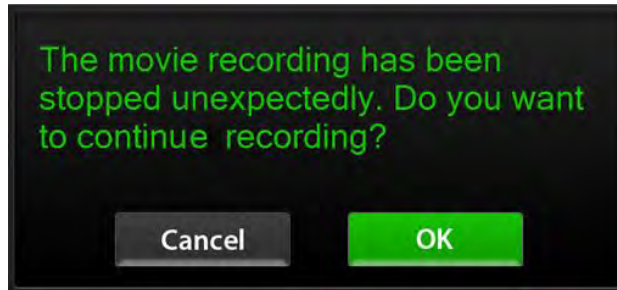*in incubator before making a movie.*

If not, it might be caused of uncertain data or unclear movie.

Operation

Monitoring

☞ Unexpected problems such that the power is off suddenly or the scope unit is not connected to station unit while movie recording could be happened.

Then, the error message as below would be shown after restarting the instrument.

Recorded data before getting in problem is saved in the disk of instrument temporarily. So press **OK button** if the movie recording should be continued.

7. Recorded data can be opened in **Data menu**. (**page 20**)
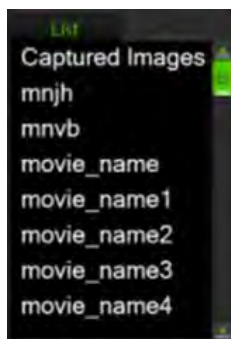
Operation

Data

: Open data

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

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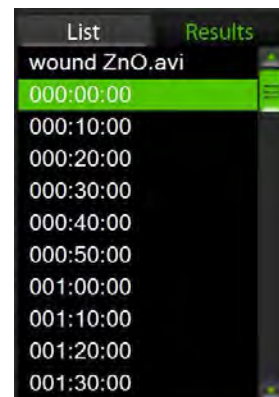

→ **Default folder for captured images**

Monitoring data folders set up by user

<List category>

2. Data can be opened or shown by double tapping folder name in **List category**, or tapping folder name once and pressing **Result category.**
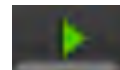

<Result category>

Operation

Data

: Open data

3. Recorded movie or image file could be shown by tapping its file name. Movie file can be checked by pressing **Play button** .

4. Magnify movie screen or image screen widely if it is convenient.
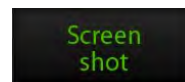
Operation

Data

: Screenshot

1. Insert USB drive into USB port.

   ☞If a USB drive is not inserted into USB port, screenshot function can not be used.

2. Press **Screenshot button**.

3. Select the desired capture region by moving icon.
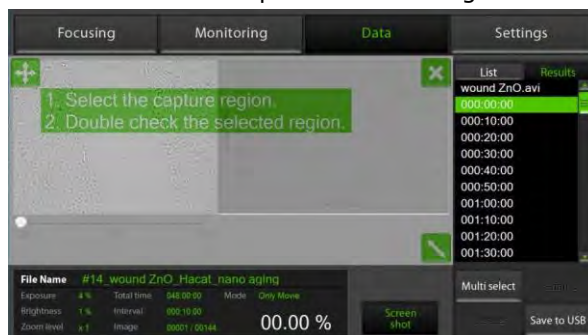

4. Select the screen size of snapshot by size icon.

   ☞ Snapshot capture process can be canceled by pressing cancel icon
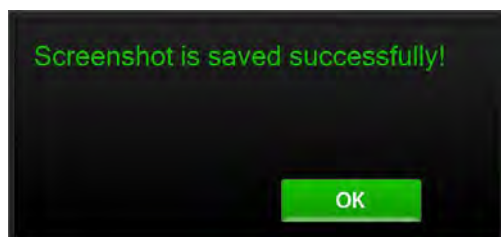

5. After then double tap the selected region.

6. Type the name for saving it, then press **Save button**.

7. Check confirmation message 'Screenshot is saved successfully!' .
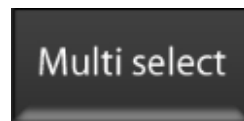
Operation

1. Insert USB drive to USB port.

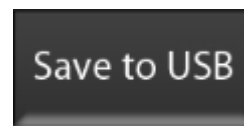   ☞If a USB drive is not inserted into USB port, can not use this function.

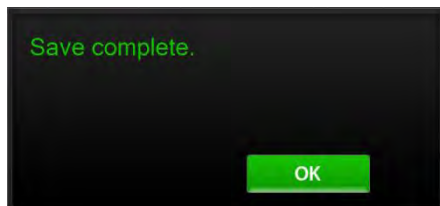2. Select the folder or file by tapping it once.

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

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

5. Confirmation message 'Save complete' is shown, saving process is completed.
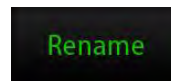
Operation

Data
: Rename

1. Select folder or file name should be changed.

☞ Rename function can be used for folders of monitored data and files in default folder 'Captured Images'. Not for each files in monitored data folder.

2. Then, press **Rename button.**

3. Enter new folder of file name using the keypad display. Then press **Save button.**

4. Check the confirmation message 'Rename complete' and renamed folder or file in List and Result category.

Operation

Data

: Delete

1. Select folder or file should be delete from the instrument.

☞ Delete function can be used for folders of monitored data and files in default folder 'Captured Images'. Not for each files in monitored data folder.
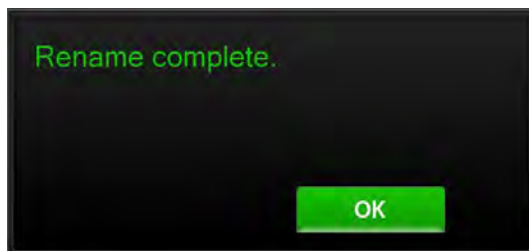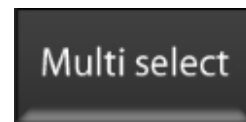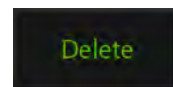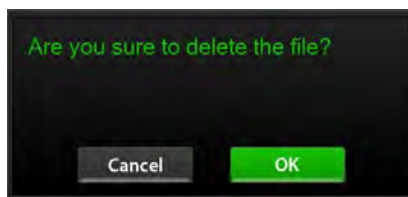

☞ Delete several folders or files at once, select all of them after pressing **Multi select button**.
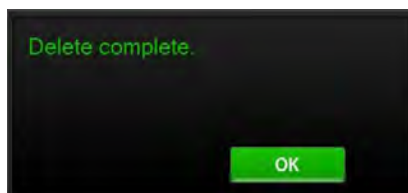
2. Delete the folder or file by **Delete button.**

☞ If 'Captured Images' folder is selected, all of image files in the folder would be deleted, but not the folder.

3. Press **OK button** for confirmation message **.**

4. Check confirmation message 'Delete complete'.

Operation

Setting
: Set up parameter

Set the recommended parameter value for corresponding to cell line.
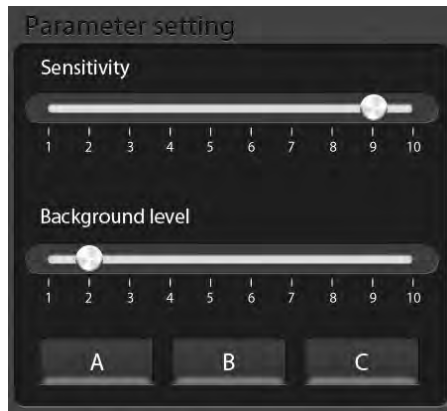Default value is A.

Sensitivity :
 refers to the contrast of the objects from the back ground.
 Increased sensitivity increases recognition of fainter objects in bright field.

Background level:
 decreased background level increases recognition of fainter objects in bright field.

| 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	U2-OS ADSC	Sensitivity level 10 Background level 8

Setting
: Update Date & Time

Set up local date & time with **up** and **down button.**

Setting
: Control LED power

Adjust the LED power intensity, touching the bar to point.
Default LED power is 10.
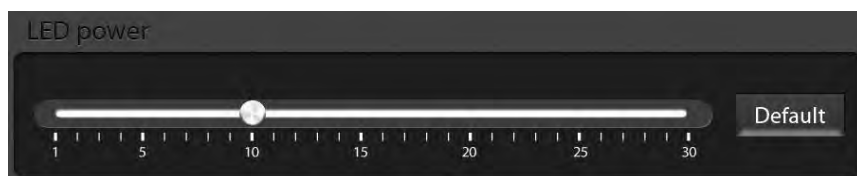
Operation

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

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

2. Visit JuLI™ Br website at **www.nanoentek.com** to download updated software which is supplied as a .zip file to your desktop.
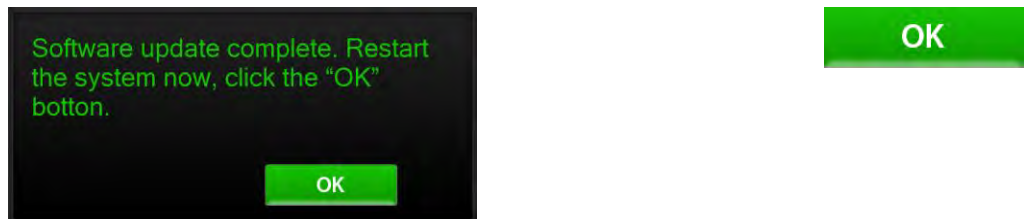
3. Unzip the .zip file and save the software to a USB.

4. Insert the USB drive into the USB port on JuLI™ Br.

5. Check the version of software, firmware and OS is the latest one.
   Press **Update button**. The update process takes a few minutes.

Software	Firmware	OS	
Version	Version	Version	Update
s1015_4 beta	0.02- 0.02-120801	Unknown	
Update	Update		

6. Restart JuLI™ Br.

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

OK

Check the disk space of JuLI™ Br.
If no disk space left, saved data should be deleted in Data menu. (**on page 20**)

Disk space

Total Space: 669,560,828 MByte
Free Space: 511,884,652 MByte
Percent: 76.45 %
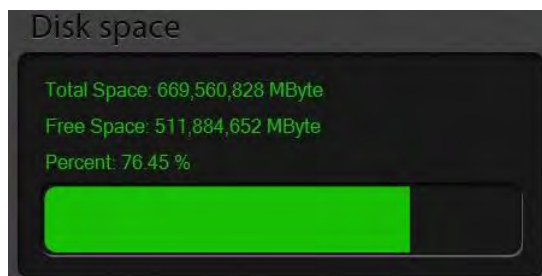
Operation

PC Software :Introduction

PC Software is designed to manage data from JuLI™ Br.

- User can review saved image from JuLI™ Br at the PC.

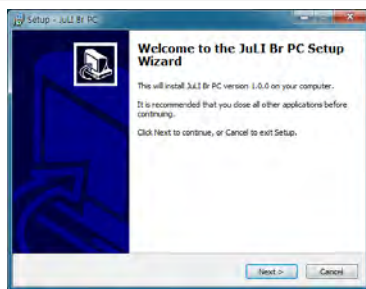- Use can recalculate confluence of all the images and edit movie.

PC Software : Installation

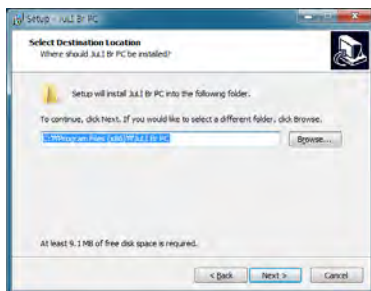To install PC software, follow the directions as below :
Check to ensure that the PC is connected to Internet and then the PC software could be installed.
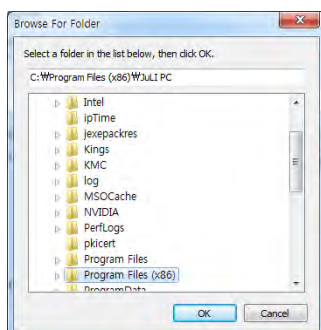

1. Insert the supplied USB drive into the computer. Then open the file "JuLI™ Br PC Software"

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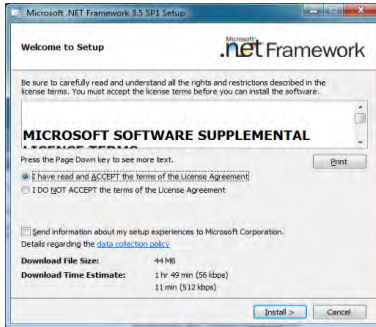

3. Click '**Next**' to start installation.

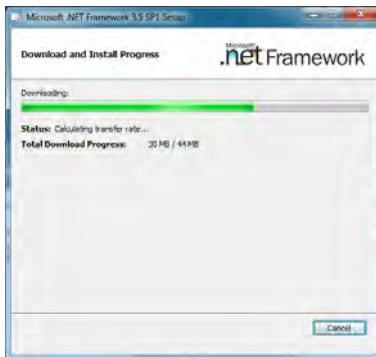4. If you want to change installation folder, click '**Browse**' and choose the location that you want.

Operation

PC Software
: Installation

5. After choosing installation folder, click "**Install**" to proceed with the installation.

6. The computer activates the "**Installation of the Software**"
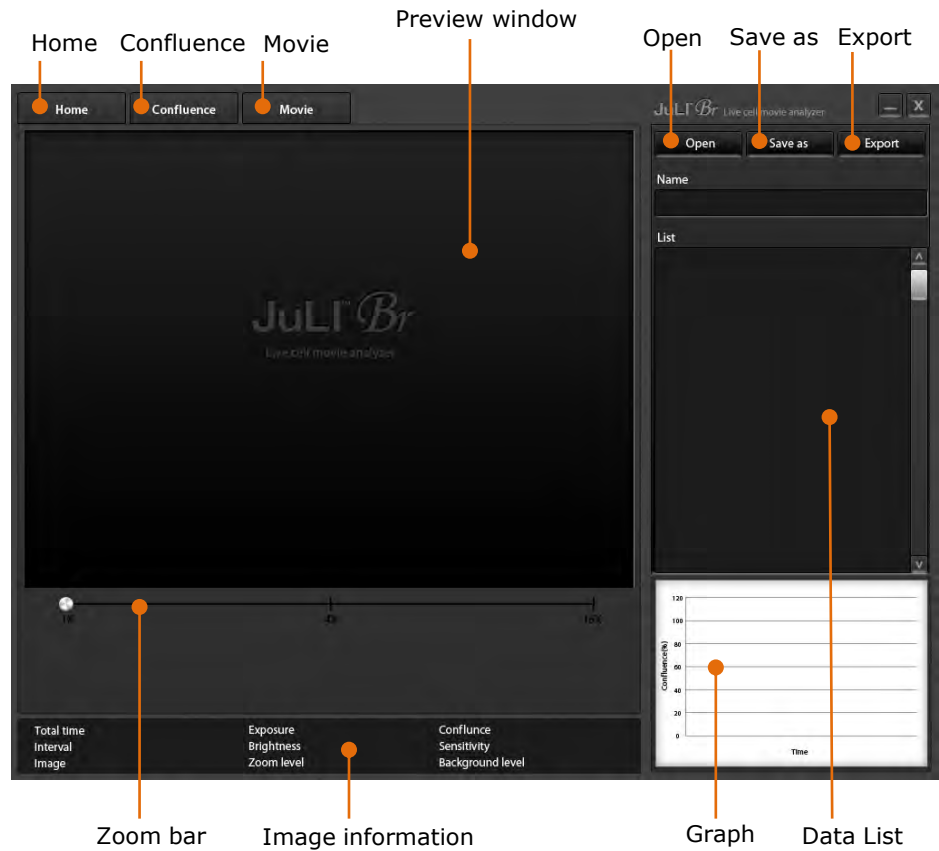

7. If the installation is successful, The PC Software program can be found at you wallpaper.

Operation

When PC Software program starts, the interface as above image would be shown.

Home Confluence Movie

Preview window

Open Save as Export

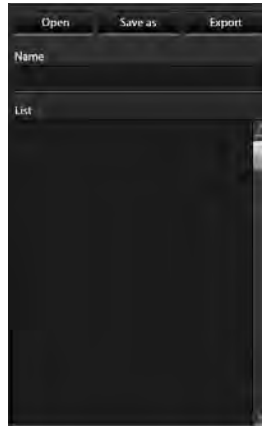Zoom bar   Image information

Graph   Data List

Operation

PC Software

: Open data

1. Click the **open button.**

   ☞Folders and files can be opened by drag and drop on List region directly.

2. Browse the folder or files should be opened and select it.
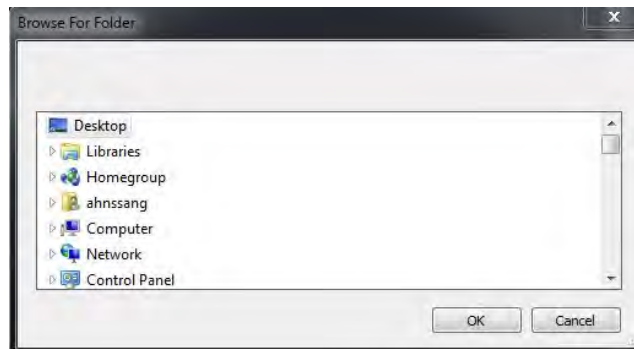
3. If data opened successfully, data list can be checked out as below image.

Operation

4. Click the name of image in data list, Preview window will show the image and movie.

5. The image could be magnified by clicking zoom bar.

6. Select the viewing region by dragging preview window.

Operation

1. Click the confluence menu button.

   Confluence

2. Select one image that need recalculated confluence value from data list.
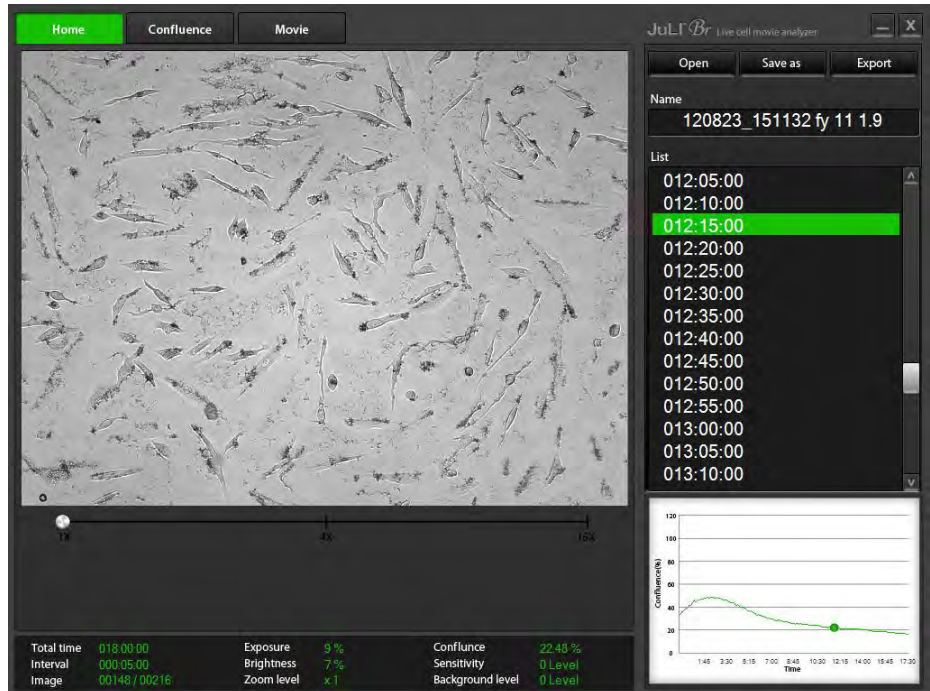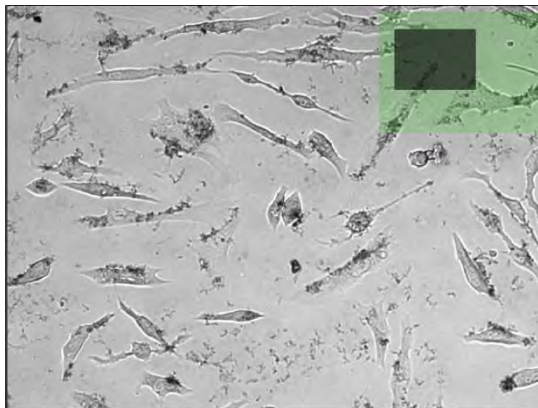
3. Adjust the image by changing parameter; recommended sensitivity level and background level corresponding to cell line.

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	U2-OS, ADSC	Sensitivity level 10 Background level 8

4. Click the **Confluence button**. the value of confluence would be recalculated by new sensitivity level, and background level.

   Confluence

5. If the confluence value from *step 4* is good enough to use, then check **Apply box** for recalculating confluence value of all images in same folder by new sensitivity and background level.

   Apply

6. Confluence graph would be redrawn.

<before>   <after>
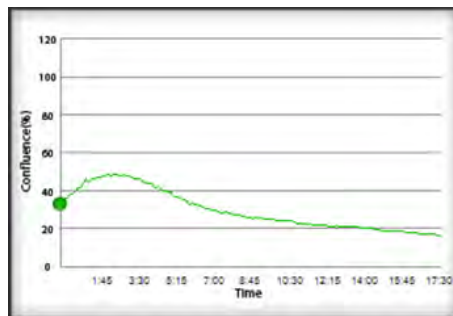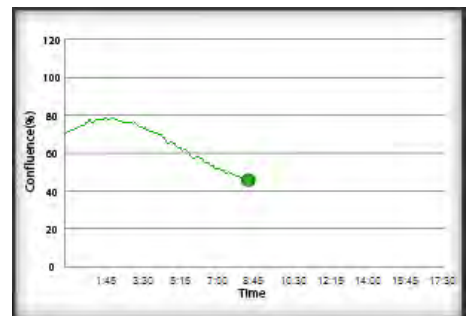
7. Click **Save as button** if recalculated data should be saved.

   Save as

Operation

1. Recorded movie can be shorten easily through PC Software.
   Set the start point and end point by moving the bar.

2. Check **Apply box** to edit the movie.

3. Click **Save as button** if edited movie should be saved.

4. Select the folder for saving edited movie and Press OK button.

Operation

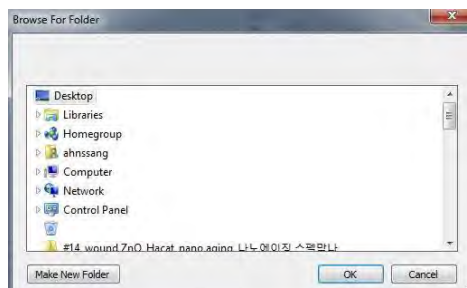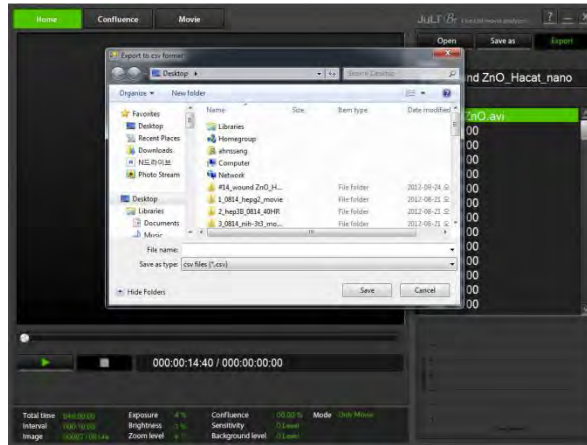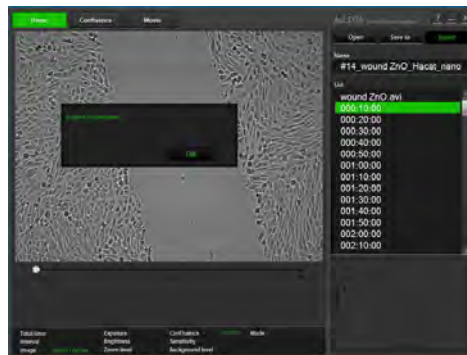1. Click **Export button.** Information of each image in folder can be exported.

2. Select the folder that exported file should be saved.
   Type the file name for saving exported file.

3. Exported file can be found in folder.

Cleaning & Maintenance

Clean the surface of JuLI™ Br instrument with a damp cloth.
To clean the LCD screen, turn off JuLI™ Br 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 the screen. Wipe the screen dry immediately.

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

JuLI™ Br does not need regular maintenance. To troubleshoot problems with JuLI™ Br, contact Technical Support (page 44).

⚠

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

⚠

***IMPORTANT! Always wipe surfaces with ethanol-soaked paper towels**, not directly spray ethanol anywhere on JuLI™ Br.*

⚠

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

Troubleshooting

Poor image (Too dark and too bright)	• Re-optimize the brightness and exposure value. • Reset on the power button
Dirty image	• Swipe with cotton swab in the stage carefully. • Eliminate dust on culture dish. • Check for and remove any condensation on the lid of the culture dish.
Time-lapse images become dark and bright	• Warm up the instrument during 1 hour before monitoring. • Eliminate dust on culture dish. • Check for and remove any condensation on the lid of the culture dish. • Pay special attention during monitoring to open and close incubator door for prevention problem shaking culture dish or inflowing light.
Movie file saving problems	• Check the left volume of the hard disk.
Focus knob doesn't move	• Move the focus knob opposite side.
Focusing and Monitoring menu can not be used	• Check the connection between scope and station.
LCD screen is black	• Touch the LCD screen with your finger . • Verify power supply is connected and power switch is on. • Reset on the power button.
JuLI™ Br does not power up	• Check on/off switch on back side of unit. • Check power source or contact your distributor.
Can not continue recording. Do you want to save the recording files?	• Recording files going to be saved as the last state before recording stopped.
Can not play the movie properly	• Create movie file with time lapse images using JuLI™ Br PC software program.
Fail to capture	• Connect scope and station using connection cable again.
'JuLI Br Update' folder does not exist in the USB drive.	• Download 'JuLI Br Update' folder on NanoEnTek website. (www.nanoentek.com)
The update files do not exist in the USB drive.	• Check the files as below image. And download 'JuLI Br Update' folder on NanoEnTek website. (www.nanoentek.com) JuLI_II.exe Profile.xml TS500SDK.dll
Camera problem	• Reset on the power button

Warranty

Nanoentek warrants that JuLI™ Br will be free from defects in material and workmanship for a period of one (1) year from date of purchase.

If any defects occur in JuLI™ Br during this warranty period, Nanoentek will repair or replace the defective parts at its discretion without charge.

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™ Br 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, refer to Product Specifications (page 32)

- 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. When 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 any walls.

- Do not install the instrument on a slant or a place prone to vibrations, which induces the risk of instrument 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).

※**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.

Product Specifications

Environmental Conditions

Electrical input	AC 100 – 240Va.c.,, 1.9A, 100W
Frequency	50 / 60 Hz
Installation site	Indoor use only
Operating Temperature	10 – 45 °C
Maximum Relative Humidity	20 - 95 %

Instrument Specifications

Cat. no.	JULI-BR04 (Full set) JULI-BRSC (Scope)
Magnification	Objective 4x and digital zoom (~400X)
Image resolution	2560 x 1920 pixels (5M)
Exported formats	JPEG (image), AVI(movie), XLS (law data)
Display	10.1″ LCD touch screen
Light source	White LED
Dimension & Weight	Scope unit : 300 x 190 x 188 mm, 4kg Station unit : 282 x 285 x 160 mm, 3.2kg
Storage	320 GB Hard drive 4 GB USB drive

Appendix

The following products can be used with JuLI™ Br, live cell movie analyzer and are available separately from nanoentek.

For more information,
visit **www.nanoentek.com** **or** email to **sales@nanoentek.com**

Product	Quantity	Catalog no.
Connection cable (5M)	1	-
2nd scope unit	1	JULI-BRSC

Technical Support

Visit the 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.

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JuLI™ Br User Guide

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The information in this manual is described as accurately as possible. Firmware and software changes and updates may change without prior consent or notification.

Documentation : NESMU-JUB-001E

Revision History : V.0.0   Date : Oct 2012

JuLI™ *Br*