FACSCOPE™ B

Automatic Cell Counter

Instruction manual

CURIOSIS

Developed and manufactured by CURIOSIS Inc.

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Package contents

FACSCOPE™ B Automatic cell counter package includes the following items.

Item	Quantity
FACSCOPE™ B main device	1
Instruction manual	1
Quick manual	1
Main power cable	1
USB memory	1
FACSCOPE Slide (for 200 tests, **Optional**)	50 ea. per a box
Keypad **(Optional)**	1
Barcode scanner **(Optional)**	1
Thermal printer **(Optional)**	1

When receiving the package,

- Check that all items listed above are included in your package.
- Examine the device carefully for any damage during shipping.
- Contact your local distributor or info@curiosis.co.kr if any items are missing or damaged.
- Any loss or damage claims must be filed with the carrier.

Safety instruction

READ ALL INSTRUCTION BEFORE USE

Caution

- Check the power supply input voltage and do not plug in when the voltage is unmatched.
- Check the power cable is connected to a grounded and 3-conductor power wall outlet.
- Check the power cable is properly grounded to avoid potential electrical shock.
- Check the main power switch is off when plugging in the power cable to the wall outlet or unplugging the power cable.
- Wait about 2-3 minutes for the device to reboot.
- Do not insert any metallic objects into the device through backside air vent to avoid electrical shock causing personal injury or device damage.
- Place the device around 10 cm away from the surroundings for proper air-cooling.
- Do not disassemble the device and contact an authorized service center if required.
- Use authorized accessories only.
- Operator should have the general knowledge of cell counting procedure and handling bio samples safely.
- Operate the device carefully as described in this manual.

Warning

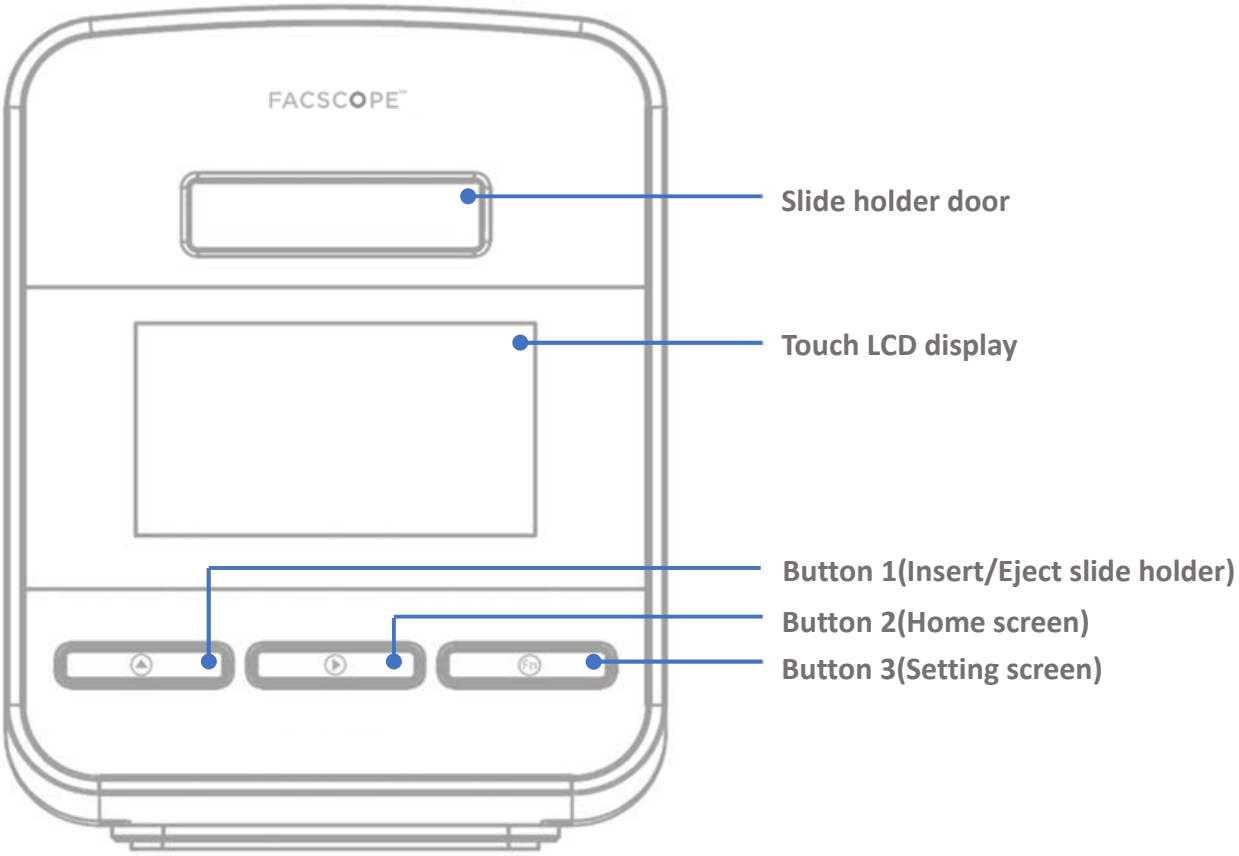
- **Battery**
  Lithium battery is inside the device. Replacing it with incorrect type can cause risk of explosion. Do not replace by a user and contact an authorized service center if required.
- **Sample handling**
  Sample may contain the infectious biohazardous substances. Operator should wear gloves while sampling.
- **Waste**
  Dispose used FACSCOPE Slides as biohazardous waste and do not reuse them.

Product specifications

FACSCOPE™B		Voltage	AC 100~240 V, 50~60 Hz
		Current	Max. 1.0 A, 50 W
		Objective lens	4 x
		Light source	4 W Green LED
		Camera	5Mega pixels high resolution monochrome CMOS image sensor
		Weight	5 Kg
		Size (W × L × H)	163 × 293 × 216 mm
		Measuring concentration range	1 x 10^4 ~ 1 x 10^7 cells/mL
		Detectable cell diameter	5 ~ 60µm
		Measuring speed*	Quick mode: ≈ 20s per test Normal mode: ≈ 30s per test Precise mode: ≈ 100s per test
		Counting area	Quick mode: ≈ 0.15 µL Normal mode: ≈ 0.9 µL Precise mode: ≈ 3.6 µL
FACSCOPE Slide (Cat. No. CRFCB-CSD50) (Optional)		Quantity	50 slides (for 200 tests)
		Sample loading volume	20 µL
Accessories	 Power Cable  USB memory	Power cable	1.5 m
		USB memory	Support USB 2.0
	 USB Keypad or Barcode Scanner (Optional)	**(Optional)** Keypad or Barcode scanner or Thermal printer	USB type

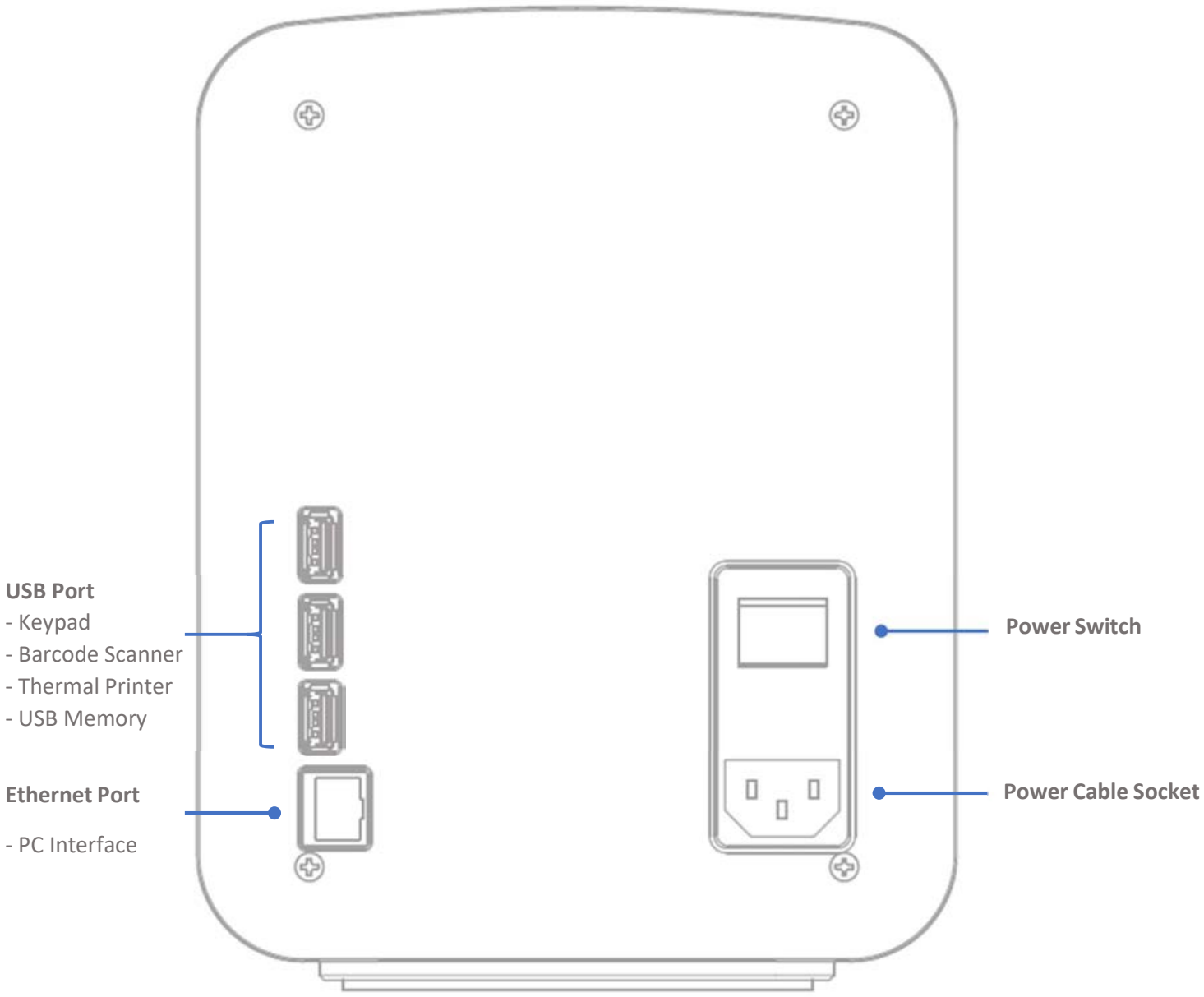
*Cell Counting time is variable according to cell type and concentration.

Device layout



Frontal view

- **Slide holder door – Slide holder is ejected from / inserted into the device.**
- **Touch LCD display – Preview, automatic cell counting processes and the results are displayed.**
- **3 control buttons**



Rear view

- **3 USB ports – Keypad, Barcode scanner, Thermal printer (optional), or USB memory are connected to these ports.**
- **Ethernet port – LAN cable is connected to this port for PC interface.**
- **Power switch – Main device power ON/OFF control.**
- **Power cable socket – Power cable is connected to this socket.**

Table of contents

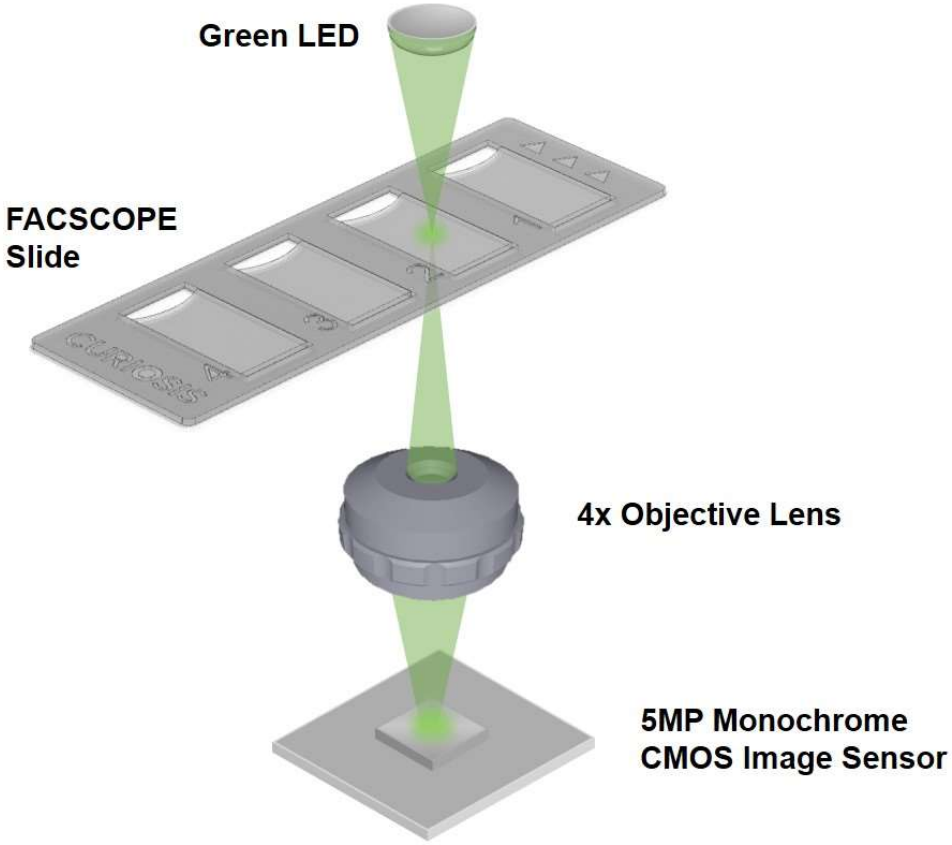
Appendix

Introduction

FACSCOPE™ B – Automatic Cell Counter

FACSCOPE™ B is a fully automated cell counting system based on a brightfield microscopy technique for mammalian cell counting. The FACSCOPE™ B utilizes high-powered LED light source, CMOS image detection (5 Mega pixels), precise X-Y-Z stages and on-slide image processing technologies for fast and accurate cell analysis.

Cell counting using FACSCOPE™ B is done by 3 steps, (1) cell staining, (2) loading sample, and (3) counting. Cells are mixed with trypan blue dye to distinguish between live and dead cells. The stained sample is pipetted on the disposable plastic slide (4 tests per 1 slide) and the slide is loaded into the FACSCOPE™ B. After loading the slide, optic system automatically focuses on the slide and then the FACSCOPE™ B acquires and analyzes images automatically. The precise X-Y-Z stages move through the preset routes to take multiple images for each channel. Highly sensitive CMOS sensor acquires bright-field microscopy images and sends images to the integrated system for image processing and analysis. The whole counting process takes 2 minutes (in Normal mode) and the counting results are displayed on the LCD touch screen panel in front of the instrument.

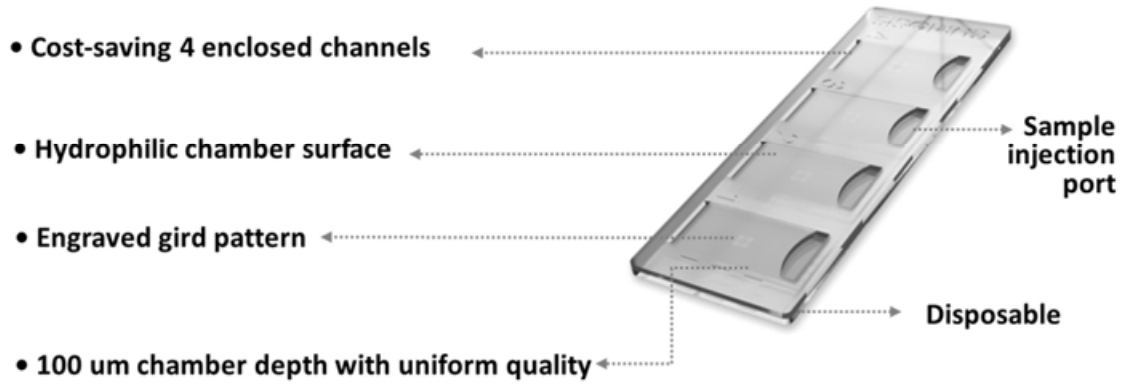


FACSCOPE Slide (50 slides for 200 tests per a box, Cat. No. CRFCB-CSD50)

FACSCOPE Slide is a disposable plastic hemocytometer having 4 channels engraved with Neubauer Improved pattern. Each channel has an enclosed structure of 100um depth and hydrophilic surface. The precise capacity and diffusible surface make cells evenly distributed and lead to accurate analysis. FACSCOPE Slide can be used for mammalian cell counting with automatic cell counter FACSCOPE™ B, as well as manual counting method. Measuring range of cell concentration is 1 x 10^4 ~ 1 x 10^7 per mL when using with FACSCOPE B.

For cell counting, prepare cell suspension for counting and mix cell suspension with trypan blue at a one to one ratio. A channel of FACSCOPE Slide is filled with 20 µL of mixture and is loaded into the FACSCOPE™ B. After the analysis completion, the results will be displayed.

Keep FACSCOPE Slide box upright and at room temperature. It should be used immediately after unsealing. Follow the exact procedure detailed in the Instructions for Use section.



Getting started

Pre-requirements

For normal and stable operation of the device, the following environmental conditions should be satisfied.

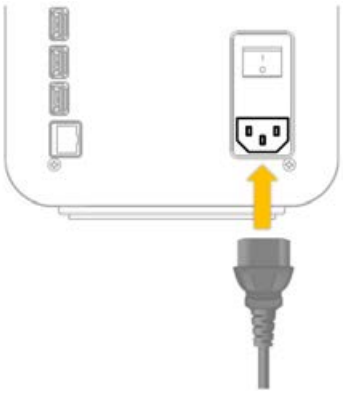
- Room temperature between 20 ~ 35 °C.

It is not recommended to operate the device at low temperature condition (below 10 °C) In those conditions, warm up the device for over 10 minutes.

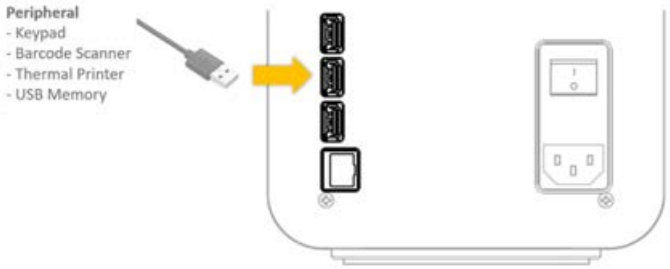
- Relative humidity between 0 ~ 95 %.
- Place at corrosive gases-free or other substances-free area.
- Place at dust-free or other airborne particles-free area.
- Avoid direct sunlight, vibration, magnetic or electromagnetic fields.
- Do not put any heavy materials on the top of the device.

Basic installation

1. Unbox FACSCOPE^{TM} B package and place the device on a flat and dry surface.



2. Plug accompanying power cable into the power cable socket.

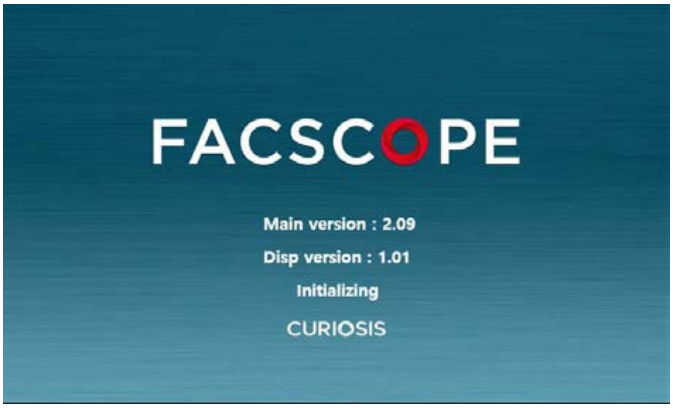


3. Connect optional peripherals (keypad, barcode scanner, or thermal printer) to the USB port if necessary.

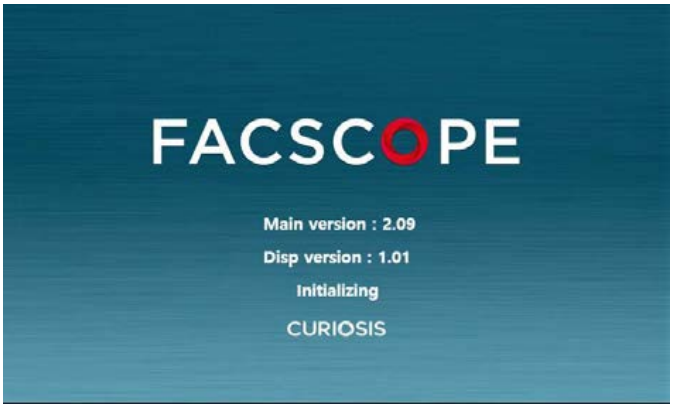
4. Switch on the power switch.

*Check that the main power switch is **I** (ON) position.*

Power up and initial display

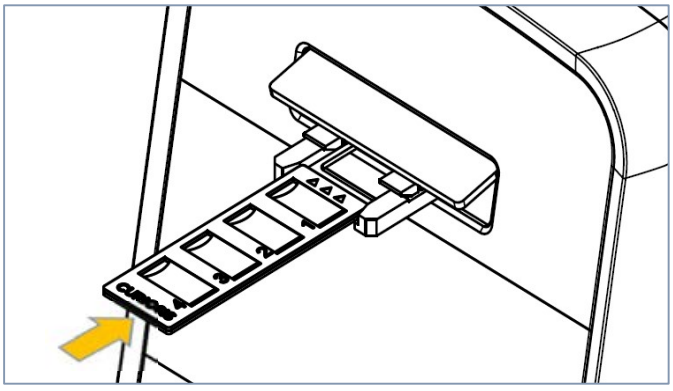


1. Once the main power is switched on, boot image is displayed on the LCD touch screen. When booting is completed, initializing process starts and internal motorized stages start moving.



2. Initializing progress is displayed while processing.

3. When initializing is finished, the slide holder is ejected, and Home screen is displayed on the LCD touch screen.



4. After load a slide with sample, the device is ready to count.

General Operation

Sample Preparation

Cell suspension, 0.4% trypan blue, micro tube 1.5ml, pipette, tips, and FACSCOPE Slide are necessary for cell counting. Whole procedure should be done in clean area to avoid decreasing accuracy of counting due to dust.

STEP 1. Prepare necessary items.

STEP 2. Place 20 µL of trypan blue in the micro tube and add an equal volume of the cell suspension.

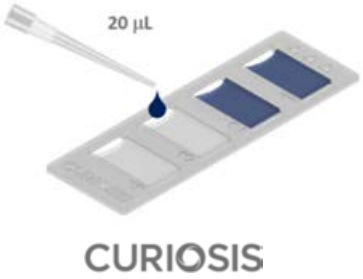
NOTE: Before sampling the cell suspension, gently resuspend the cells at least 6 times (pay attention to avoid bubbles and check if there are any cell clumps or agglomerates) The sampling should be in middle of the cell suspension, not on the surface or the bottom.

STEP 3. Mix the sample in the micro tube by pipetting the vial 3~5 times gently.

NOTE: Be careful not to bubble.

STEP 4. Load **20 µL** of the stained cell sample onto each channel of FACSCOPE Slide.

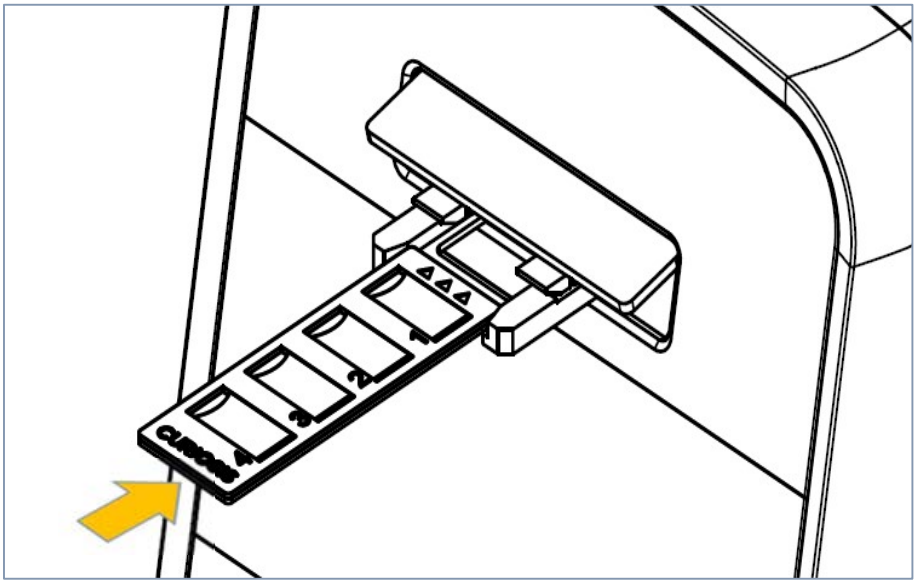
NOTE: The sampling should be in middle of the cell suspension, not on the surface or the bottom and ensure that no bubbles enter the channel.



Basic Operation

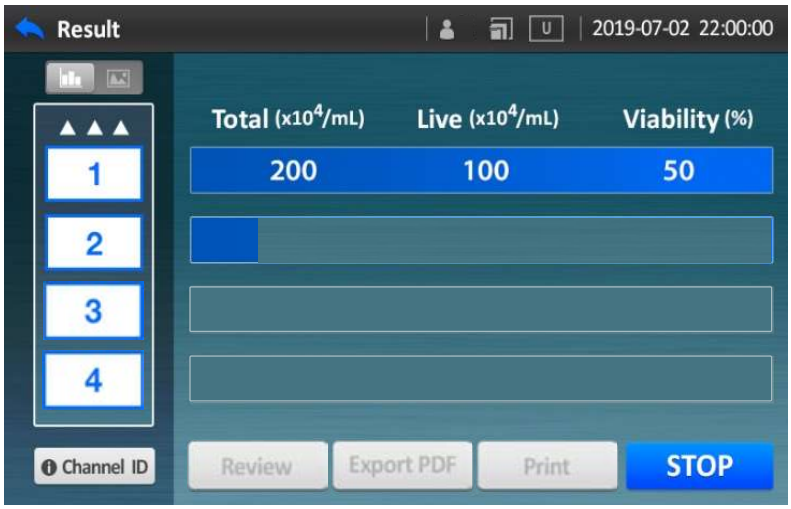
STEP 1. Insert FACSCOPE Slide loaded with the sample onto the slide holder.

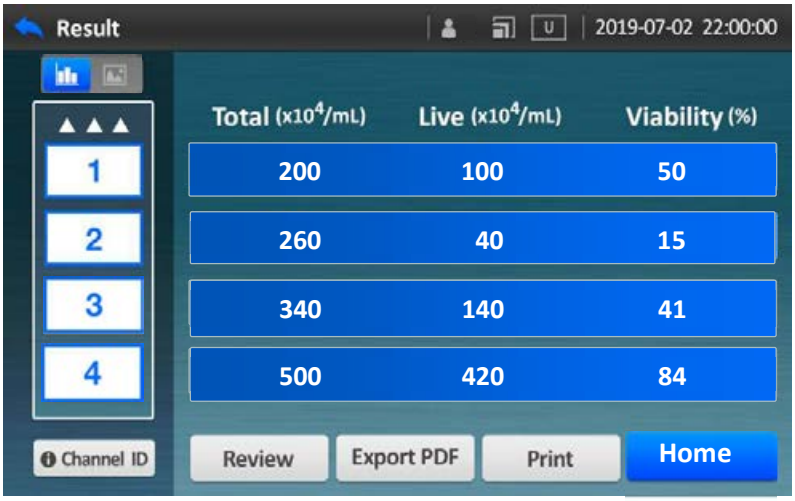
NOTE: Make sure the arrow on the slide points toward the instrument.



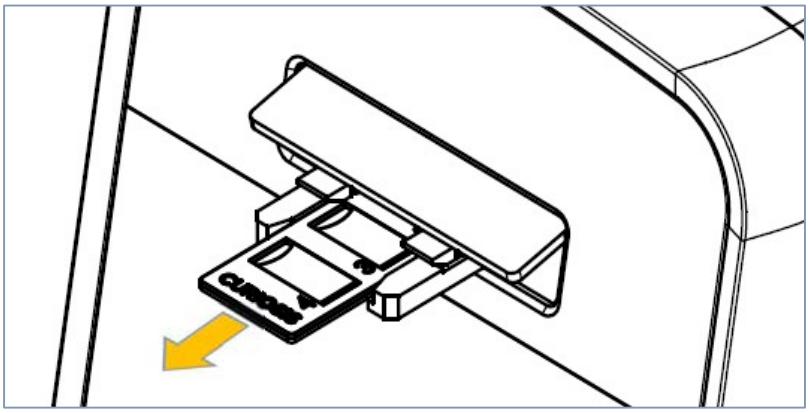
STEP 2. Press **Start** button to start counting procedures. The slide holder is inserted automatically, and auto-focusing is performed prior to counting each sample.

STEP 3. Counting progress is indicated as shown in following image. For completion of each sample, the count result (unit: $x10^4$/mL) are displayed.





STEP 4. Once counting is complete, the slide holder is ejected automatically. Remove FACSCOPE Slide from the slide holder.



Preview prior to counting

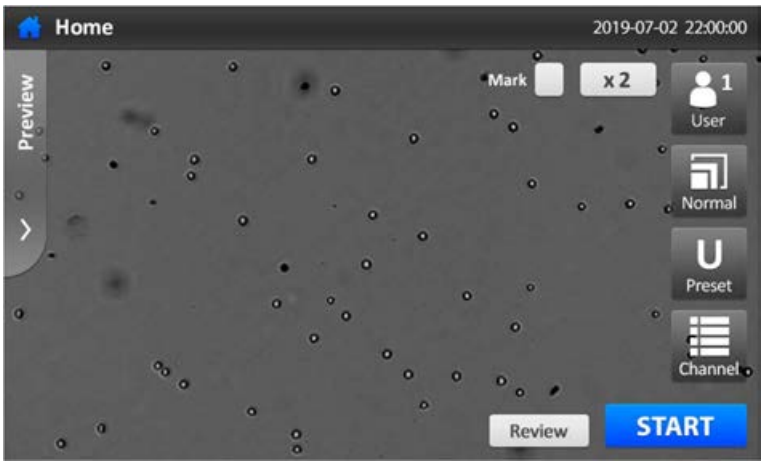
In the screen where you can see the cells, when tap the screen twice, some icons disappear. To get icons again, tap the screen twice.

STEP 1. Load a slide and press **Preview** button.

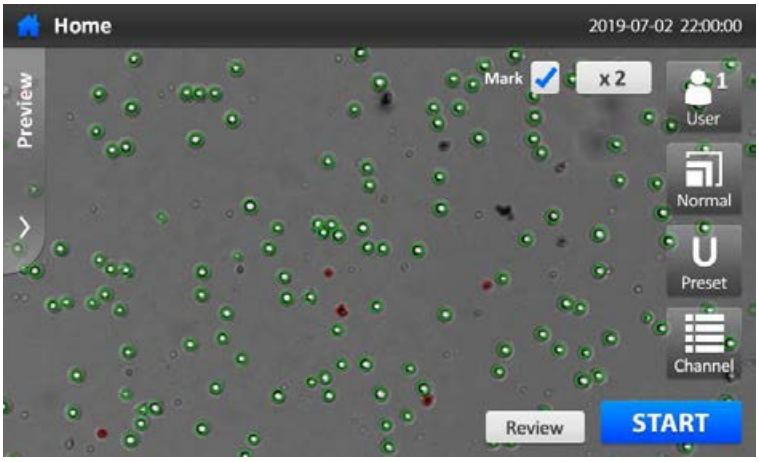
STEP 2. Select a channel to preview.

STEP 3. Positioning and Autofocusing

STEP 4. See the cell image of the selected channel.



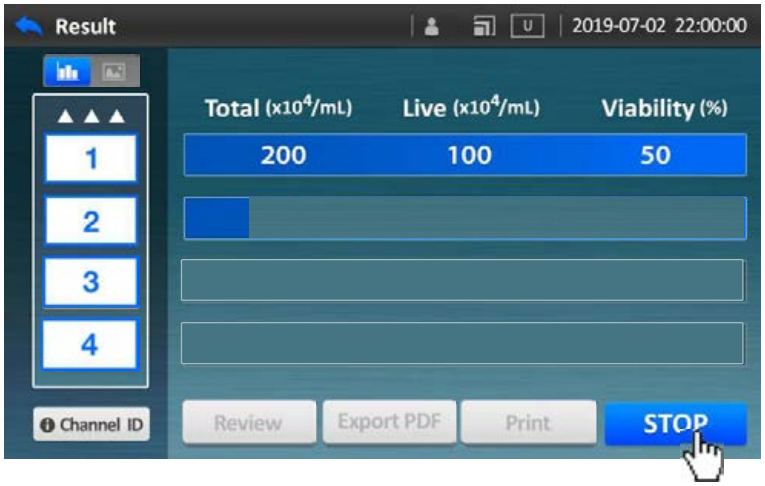
STEP 5. If press **Mark** ☑, the detection mark is displayed according to the selected preset. **Live/Dead definition** can be modified at this stage.



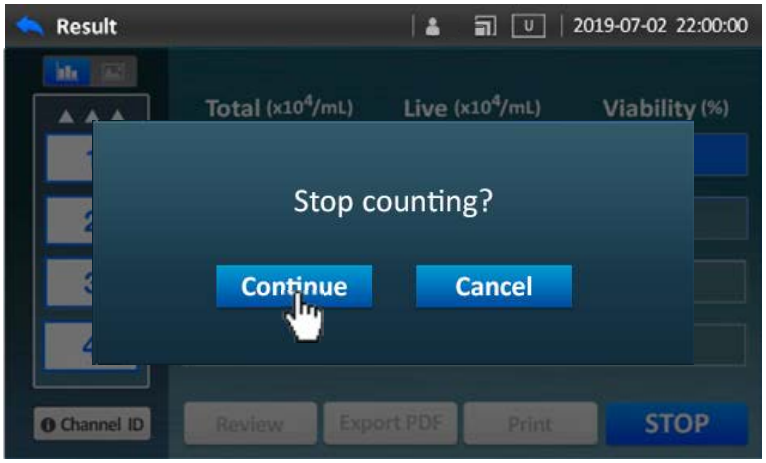
STEP 6. Counting

Making A Stop While Counting

STEP 1. To make stop while counting, Press **STOP** button.



STEP 2. Confirmation message box is displayed as shown the following image.
Press **Continue** button.



STEP 3. Once making a stop is confirmed, all remaining process are stopped, and the slide holder is ejected automatically.

Set counting option

The following operations are performed on the Home screen.

Setting options for counting

User : 1/2/3
Auto-saved data and presets can be managed as user number.

Count mode : Quick/Normal/Precise
Total counting area(The number of snapshots) is different from each count mode.
Quick mode: ≈ 0.15 µL (1 Frame)
Normal mode: ≈ 0.9 µL (6 Frames)
Precise mode: ≈ 3.6 µL (24 Frames)

Preset
User-changeable parameters for cell recognition
3 kinds of fixed presets

Channel
Decide channels to be measured
White box: enabled channel
Gray box: disabled channel
Press a channel to toggle between enabling and disabling.

A. Changing User Group

FACSCOPE^{TM} B provides personalized history of results to user groups (1,2 and 3).
The user group is useful to manage variegated user presets and numerous results autosaved after counting. The auto-saved results (review screen) are accessible only to the user group that was active at the time the results were published.

Note: Review and User preset list depends on User group. Therefore, before selecting user preset or pressing review, check the user group.

Step 1. Press the **User** button.

Step 2. Select the **User 1/2/3**.

B. Setting Count mode

FACSCOPE B provides three counting modes (Quick/Normal/Precise mode) according to counting area. FACSCOPE B is designed to capture multi frames per a channel using XYZ stage. Single frame captured by FACSCOPE™ B has volume of 0.15 µL. The more pictures are taken, higher the accuracy of results.

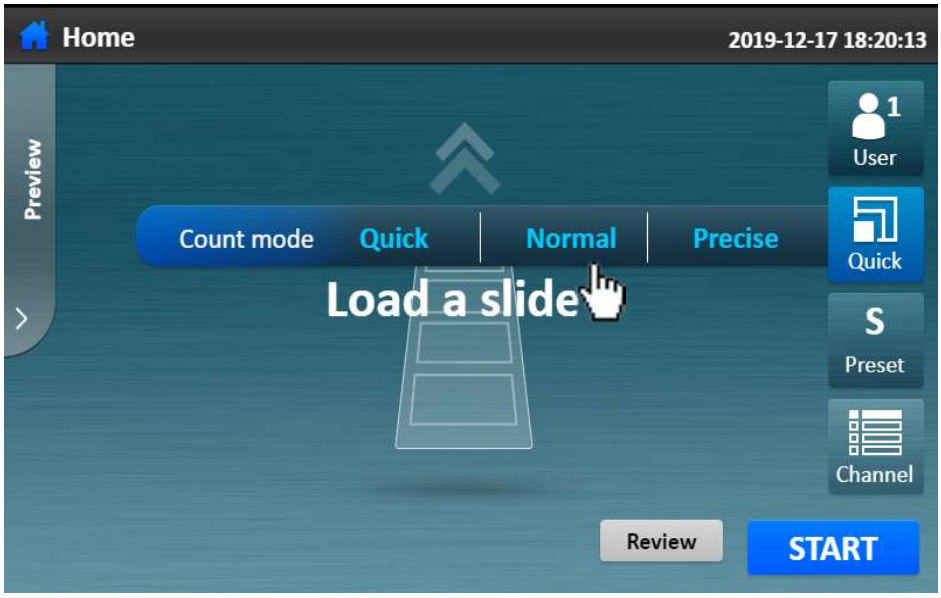
Select the count mode depending on situation refer to the following table.

Count mode	the number of frames captured per a channel	Analyzed volume	Counting time per a test	In the case
Quick mode	1	0.15µL	≤ 20s	When you want to get a result quickly and make a rough estimate of cell number.
Normal mode (default)	6	0.9µL	≤ 30s	When you want to get results with reasonable accuracy and speed (such as general subculture procedure)
Precise mode	24	3.6µL	≤ 100s	When you want to get a precise result and count cell at low concentration

NOTE: if the cell concentration is less than 5X10^{4}cells/ml, Precise mode is recommended.

STEP 1. Press the Normal (Count mode) button.

STEP 2. Select Count mode.

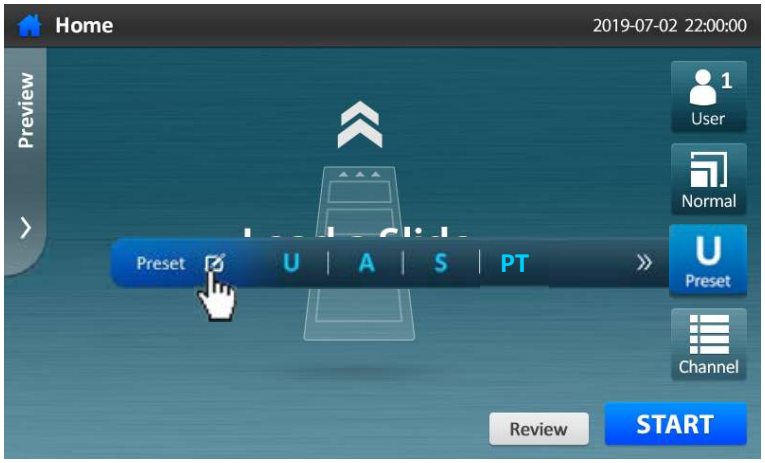


NOTE: The setting is applied to all enabled channels.

C. Creating Preset

- *Users can manage **User Preset** items. (5 User presets per User group)*
- *3 fixed presets cannot be removed or edited.*

STEP 1. To create your own preset, press Preset button.

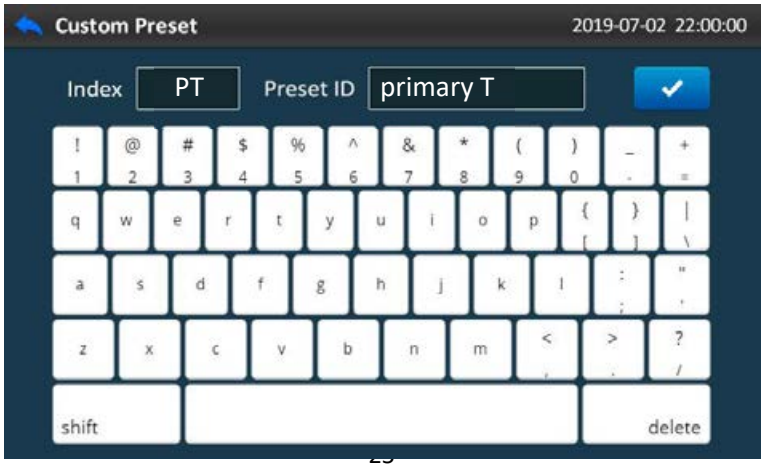


STEP 2. Press **Plus** button. 

STEP 3. Select one of 3 fixed presets (Universal, Small, Angular),

and press blank beside **Index**.

STEP 4. Type the names of **Index** and **Preset ID**.



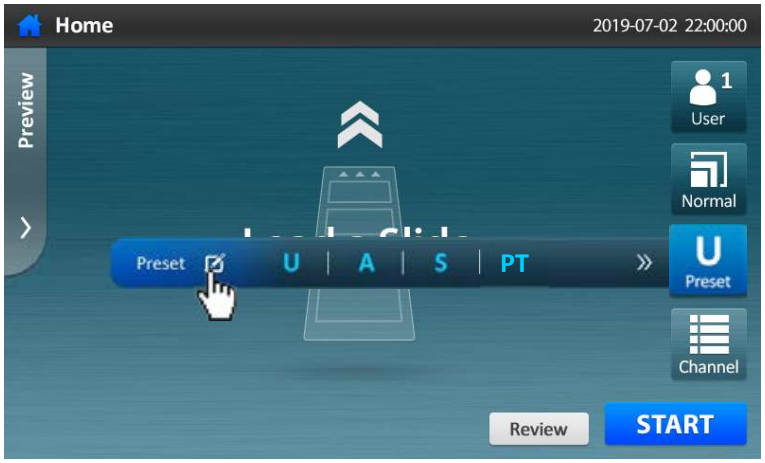
STEP 5. Adjust 3 kinds of parameters.

(**Gating size, Aggregation level, Live/Dead definition**).

STEP 6. Ready to count with a customized preset.

D. Editing Preset

STEP 1. To edit your own preset, press **Preset** button.

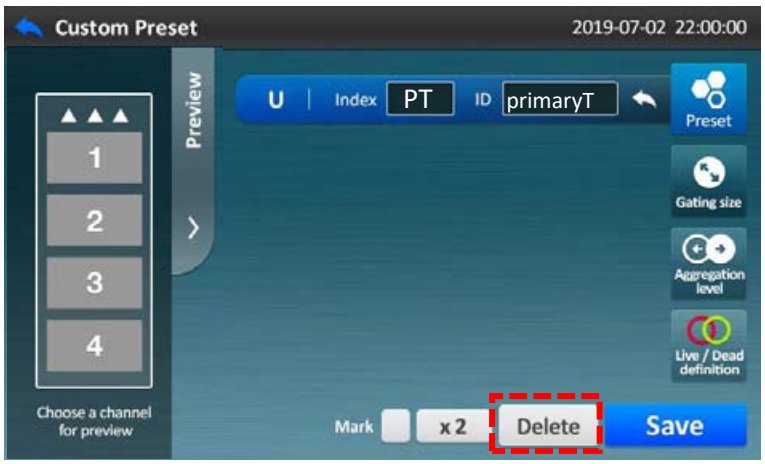


STEP 2. Press the preset button which you created by yourself.

STEP 3. Adjust the parameters of your own preset.

STEP 4. Press **Save** button to keep the changed parameters.

STEP 5. To delete your own preset, press **Delete** button.



E. Selecting Channel

Four channels in the FACSCOPE Slide can be individually enabled or disabled.

STEP 1. Press the **Channels** to be disabled/enabled. (Disabled: Gray box, Enabled: White box)

STEP 2. Press the **Start** button to count immediately.

F. Entering Channel ID

Channel IDs corresponding to the samples loaded onto the slide can be entered by Screen typing, Keypad or barcode scanner.

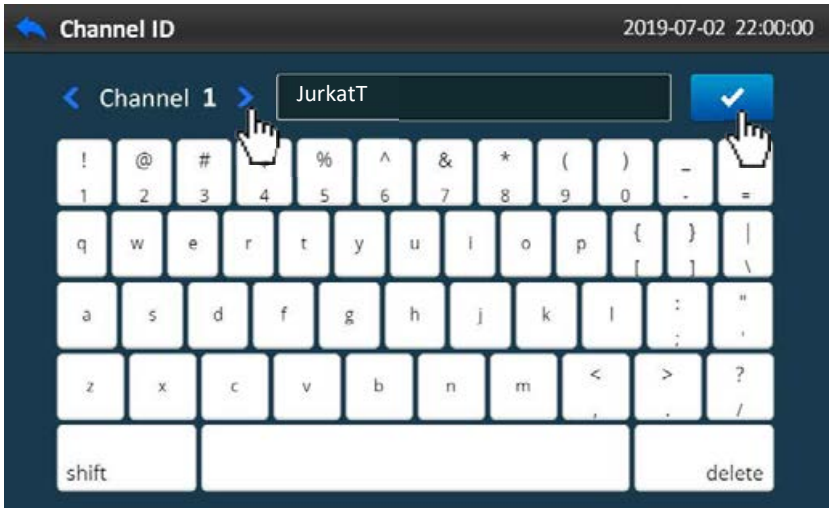
The maximum of channel ID length is 20 characters in English, Arabic numerals and some special characters.

- **Basically**

STEP 1. Press **Channel ID** button.

STEP 2. Press a blank.

STEP 3. Type the names of each **Channel ID**.



STEP 4. Press **Back** button.

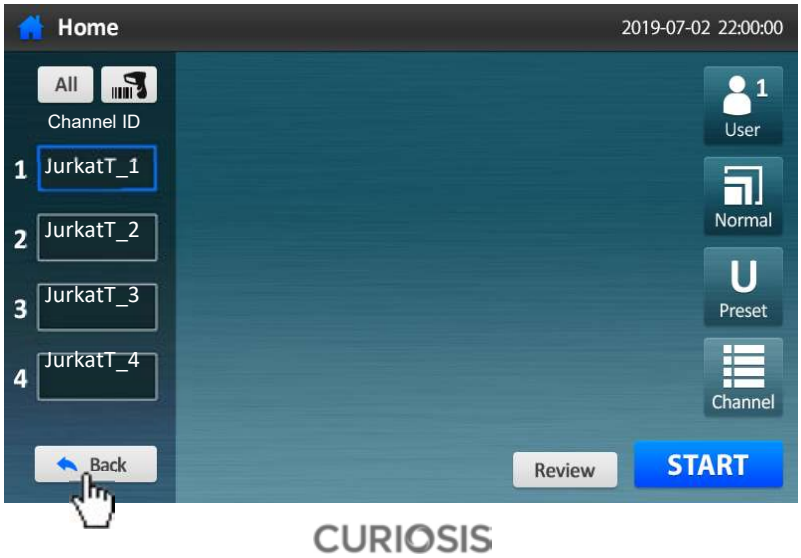
STEP 5. Ready to count.

- **Typing 4 IDs at once**

STEP 1. Press **All** button.

STEP 2. Enter the name of cell type and press **OK** button.

STEP 3. Check if 4 channel IDs are written, then press **Back** button.



- **Using extra devices_Using barcode scanner, USB keypad or USB keyboard (optional)**

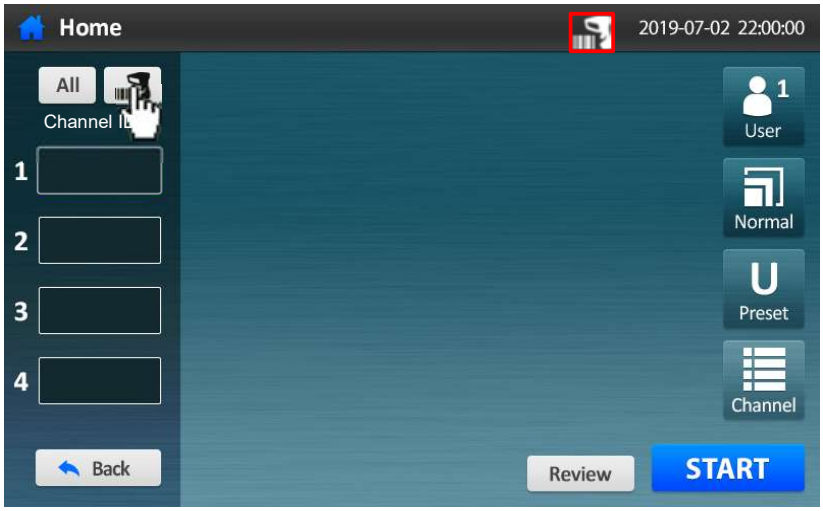
Keypad and barcode scanner are optional. Contact your local distributor if required.

Connect an extra device to the USB port at the back side of the device. Check if an icon appears on status bar.

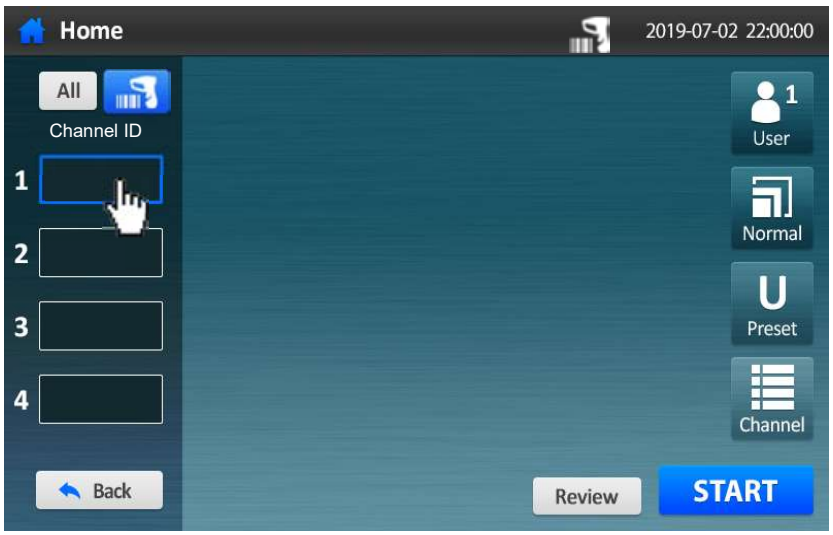
Method	Usage
Keypad	1. Enter a channel ID and press "**Enter**" key 2. Key cursor moves to the next channel ID form (It is available to move to the other channel using direction key.)
Barcode Scanner	1. Scan a barcode containing channel ID. 2. Channel ID form is filled with corresponding channel ID, and key cursor moves to the next form if entered successfully.

STEP 1. Connect keypad or barcode scanner to the USB port at the back side of the device.

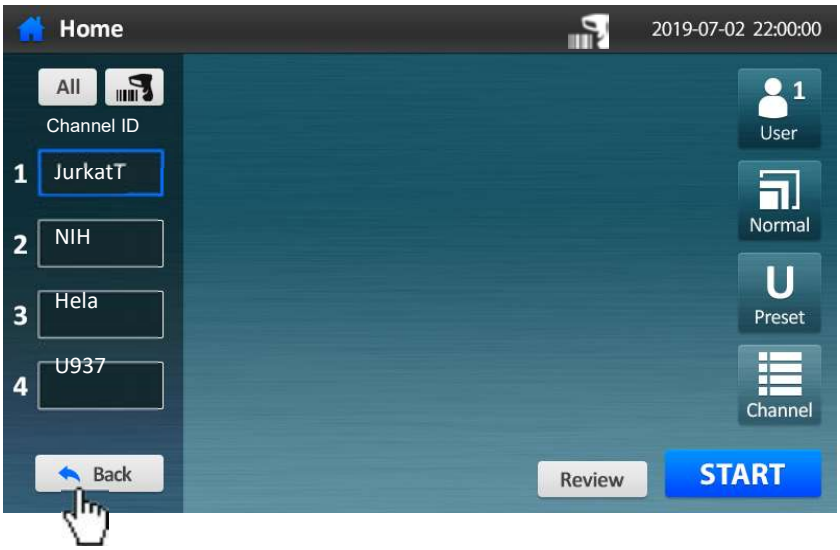
Check if  icon is present at the top. Press **Barcode scanner** button.



STEP 2. Press blanks and enter 4 channel IDs using keypad or barcode scanner (refer to the above table). The maximum of channel ID length is 20 characters in English, Arabic numerals and some special characters.



STEP 3. Check if 4 channel IDs are written, then press **Back** button.



On the Result screen

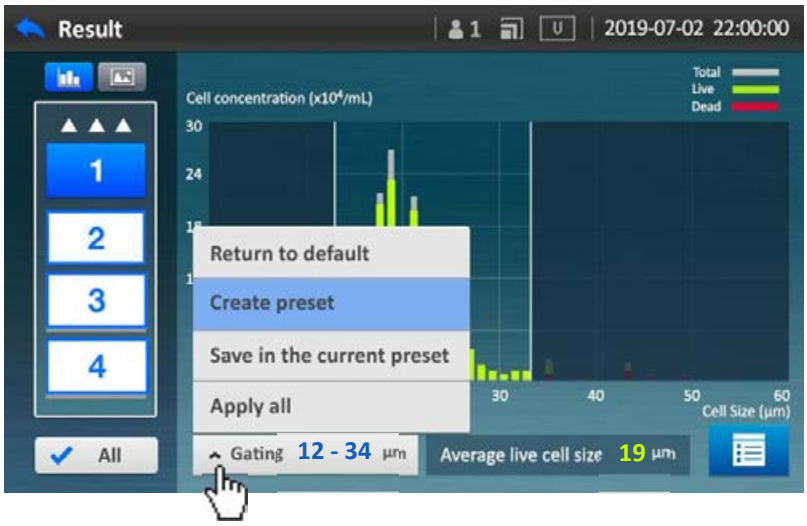
The following operations are performed on the result screen after counting.

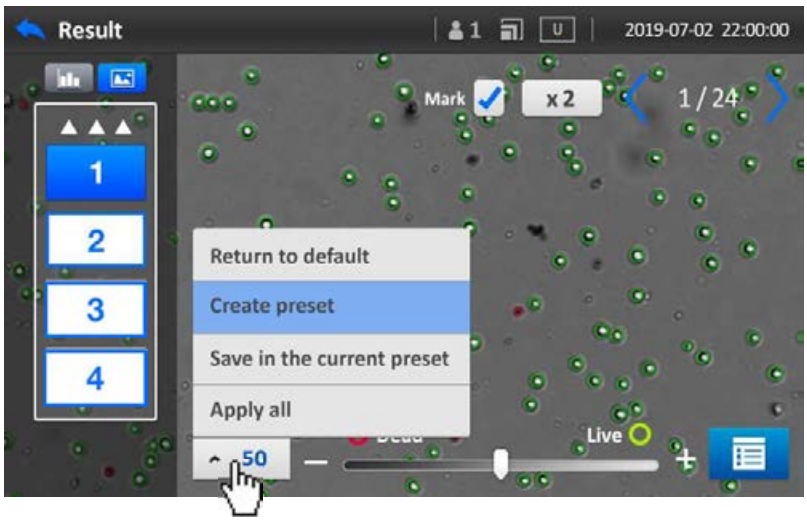
After completing cell count, histograms of cell size distribution and result images are provided. While viewing histogram, it is possible to modify cell size gating parameter. FACSCOPE™ B can generate both histogram of Individual channel and combined histogram of all channels.

FACSCOPE B can detect 5 ~ 60µm objects in diameter. However, the gating system is set to count from 8µm by default because the common cell line size is higher than 8µm.
Thus, the Initial range of cell size gating parameter on a histogram is automatically arranged between 8µm and maximum size of the recognized cell population.

NOTE: If you want to count smaller than 8 µm, change the cell size gating parameter in the histogram.

Toggle between histogram and result image once select a channel.

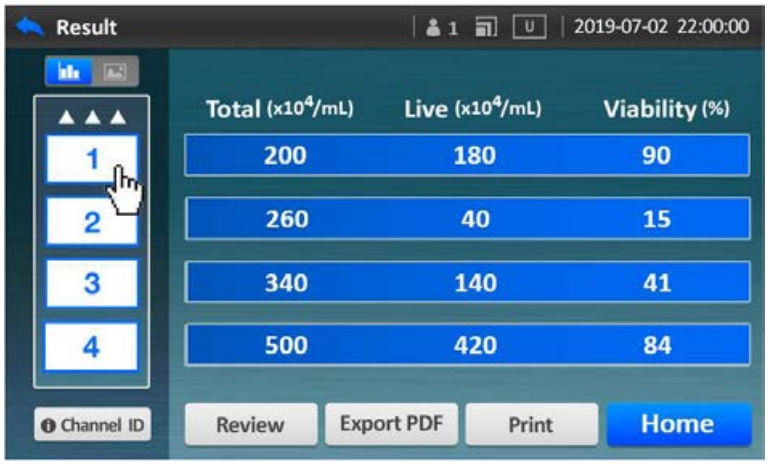




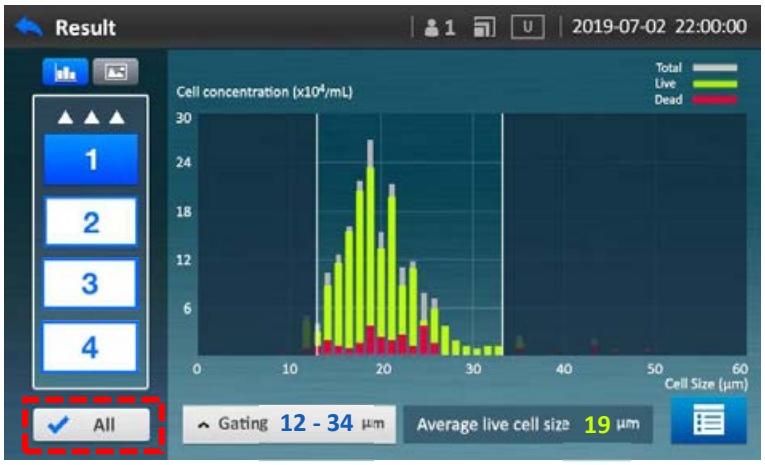
- Once press  or  button, see the result images of selected channel at once.
- **Return to default** : The changed value returns to default in the current preset value.
- **Create preset** : The value is saved in the new preset.
- **Save in the current preset** : The changed value is saved in current preset(This is not available in a fixed preset).
- **Apply all** : The changed value is applied to all channels.

A. Analyzing by Histogram

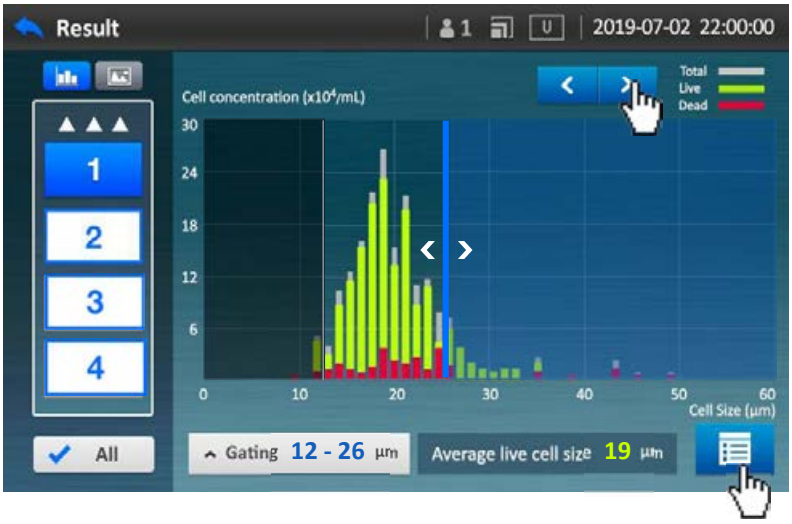
STEP 1. Press a **channel** which you want to check, and switch to the **histogram** icon. 



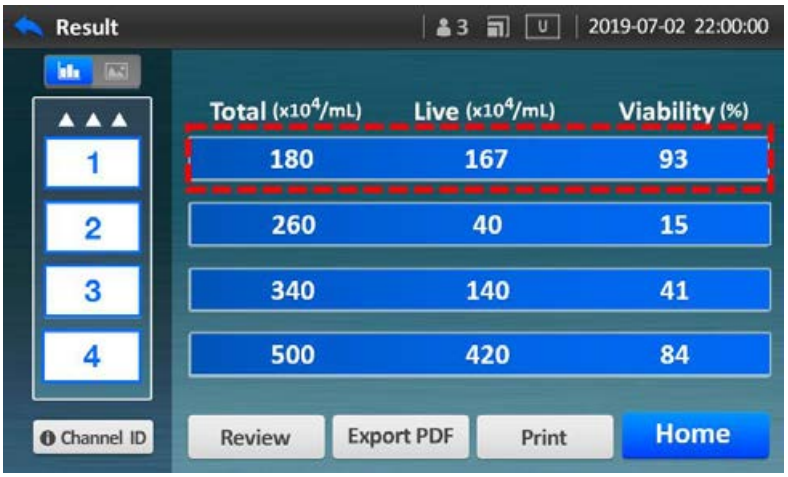
STEP 2. Press **All** to check the average data of all channels.



STEP 3. Move both columns and adjust the cell size.



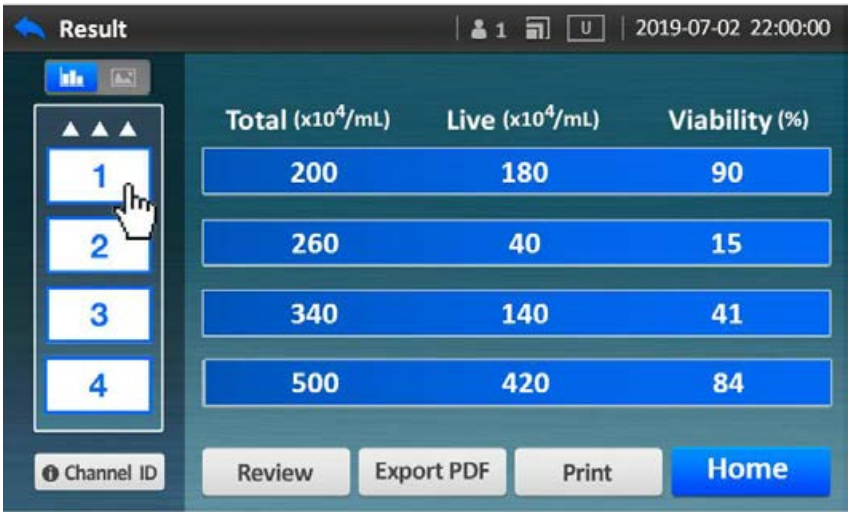
STEP 4. Check the results.



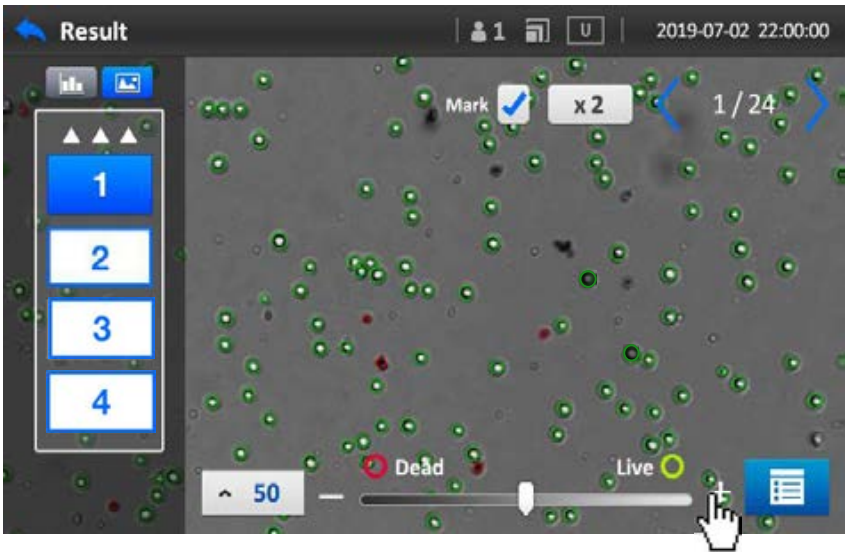
B. View Result image

FACSCOPE B provide the result image after counting. FACSCOPE B take multiple image per a channel depending on count mode and analyze those images. “Result image” menu shows the analyzed images that labels appended to. Live cells are circled in green and dead cells are circled in red on the screen.

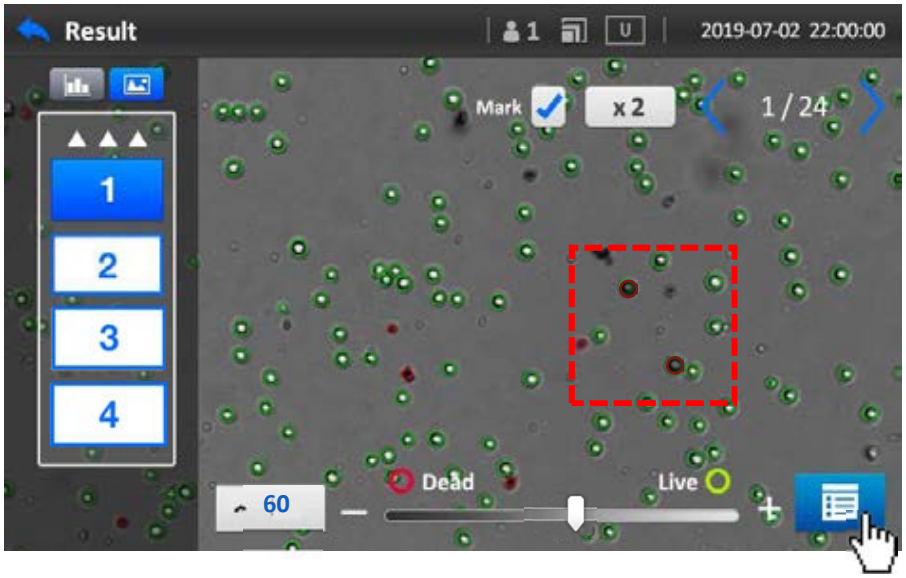
STEP 1. Press a **channel** which you want to check, and switch to the **Image** icon.



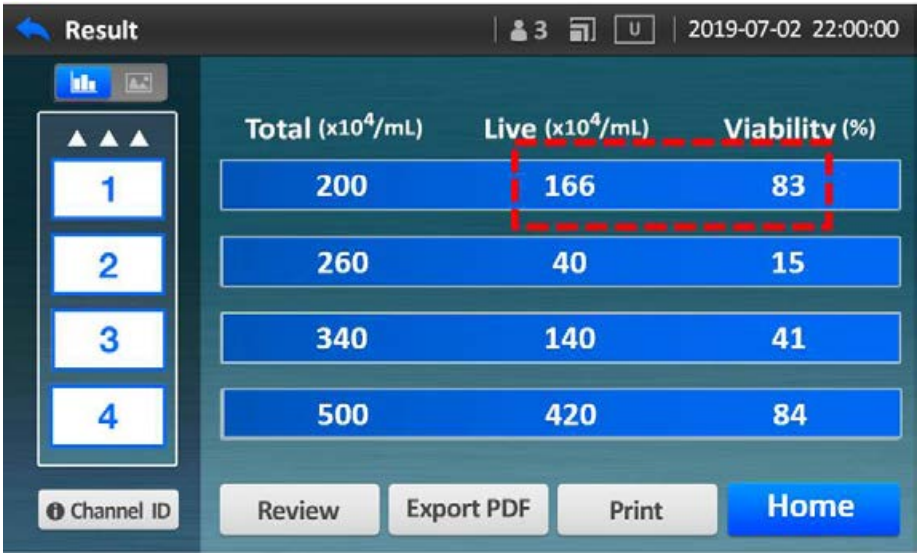
STEP 2. Adjust Live / Dead cell definition.



STEP 3. Press **Data** icon.



STEP 4. Check the number of Live cell and Viability.



C. Printout Cell Count Result using Thermal Printer

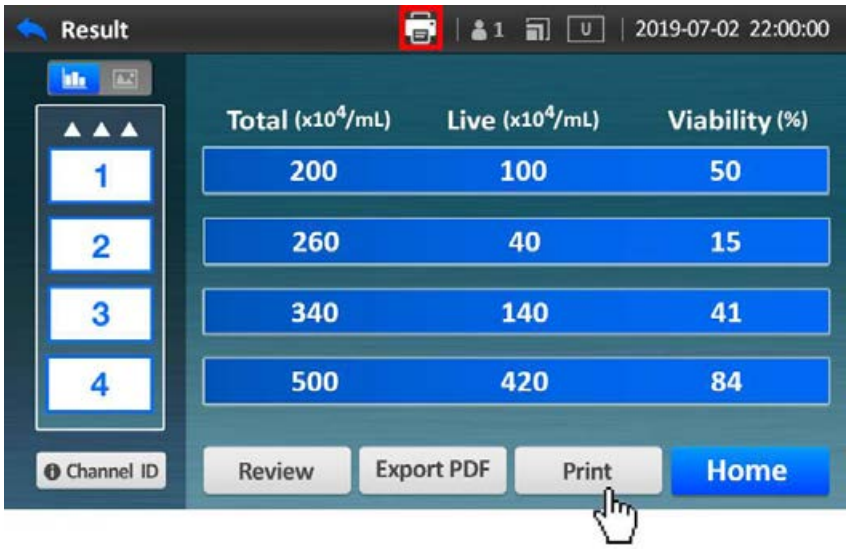
FACSCOPE™ B can use a thermal printer to printout the counting result.

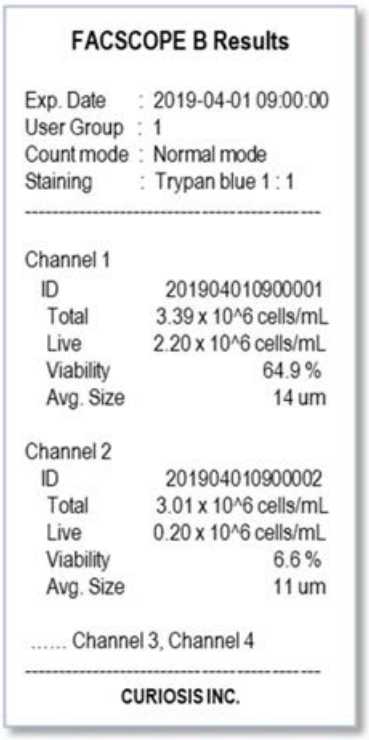
Thermal printer is optional. Contact your local distributor if required.

Step 1. Connect thermal printer to the USB port at the back side of the device.

Check if  icon is present on the status bar.

Press **Print** button.





FACSCOPE B Results

Exp. Date : 2019-04-01 09:00:00
User Group : 1
Count mode : Normal mode
Staining : Trypan blue 1 : 1

Channel 1
ID 201904010900001
Total 3.39 x 10^6 cells/mL
Live 2.20 x 10^6 cells/mL
Viability 64.9 %
Avg. Size 14 um

Channel 2
ID 201904010900002
Total 3.01 x 10^6 cells/mL
Live 0.20 x 10^6 cells/mL
Viability 6.6 %
Avg. Size 11 um

..... Channel 3, Channel 4

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Example

D. Exporting the Report into USB memory

A report on the counting results can be exported as PDF to USB memory. PDF report show general information, cell image and histogram of cell size distribution.

USB memory formatted to ex-FAT file system is unsupported.
In case of connecting ex-FAT File system formatted USB memory, USB memory icon is present but error message "Unsupported USB memory." is displayed when trying to export data or report. Please use USB memory included in FACSCOPE B package or another formatted to FAT32 or NTFS file system.

Step 1. Connect USB Memory to the USB port at the back side of the device.

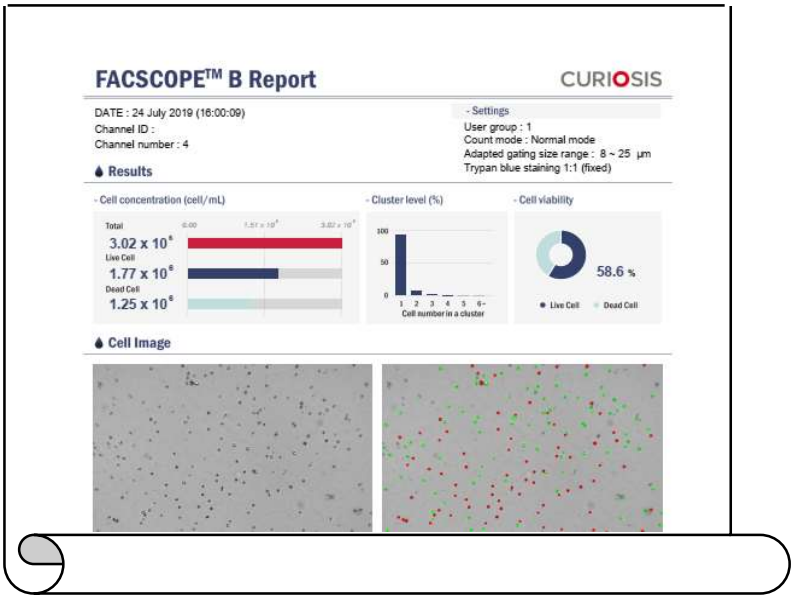
Check if icon is present on the status bar.

Press **Export PDF** button.

Step 2. A progress dialog box appears to inform that exporting the report is in progress.

Step 3. Once progress dialog box disappears and notification message (“Export success”) is displayed on status bar, remove the USB memory from USB port.

NOTE: If the USB memory is removed before the message disappear, the result file may be corrupted.



E. Exporting Data(all history) into USB memory

The results, recorded in current user group (All history), can be exported to USB memory.
Result data are saved automatically in the device memory of activated user group. Once executing “Exporting Data”, those are exported as CSV file(comma-separated-value format) which can be opened by Microsoft Excel.

USB memory formatted to ex-FAT file system is unsupported.
In case of connecting ex-FAT File system formatted USB memory, USB memory icon is present but error message "Unsupported USB memory." is displayed when trying to export data or report. Please use USB memory included in FACSCOPE B package or another formatted to FAT32 or NTFS file system.

FACSCOPE B automatically saves data up to 1000 volume per each of groups.

Step 1. Select **User.**

Step 2. Press **Review.**

Step 3. Show the results auto-saved with selected user group.

Connect USB Memory to the USB port at the back side of the device.

Check if  icon is present on the status bar.

Press Export CSV.

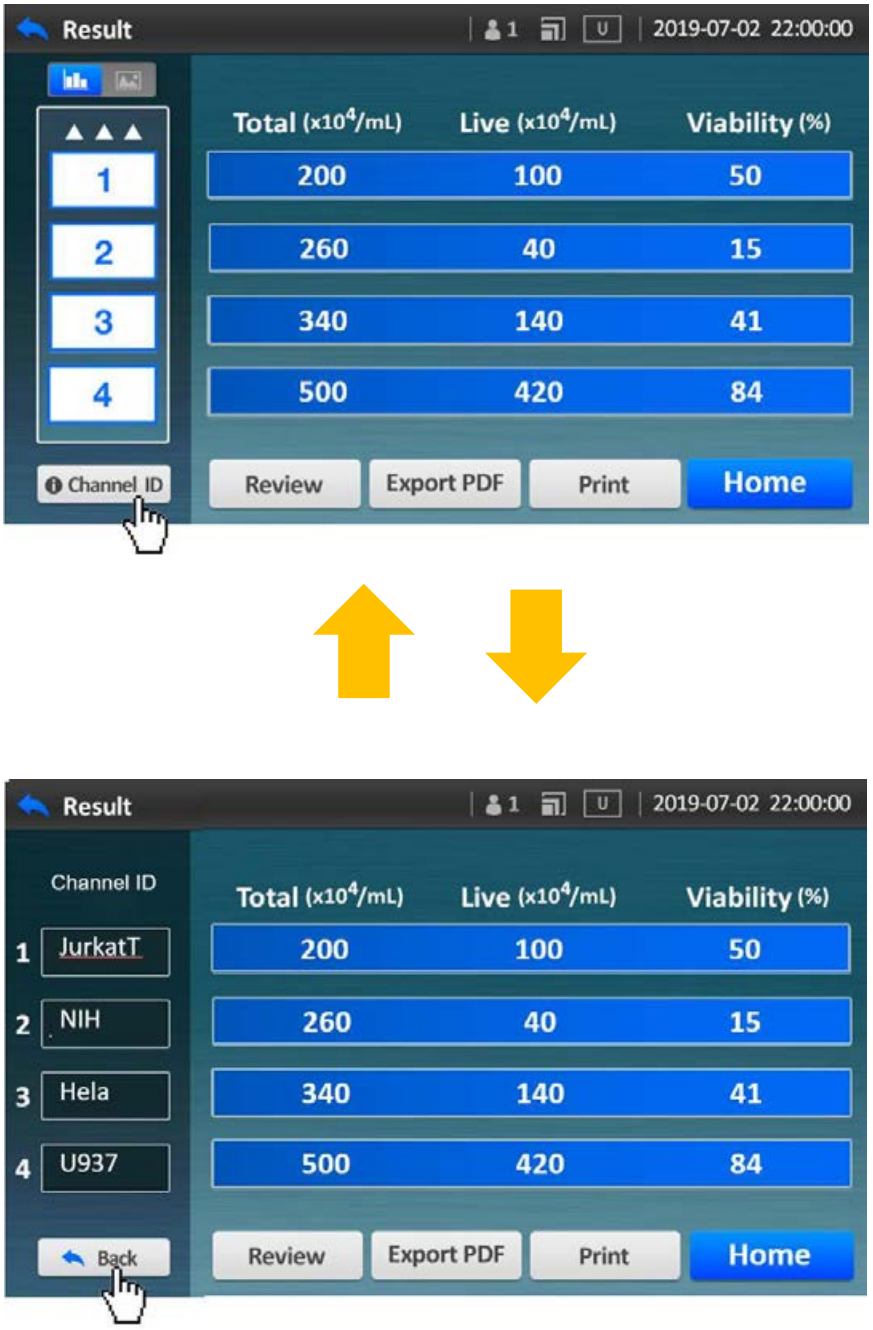
Step 4. A progress dialog box appears to inform that exporting data is in progress.

Step 5. Once the progress dialog box disappears and notification message (“Exported all data”) is displayed on status bar, remove the USB memory from USB port.

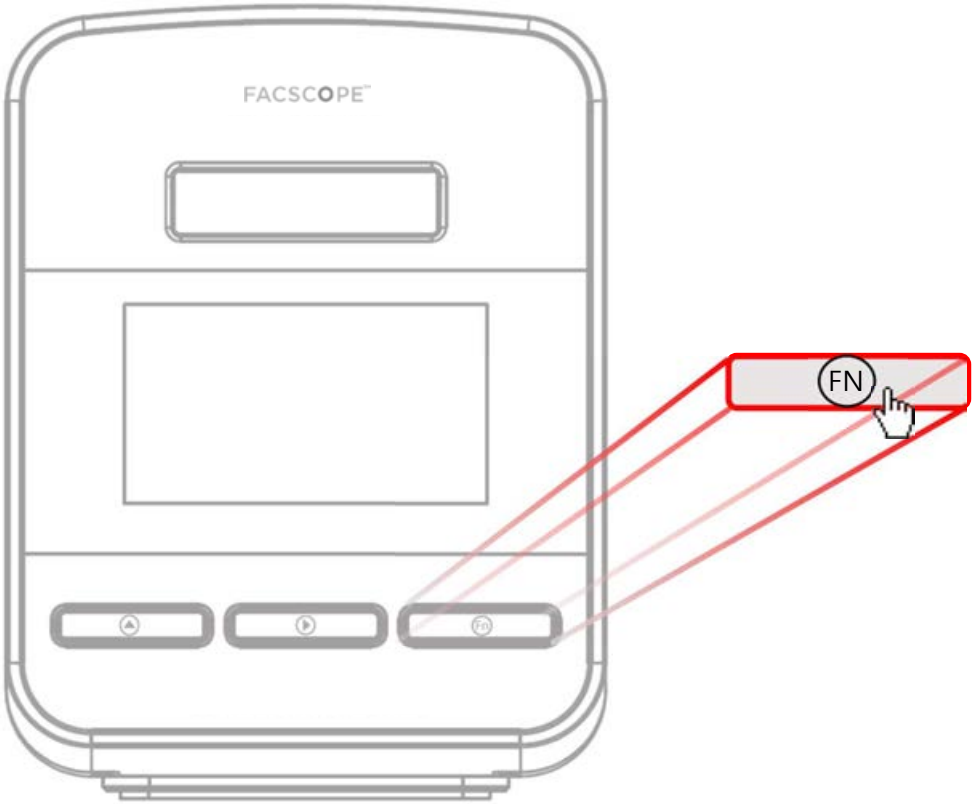
NOTE: If the USB memory is removed before the message disappear, the result file may be corrupted.

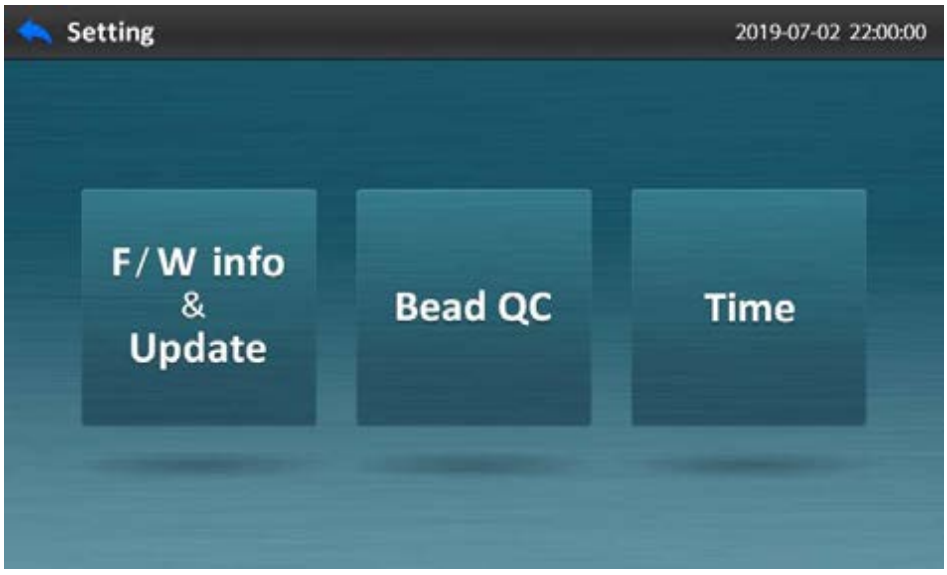
F. Showing ID

Step 1. To see each of Channel IDs, press **Channel ID**.
To go back, press **Back**.



On the Setting screen

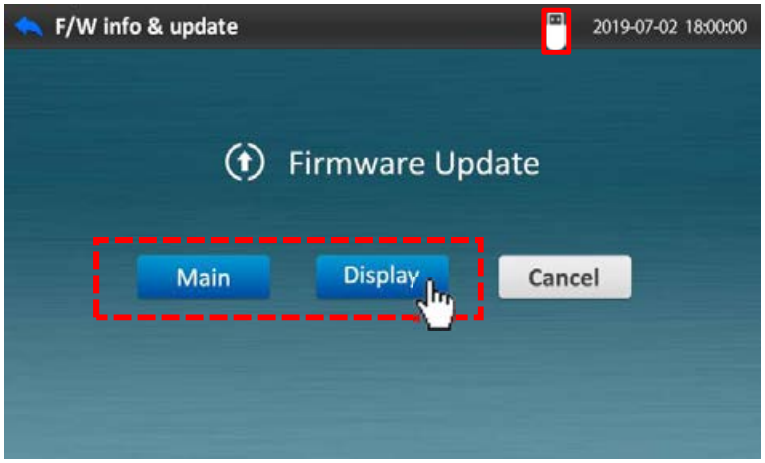




A. Cheking Firmware information and Update Firmware

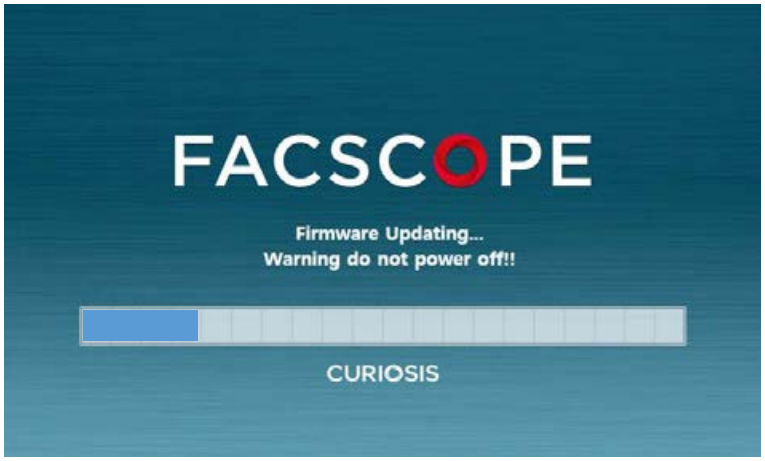
Step 1. Press **F/W info & Update**, and connect USB memory.

Step 2. Choose the category to update(**Main** or **Display**).
If USB memory is disconnected or it doesn't have updated program, the message will notice it.

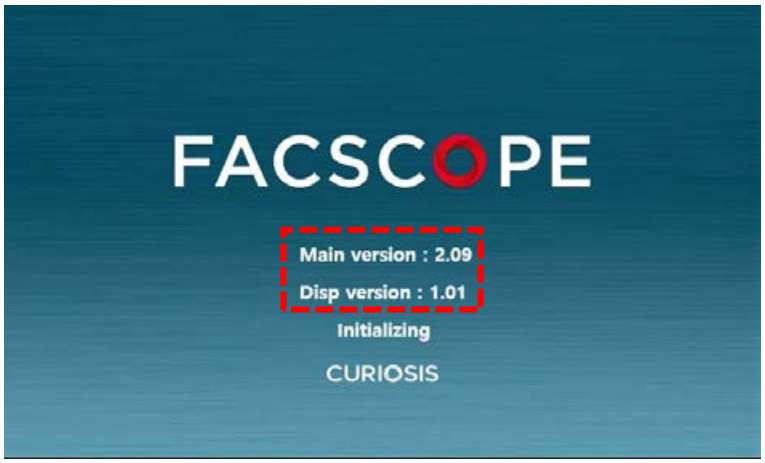


Step 3. Press **Update** button.

Step 4. Updating

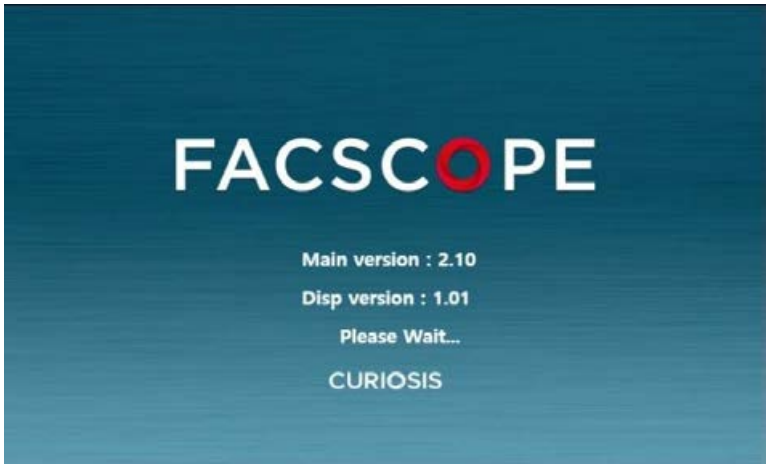


Step 5. The device will start again automatically with updated version.
Check if the version is changed.



Step 6. After about 1 minute, switch off and on for stable operation.

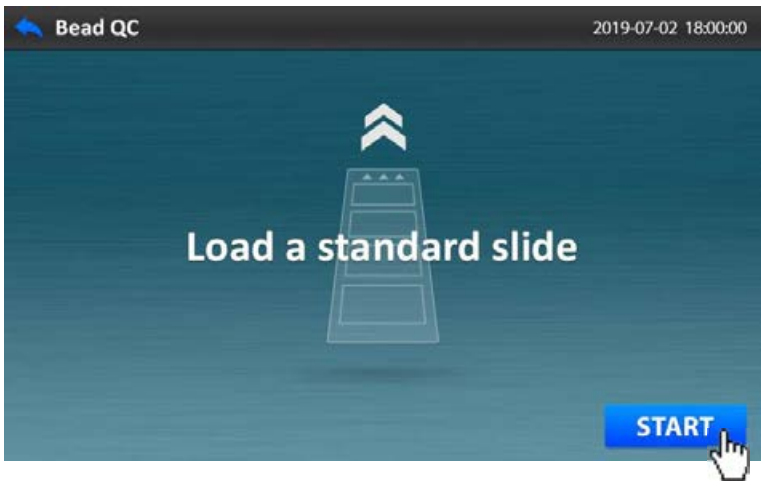
NOTE: When the following message "Please wait…" appear on initialization screen after update F/W, please wait 2~3 minutes, do not turn the device off immediately.



B. Bead Quality Control

Step 1. Press **Bead QC** button.

Step 2. Load a standard slide and press **START** button.



Step 3. Counting

Step 4. Check the result amount.

Step 5. Check the Histogram and Bead image.

Step 6. Return to Home screen.

C. Setting Time

STEP 1. Press **Time** button.

STEP 2. Adjust date and time.

STEP 3. Press **Set** button.

STEP 4. Return to Home screen.

Maintenance and Cleaning

FACSCOPE™ B does not require regular maintenance or replacement of consumable parts.

Clean the exposed surface of the device using a soft cloth. Isopropyl alcohol or deionizes water can be used together for cleaning.

Dispose of wipes in a "Solvent-contaminated waste" labelled container.

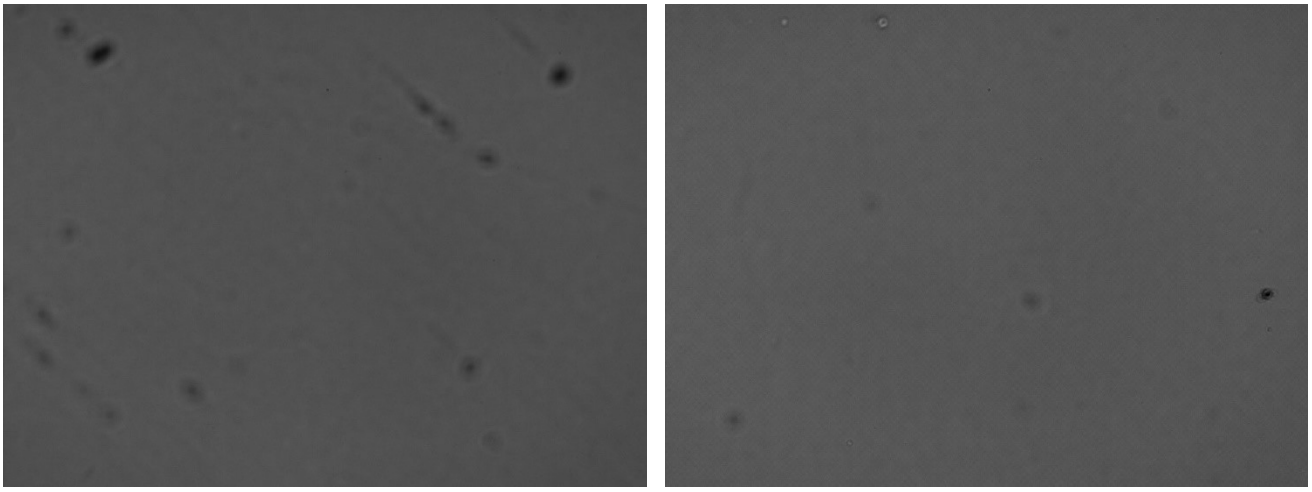
Appendix A. Trouble Shooting

Problem	Cause	Solution
Device Not powered up	Power switch is in off position.	Check power switch on back of unit.
	No power from outlet.	Check power source.
	Bad power cable.	Replace.
Inaccurate result	Stain solution has expired or been contaminated.	Use new stain solution or filter the solution.
	The severely aggregated cell is too many.	Try again after pipetting the cells (check the cell image if there are any cell clumps or agglomerates)
	Sampling error	✓ Take again cell suspension to stain the cell. ✓ Before sampling the cell suspension, gently resuspend the cells at least 6 times ✓ The sampling should be in middle of the cell suspension, not on the surface or the bottom.
	Bubbles in slide	Pay attention to avoid bubbles when pipetting and loading into slide
	low cell concentration ($\leq 5 \times 10^4$)	Try again using Precise mode.
	Cell size is smaller than 10µm or around 10µm.	Change the gating size parameter in histogram.
	The ratio of trypan blue in counting sample is less or more.	Mix cell suspension and trypan blue 1:1.
	Too Bright or dark cell image	Mix cell suspension and trypan blue 1:1. If the problem isn't resolved, contact your local distributor.
	The grid pattern or line is visible in result images.	Try again using another slide. If the problem occurs frequently, contact your local distributor.
Exported data or Report is corrupted	The USB memory was removed before displaying notification message	After notification massage appears, remove the USB memory.
USB memory Not Connected to device	The USB memory is formatted to ex-FAT or NTFS file system.	Use USB memory included in FACSCOPE B package or another formatted to FAT32 file system

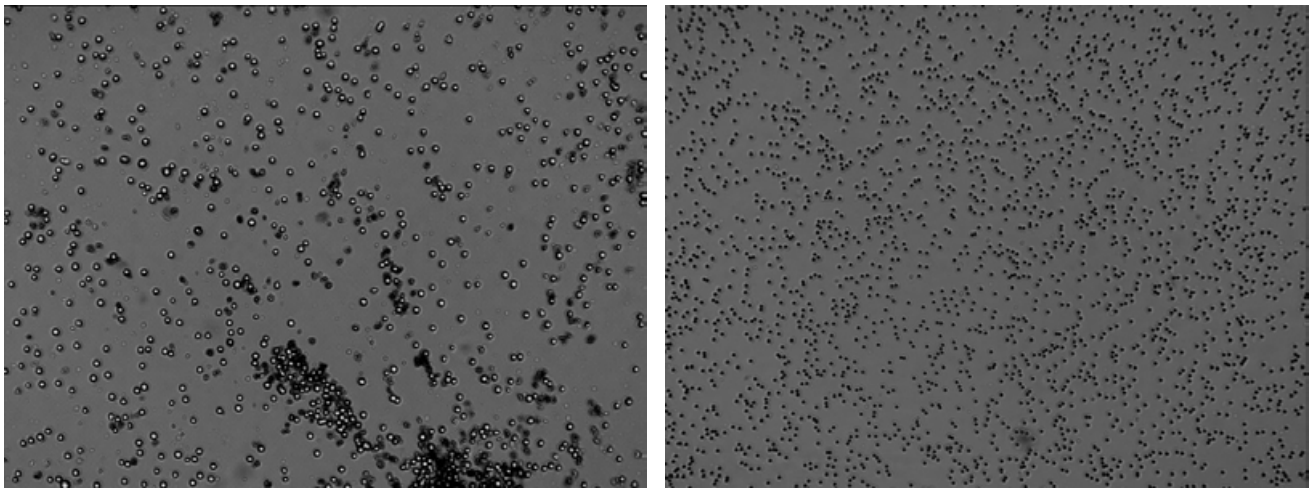
If trypan blue or media contain debris which is similar in size and shape to cell, it causes inaccurate result.

Appendix B.
Examples of error and inaccurate result

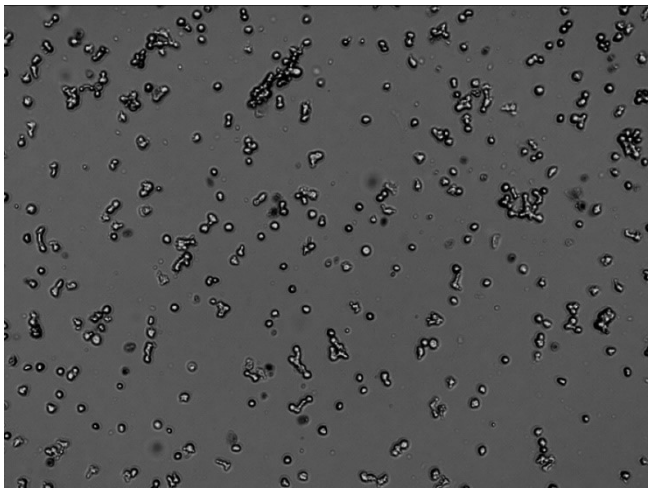
1. **“Too Low” error**



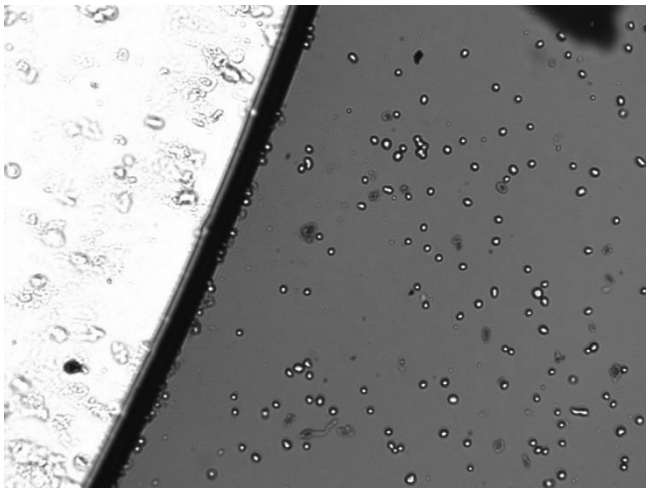
2. **“Too High” error**



3. “Sample error” error

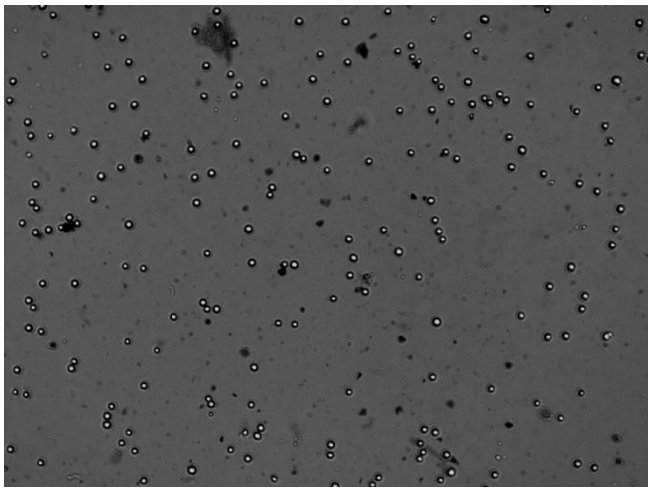


The severely aggregated cell

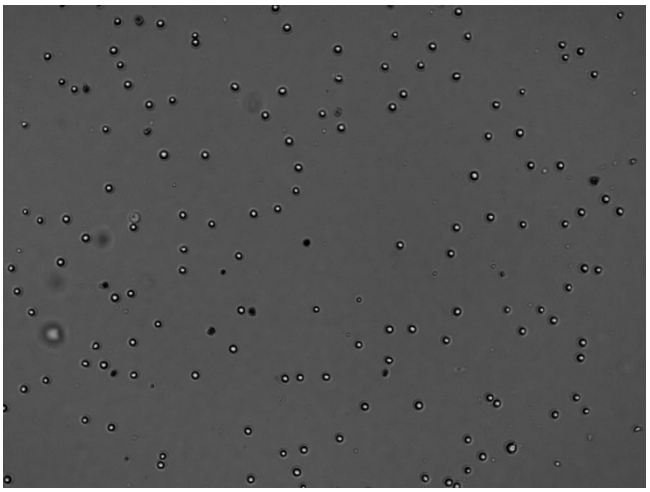


The sample loaded into the slide is dry out

4. the usage for contaminated stain solution



The Cells with the contaminated trypan blue



(Comparative data) The Cells with the filtered trypan blue

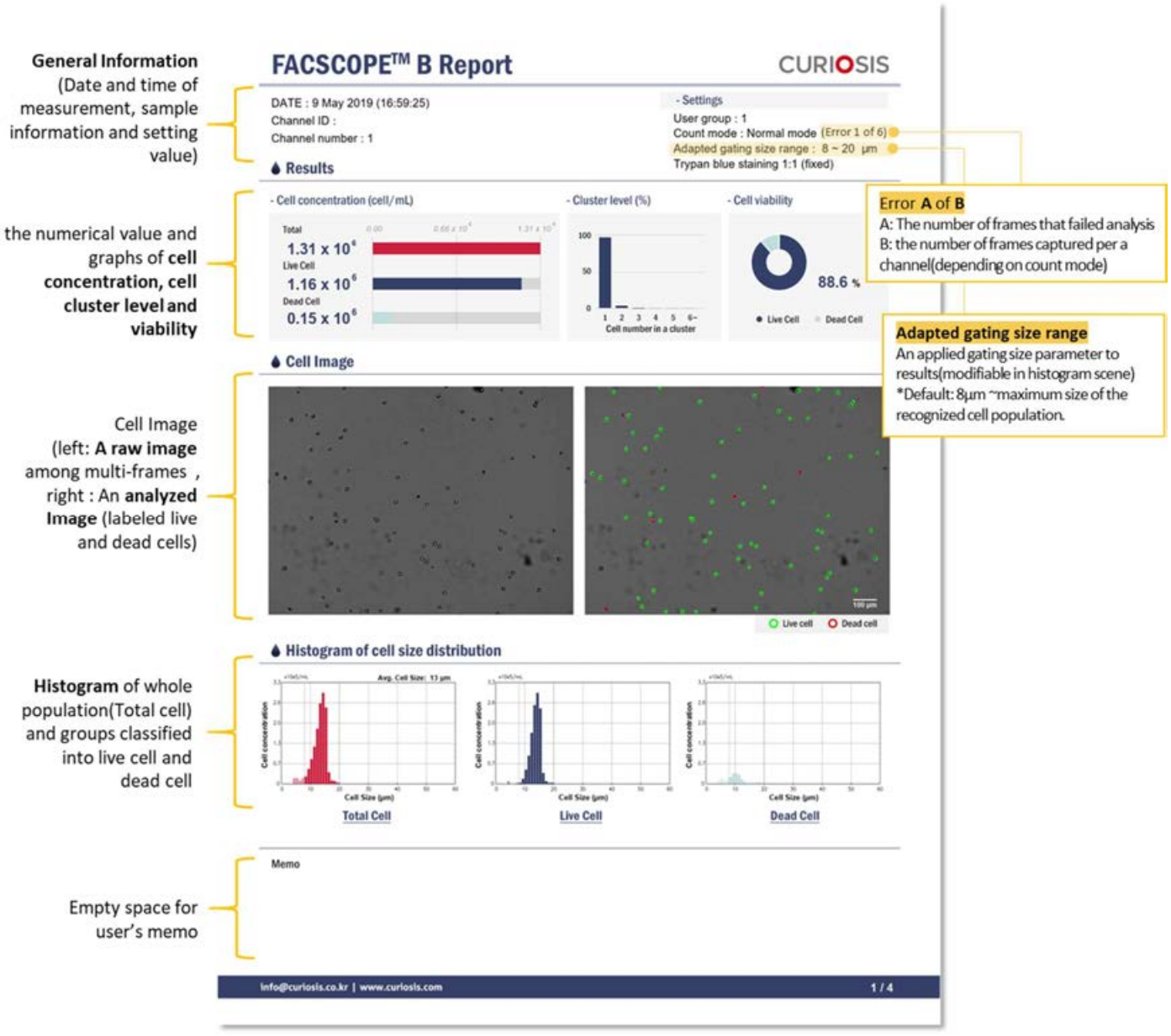
Appendix C. The contents of Result data

History table(Excel data) consists of following items.

User	Selected user group
File created	Time when file is created
Channel No.	Channel number
Channel ID	Channel ID
Date	Measurement date
Time	Measurement time
Total cell [x10^4/mL]	Total cell Count result (x $1X10^4$ cells/mL) (Converted count result)
Live cell [x10^4/mL]	Live cell Count result (x $1X10^4$ cells/mL) (Converted count result)
Dead cell [x10^4/mL]	Dead cell Count result (x $1X10^4$ cells/mL) (Converted count result)
Viability	Cell viability (%)

Appendix D.

Example and explanation of PDF report



FACSCOPE™ Instruction Manual

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The information in this manual is described as correctly as possible and is applicable to the latest firmware versions, but it may be changed without prior consent or notification.

Revision History:

Date	Revision	Description
2019/03/05	V.0.0	Initially issue
2019/03/20	V.1.0	Error correction (Overall)
2019/05/24	V.2.0	-Add contents (“Firmware update”, Appendix C, Appendix D, and Appendix F) -Revise contents (The order of contents, “Before using the User-Interface”, “Changing User group”, “Selecting Channel”,” Setting Count mode”, “Exporting the Report into USB memory”, and “Exporting Data(all history) into USB memory”) -Revise UI (Confirmation box, Selection box, and so on) -Error correction (Overall)
2019/12/18	V.3.0	-Added contents(Firmware update) -Improved operations(LCD touch screen, UI)
2020/11/30	V.4.0	-added caution contents of rebooting device -change the contents name

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