Beijing SeekGene BioSciences Co., Ltd

SeekMate Tinitan™ Fluorescence Cell Counter

User Manual

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Version Number: V1.1

Declaration

Beijing SeekGene BioSciences Co., Ltd (hereinafter referred to as "the Company") owns the copyright of this user manual, which is not intended for public distribution, and reserves the right to treat it as confidential material. This user manual is intended only as a reference for operation, maintenance, and repair. No other party is authorized to disclose the contents of this manual to others.

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Before using the products of our company, any user must carefully read this document. This document informs users of the operating steps that must be observed, the possible operations that may cause abnormalities, and the dangers that may cause damage to device. If any abnormalities occur or any danger or injury is caused to persons or devices as a result of the operations that must be avoided as prescribed in this document, our company shall not be liable for safety, reliability and performance assurance. Our company will also not provide free repairs for such faults. The contents contained in the instruction manual may be subject to change without prior notice.

The contents of this user manual are subject to change without notice.

Manufacturer’s Responsibility

The company is only responsible for the safety, reliability, and functionality of the device when the following procedures are adhered to:

• Adjustment and maintenance of the device must be performed by service personnel designated and specially trained by the company.

• The necessary electrical device and working environment must conform to national standards, industry standards, and requirements specified in the instruction manual.

• Operation of this device must strictly follow instructions in the manual.

Usage Notice

Welcome to use our product!

This device is an integrated cell counting and analysis system, comprising a control module, light source module, imaging module, display module, displacement module, base module, and enclosure module. It is primarily designed for cell sample counting and viability assessment.

To ensure correct and effective use of this product, users must carefully read this manual before operation.

Users must fully understand and strictly adhere to the guidelines outlined in this manual during operation.

This product is only intended for the applications described in this manual.

Repairs and maintenance should only be performed by trained and certified professionals.

If you encounter any issues during use, please contact us for prompt and dedicated support.

Specifications are subjected to change without prior notice.

Contact us

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CONTENTS

1.Overview

Thank you for choosing the SeekMate Tinitan™ Fluorescence Cell Counter (abbreviated as SeekMate Tinitan™ FL) produced by Beijing SeekGene BioSciences Co., Ltd!

This user manual is specifically designed to assist researchers in effectively utilizing the SeekMate Tinitan™ FL. Within this manual, you will find detailed instructions on installation, operation, and maintenance of the SeekMate Tinitan™ FL, along with other important information.

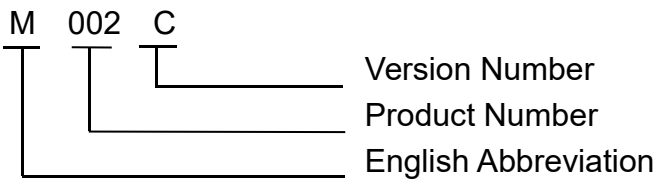
Please carefully read the user manual before using the product. If you have any further questions or concerns regarding operation and usage, please contact Beijing SeekGene BioSciences Co., Ltd.

Warning:

Disassembly or modification of this product is strictly prohibited!

In case of any emergency where immediate power cutoff is necessary, please unplug the power plug.

1.1 Model Name



1.2 Warnings and Cautions

⚠Warning:

- Please inspect the power cord for any damage before connecting it. If there is any damage, replace it immediately.
- Use the device according to the specified instructions to prevent damage that could render the device inoperable.
- During experimental procedures, wear a mask and gloves. In case of biological contamination, rinse immediately and have the contaminants handled by a professional service.
- If the product has been dropped, mishandled, the casing is damaged, or there has been water ingress, the device may be compromised. Discontinue use and contact the manufacturer or supplier for inspection and repairs.
- If the product requires re-transportation, refer to the "Packaging and Transport" instructions. Failure to do so may result in device malfunction.

⚠Caution:

- Keep the device away from heating or cooling devices (e.g., exhaust fans, radiators, or air conditioners) during operation.
- Avoid operating the device in high-humidity environments and ensure no liquid enters the device.
- In case of any system malfunction, immediately stop using the device and contact the manufacturer promptly.

2. Storage and Transport Requirements

The SeekMate Tinitan™ FL is a precision electronic device that requires the use of original shock-absorbing packaging provided by the manufacturer during long-distance relocation, and must be kept as stable as possible. Otherwise, it may cause system failure and affect its use.

SeekMate Tinitan™ FL has the following requirements for transportation and storage.

Storage environment requirements:

Transportation storage temperature: -20℃ to +55℃

Relative humidity: 10% to 93% (non-condensing)

Atmospheric pressure: 50KPa to 106KPa

Transportation Requirements:

During transportation, the environmental conditions should meet the storage requirements, and the device should be properly packaged as follows:

1) Accessories and documents of the device should be packed in neutral material.

2) The packaging should have good shock-absorbing properties and should be transported in an upright position, preventing it from falling or experiencing severe impact.

3) During transportation, it should be protected from rain and moisture.

3. Device Installation Requirements

3.1 Installation

Upon receiving the device, please follow this operation manual for installation. If there are any issues, please contact our company's technical personnel for assistance with the installation.

3.2 Unpacking and Acceptance

The product has undergone rigorous packaging before shipment. Before unpacking, please carefully inspect the packaging for any damage. Refer to the packing list to check if all ordered components are complete, and please keep all packaging materials. You will need these packaging materials when returning the product to our company or storing the device.

Please inspect whether the contents are complete according to the packing list. If you have any questions, please contact us immediately at email info@seekgene.com.

3.3 Workspaces Requirements

a. Clean environment with no direct sunlight exposure, minimal dust, and good ventilation.
b. Good levelness of the floor (inclination ≤ 1/200).
c. Vibration-free floor with a load-bearing capacity of 50 kg/m^2 and an altitude below 2000 m.
d. Nearby electrical distribution panel equipment.
e. Absence of machines emitting abnormally high-frequency signals (ultrasonic, discharge equipment, etc.).
f. Heat dissipation is required during device operation. Sufficient space should be reserved behind the device during installation, ensuring that the device is positioned for easy disconnection. Minimum installation space: 476 mm * 458 mm * 320 mm (length * width * height).
g. Refer to Figure 3-1 for the site requirements for device installation space.

Figure 3-1: Top View of the Device - Device Dimensions: 226 * 158 * 199 mm (L * W * H)

4. Safety protection

4.1 General Safety

The SeekMate Tinitan™ FL has undergone rigorous safety testing before leaving the factory, and standard operations should not cause any safety accidents. Therefore, please carefully read this chapter and other relevant sections. In addition, personnel operating this product must be undergo appropriate technical training.

Warning:

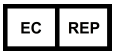
Do not use this device in the presence of flammable or explosive materials, and do not place or store flammable or explosive materials around the device. Flammable and explosive materials include gasoline, alcohol, anesthetics, solvents, desiccants, oil-based ointments, synthetic resins, etc.

4.2 Hazardous Waste Disposal

Associated waste from tissues or cells, such as cell counting plates, pipette tips, staining solutions, etc., must be disposed of according to the relevant biohazard material handling regulations. Appropriate personal protective equipment, including masks and protective gloves, must be worn during disposal.

4.3 Safety Signs

Labels, nameplates, and warning signs have been affixed as required by relevant standards and regulations.

Label	Instructions	Label	Instructions
	Manufacture		European union representative
	CE mark		Use-by date
	Serial number		Unique device identifier
	In vitro diagnostic medical device		Consult instructions for use
	Keep dry		Cautions
	Date of manufacture		Fragile, handle with care
	Stacking limit 5		Biohazard

4.4 Environmental Pollution Level

This device is rated as Class II for environmental pollution.

5.Operation Procedure

5.1 Pre-experiment Preparation

a. **Reagents and consumables**: SeekMate cell counting chips, AO/PI stains or Trypan blue stains, 10 μL pipette with corresponding pipette tips.

b. **Sample Preparation**: Mix the cell suspension with the stain to form a uniform 10 μL mixture. The recommended cell suspension to stain volume ratio is 1:1, i.e., 5 μL of cell suspension + 5 μL of stain, though you may adjust the ratio as needed. When using AO/PI stain, wear a mask and protective gloves.

c. **Device**: SeekMate Tinitan™ Fluorescent Cell Counter.

5.2 Power on and Login

Turn on the power and switch on the lower left rear switch. (Refer to Figure 5-1)

Figure 5-1 Power switch location

Enter the username and password or click "Guest Login" to enter the operating interface. The initial username is admin, and the initial password is 1234. (Refer to Figure 5-2)

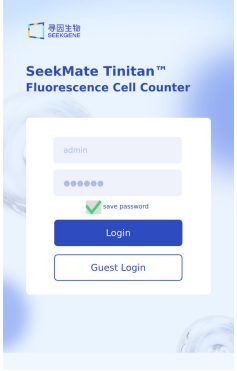


Figure 5-2 Log in

5.3 Sample processing

Mix the sample to be tested with the staining solution, pipette to mix thoroughly, take 10 μL of the mixed sample, add it slowly and evenly into the compartment of the cell counting chip, and insert the loaded chip into the device's loading port. (Refer to Figure 5-3).

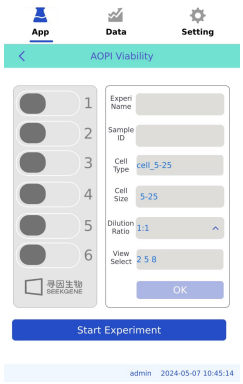
Figure 5-3 Chip loading port

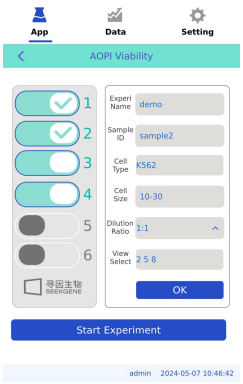
5.4 Initiating the experiment

Select the experimental mode according to the requirements of the experiment, such as "AOPI Viability". (Refer to Figure 5-4).

Figure 5-4 Experiment Selection

Edit the sample information according to the sample chamber. (Refer to Figures 5-5, 5-6, 5-7)





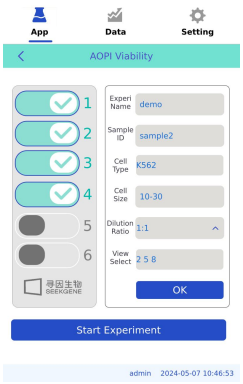


Figure 5-5 Information Editing Figure 5-6 Chamber Selection Figure 5-7 Chamber Confirmation

a. Click on the corresponding chamber of the sample on the left side of the screen, and the chamber will turn light green.

b. Edit the experiment name, sample ID, cell type and dilution rate, etc.

c. Click "OK", and the corresponding chamber will display a " √ ".

d. If there are multiple samples, edit the sample information one by one.

e. Click "Start Experiment" to automatically initiate sample detection by the device (Refer to Figure 5-8), if there is no chip inside the device, a "Please Input Chip" interface will pop up. (Refer to Figure 5-9)

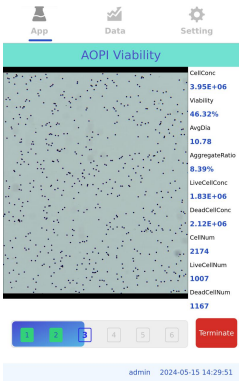


Figure 5-8 Sample Detection Figure 5-9 Insert Chip

5.5 Data

After the sample detection is completed, the chip will eject and the screen will display the detection results. (Refer to Figure 5-10)

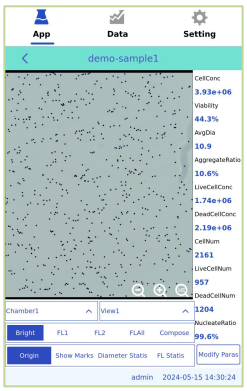


Figure 5-10 Result Display

5.6 Power Off

After sample detection is completed, if the device is not going to be used further, you can manually turn off the device's power switch.

6. Product Description

The SeekMate Tinitan™ FL utilizes the compatible SeekMate series chips and corresponding experimental reagents to achieve statistical and analytical analysis of cell sample morphology, viability, and related quantities.

6.1 Main Components of the Device

The main components of the SeekMate Tinitan™ Fluorescence Cell Counter are illustrated in Figure 6-1 and Figure 6-2).

Figure 6-1 Front view of the device

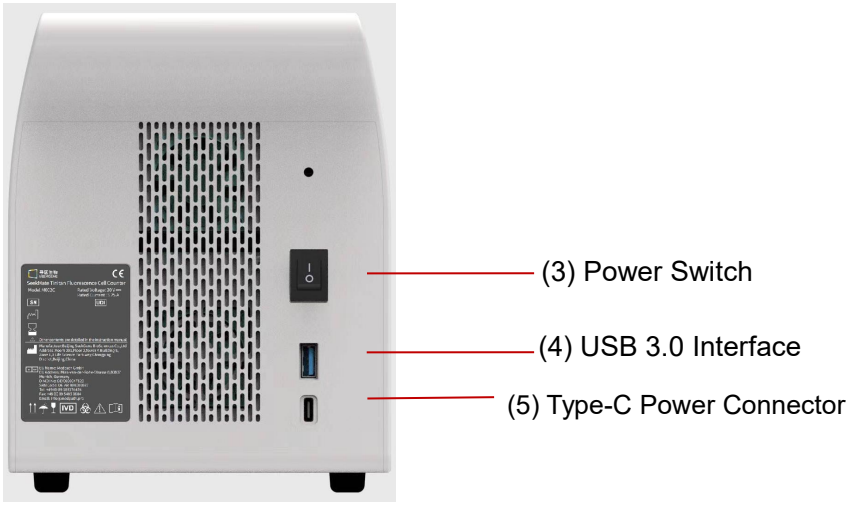


Figure 6-2 Back view of the device

Detailed description:

(1) Touch Screen: High-definition capacitive touch screen, with user-friendly UI design, allowing for adjustment and control of multiple parameters.

(2) Chip Inlet: Insert the detection chip from this inlet.

(3) Power Switch: "I" for power on, "O" for power off.

(4) USB 3.0 Interface: Used for data transmission.

(5) Type-C Power Connector: Used for power connection.

6.2 Cell Counting Chip

The Cell Counting Chip (Figure 6-3).

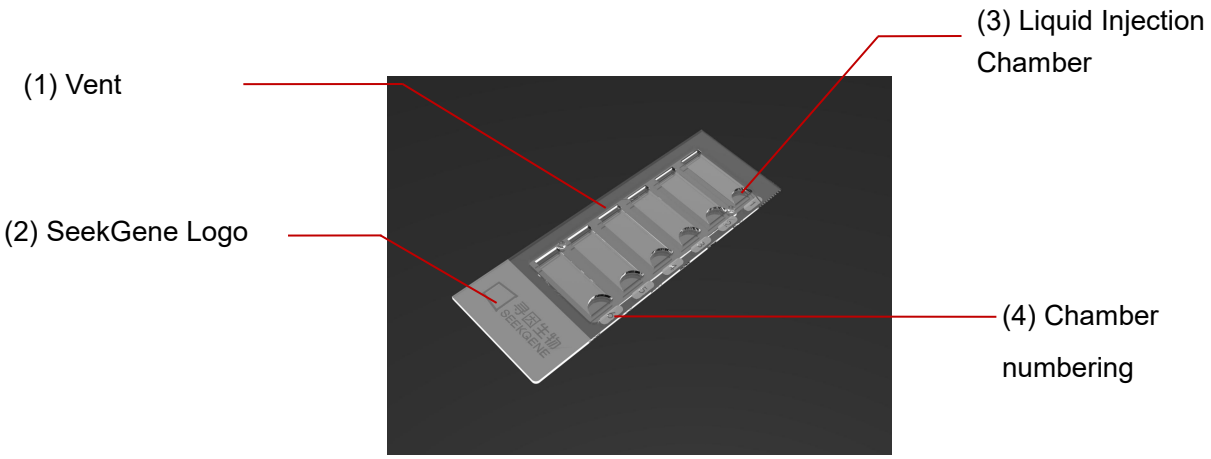


Figure 6-3 Chip Illustration

Detailed description:

(1) Vent: Used for exhausting excess gas from the chip.

(2) SeekGene Logo: Company logo, with a frosted surface for better grip.

(3) Liquid Injection Chamber: Where the cell samples for the experiment are loaded.

(4) Chamber numbering: Numbers here are used to distinguish and label different experimental samples.

6.3 Intended Use

Used with the accompanying cell counting chip, this device is intended for cell counting and viability testing during sample preparation, and before and after cell culture in research institutions.

7. Product Parameters and Related Requirements

7.1 Product parameters

Electrical Parameters	
Adapter Operating Voltage	DC 20V 3.25A
Power Supply	100-240V AC 50/60Hz
Overvoltage Category	Class II

Performance Parameters	
Concentration Range	1×10^4-3×10^7 cells/mL (Optimal: 5×10^4-1×10^7 cells/mL)
Detection Volume	10 μL
Detection Throughput	1 – 6 samples per run
Fluorescence parameters	Excitation: 470 nm, 525 nm Emission: 535 nm, 600 LP
Objective Lens	5×
Screen	8.0-inch touchscreen display
Imaging Pixel	500 W
Storage Capacity	500 G / 1 T

Packaging Parameters	
Mainframe Dimensions (L * W * H)	226 * 158 * 199 mm
Packaging Box Dimensions (L * W * H)	404 * 314 * 320 mm
Net Weight	4.5 kg

7.2 Related Requirements

Working Environment Requirements:

Operating Temperature: +10℃ ~ +40℃

Operating Humidity: ≤ 80%

Operating Atmospheric Pressure: 70 ~ 106 KPa

Storage Environment Requirements:

Transport and Storage Temperature: -20℃ ~ +55℃

Relative Humidity: 10% ~ 93% (non-condensing)

Atmospheric Pressure: 50 ~ 106 KPa

8. Device Installation and Packing Procedure

8.1 Standard Accessories

No.	Name	Catalog Number	Quantity
1	Fluorescence Cell Counter	M002C	1
2	Power Adapter	SP00020	1
3	User Manual	---	1
4	Quality Certificate / Warranty Card	---	1

NOTE：

To ensure optimal performance of the device, please use the designated accessories and consumables. The company is not responsible for any damages resulting from the use of non-compatible accessories or consumables.

Ensure that consumables are used within their validity period.

8.2 Installation

8.2.1 Unboxing

First, remove the packaging box of the entire device, take out the relevant accessories and the inner lining of the box, and remove the device from the packaging bag. During the unboxing process, please pay attention to placement to prevent accidental drops.

8.2.2 Electrical Connection

First, confirm the voltage of the power supply matches that of the device. Then, insert the power adapter into the power interface on the rear panel of the main unit, and finally, turn on the power switch at the back of the device.

8.3 Packing and Transportation

8.3.1 Transport Mode

Before packing, ensure that the device enters the transport mode (refer to the "Transport Mode" setting process), and there are no remaining chips inside the device. Then, turn off the power switch at the back of the device.

8.3.2 Packing and Transport

It is recommended to use the original packaging box to pack and fix the equipment during transportation. If the packaging box is damaged or lost, you can use other packaging boxes for packing and fixing. During the packaging process, ensure that the device is filled and fixed with soft packaging on all sides to avoid unnecessary damage during transportation due to collisions.

9. Device Startup and Shutdown

9.1 Device Startup

After turning on the power switch, the screen lights up (see Figure 9-1). Two seconds later, it enters the self-check interface (see Figure 9-2). After the self-check is completed, it enters the login interface (see Figure 9-3), and users can choose the login method to enter the main function interface.

Figure 9-1 Startup Interface

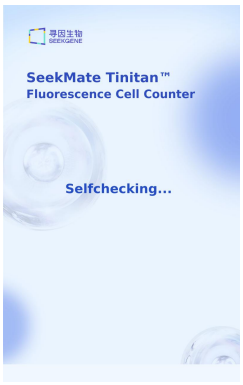


Figure 9-2 Self-check Interface

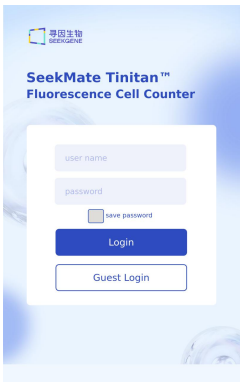


Figure 9-3 Login Interface

Guest login: No need to enter a username and password, you can quickly enter the working interface.

Login: Enter the username and password to access the corresponding user account.

9.2 Device Shutdown

9.2.1 Logout

Click on "Setting", select "Log out" (as shown in Figure 9-4), click "OK" (see Figure 9-5), you can log out the current user and return to the "Login Interface" (see Figure 9-6).

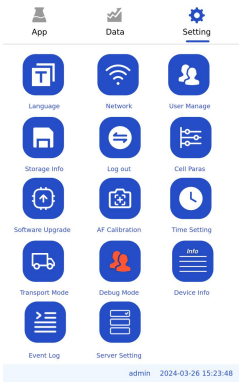


Fig 9-4 Logout Option

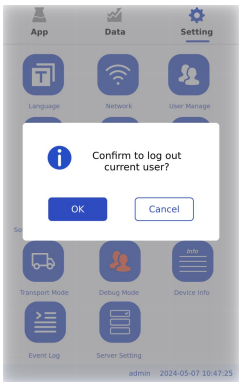


Fig 9-5 Logout Current User

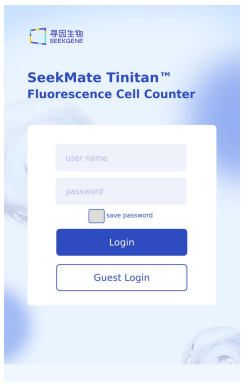


Fig 9-6 Return to Login Interface

9.2.2 Shutdown

Click on the device's power switch to perform the shutdown operation.

10. Interface and Function Description

Note: The same button in different interfaces is not repeated.

10.1 Experiment Selection

Experiment selection interface (see Figure 10-1).

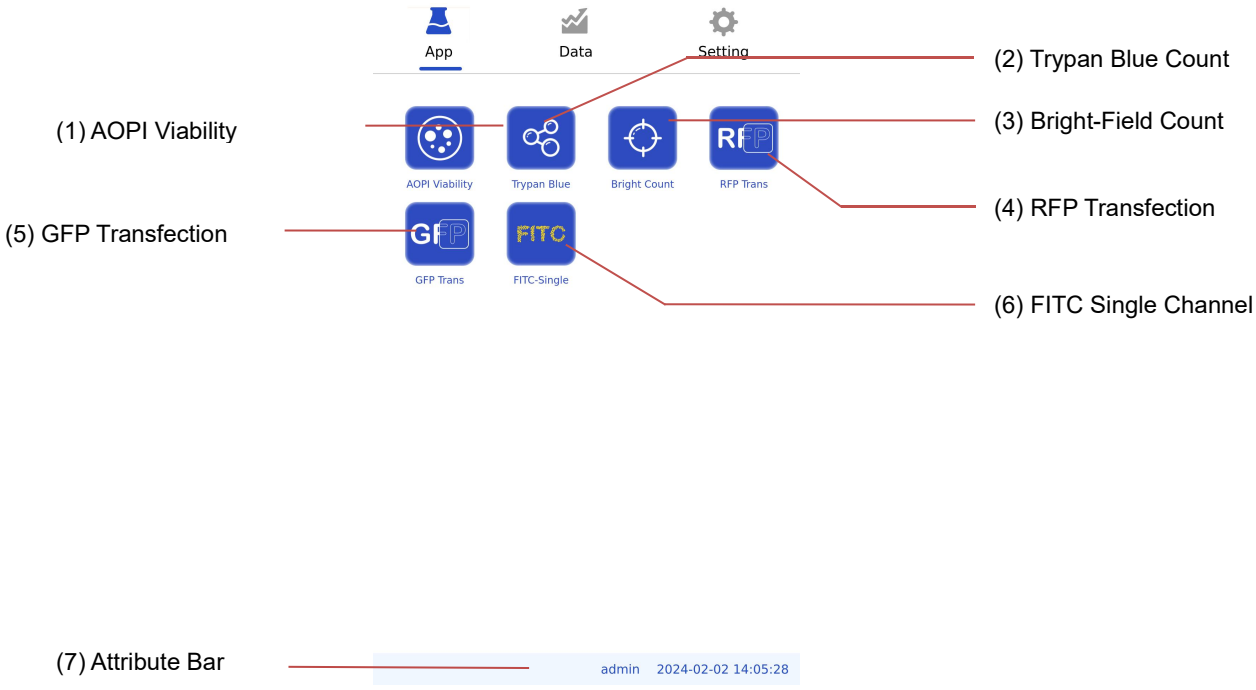


Figure 10-1 Main Function Interface

Detailed Description:

(1) **AOPI Cell Viability**: Experimental analysis mode for AOPI reagent.

(2) **Trypan Blue Count**: Experimental analysis mode for Trypan Blue reagent.

(3) **Bright-Field Count**: Experimental analysis mode under bright field.

(4) **RFP Transfection**: Experimental analysis mode for RFP transfection.

(5) **GFP Transfection**: Experimental analysis mode for GFP transfection.

(6) **FITC Single Channel**: Experimental analysis mode for FITC reagent.

(7) **Attribute Bar**: Device attribute bar used to display time, user and other information.

10.1.1 Information Input

The information input interface (see Figure 10-2) allows editing of sample information, including chamber selection, experiment name, sample ID, cell type (see Figure 10-3), dilution ratio (see Figure 10-4), view select (see Figure 10-5), etc.

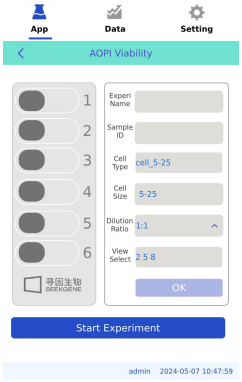


Figure 10-2 Information Input

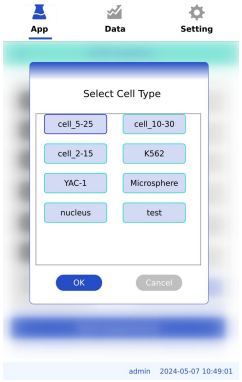


Figure 10-3 Select Cell Type

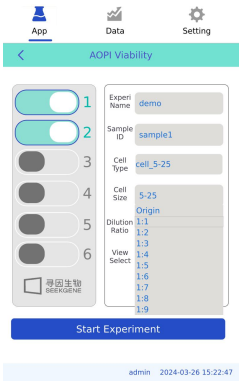


Figure 10-4 Dilution Ratio

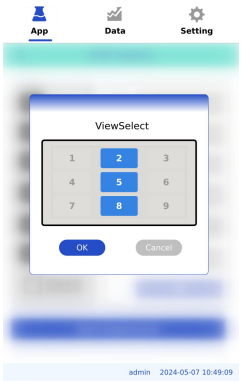


Figure 10-5 View Select

10.1.2 Sample Detection

In the sample detection interface (see Figures 10-6, 10-7, and 10-8), samples are sequentially tested in their respective chambers, capturing bright-field and fluorescent-field images. During the detection process, if it is necessary to stop the experiment, you can click "Terminate" to halt the sample detection process and return to the experiment selection interface.

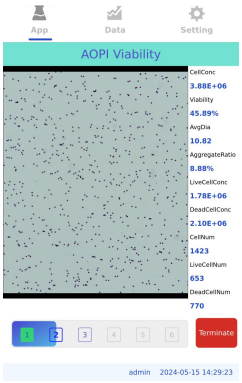


Figure10-6 Bright-Field

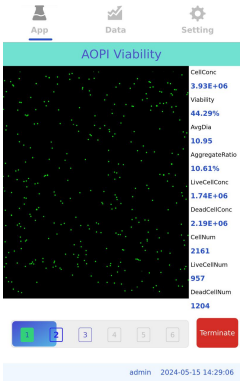


Figure 10-7 Fluorescent-Field

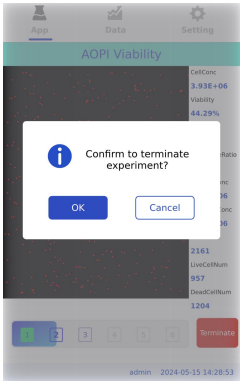


Figure10-8 Terminate

10.1.3 Result Display

Upon completion of sample detection, the interface directly transitions to the results page (see Figure 10-9).

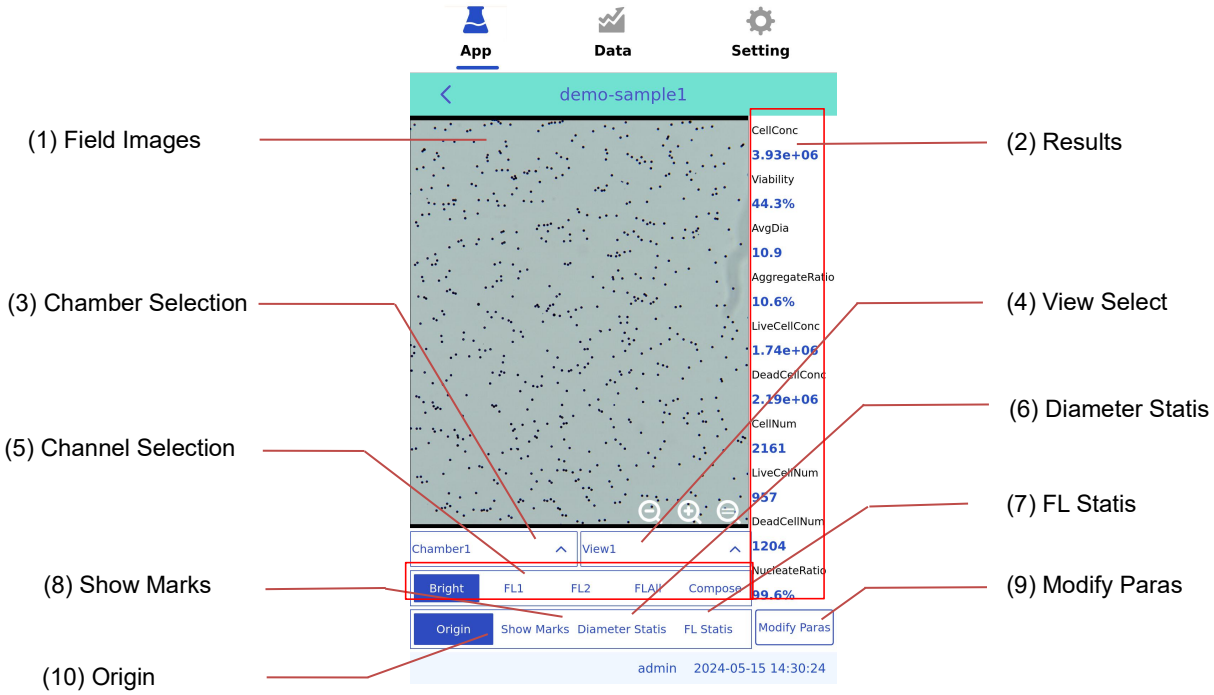


Figure 10-9 Result Page

Detailed Description:

(1) **Field Images**: Displays the result images under the current field of view. You can zoom in or out of the current image using two fingers, or click the "-" "+" "=" icons in the bottom right corner of the image to zoom out, zoom in, or restore the image. (see Figure 10-9).

(2) **Results**: Displays the detection results of the current sample. (see Figure 10-9).

(3) **Chamber Selection**: Click the chamber dropdown menu to view the experimental results of different samples on the current chip.

(4) **View Select**: Click the ViewSelect to view the result images of the current sample under different fields of view.

(5) **Channel Selection**: The default display is bright-field images. For fluorescent experiments, you can choose to view fluorescent experimental images under different fluorescent channels, as well as merged fluorescent channel images or bright-field and fluorescent channel merged images. (see Figures 10-10, 10-11, 10-12, 10-13, 10-14).

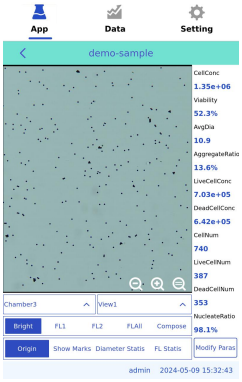


Figure 10-10 Bright-Field

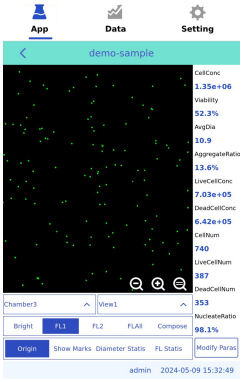


Figure 10-11 FL1

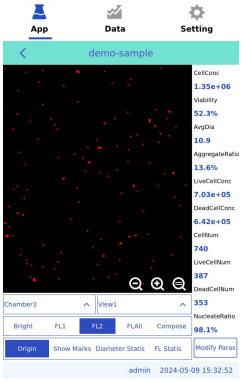


Figure 10-12 FL2

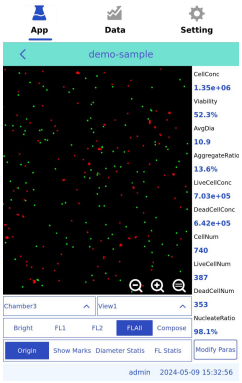


Figure 10-13 FL Composed

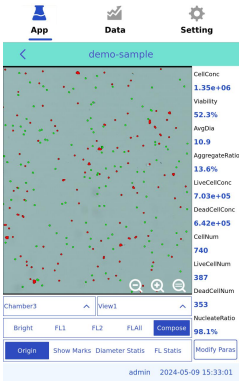


Figure 10-14 Bright-Field and FL Composed

(6) **Diameter Statis**: It statistically analyzes the diameter distribution of cells under the bright field for the current sample. The x-axis represents cell diameter (unit: μm), and the y-axis represents the number of cells (unit: count). (see Figure 10-15).

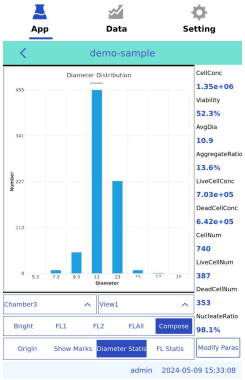


Figure 10-15 Diameter Statis

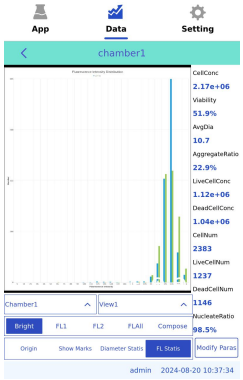


Figure 10-16 FL Statis

(7) **FL Statis**: It statistically analyzes the fluorescent intensity distribution of cells under the FL1 field and the FL2 field for the current sample. The blue bars represent the FL1 intensity distribution. The green bars represent the FL2 intensity distribution. The x-axis represents density distribution, and the y-axis represents the number of cells (unit: count, see Figure 10-16).

(8) **Show Marks**: Displays the cell markings under the current field of view, either under bright field or different fluorescent channels. (see Figures 10-17, 10-18).

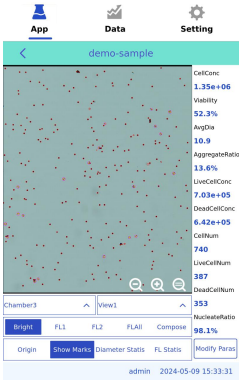


Figure 10-17 Bright-Field Markings

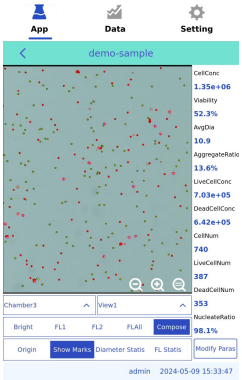


Figure 10-18 Bright-Field & FL Merged Markings

(9) **Modify Paras**: Click the "Modify Paras" icon to enter the parameter modification interface, where you can modify parameters for bright field and different fluorescent channels, or call other cell parameters for detection, and

then recalculate to display the results after adjusting the parameters. (see Figures 10-19, 10-20, 10-21).

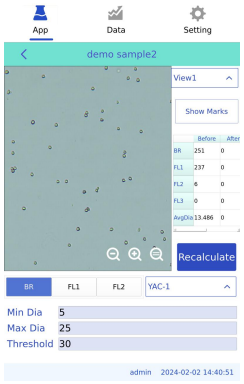


Figure 10-19 Before Adjustments

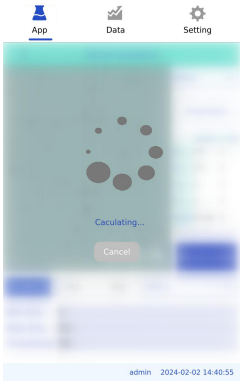


Figure 10-20 Recalculating

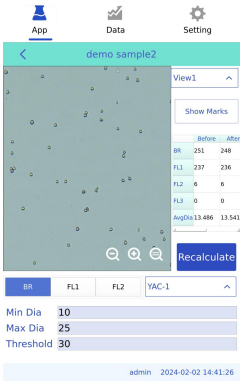


Figure 10-21 After Adjustments

(10) **Origin**: Click on the "Origin" to display the current field of view image in its unmarked state.

10.2 Experiment Data

The experiment data interface is shown in Figure 10-22.

Figure 10-22 Experiment Data

Detailed Description:

(1) **Data Filtering Area**: Set filtering conditions for the data types that need to be viewed or operated.

(2) **Data Content**: Displays all experiment data records.

(3) **Upload Server**: After selecting experimental sample data, upload it to the cloud server.

(4) **Export Data**: After inserting a USB flash drive, select the experimental sample data to be exported, check the data types to be exported, click "OK" to start data export. When the data export is complete, the interface will prompt "Export data finished". (see Figure 10-23)

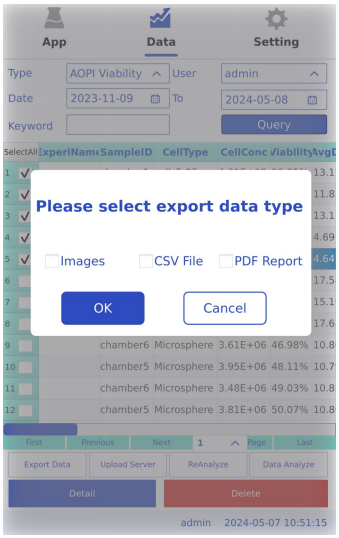


Figure 10-23 Export Data Type Selection

(5) **ReAnalyze**: When there is a significant difference between the sample data and the expected results, re-select the "Cell Type" and re-analyze the sample results. (see Figure 10-24)

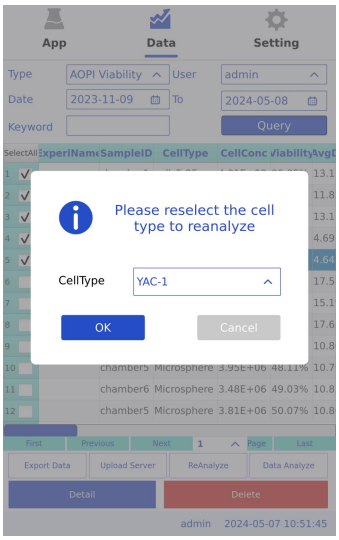


Figure 10-24 Data Re-analysis

(6) **Data Analysis**: Under the "Data Analysis" function, you can perform "Data Statistics" and plot "Growth Curve." Selecting two or more sets of sample data for "Data Analysis" allows comparison of differences between multiple sample data

or plotting the "Growth Curve" of multiple sample data. (see Figures 10-25, 10-26).

Figure 10-25 Data Statistics

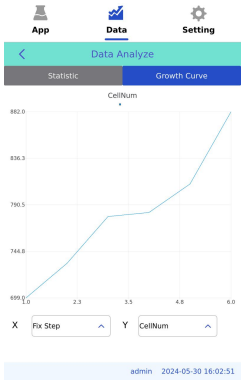


Figure 10-26 Growth Curve

(7) **Detail**: Selecting individual sample experiment data and clicking on "Detail" allows you to view detailed experiment data for that sample.

(8) **Delete**: Select the sample experiment data to be deleted and click on the "Delete" icon to remove the corresponding sample experiment data.

10.3 System Settings

Clicking on the "Setting" button will navigate to this interface (see Figure 10-27).

Figure 10-27 System Settings Interface

Detailed Description:

(1) **Language**: Click on the "Language" icon to navigate to the language selection page. On this page, users can set their preferred language. After selecting the desired language, clicking "OK". Wait for 10 seconds, then restart the device to apply the language changes. (see Figures 10-28, 10-29).

Figure 10-28 Language Selection

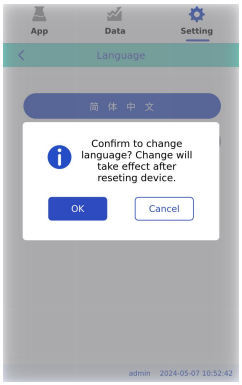


Figure 10-29 Confirm Modification

(2) **Network**: Click on the "Network" icon to access the wireless network settings interface. Input the account and password to establish a wireless connection. (see Figure 10-30).

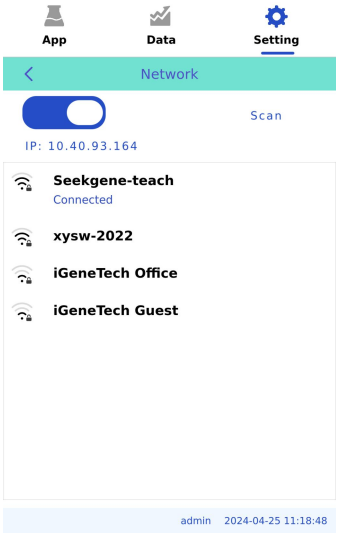


Figure 10-30 Network Settings

(3) **User Manage**: User management levels include Admin, Senior User, Normal User, and Guest User. Click on the "User Manage" icon to configure device users. Users can add, delete, modify user information, and change user passwords as needed. Click on the "⊕" icon to add a new user. User categories include Senior User and Normal User. Input user information accordingly. Click on the "✎" icon to modify user information. Click on the "🗑" icon to delete user

information. Click on the "🔒" icon to modify user passwords. (see Figures 10-31, 10-32, 10-33).

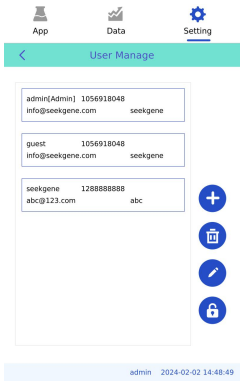


Figure 10-31 User Management

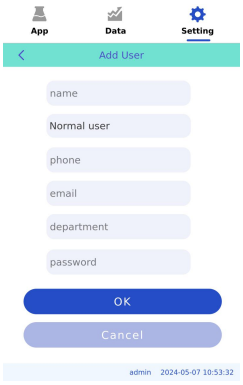


Figure 10-32 Add User

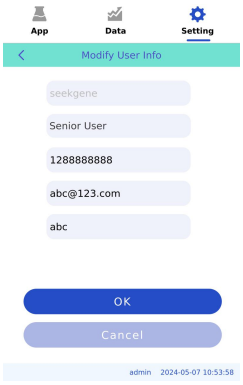


Figure 10-33 Modify User Info

Different user levels have different operational permissions for the device. Detailed permissions are shown in Table 10-1.

Table 10-1. Explanation of Different User Levels Permissions

Permission	Description	Admin	Senior User	Normal User	Guest User
Experiment Operation	Can perform sample detection in all experiment modes on the "Experiment Selection" interface.	√	√	√	√
Data Management	Can manage all users' data on the data management interface.	√	×	×	×
Personal Data Viewing	Can view personal user data on the data management interface.	√	√	√	√
Personal Data Management	Can manage personal data on the data management interface, including export/upload, delete, data re-analysis, and data analysis.	√	√	√	×
Subordinate Data Management	Can manage subordinate users' data on the data management interface, including viewing, export/upload, delete, data re-analysis, and data analysis.	√	√	√	×
Cell Parameter Adjustment	Edit cell type parameters.	√	√	×	×
User Management	Manage user information.	√	×	×	×
Transport Mode	Transport mode operation.	√	√	√	×
Operating Logs	View/export device logs.	√	×	×	×
Server Settings	Configure server information.	√	√	×	×

(4) **Storage Info**: Click on the "Storage Info" icon to check the device storage status. Additionally, users can perform operations such as "Backup Data", "Restore Data", and "Clear Data". (see Figure 10-34).

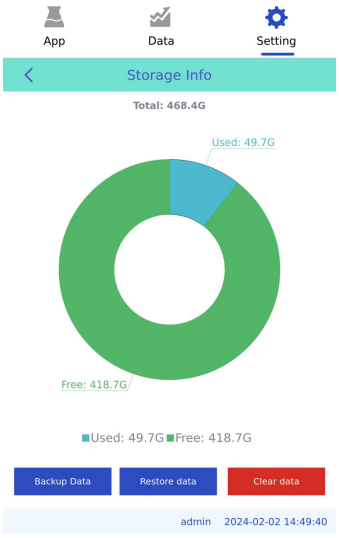


Figure 10-34 Storage Information

(5) **Log out**: Click on the "Log out" icon, then click "OK" to log out the current user and return to the user login interface. (see Figure 10-35).

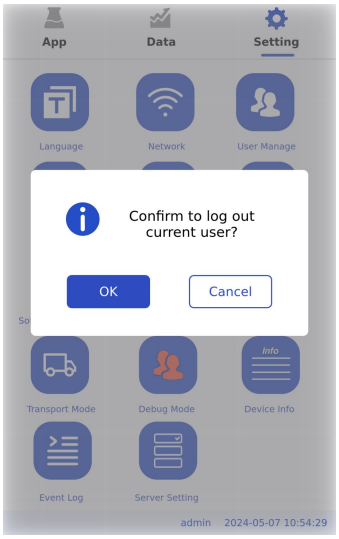


Figure 10-35 Confirm Logout of Current User

(6) **Cell Paras**: Click on the "Cell Paras" icon to enter the cell parameter settings interface (see Figure 10-36). Users can select the corresponding experiment type and use the "⊕" "✎" "🗑" icons to add, modify, or delete cell parameters as needed.

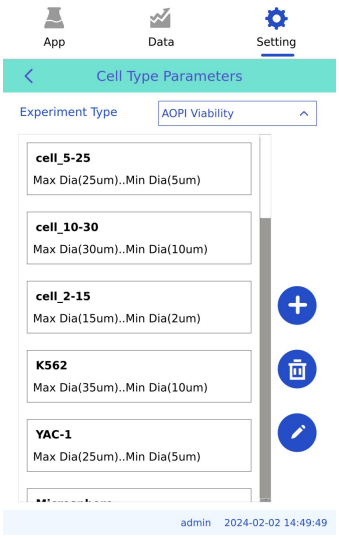


Figure 10-36 Cell Parameter Settings

As an example, for the "AOPI Cell Viability" experiment, the detailed procedure for editing the "Cell Paras" is as follows:

A. Adding Cell Parameters

Click the "⊕" icon, enter the password, and access the interface for adding new cell type parameters. Within this interface, you can set parameters for both bright field and fluorescent field detection, enter the cell type name, adjust parameters, and click "OK". (See Figure 10-37).

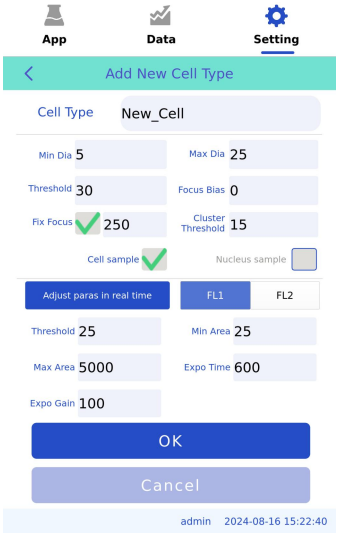


Figure 10-37 Interface for Adding New Cell Type Parameters

A-1 Bright-field parameters

The adjustment of bright-field parameters includes cell diameter adjustment, threshold adjustment, focus adjustment, fixed focus, and real-time cell parameters adjustment.

1) **Minimum Diameter (Min Dia) and Maximum Diameter (Max Dia)**:

These parameters define the diameter range for identifying cells. Visualized unit within this diameter range will be identified as cells in the bright field and marked accordingly. Particles with diameters smaller than the minimum diameter will be classified as impurity debris, while particles with diameters larger than the maximum diameter will be treated as cell aggregates and divided into multiple cells.

2) **Threshold**: This refers to the boundary used to determine whether a visualized unit is recognized as a cell. A lower threshold increases the probability of identifying a visualized unit as a cell, thus selecting more units under brightfield. A higher threshold reduces the likelihood of identifying a visualized unit as a cell, thus selecting fewer units.

3) **Focus Bias**: This determines the optimal focal position for the given type of sample. During sample detection, the system will automatically focus within a range around this set focal position to ensure the clearest image capture.

4) **Fix Focus**: The default "**Cell Type**" parameters pre-configured in the device include a fixed focal length value. If you wish to detect additional cell types, refer to the "**Adjust paras in real-time**" section to determine the fixed focal length for the new cell type. If you uncheck "**Fix Focus**", the device will operate in autofocus (AF) mode.

5) **Cluster Threshold**: Sets the boundary for identifying cell aggregates. A lower threshold increases the probability of particles being identified as cell aggregates, resulting in a higher aggregation rate. A higher threshold decreases the probability, resulting in a lower aggregation rate. The range is from 5 to 80, with a default value of 15.

6) **Cell Sample/Nucleus Sample**: This option allows you to select whether the sample type is based on whole cells or just cell nuclei.

7) **Adjust Paras in Real-time**: This function is designed for first-time usage with new sample types, primary cells, or special cell types, requiring manual adjustment of cell parameters. Insert the sample chip (see Figure 10-38), and click to enter the real-time cell parameter adjustment interface. Choose either "Fix Focus" or "AF" mode. Start with autofocus (AF), then adjust the coarse and fine focus to achieve the clearest view of the sample in the current field of view. Afterward, click "Update fix focus position" or "Recalculate focus bias" to finalize the fixed focus or autofocus parameters (see

Figures 10-39 and 10-40). If the sample does not properly bind to the fluorescent dye, leading to weak or excessive fluorescence intensity, select the appropriate fluorescence field and adjust the exposure time to achieve optimal fluorescence intensity. If adjusting the exposure time does not improve fluorescence intensity, fine-tune the "Expo Gain" setting to achieve the desired result (see Figure 10-41).

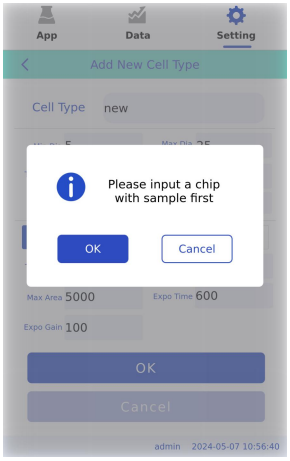


Figure 10-38 Confirm Chip Insertion

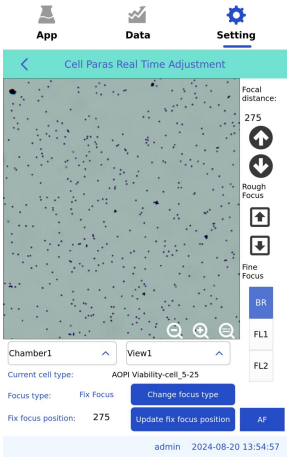


Figure 10-39 Fix Focus Adjustment

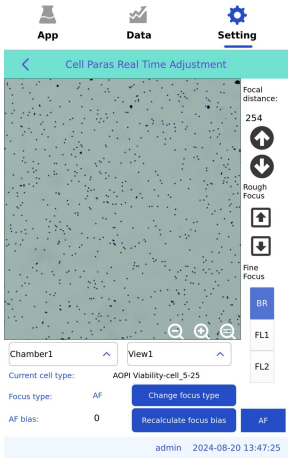


Figure 10-40 AF Adjustment

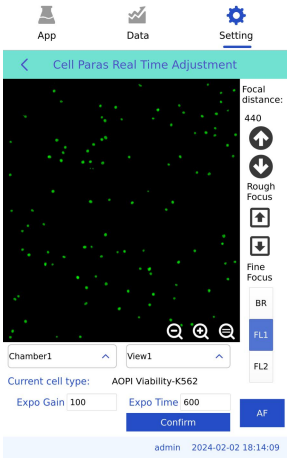


Figure 10-41 FL Adjustment

A-2 Fluorescent Field Parameters:

Fluorescent field parameters include fluorescence threshold adjustment, fluorescence area adjustment, exposure time adjustment, and exposure gain adjustment. These parameters control the sensitivity and accuracy of fluorescence detection and help to fine-tune the experiment for optimal results. Below is a detailed description of each parameter:

(1) Threshold:

The fluorescence threshold is the boundary used to determine which fluorescence signals are classified as cells within the fluorescence field based on their intensity. The

lower the threshold, the more fluorescence signals are selected as "cells," while the higher the threshold, the fewer signals are selected.

- **Lower Threshold**: Setting a lower fluorescence threshold will classify more fluorescence signals as cells, increasing the number of "cells" selected within the fluorescence field (i.e., including weaker fluorescence signals as cells).
- **Higher Threshold**: Setting a higher threshold will reduce the number of selected "cells," considering only those fluorescence signals that are strong enough.
- **Effect of Threshold Adjustment**: When other parameters remain unchanged, increasing the threshold will reduce the fluorescence detection count as weaker signals are excluded, while decreasing the threshold will increase the fluorescence detection count as more weak signals are considered valid.

(2) Min and Max Area:

The minimum (Min) and maximum (Max) area parameters define the range of fluorescence signal areas in the fluorescence field. Fluorescence signal units within this area range will be selected and counted in the experimental results.

- **Min Area:** The smallest area for a fluorescence signal to be considered valid.
- **Max Area:** The largest area for a fluorescence signal to be considered valid.
- **Effect of Area Adjustment:**

  Increasing the min area or decreasing the max area will reduce the number of valid fluorescence signals detected, as smaller signals or larger signals are excluded.

  Decreasing the min area or increasing the max area will increase the number of valid fluorescence signals detected, as more signals fall within the new area range.

(3) Expo Time:

Exposure (Expo) time can be adjusted to regulate the fluorescence intensity when the sample fluorescence is either too strong or too weak.

- **Effect of Area Adjustment:**

  Increasing the exposure time will enhance the fluorescence intensity of all samples, resulting in higher detection values.

Decreasing the exposure time will reduce the fluorescence intensity of all samples, resulting in lower detection values.

(4) **Expo Gain**:

When adjusting the exposure time alone is insufficient to modify the fluorescence intensity, exposure gain can be adjusted.

- **Effect of Area Adjustment:**

  Adjusting this parameter will alter the overall background fluorescence intensity, which may lead to inflated or diminished detection values.

  Use caution when adjusting exposure gain, as it can significantly affect the accuracy of the results.

B. Modifying Cell Parameters

Select the cell type parameters to be modified, click "", enter the user password, and you can proceed to modify the parameters for that cell type (see figure 10-42).

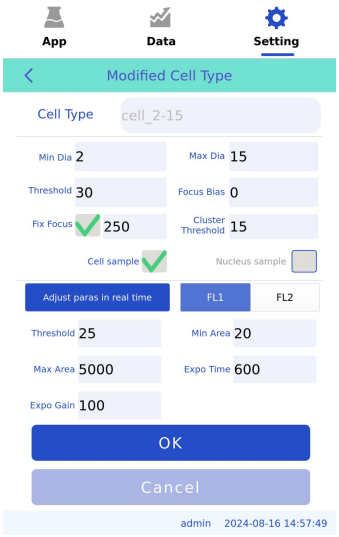


Figure 10-42 Modified Cell Type Interface

Note: The parameter adjustment process follows the "A. Adding Cell Parameters".

C. Deleting Cell Parameters

Select the cell type parameter that needs to be deleted, click "", enter the user password, and you can delete that cell type.

(7) **Software Upgrade**: Click the button to enter the software upgrade interface. Under network connectivity conditions, clicking "Upgrade software" or "Upgrade

Algorithm" initiates the respective upgrades. Alternatively, inserting a USB drive, and selecting "Local upgrade" enables software updates. After completing the upgrade, wait for 10 seconds, then restart the device to utilize the new software program (see Figure 10-43).

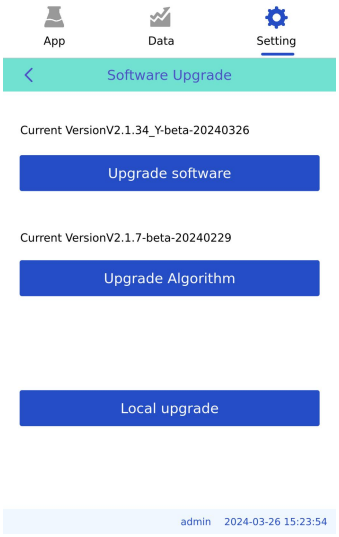


Figure 10-43 Software Upgrade Interface

(8) **AF Calibration**: Insert a chip containing standard cell lines or standard microspheres, then click the button to enter the AF calibration interface. Select the sample loading position, and begin by clicking "AF." Adjust the coarse or fine focus buttons to achieve the clearest view, ensuring a bright center and clear edges. Click "Update AF Paras" to complete the focus calibration process (see Figure 10-44).

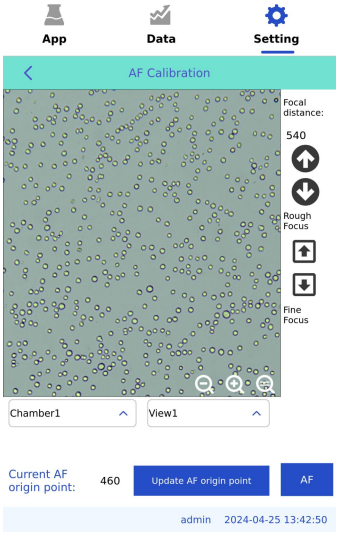


Figure 10-44 AF Calibration Interface

(9) **Time Setting**: Click the button to navigate to the time settings page, where users can adjust the time zone of the device and modify the current time directly (see Figure 10-45).

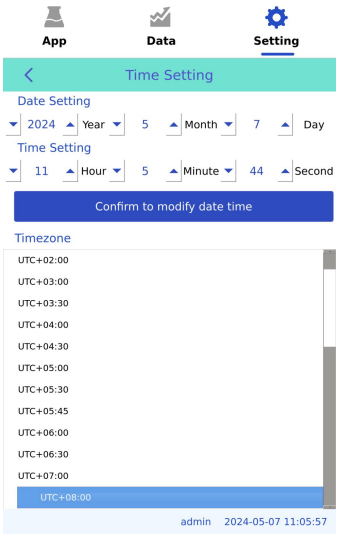


Figure 10-45 Time Setting Interface

Note: UTC stands for Coordinated Universal Time.

(10) **Transport Mode**: When transporting, moving outdoors, or shipping the device, ensure it enters transport mode. Before entering transport mode, remove the internal chip. Click the "Transport Mode" icon and follow the “OK” to confirm entering transport mode. Once in transport mode, you can power off the device and pack it securely (refer to Figures 10-46 and 10-47).

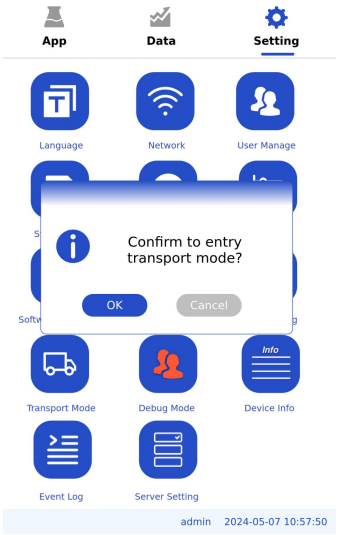


Figure 10-46 Confirm to entry transport mode

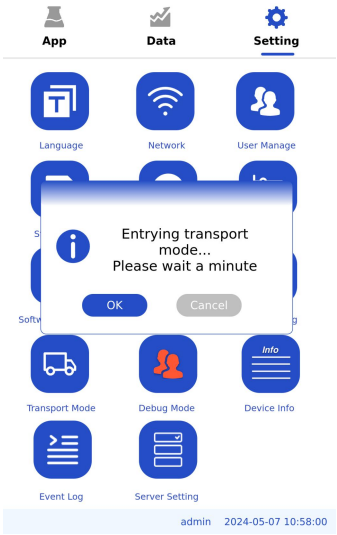


Figure 10-47 Enter transit mode

(11) **Debug Mode**: This mode is reserved for engineers and is not accessible to customers.

(12) **Device Info**: This interface displays basic device information such as device name, serial number (SN), software version, model version, etc. It also allows users to configure the report settings such as modifying the report company name and logo. To modify report information, save the report name as “title.txt” and the report logo icon as “logo.png” format, then insert the USB drive into the device. Click "Report Setting" to modify the report header and icon (see Figure 10-48).

Figure 10-48 Device Information Interface

(13) **Device Log**: Click the "Device Log" icon, enter the password, and you can view all operation records of the device, including timestamps, users, and all user activities. Additionally, it provides querying and exporting functionalities, enabling users to search based on time intervals or keywords. Insert the a USB drive and click "Export Logs" to export all information of the current query record (see Figure 10-49).

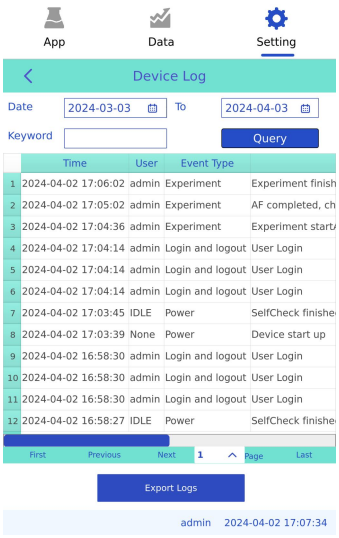


Figure 10-49 Device Log

(14) **Server Setting**: Click on the "Server Setting" icon, enter the password, and access to the server settings interface. This function is primarily used for configuring server data upload settings. If the customer has a server, while in wireless networking mode, they can input the server's IP address, port number, username, and password. Click on "Test Connection" to check whether the connection to the server is successful. If successful, click on the "OK" icon to confirm the server information. Subsequently, if there are any changes to the server, they can be adjusted on this interface (see Figure 10-50).

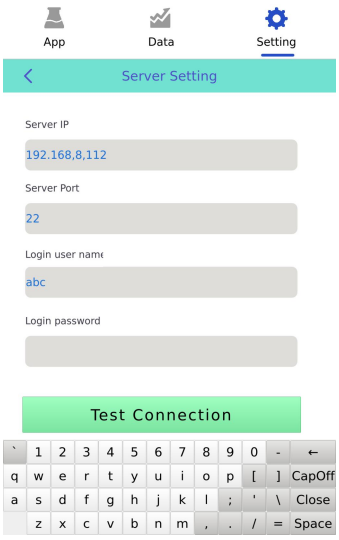


Figure 10-50 Server Setting Interface

11. Maintenance and Inspection of the Device

11.1 Device Maintenance

Regularly inspecting the various performance aspects of the device and promptly addressing any issues found is crucial for preventing problems and maintaining optimal performance. To ensure the performance and extend the service life of the device, it is necessary to conduct regular inspections and maintenance. The main inspection items are listed in Table 11-1.

Table 11-1. Inspection

Inspection Item	Inspection Frequency	Detection Standard
Power cord and connection sockets	Once a week	Check for damage and ensure secure connections.
LCD touchscreen	As needed	Check for damage and ensure normal display.

11.2 Cleaning of the Device

The surface of the device's outer casing can be cleaned using a soft cloth. Avoid using rough cloths, sandpaper, sponges, or similar items to prevent scratches that may affect its appearance. When cleaning, please disconnect the power supply, and ensure the cleaning cloth is not excessively wet to prevent liquid from seeping into the interior of the device.

11.3 Maintenance and Troubleshooting

If the device encounters a malfunction, refer to the following list to identify possible causes based on the observed symptoms and take appropriate measures to resolve the issue. If the problem persists, please contact us at info@seekgene.com for assistance. We will arrange for the device to be returned to the factory or serviced at a designated repair facility. Do not attempt to disassemble the device yourself or have it serviced at an unauthorized location, as this will void any responsibility for damages.

When the device experiences the following conditions, it will issue a warning and display the corresponding interface:

11.3.1 Fault Classification

Make sure the power supply is connected properly. If this dialog box appears (see Figure 11-1, 11-2), please try restarting the device. If the problem persists, there may be a hardware issue. Please contact (info@seekgene.com) for further assistance.

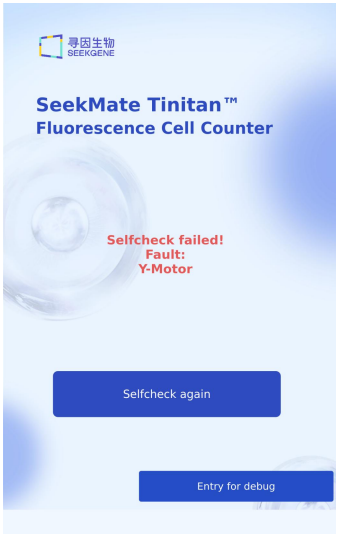


Figure 11-1 Self-Check Failure

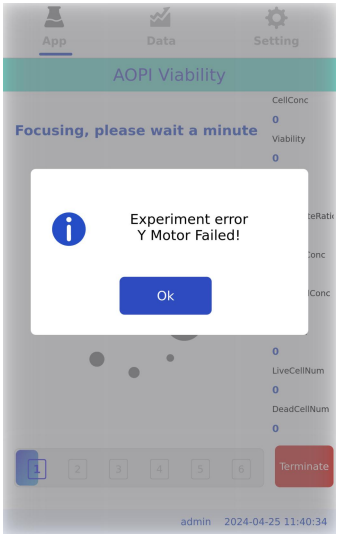


Figure 11-2 Experiment Failure

When seeking assistance from a service engineer, please provide details of the fault. Below is a list of common hardware failure alerts that may appear when the device encounters a hardware malfunction, as shown in Table 11-2.

Table 11-2. Common Hardware Failure Details

Name
X-motor error
Y-motor error
Lens-motor error
Filter-motor error
Camera error
Chip error

11.3.2 Common Malfunctions and Solutions

Table 11-3. Common Malfunctions and Solutions

Issue	Cause	Solutions
Device Self-check Error	Abnormality during hardware self-check, failure to reach initial state.	Shut down and restart the device, conduct re-self-check operations. If errors persist, contact support for assistance, and provide the fault code.
	Power supply does not meet the device's standard.	Ensure that the power adapter used is the one provided with the device, and check that the power connection is secure.
Inaccurate Counting	High or low concentration	Adjust cell concentration by dilution or centrifugation. Detection concentration range is 1 x 10^4-3 x 10^7 cells/mL (Optimal: 5×10^4-1×10^7cells/mL)
	Uneven cell mixing	Thoroughly mix the sample before adding it to the chamber to ensure even distribution of cells.
	Incorrect cell parameters settings, leading to the system not recognizing actual cells.	The selected cell parameters may not be suitable for the sample (e.g., too long or too short exposure time, excessive fluorescence threshold). Adjust or create new appropriate cell parameters based on the sample's cell condition. For detailed instructions, refer to “10.3 System Settings — (6) Cell Paras.” If issues persist, contact us for support.
	Air bubbles in sample wells.	Slowly add samples using a pipette to avoid air bubbles in the detection wells.
	Chip reused	Residual samples on the chip after detection can cause inaccurate counts upon reuse. Do not reuse chips.
	Insufficient sample settling	After loading the sample, allow it to settle for 30s-1min for standard cells, or 1-2 min for nuclear-type samples, to ensure most cells settle on the same plane.
Chip cannot be inserted	The chip is inserted incorrectly.	Ensure that the chip is inserted with the front side facing up.
	A chip is already inside the device.	Remove the existing chip and insert a new one.
	The device is in transport mode.	Power off and restart the device, then reattempt the detection. If the issue persists, contact us for support.
Chip Breakage or Jam	Excessive force or incorrect insertion.	When inserting the chip, align it correctly with the insertion slot and avoid forcing it in. If the chip is broken inside near the insertion area, use tweezers to remove it. If the break is deeper inside, contact us for support.

Issue	Cause	Solutions
Chip malfunction	The chip does not reach the correct detection position after insertion.	a. Stop the experiment, remove the chip, and reinsert it properly. Ensure the chip is properly inserted, applying a gentle push to ensure it is fully seated. b. If the error persists, replace the chip and retest. c. If the issue persists, contact us for support.
Chip Cannot Be Ejected	The software system is unresponsive after the experiment.	a. Repeat the detection process to see if the chip is ejected automatically. b. Power off and restart the device, the chip should eject automatically. c. If the issue persists, contact us for support.
Blurred imaging	Improper focus.	a. Ensure that the correct cell type parameters are selected for the sample. b. Perform the detection again to allow the camera to focus clearly. c. If the image is still blurry, enter "Setting - AF Calibration" to adjust the focus. Ensure the sample is present for calibration. d. Adjust the cell parameters in "Setting - Cell Paras - Modified Cell Type - Adjust paras in real time" and save the settings before retesting. e. If the issue persists, contact us for support.
Stains in the Image	Impurities on the counting chip	a. Do not reuse the chip chamber. b. When adding samples to the chip, ensure that the back of the chip is not contaminated by stains. You can either hold the chip by hand or place it on a clean platform for sampling. c. Ensure that hands do not touch the back of the chip.
	Contamination on the camera lens.	Contact us for support.
Slower Software Performance	High memory usage	The device storage may be full. Regularly clear historical data to free up space.
Language Switch Fails	Failure to restart after language switch.	Follow the prompt to power off and restart the device after language switch.
Remote Software Update Fails	Failure to restart after upgrade.	After the software update, power off and restart the device.
	Network connection issues.	Ensure the device is connected to a network with internet access. If updates take too long, try switching to a better network and retry the update.

Issue	Cause	Solutions
Local Software Update Fails	USB drive not recognized.	a. Power off and restart the device, then reinsert the USB drive. b. Try using a different USB drive formatted in FAT32 or exFAT. c. If the issue persists, contact us for support.
	Incorrect software update package on USB.	a. Ensure the software update package has not been renamed. b. Ensure the update package is located at the root directory of the USB drive, not inside any subfolder. c. Ensure the update package is not corrupted or modified.
Data Export Failure	Storage device not recognized.	a. Power off and restart the device, then reinsert the USB drive. b. Try using a different USB drive formatted in FAT32 or exFAT. c. If the issue persists, contact us for support.
	Data export fails due to static electricity on the USB drive.	a. Power off and restart the device, then reinsert the USB drive. b. Try using a different storage device with a plastic connector. c. If the issue persists, contact us for support.
	Wireless transmission failure due to no network connection.	Ensure that the device is connected to the network when using wireless data transmission.
Touchscreen Unresponsive	Screen temperature too high, entering protection mode.	a. Power off and restart the device, then continue with the experiment.Power off, then restart. b. If the issue persists, contact us for support.
Experiment interrupted	Special characters in the sample name.	a. Power off and restart the device. b. Check if the sample name contains any special characters such as “[”, “]”, “\”, “/”, “:”, “?”, “”, “<”, “>”, “
For Issues Not Listed Above If any issue occurs that is not mentioned in the above descriptions, please power off and restart the device. If restarting does not resolve the issue, please contact us promptly for further assistance.		

Note:

To protect customer rights and avoid further damage to the device, repairs must be conducted either at the factory or at a manufacturer-certified repair facility. Self-repair or repair by unauthorized service providers is strictly prohibited.

11.4 Maintenance Safety Instructions

Device maintenance must ensure the safety of both the maintenance personnel and the device. Maintenance should be conducted by professionals at a clean workbench, with attention to safety precautions. Wear maintenance uniforms and gloves to ensure safety throughout the repair process.

11.5 Lifetime

The main unit of this product has a service life of 10 years.

11.6 Disposal

According to relevant national laws and regulations, products and packaging materials at the end of their service life should be disposed of properly. Generally, products at the end of their service life, along with packaging materials such as cardboard and protective plastic, should be sent to recycling facilities. These facilities should be able to handle materials such as plastics, metal parts, printed circuit boards, cables, wires, and motors.

11.7 Disclaimer

The company shall not be liable for the following:

1. Damage caused by assembly, upgrades, adjustments, or repairs performed by individuals not authorized by the company.

2. Damage resulting from operation that does not follow the procedures outlined in this user manual.

3. Damage caused by the use of accessories not provided by the company or not approved by the company.

4. Damage resulting from unauthorized technical modifications made without the company's consent.

12. Service

Our company solemnly promise:

◆ Each product and accessory leaving the factory is complete, functioning normally, and meets the specifications listed in the manual.

◆ In case of performance failure within 7 days from the date of purchase, customers can choose to return, exchange, or repair the product.

◆ From the date of contract signing, the device enjoys one year of free warranty. However, damages caused by human factors are not covered by our company's warranty. The device is eligible for lifetime maintenance, and only the corresponding cost will be charged for replacing parts.

◆ The main unit should not be dismantled without our company's permission. Otherwise, it will be considered that the user has waived the right to repair.

◆ Disposal of waste or products should be done in accordance with local laws and regulations, or they can be returned to our company.

Appendix 1. Revision

No.	Revision	Modified Content	Effective Date
1	New Creation	New file	April 1, 2024
2	Revised	Add fixed focus option. Add descriptions of safe operations.	August 20, 2024
3	Revised	1T storage capacity option added; Added detailed description: cell parameters description and adjustment, common faults and solutions	March 1, 2025

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