

# Operation Manual



BCLC-301

# Cell Counter

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## 01 Introduction

Thank You for purchasing BCLC-301 Cell Counter. Please read this manual carefully before using the instrument, follow the instructions and procedures, and beware of all safety instructions when using this instrument. Please keep the manual in an easy accessible place for reference. In this manual, "user" refers to an operator who has been systematically trained. Any operations beyond this manual is forbidden, which will void your warranty. The company reserves the right to upgrade the Instructions. All changes are subject to no prior notice and will be incorporated directly into the new Instruction.

Possible reasons of changing: Errors caused by printing or typeset software upgrade, changes in other parts of the equipment, etc.

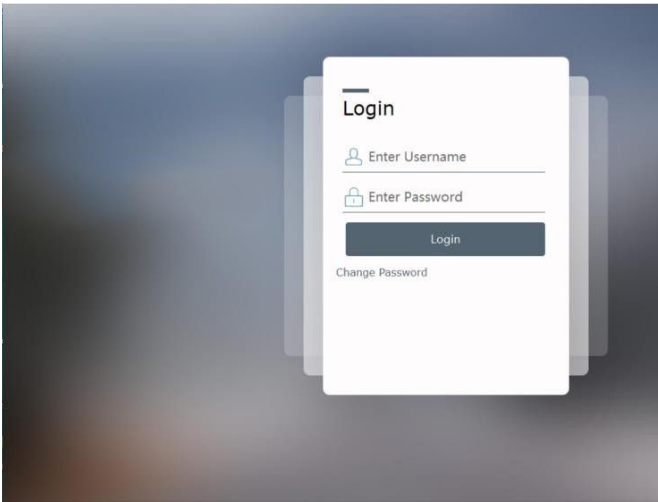


The pictures used in the instructions are for reference, which may be different from the actual equipment. Please refer to the actual equipment.

## 02 Safety Instructions

In order to safely operate BCLC-301 automatic portable cell counter, please pay attention to the following safety instructions and operation guidelines:

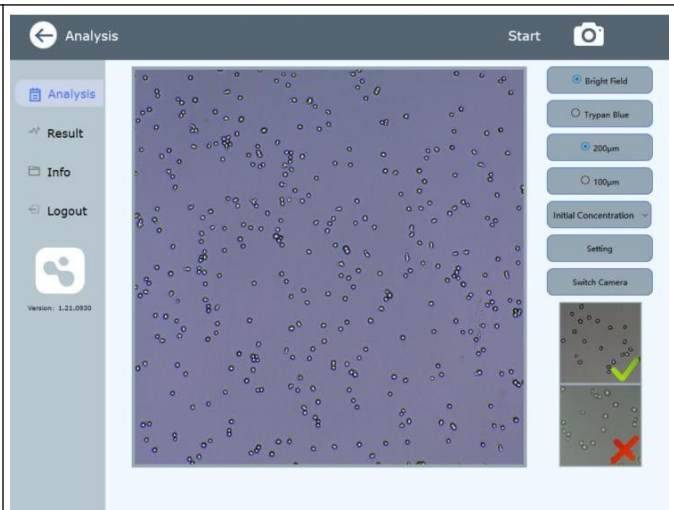
- Place the equipment on a dry, solid and stable table.
- Don't keep equipment in a humid environment.
- Keep the equipment away from dust and smoke.
- Avoid direct sunlight
- The ambient temperature should be in the range of 50° F-104 °F (10° C-40°C)
- The equipment should be connected to a ground power supply.
- The BCLC-301 system can only be operated by a trained operator in a well-managed laboratory.
- All service and repair must be performed by designated maintenance technician.
- All safety rules must be followed when handling Trypan Blue.
- The waste, such as EasyFive counting slides, tips, must be handled in accordance with relevant biohazard material handling regulations.
- The cell samples used for detection can only be loaded with our EasyFive counting slide. Use of other slides may cause irreparable damage to BCLC-301.
- EasyFive counting slides are disposable consumables.
- Protective clothing, such as gloves, must be worn when handling samples.
- Ensure the EasyFive slides, pipette tips are stored in a dust-free environment, as dust particles may affect image quality and counting accuracy.
- Ensure that the EasyFive counting slide is not contaminated before use. A clean counting slide can guarantee the BCLC-301's performance.

**BCLC-301 cell counter quick start guide**

<p>1.Boot</p> <p>Turn on the Laptop /PC power switch and connect the cell counter correctly</p>	
<p>2.User login</p> <p>Enter the username and password. Login modes include “administrator mode” and “super administrator mode”.</p>	
<p>3.Sample preparation</p> <p>Prepare a EasyFive cell counting slide, load 25 μ L sample to each chamber.</p>	
<p>4.Analysis I</p> <p>Insert the counting slide and move it slowly. When a slight "click" sound is heard and the indicator lights turn on, stop moving the slide. At this time, the sample image will be in the correct position for analysis.</p>	

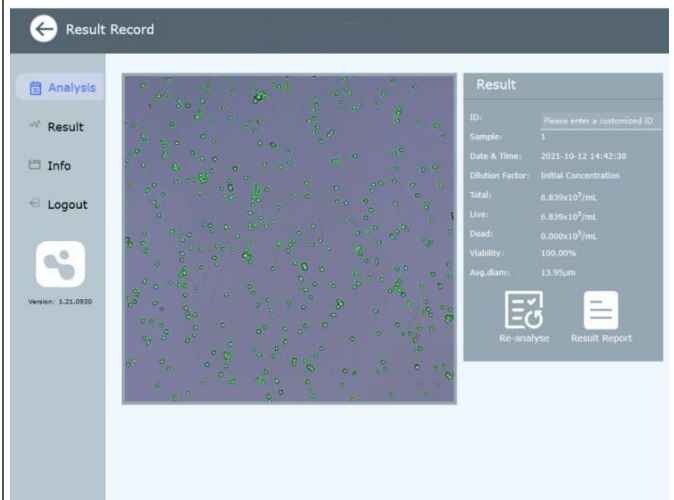
## 5. Analysis II

Adjust the focus until the sample image is clear, click "Start"



## 6. View Layout

2 seconds later, analysis results will appear. Click "Result Report" to check the detailed data



# 01 Chapter I: BCLC-301 introduction

BCLC-301 is a portable cell counter that can quickly and accurately detect total cell concentration and cell viability. It can supplant the traditional method of counting cells, which is time-consuming and may cause large deviation. Cell Viability measurement in BCLC-301 is based on trypan blue stain elimination method, live cells will appear bright and dead cells will be dyed blue. BCLC-301 uses intelligent image analysis technology to make cell counting simpler and more reliable.

The compact design incorporates a high-precision microscope light path, patented image recognition, and comes with an intelligent analysis software. Chamber indicators lights make it easy to know the sample location. When one light is on means the location is sample one;

Two lights on means the current sample being analyzed is sample two, and so on. BCLC-301 system can accurately analyze adherent cells, suspended cells, stem cells and insect cells in a concentration range of  $1 \times 10^4 \sim 3 \times 10^7$  cells/mL. The diameter range is  $8 \sim 200 \mu\text{m}$ . Accurate cell information, such as cell concentration, cell viability and diameter distribution also can be checked.

BCLC-301 cell counter requires unique EasyFive disposable cell counting slide, each counting slide has 6 sample chambers, which can count 6 different samples or parallel counting of the same sample. About  $25 \mu\text{L}$  of cell suspension is required for each test.

### 1.1 System overview

BCLC-301 cell counter is a compact cell counter, which uses Trypan Blue stain exclusion method to measure cell viability. The structural composition is shown in Figure 1.

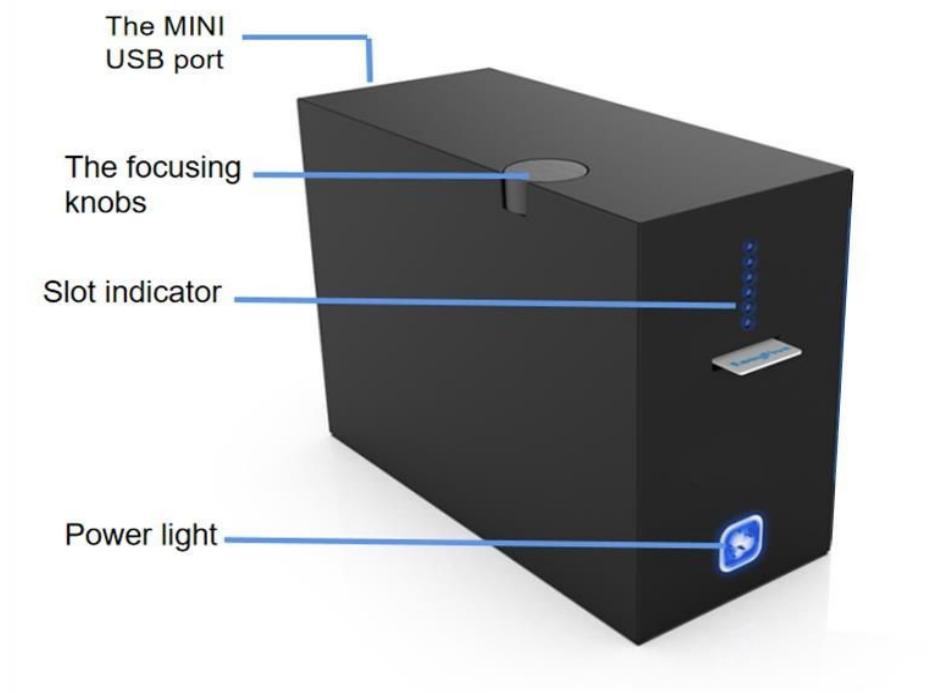


FIG. 1 BCLC-301 structure

#### Slot indicator

The indicator light in front of the cell counter corresponds to slide chamber number. When one light is on means the location is sample one; Two lights on means the current sample is sample two, etc.

#### Counting slide Slot

EasyFive counting slide insert slot.

#### The focusing knobs

The focusing knob is used to adjust the focus distance in order to get a clear image. Correct focus makes the living cell's cytoplasm clear and translucent.

#### The MINI USB port

Connected one side of mini-USB power cord to BCLC-301 and the regular USB side to a

laptop or PC. The USB cable not only powers the instrument, but also serve as the data transmission line.

## 1.2. Function Overview

The software is divided into the following two parts: login interface (as shown in Figure 2) and main menu interface.

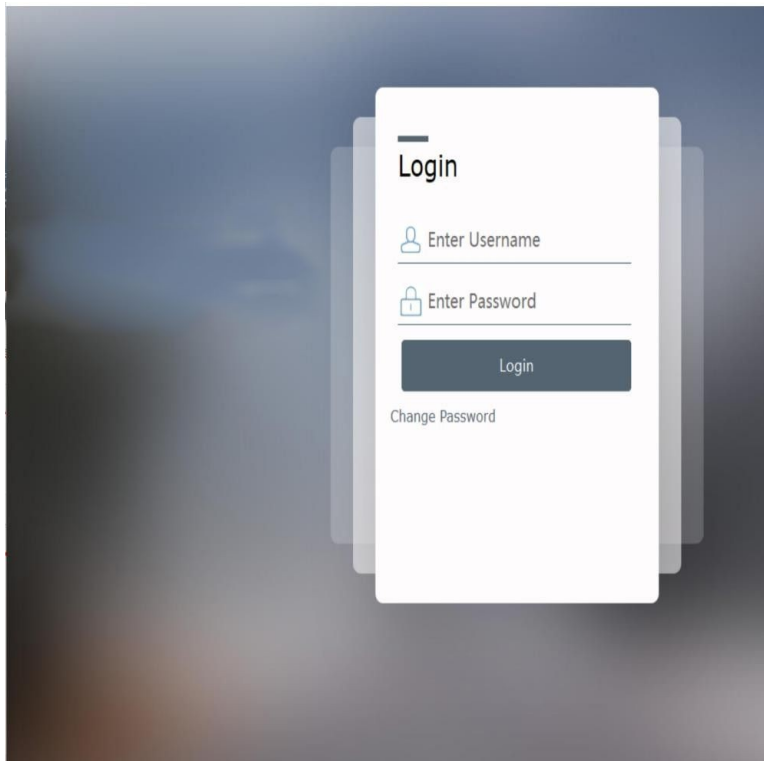


FIG. 2 BCLC-301 login interface

### Login Interface

Connect BCLC-301 to computer correctly, then double-click the software icon to open the software. After the equipment logo is displayed, the login interface is displayed. Enter a username and password and click Login to enter the main menu interface. There are two ways to login:

“administrator mode” and “super administrator mode”, the default account name and password of “administrator mode” is admin and 888. The default account and password of “super administrator mode” is super and ndgx.

### Main Menu Interface

The main menu interface is different for the two user modes: "administrator mode" (as shown in Figure 3) and "super administrator Login" (as own in Figure 4). There are four Icons on the “administrator mode” menu: “User”, “Log”, “Info” and “Logout”. Compared with the “super administrator mode”, the “administrator mode” does not have the operation rights of “Data”.

### Analysis

After the counting slide is inserted, click the “Analysis” button to display the selection of analysis mode.

### User

It is used for laboratory managers to manage the users of this instrument. Log Record the log history of all users in this instrument.

### Data

Stores historical analysis data. You can use this function to find the specific sample data.

### Info

Users can learn about the software version of the equipment Logout Click logout to return to logout of account.

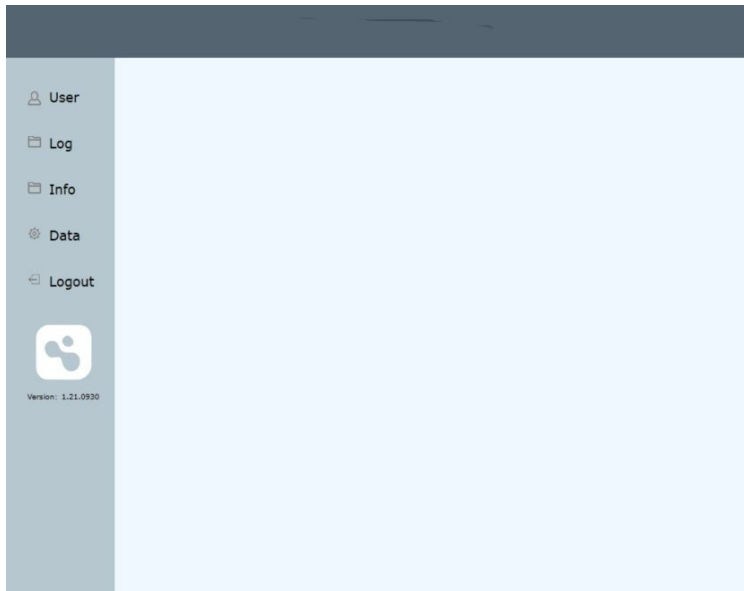


Figure 3 BCLC-301 main menu interface (super administrator mode)



Figure 4 BCLC-301 main menu interface (administrator mode)



### 1.3. Parameters

Instrument specifications	Instrument Type	Portable cell counter
	Size (W*D*H)	255mm(w)*164mm(d)*97mm(h)
	Weight	1.35 Kg
	Concentration Range	$1 \times 10^4$ — $3 \times 10^7$ cells/mL
	Diameter Range	8-200 $\mu$ m
	Activity Range	0-100%
	Test Time	2-5s
	Detection Accuracy	$\pm 5\%$
	The Optical System	Bright Field
	Sensor	5 megapixel color CMOS
	Data Output	JPG、PDF、XLS、XLSX etc
EasyFive Cell counting slide specification	External dimension	96mm(w)*25.1mm(d)*1.2mm(h)( $\pm 0.2$ mm)
	Sample volume	25 $\mu$ L/14 $\mu$ L(200 $\mu$ m/100 $\mu$ m slide)
	Channel	6

## 02 Chapter II: BCLC-301 Operation Guide

### 2.1 Installing the instrument

#### System components

BCLC-301 cell counter, USB power cord, equipment manual, warranty card

#### Installing System Components

Carefully open the BCLC-301 cell counter box, remove the packing filler and store it for future using. Check the packing list and contents in the packing case. If any component is missing or damaged, please contact seller. Place BCLC-301 cell counter on a dry, horizontal surface.

(If

moving the cell counter is necessary, please carefully hold the bottom of with both hands).

Insert the Mini-USB power cord into the mini-USB port of the cell counter and keep it connected to the USB port of a laptop or a PC. Install BCLC-301 software. Please contact supplier for the Installation software package.

### 2.2. Turn on or off the instrument

#### Turn on the instrument

(1) Properly connect BCLC-301's power cord to a PC (Connect the instrument and computer first and then open the software. Otherwise, connection error may occur. In case of error, close the software connect the instrument and then open software again).

(2) Double-click BCLC-301 software and enter the login interface after the self-check is complete. Enter the username and password and click login to enter the main menu interface. (Warning: Make sure the USB cable is properly connected to the equipment and computer before activating BCLC-301, otherwise the system will fail to initialize.)

New user need to create a personal account before using the equipment for the first time: Click "User", then click "New User" in the upper right corner, input personal information, and finally click "Submit". Use this new username and password to log in to the device.

#### Turn off the instrument

(3) Click the shutdown button on the computer page to turn off the computer and unplug the USB cable of BCLC-301 instrument and computer.

### 2.3. Focus adjustment

The BCLC-301 cell counter focus is factory calibrated and doesn't need any further adjustments. However, special situations during storage and transportation process cannot be ruled out (like large shocks) may cause the internal components of the cell counter to shift and lead to the shift of focus, thus requiring further focus adjustment.

The operation steps are as follows:

1. Log in to the main interface of cell counting.
2. Insert the counting slide after loading samples, slowly push the counting slide to the slot, and click "Analysis" to start counting cells.
3. Adjust the focusing knob on the upper left side of the instrument clockwise or counterclockwise to adjust the cells in the field of vision until the cytoplasm center is translucent, and the cell membrane is clear, as shown in FIG. 5 and 6.
4. After the focus is right, click " Start " to obtain the results of cell concentration, viability, diameter distribution.

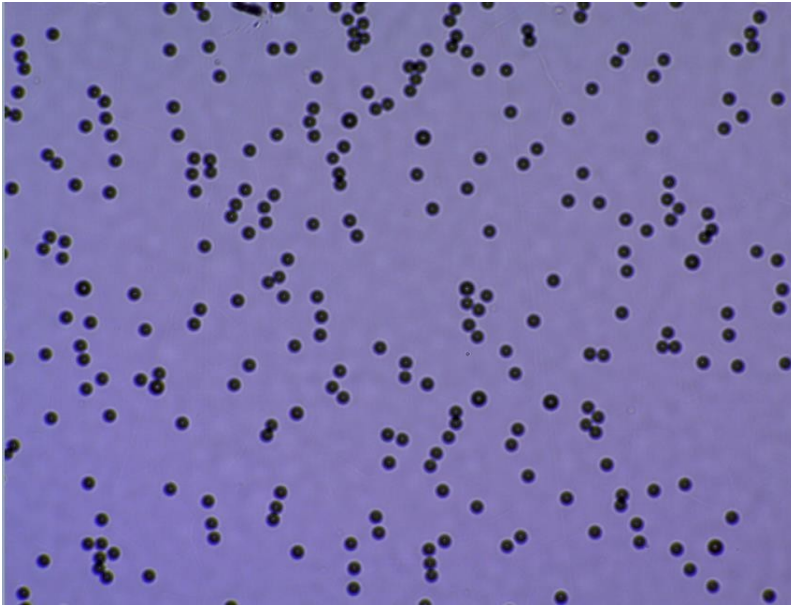


FIG. 5 Example of unclear sample imaging

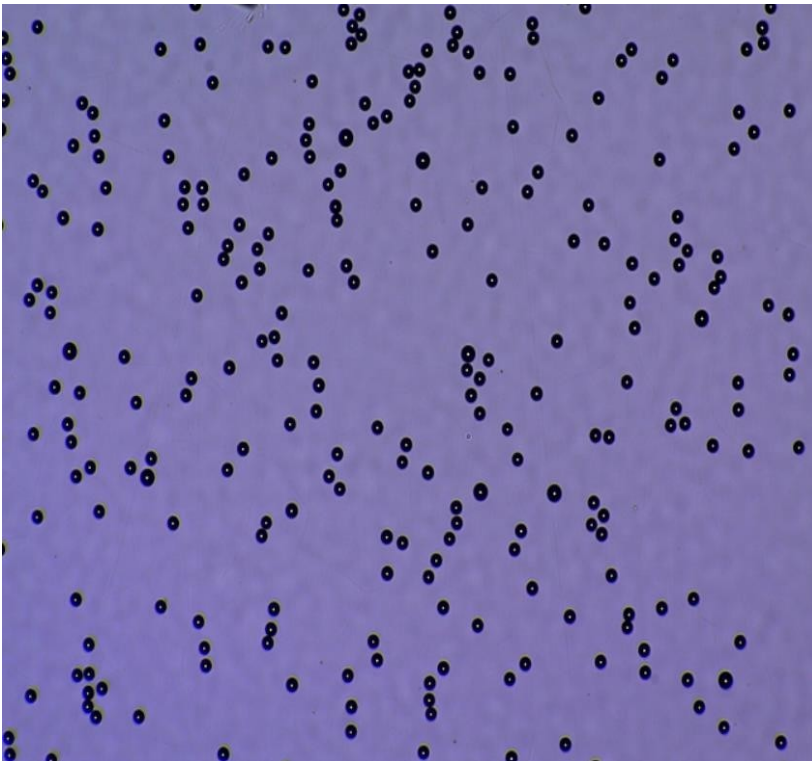


FIG. 6 Example of clear focus image

#### 2.4. Diameter range, Live/Dead Cell Threshold adjustment

Users can set the diameter range to the actual cell size range to improve the counting accuracy. The default value is 1 $\mu$ m-200 $\mu$ m. If the diameter range is set properly but living cells and dead cells still cannot be identified, the threshold of living cells and dead cells should be reset. Setting procedures are as follows: Insert the sample, and click “Analysis”, then click “Setting”, select “Edit” button, now you can click the “+” or “-“ to adjust the threshold parameters, and click “Preview”(“Refresh effect”). When every live and dead cells

are correctly tagged, click “ Save ” .

The default parameters can be applied to most cells. If you have any questions during threshold modification, contact your local agent or manufacturer.

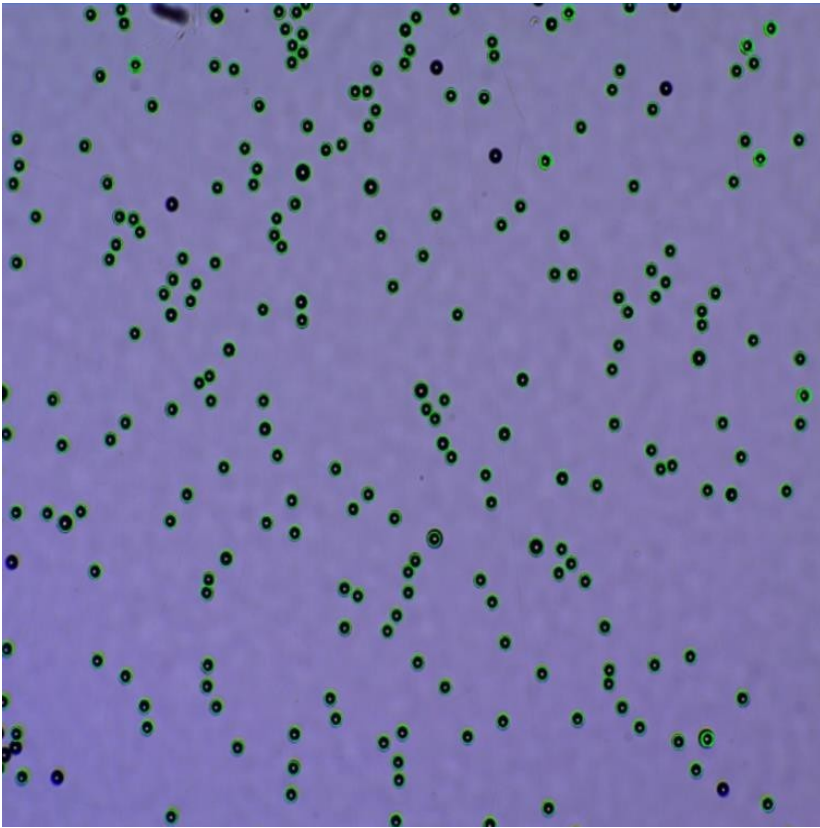


Figure 7 An example of correct threshold parameters

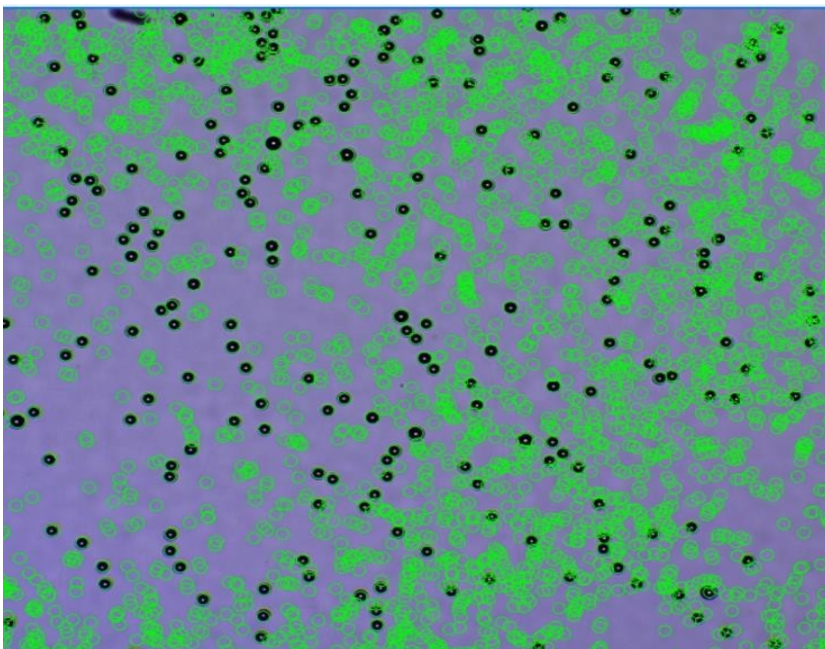


Figure 8 Example of incorrect threshold parameters

## 2.5. Cell counting

For best test results, please follow these recommendations:

1. BCLC-301 cell counter is used only at recommended ambient temperature (10-40°C).
2. The BCLC-301 can only use proprietary EasyFive counting slide. Incompatible counting slide may cause irreparable damage to the equipment or make it impossible to count.
3. Operators must be trained and operate the system in a well-managed setting.
4. When handling samples, wear protective clothing and gloves to prevent dust and particles from entering the sample chamber.
5. Ensure that all equipment for sample preparation such as EasyFive counting slide, pipette tip is stored in a dust-free environment, as dust or particles may affect image quality.
6. Do not touch the counting area of the EasyFive cell counting slide. Hold the edge of the slide, and make sure the EasyFive counter slide is not contaminated before use.
7. EasyFive cell counting slide and pipette tip are disposable consumables, please do not reuse. Used consumables should be treated as hazard biological waste for proper disposal.
8. The waste of tissue or cell must be disposed of in accordance with the relevant biohazard material handling regulations.
9. Ensure that Trypan Blue solution is not contaminated; If contaminated, it should be filtered before use, Trypan Blue treatment must follow the relevant safety rules.
10. To obtain accurate cell survival rate, ensure that the counting area is covered with cell suspension. Meanwhile cells mixed with Trypan Blue solution should be counted within 5 minutes, as trypan blue is toxic to cells. For more accurate counting results, we recommend you count at least two times and make an average.

### Counting Settings

1. Enter username and password to login the system
2. BCLC-301 has two counting modes: users can click “Analysis”, then select either “Bright Field” or “Trypan Blue” counting mode, and preview cell images (as shown in FIG. 9). The “Bright Field” mode only tag the living cells and counts the total number of living cells. The Trypan Blue mode can count the number of living cells, dead cells and calculate cell viability. Click “Start” to get the counting result in 2 seconds.



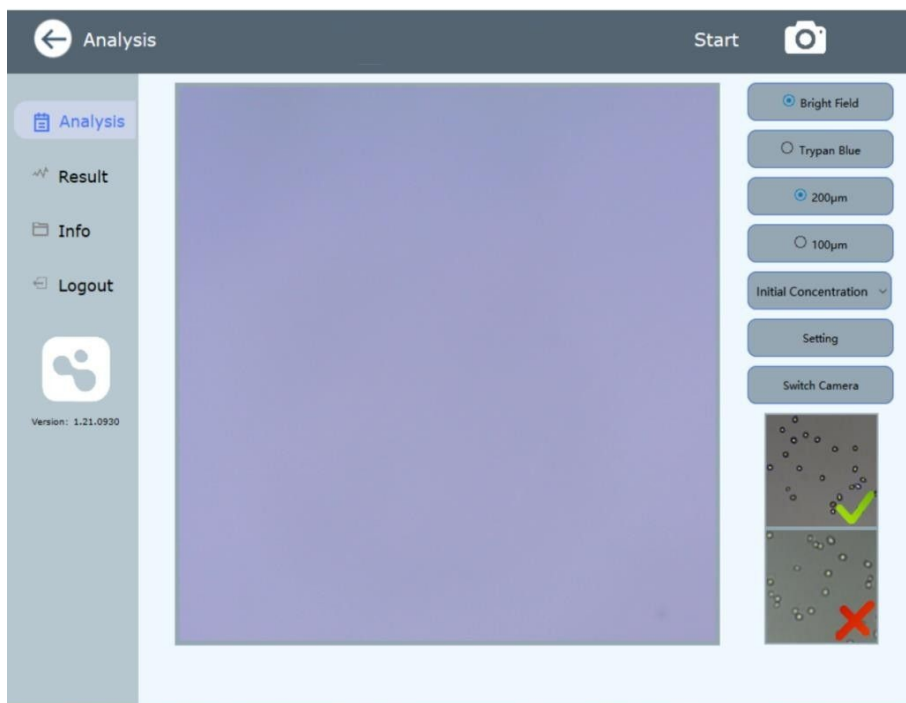


Figure 9 Cell image preview and counting mode selection

### Bright Field count

1. Count the total cell number in a single chamber: click "Analysis" and select "Bright Field". After inserting the counting slide, the corresponding chamber indicator light will be On.
2. Count multiple samples: If there are more than one samples, count one sample according to Step 1, then push the counting slide to next sample, click "Start" and count the next or multiple cell samples.

### Cell viability count

If Trypan Blue is used, click "Trypan Blue", and the test procedure is the same as "Bright Field" mode.

### Cell counting Preparation

1. Open a new EasyFive six-position cell counting slide, tear off the upper and lower surface protective films, place the EasyFive six-position cell counting slide on a horizontal clean bench, and load 25µL cell sample into the chamber. The pipette and counter plate should be positioned at 45-60° (as shown in FIG. 10).  
(Note: ① Do not inject too much or too little sample; ② The sample should not be placed for more than 5 minutes before load into chamber, otherwise the measurement results will be deviated due to sample volatilization, Trypan Blue toxicity and other factors.)
2. Prepare cell suspension according to standard procedures. When Trypan Blue is used for staining, the cell sample should be mixed with Trypan Blue (0.4%) in a ratio of 1:1, and the mixed repeatedly with the suction tip. After the mixture is evenly mixed, load 25µL mixture into the counting slide chamber.



FIG. 10 Sample of cell counting slide

2. Complete counting analysis in one step. Insert the EasyFive cell counting slide horizontally into the slot and click analysis to calculate the cell viability. (Note: Do not touch the optical surface of the EasyFive cell counter. Hold the edge of the counter by hand, otherwise fingerprints will affect the count accuracy.)
3. It takes about 2s for the cell counter to complete the counting of a sample, and the interface will display the results of the test sample (as shown in Figure 11). The analysis results includes the following six parameters: total cell concentration, live cell concentration, dead cell concentration, cell viability (the proportion of live cells to total cells), and average diameter.

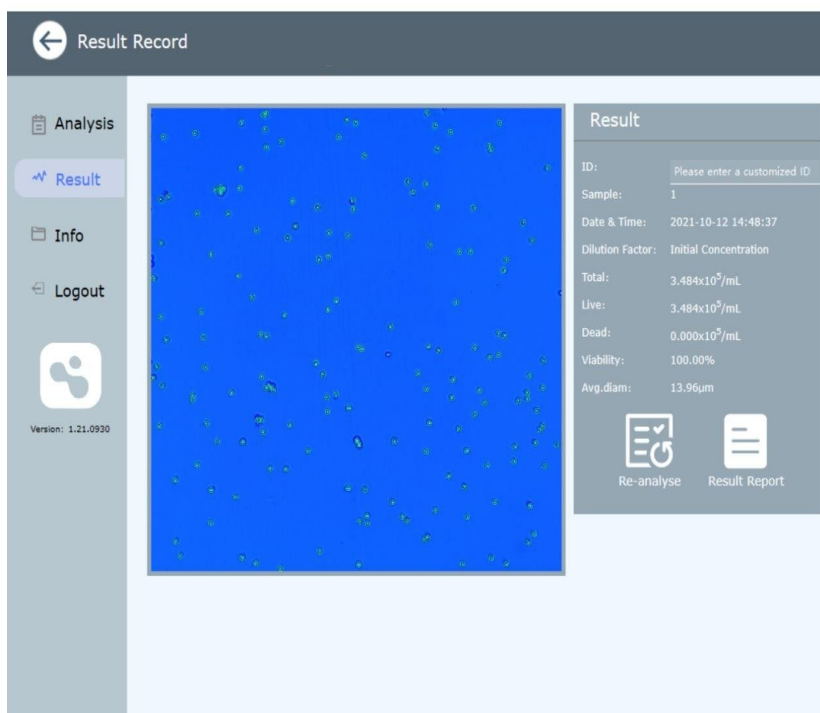


FIG. 11 Results interface

## 2.6. View Results

After counting, results will be displayed directly (as shown in Figure 11), and all test results will be automatically stored in the connected computer, including counting images and the parameters.

### Sample Image

BCLC-301 takes single photo of each cell sample, and the tagged cells can be observed after counting. The green circle represents living cells, and the red circle represents dead cells.

**Test sample data**

As shown in Figure 11, the total cell concentration, living cell concentration, dead cell concentration, cell viability rate (proportion of living cells to total cell number) and average diameter of the sample will be displayed on the analysis interface. Users can also name the counting sample at Number.

**Analysis report**

Analytical text data including distribution maps and comprehensive documents.

**Distribution diagram**

Click "Distribution" in Figure 11 to view the histogram of sample cell diameter.

**Bar Graph of cell diameter**

The diameter distribution of cells is shown (FIG. 12), and the X-axis represents the distribution range of cell diameter, in micron. The Y-axis represents the number of cells corresponding to a particular diameter.

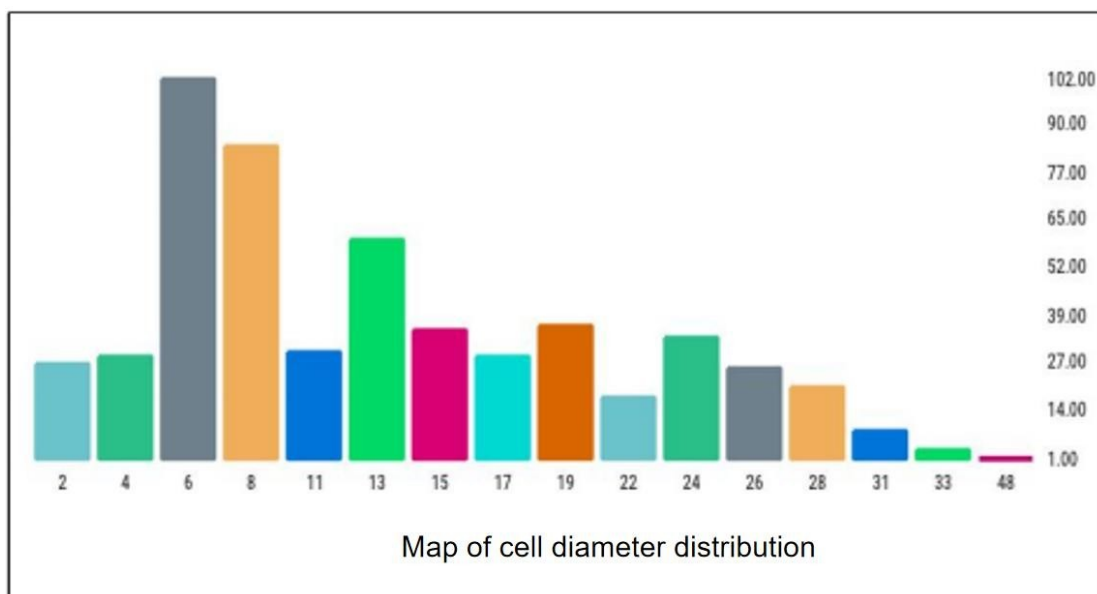


FIG. 12 Distribution of cell diameter

**Result Report document**

Click "Result Report" in the analysis result interface (as shown in Figure 11) to view the overall analysis report of sample cells (.pdf file).

**2.7. Data Export**

All sample data counted by the cell counter is stored in the connected computer, and the user can also export the data to other storage locations. In addition, the cell count picture can be directly viewed in the computer, as JPEG image format. The cell diameter distribution chart reflects the detection results in a graphical manner.

**Export the target sample data**

Click "Result" to find the specific sample data (as shown in Figure 13), check it and export it



to the corresponding folder of cell counter for storage, or export it to other storage equipment through USB drive.

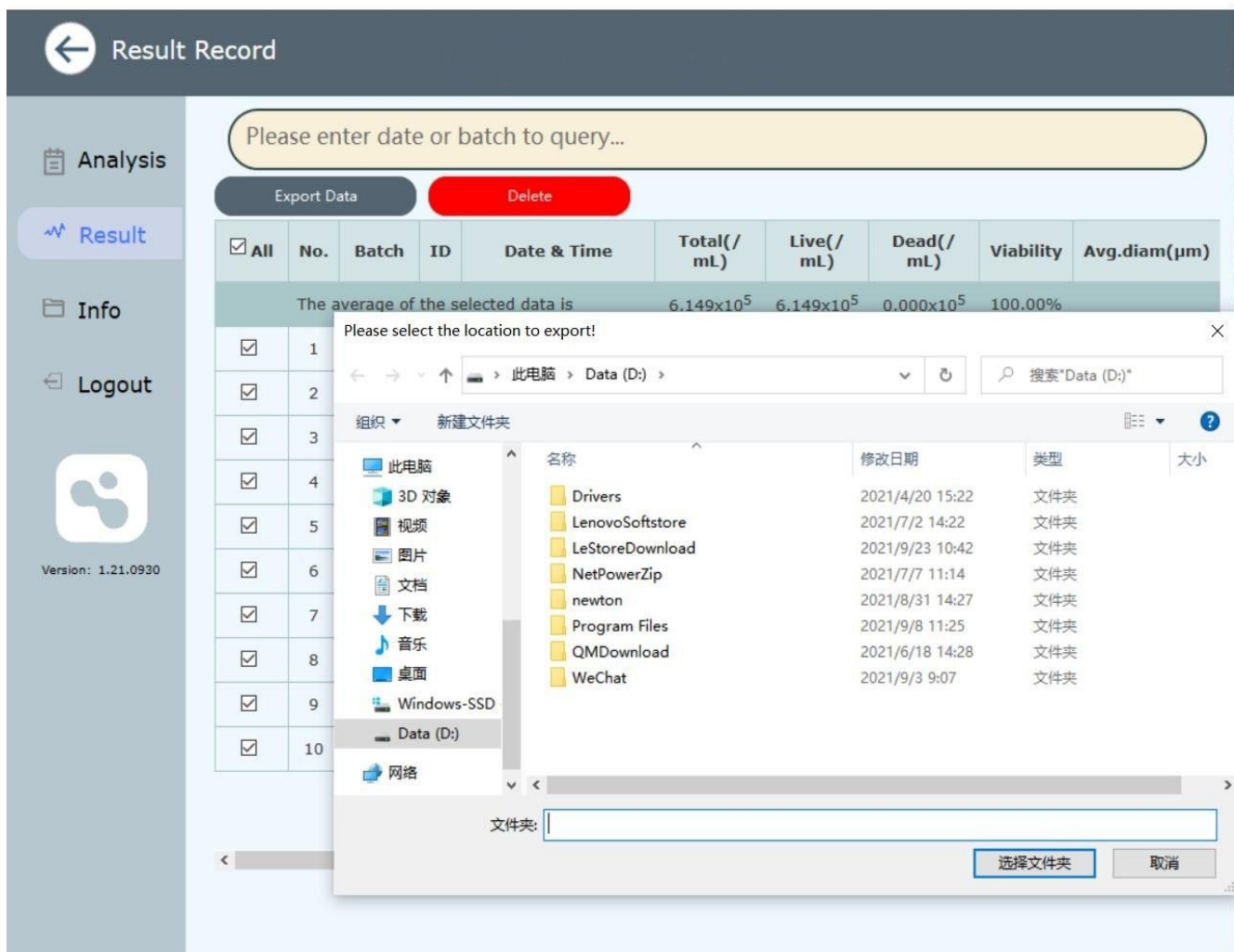


FIG. 13 Example of data export Interface

## 2.8. Return to Main Menu and Powering Down

### Return to main screen

After completing data analysis, result review, data saving and export, please click the return icon (←) of the interface to return to the main interface for testing the next sample.

### Shut down the instrument

If you are no longer using the cell counter, turn off the computer or pad. If it is not used for a long time, please unplug the mini-USB data line and disconnect the connection between the data line and the computer.

## 03 Chapter III. Maintenance and Troubleshooting

### 3.1. Cleaning and maintenance

- Do not use damp cloth to clean the surface of BCLC-301.
- EasyFive cell counting slide is a disposable consumable, do not reuse the counting slide.
- BCLC-301 cell counter doesn't require regular maintenance. In case of any issues, please

contact the seller. Unauthorized repairs will void warranty.

## 2.Common problems and troubleshooting

Problems	Possible reasons	Solutions
The cell count is not accurate	Sample processing	Do not insert the EasyFive cell counting slide upside down into the instrument to avoid damage caused by liquid inflow into the instrument.
		Please do not use the EasyFive cell counting slide repeatedly, residual dye from the last count may affect the results of the next count.
Please do not use other counting slides, such as blood counting slides. The focusing area of counting slides made by other manufacturers is different from ours, so accurate counting cannot be carried out, and irreparable damage may be caused to the equipment.		
	Ensure that the sample covers the entire counting area and the EasyFive slides is inserted properly.	
	Data is low or high	The range of cell concentration counted by BCLC-301 was $1 \times 10^4$ -- $3 \times 10^7$ cells/mL. The deviation rate of cell samples is the lowest in the concentration range of $1 \times 10^5$ -- $5 \times 10^6$ cells/mL.
		If the sample concentration is not within the concentration range measurable by the instrument, the sample should be diluted or enriched before counting.
		Make sure the counting slide is clean before using, and is prepared in a clean environment.
		Trypan Blue should be kept at room temperature before use, otherwise the dye may crystallize and affect the counting result.
	Poor image	Cell focal length parameters deviate. Need to readjust the

	quality	focal length
	Cell aggregates	Thoroughly mix the cell sample before adding to ensure that the cells are not clustered.
	impurity interference	Avoid cell samples mixed with impurities or tissue fragments. Clean the samples with PBS before adding samples, and then re-suspend them for detection with PBS after centrifugation.
Software runs slowly	Large Historical Data Size	Delete unnecessary records from historical data.
Problems in Saving and printing	The printer driver is not installed or is incorrectly installed	Connect the cell counter to the printer and ensure that the cell counter has the correct printer driver installed.

## 04 Chapter IV. Warranty

This instrument is warranted to be free from defects in materials and workmanship under normal use and service, for a period of 12 months from the date of dispatch. The warranty is extended only to the original purchaser. It shall not apply to any product or parts which have been damaged on account of improper installation, improper connections, misuse, accident, or abnormal conditions of operation. For claims under the warranty, please contact your local supplier or the manufacturer.

**Scope: The following conditions are not covered under the warranty.**

- Faults resulting from improper use and maintenance which are not in accordance with operating instructions.
- Issues caused by unauthorized disassembly or modification.



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