GeneMind

FASTASeq 5

Sequencing System User Manual



GeneMind Biosciences Co., Ltd.

Revision History

Revision Date	Version
May 12, 2025	V 1.0

Description

Thank you for becoming a user of FASTASeq S Sequencing System.
The User Manual is applicable to FASTASeq S Sequencing System.
The User Manual (V1.0) was issued on May 12, 2025.
Please read the User Manual carefully in advance to ensure the correct use of the product.
After reading, keep the User Manual properly for future reference whenever necessary.

Product Information

Product Name: FASTASeq S Sequencing System
Model: FASTASeq S
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Date of Manufacture: See product label
Service Life: 10 years

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- The product label is legible, and the product has been verified by GeneMind Biosciences that it is manufactured by GeneMind Biosciences.
- All parts involved in maintenance and replacement, accessories and consumables are attached (original) or approved by GeneMind Biosciences.
- The product storage environment, working environment and electrical environment shall meet the product specifications.
- Damage caused by non-human factors (such as vandalism).

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Chapter 1 Introduction

This User Manual details the intended use, functions, and operation of the FASTASeq S Sequencing System.

This chapter introduces the general identification of the FASTASeq S Sequencing System. Before using the System, please read and understand the contents carefully to ensure the correct operation of the System.

1.1 Universal Symbols

This section describes the general identification used by the instrument. Please make sure that you have read the contents of this section carefully before operating, and keep this User Manual for easy reference at any time.

Graphic Symbol	Symbol Title	Symbol Description
	Manufacturer	Indicating the medical device manufacturer.
	Date of manufacture	Indicating the date when the medical device was manufactured.
	Use-by-date	Indicating the date after which the medical device is not to be used.
	Batch code	Indicating the manufacturer' s batch code so that the batch or lot can be identified.
	Serial number	Indicating the manufacturer' s serial number so that the specific medical device can be identified.
	Fragile, handle with care	Indicating a medical device that can be broken or damaged if not handled carefully.
	Keep dry	Indicating a medical device that needs to be protected from moisture.
	This way up	Indicating the correct upright position of the transport package.
	Do not roll	Indicating that the transport package should not be rolled during transportation.
	Do use stack	Indicating only single stacking is allowed for the package.
	Temperature limit	Indicating the temperature limits to which the medical device can be safely exposed.
	Humidity limitation	Indicating the range of humidity to which the medical device can be exposed.
	Atmospheric pressure limitation	Indicating the range of atmospheric pressure to which the medical device can be exposed.
	Consult instructions for use	Indicating the need for the user to consult the instructions for use.
	Biological risks	Indicating that there are potential biological risks associated with the medical device.
	Caution	Indicating the need for the user to consult the User Manual for important cautionary information such as warnings and precautions that cannot, for a variety of reasons, be presented on the medical device itself.

Graphic Symbol	Symbol Title	Symbol Description
	Warning	Indicating warnings.
	Laser radiation	Indicating laser radiation.
	Biological hazards	Indicating biological hazards.
	Electric shock	Indicating high voltage.
	Hot surface	Indicating high temperature.
	Crushing of hands	Indicating crushing of hands.
	Pinching of hands	Indicating pinching of hands.
	Grounding	Indicating the grounding terminal. (in cases where it is not necessary to mark "functional grounding" or "protective grounding")
	Protective grounding	Indicating the terminal connected to an external protective conductor or the terminal connected to a protective grounding electrode to prevent electric shock in case of failure.
	Laser aperture	Indicating outgoing laser beam.
	Unique device identifier	Indicating a code consisting of numbers, letters or symbols attached to an instrument product or package, which is used to uniquely identify the instrument.
	WEEE symbol	Indicates that waste electrical and electronic equipment must not be disposed of as unsorted municipal waste and must be collected separately. Please contact an authorized representative of the manufacturer for information concerning the decommissioning of your equipment.

Table 1-1 Description of Graphical Symbols

Chapter 2 Product Introduction

This chapter introduces the basic information and structure of the FASTASeq S Sequencing System.

2.1 Product overview

The FASTASeq S Sequencing System (hereinafter referred to as sequencing system, system or instrument) is intended for sequencing of deoxyribonucleic acid (DNA) and ribonucleic acid (RNA) derived from human samples. Nucleic acid samples are fragmented, connected by connectors, targeted capture and other steps to form a DNA library. The connector sequence of such library is complementary and hybridized with the specific probes fixed in advance on the sequencing flow cell, and surface amplification is carried out to form a molecular cluster. By adding sequencing primers and using the reversible terminator base and polymerase reaction system labeled with fluorescence, only one base is synthesized and extended in each round of polymerization reaction of molecular clusters. Specific analysis software recognizes the fluorescence signal as base information, thus achieving the purpose of Sequencing by Synthesis (SBS), and finally obtaining the corresponding base sequence data through the software.

2.2 Scope of application

The product adopts the reversible terminator sequencing method, which is used to sequence deoxyribonucleic acid (DNA) and ribonucleic acid (RNA) from human samples to detect the genetic changes.

⚠ Warning

- The device is for Research Use Only (RUO).

2.3 Main structural composition

The product consists of optical system, fluid and temperature control system, reagent storage system, motion system, electromechanical control system, power supply system, display system, mechanical system and software system, including software mainframe and attached software.

2.4 Contraindications

None.

2.5 Overall appearance

The overall appearance of the Sequencer is as follows:

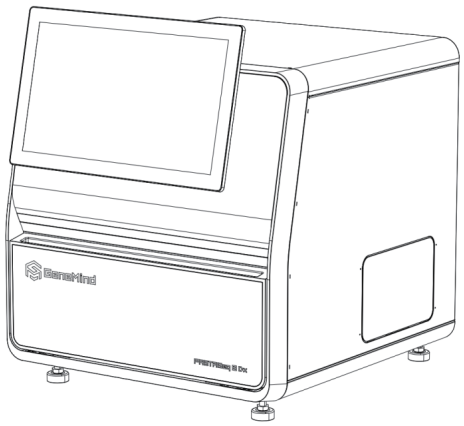


Figure 2 1 Appearance of Sequencing System

2.5.1 Front of instrument

The front of the sequencing system is as follows:

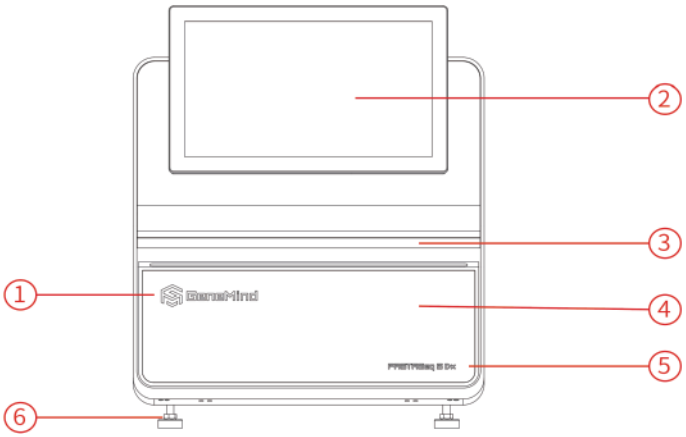


Figure 2-2 Front View of System

S/N	Designation	Functions
1	Company brand trademark	Indicating the product brand
2	Touch screen	Information display and input/output
3	Status indicator	Displaying instrument status
4	Door of consumables compartment	Storing flow cell, reagent kits or reagent washing cartridge
5	Product Model	Display the product model
6	Anchor	Supporting and leveling instrument

Table 2-3 Explanation of Instrument Structure

2.5.2 Left and right sides of instrument

The left and right sides of the whole sequencing system are as follows:

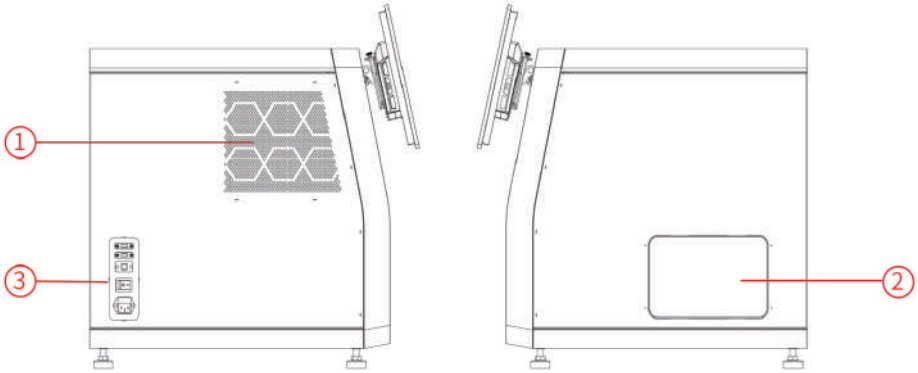


Figure 2-4 Left and Light Side Views of System

S/N	Name	Functions
1	Air inlet	Heat dissipation of the whole instrument
2	Observation window	Observing and maintaining the syringe pump
3	Instrument interface area	Power supply, network connection, and peripheral interface

Table 2-5 Left and Light Side Views of System

2.5.3 Rear of instrument

The back of the whole sequencing system is as follows:

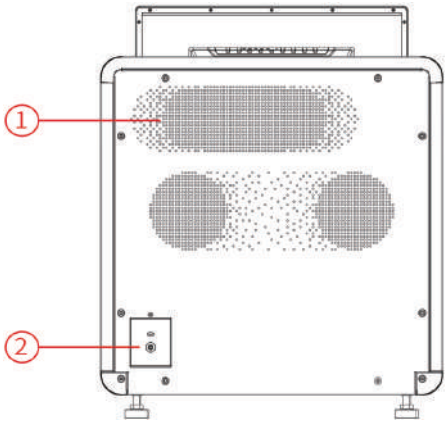


Figure 2-6 Rear View of System

S/N	Designation	Function
1	Heat dissipation hole	Heat dissipation of the whole instrument
2	Reserved external waste liquid interface area	Connecting waste liquid tank

Table 2-7 Introduction to the Structure of the System

2.5.4 Consumable compartment

The sequencing flow cell compartment is in the middle-left part of the front of the instrument, and the reagent compartment is in the lower-right part of the front of the instrument.

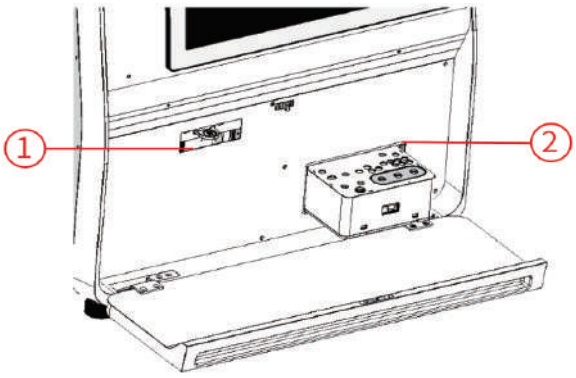


Figure 2-8 Consumable Compartment

S/N	Name	Functions
1	Flow cell compartment	Loading sequencing or washing flow cells
2	Reagent compartment	Storing reagent kits or reagent washing tank

Table 2-9 Function Description of Flow Cell Compartment and Reagent Compartment

2.5.5 Instrument interface

Instrument interface area includes communication interface and power supply interface of the system.

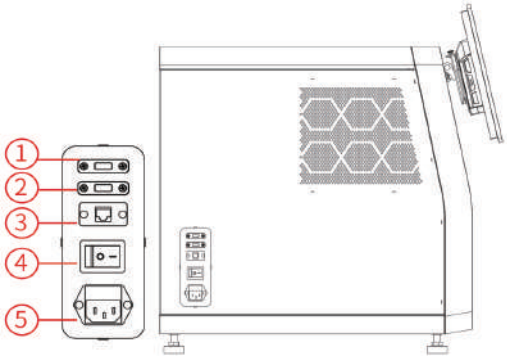


Figure 2-10 Instrument Interface Area

S/N	Name	Functions
1	USB2.0 interface	Mouse and keyboard interface
2	USB3.0 interface	USB data transfer
3	RJ45 network port	Network data transmission
4	Mainframe switch	Turning on or off the mainframe power supply. Power-off status when it is “O”. Power-on status when it is “I”.
5	Power supply interface	Mainframe power supply, this power interface with fuse, fuse information is as follows: Parameters: F10A/250V Specification: 5*20

Table 2-11 Interface Description of System

2.5.6 Status indicator

This area is in the middle part of the instrument, and is used to display the current state of the instrument.

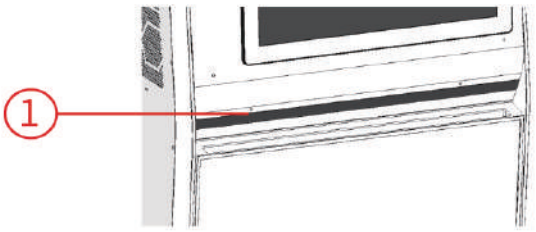


Figure 2-12 Status Indicator

S/N	Designation	Functions	Status Description
1	Status indicator	Indicating instrument status	Blue - Running Green - Idel Yellow - Warning Red - Error occurs

Table 2-13 Description of Indicator Status

2.5.7 Software main interface

The display screen is located at the upper of the instrument, showing the instrument parameter setting and the instrument running status. The main interface of control software is as follows:

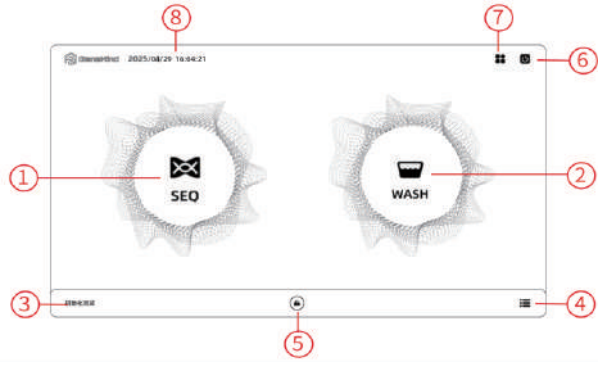


Figure 2-14 Software Main Interface

S/N	Designation	Function
1	Sequencing button	Instructing the users to perform sequencing steps, complete experiment information settings, load consumables, review experiment information, monitor sequencing status, and wash the liquid pipe after sequencing
2	Washing button	Instructing the users to perform different washing modes to wash the instrument liquid pipe
3	Prompt message area	Displaying important tips, warnings, and error messages
4	Status unfold button	Clicking to unfold important status information
5	Screen lock button	Clicking to lock and unlock the screen
6	Power button	Clicking to restart or shut down the system
7	Setting unfold button	Clicking to unfold multiple settings buttons
8	System time display area	Displaying the current system time

Table 2-15 Function Description of Main Interface of System Software

Description of other icons on the page:

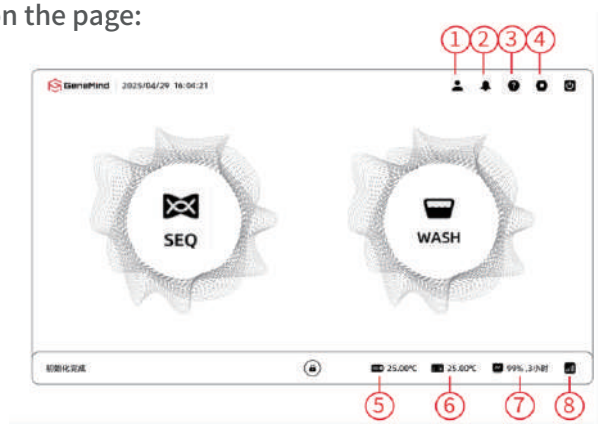


Figure 2-16 Icons on the Software Main Interface

S/N	Designation	Functions
1	User login button	Clicking to log in as a user or switch user groups
2	Running log button	Clicking to unfold the list of running logs
3	Help button	Clicking to unfold help information
4	System settings button	Clicking to unfold the system settings page
5	Flow cell in place status and flow cell platform temperature information	Displaying flow cell in place status and flow cell platform temperature
6	Kit in place status and internal temperature information	Displaying the reagent kit in place status and the internal temperature
7	Data upload status information	Displaying data upload progress and remaining time
8	Lims connection status information	Displaying Lims connection status

Table 2-17 Function Description for the Icons on the Software Main Interface

2.6 Self-provided reagents consumables and equipment

To run sequencing on the sequencing system, users shall bring the following reagent consumables and equipment.

2.6.1 Self-provided consumables

Designation	Supplier	Function
Cleaning wiper	General laboratory supplier	Cleaning of laboratory supplies
Lens wiping paper	General laboratory supplier	Cleaning of laboratory supplies
Pipettes (various specifications commonly used)	General laboratory supplier	Reagent preparation
Pipettes tips (various specifications commonly used, with filter elements)	General laboratory supplier	Reagent preparation
Disposable powder-free gloves	General laboratory supplier	PPE
Dust removal tank	MATIN, Model: M-6317 (or equivalent)	Flow cell platform and Flow cell cleaning

Table 2-18 List of Self-provided Consumables

2.6.2 Self-provided reagents

Designation	Supplier	Function
Tween 20 0.5% (v/v)	General laboratory supplier	Instrument liquid pipe washing/instrument liquid pipe maintenance washing
NaClO 5% (v/v)	General laboratory supplier	Instrument liquid pipe washing
Laboratory-grade water	General laboratory supplier	Instrument liquid pipe washing, reagent and instrument liquid pipe maintenance washing
75% alcohol	General laboratory supplier	Wiping the external surface of the instrument and maintaining and cleaning the instrument liquid pipe
Absolute ethanol	General laboratory supplier	Flow cell platform and flow cell cleaning

Table 2-19 List of self-provided Reagents

⚠ Caution

- Laboratory-scale water may be deionized water, 18 megaohms (MΩ) water, high purity water, ultrapure water, and water at the similar molecular biological grade. Never use tap water.
- The dust removal tank is equipped with liquid gas, featured by rapid cooling. Please do not shake it before use, and avoid the inverted bottle mouth or the tilted bottle body when using it.

2.6.3 Self-provided equipment

Designation	Supplier	Function
Freezer, -25°C to -15°C, frost free	General laboratory supplier	Storing the reagent consumables
Refrigerator, 2°C to 8°C	General laboratory supplier	Storing the reagent consumables
Ice box	General laboratory supplier	For the reagent insulation

Table 2-20 List of Self-provided Equipment

Chapter 3 Environment and Safety

This chapter introduces the environmental and safety requirements for the sequencing system in use, including transportation and storage requirements, installation requirements, space requirements, electrical safety requirements, operating environment requirements, biosafety requirements, and cyber security requirements.

3.1 Transportation and storage requirements

- Ambient temperature: -10°C to 50°C
- Relative humidity: 15%-85% (non-condensing)

Note: This Instrument is transported by the service provider authorized by GeneMind Biosciences.

3.2 Installation requirements

⚠ Caution

- This instrument can only be unpacked, moved, installed, debugged and maintained by after-sales service personnel authorized by GeneMind Biosciences or trained qualified personnel. Improper operation may affect the precision of the instrument or damage the instrument.
- After receiving the instrument, please check whether the outer packaging is intact and whether the anti-tilt label is abnormal (turns red). If there is any abnormality, please contact the after-sales service provider in time.
- Please place the instrument on a stable horizontal plane and ensure that it is not easy to be moved to avoid personal injury caused by falling.
- Do not move the instrument. Incorrectly moving the instrument may affect its performance. If you need to move or transport the instrument, please contact the after-sales service provider.

3.3 Space requirements

Mainframe size: 626 mm (L) × 580 mm (W) × 575 mm (H) (excluding anchor)
Mainframe weight: About 100 kg
In order to ensure the cable connection and power switch touch and facilitate the heat dissipation and maintenance of the instrument, it is necessary to reserve space around the instrument and other equipment. The space requirements are as follows:

- The size of the experiment bench for placing instruments is ⩾800 mm (L) × 700 mm (W), with a bearing capacity of ⩾200 kg;
- If an external waste liquid tank is configured, the installation distance between the waste liquid tank and the instrument shall be ⩽1 m;
- Front space: ⩾ 1,200 mm;
- Side and back space: ⩾700 mm;
- Space above the experiment bench: ⩾1,500 mm;
- Distance from power socket: ⩽1,500 mm.

⚠ Caution

- The installation space of the instrument shall be free from dust, corrosive and combustible gases, heat sources and air sources. Direct sunlight shall be avoided.
- It is necessary to ensure that the air inlet at the bottom of the instrument and the air outlet at the left and rear sides are not blocked by foreign objects, to facilitate ventilation.
- It is not allowed to put any other equipment, such as oscillator or centrifuge, that may cause vibration on the instrument experiment bench.
- It is not allowed to install the instrument near the frequently used door. Opening and closing doors may cause vibration.
- When the instrument is running, it is not allowed to touch the instrument, open the door of the reagent compartment or put anything on the top of the instrument.
- It is not allowed to block the mainframe switch when placing the instrument, so that the mainframe switch can be operated when necessary.

3.4 Electrical safety requirements

- Input voltage: 100-240 VAC
- Frequency: 50/60 Hz
- Input power: ⩽1,000 VA

⚠ Caution

- The instrument must be used under good grounding conditions.
- It is necessary to ensure that the power supply specifications meet the requirements for the instrument.
- It is not allowed to directly disconnect the connecting wires, including power cord, USB2.0, USB3.0, etc., when the instrument is turned on.
- The user is responsible for ensuring the electromagnetic compatibility environment of the instrument to ensure the correct operation of the instrument.
- It is recommended to evaluate the electromagnetic environment before the instrument is used.
- In the home environment, this equipment may cause radio interference, and protective measures need to be taken then.
- It is prohibited to use this instrument near strong radiation sources (such as unshielded RF sources); otherwise, it may interfere with the normal operation of the instrument.
- If the equipment is not used following the method specified by GeneMind Biosciences, the protection provided by the equipment may be destroyed.

3.5 Operating environment requirements

- Ambient temperature range: 19°C-25°C
- Relative humidity range: 20%-80% (no condensation)
- Altitude: Below 3,000 meters
- Rated pollution: Grade 2

⚠ Caution

- The fluctuation of temperature and humidity will affect the stability of sequencing, and it is necessary to maintain the required environment when the instrument is not used. Therefore, the laboratory where the instrument is located must be equipped with temperature and humidity regulation equipment.

3.6 Biosafety requirements

☣ Biological risks

- Chemicals in reagents and waste liquids can irritate eyes, skin and mucous membranes, which may cause personal injury. Operators should abide by the laboratory safety operation regulations and wear personal protective equipment (such as laboratory protective clothing, gloves, and masks) when they are exposed to reagent-related items in the laboratory.
- If the reagent or waste liquid is accidentally splashed into the eyes or exposed to the skin, please rinse immediately with plenty of water and seek medical help.
- Please check the expiration date of the reagent before using it, and do not use the expired ones.
- Operators must abide by the relevant regulations of the country (or region) where they are located on the discharge and treatment of reagents, waste liquid, waste samples and consumables.

3.7 Software requirements

3.7.1 Running environment

3.7.1.1 Hardware configuration

The minimum hardware configuration required for software running are as follows:

Hardware	Part	Configuration
Workstation	CPU	13th Gen Inter(R) Core(TM) i7-13700T
	Memory	64 GB
	Hard disk 2	4 TB
Touch screen display	Size	18.5 inch
	Resolution	1920*1080
*Mouse	/	USB interface
*Keyboard	/	USB interface

Table 3-1 Hardware Configuration for Software Running of System

3.7.1.2 Software running environment

⚠ Caution

- This instrument can only be installed with and run the software provided by the Company. Otherwise, the control software may not run normally or data may be lost. If other software is required, please confirm with the after-sales service personnel in advance.

Software type	Software name
Operating system	Microsoft Windows 10
Compatible software	MindVision Camera Platform Setup
	Python
Security software	Windows Firewall

Table 3-2 Software Running Environment

3.7.1.3 Network conditions

- Network type: LAN
- Network architecture: C/S architecture
- Bandwidth: Above 1 Gb/s

3.7.2 Security software

The software operating system is a customized operating system environment, which only supports Windows-attached firewall and can be used in a local area network with security protection software.

3.7.3 Data and instrument interface

Item	Description
Type	Device data
Function	One-direction swap of electronic data through wired network, U disk and mobile hard disk.
Swap mode	Wired network swap mode
Transfer protocol	FTP protocol, shared disk
Interface	USB, RJ45
Storage medium	U disk, mobile hard disk
Storage format	*.fq.gz

Table 3-3 Description of Data and Instrument Interface

3.7.4 Product control software users

Only users authorized by the Company can use the control software of the instrument.

Chapter 4 Operation

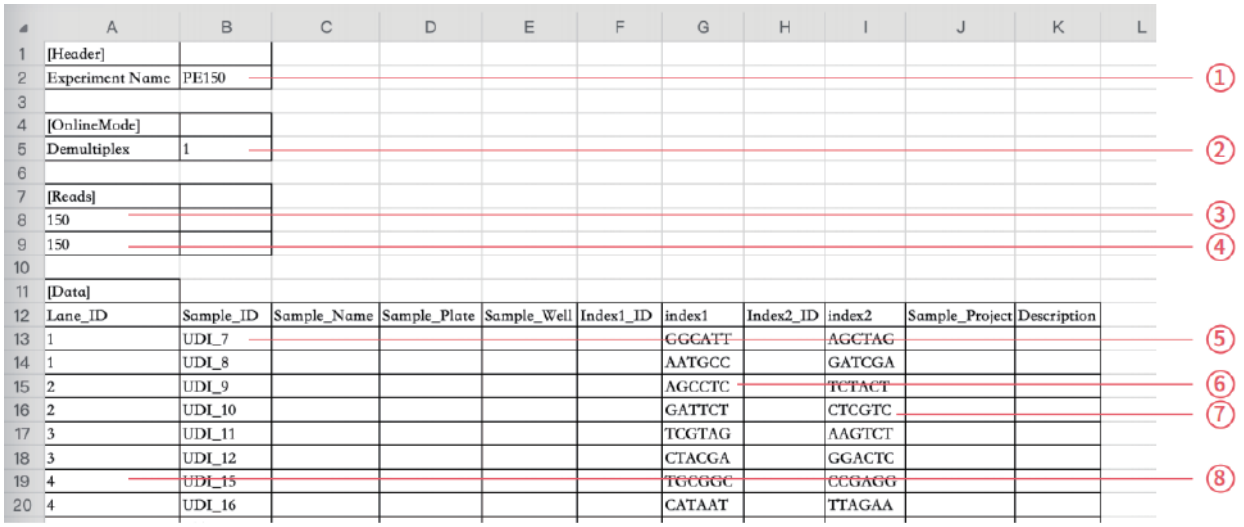
This chapter introduces the operation process of the system, including preparation before sequencing, sequencing, washing, report viewing and setting operation. Please read this section carefully before operation to ensure the correctness of operation.

4.1 Sequencing preparation

- Editing of experiment information sheet
- Emptying of waste liquid tank (if necessary)
- Preparation of sequencing kit
- Preparation of sequencing flow cell
- Preparation of sequencing library
- Flow cell platform cleaning

4.1.1 Editing of experiment information sheet

Before starting sequencing, you need to determine the key sequencing parameter information in advance, namely the experiment name, the number of first-strand cycles, the number of second-strand cycles, and the index length, or complete the editing of the experiment information sheet in advance. Please refer to the requirements of the corresponding ***User Manual for FASTASeq S Sequencing Kit*** as well as experimental requirements to fill in the experiment information. The parameters in the sheet are described as follows:



	A	B	C	D	E	F	G	H	I	J	K	L
1	[Header]											
2	Experiment Name	PE150										
3												
4	[OnlineMode]											
5	Demultiplex	1										
6												
7	[Reads]											
8	150											
9	150											
10												
11	[Data]											
12	Lane_ID	Sample_ID	Sample_Name	Sample_Plate	Sample_Well	Index1_ID	index1	Index2_ID	index2	Sample_Project	Description	
13	1	UDI_7					GGCATT		AGCTAG			
14	1	UDI_8					AATGCC		GATCGA			
15	2	UDI_9					AGCCTC		TCTACT			
16	2	UDI_10					GATTCT		CTCGTC			
17	3	UDI_11					TCGTAG		AAGTCT			
18	3	UDI_12					CTACGA		GGACTC			
19	4	UDI_15					TGCGGC		CCGAGG			
20	4	UDI_16					CATAAT		TTAGAA			

Figure 4-1 Editing of Experiment Information

S/N	Position	Contents	Function	Description
1	B2	Experiment name	Naming this experiment	Only allow letters, numbers, dashes and underscores, no more than 30 characters
2	B5	Index splitting configuration	Determining whether index splitting is automatic	0: Not demultiplex; 1: Automatic demultiplex
3	A8	Number of the first-strand sequencing cycles	Determining the number of the first-strand sequencing cycles	A positive integer between 10 to 300
4	A9	Number of the second-strand sequencing cycles	Determining the number of the second-strand sequencing cycles, and leave it blank for single-end sequencing	Any positive integer between 10 and 300
5	Starting from B13	Sample information	Identifying the sample	No more than 30 characters, consisting of English letters, numbers, dashes, and underscores
6	Starting from G13	Sequence of index 1	Determining the sequence of index 1 configured for corresponding sample	ATCGNM characters are allowed, “N” is used to complete the index sequence of mixed sequencing samples, and “M” is for UMI sequence. index 1 + index 2: not exceeding 40 characters in total length
7	Starting from I13	Sequence of index 2	Determining the sequence of index 2 configured for corresponding sample	ATCGNM characters are allowed, “N” is used to complete the index sequence of mixed sequencing samples, and “M” is for UMI sequence. index 1 + index 2: not exceeding 40 characters in total length
8	Starting from A13	Flow channel information	Distinguishing sample information of different flow channels on the flow cell	This Flowcell of the product is designed with a single flow channel, and channel information does not need to be filled in

Table 4-2 Description of Editing of Experiment Information

⚠ Caution

- Sample information shall be edited in areas B13 and below, with each sample being assigned a unique index sequence or combination of index sequences.
- If index sequence experiment is not required in the experiment, the area starting from Line G13, I13 and below is empty.

4.1.2 Emptying of waste liquid tank (if necessary)

The default configuration of the instrument is to empty sequencing waste liquid into the waste liquid bottle that comes with the sequencing kit. This waste liquid bottle is disposable and can be removed together with the used sequencing kit.
If the instrument is configured to discharge sequencing waste liquid into an external waste liquid tank, the waste liquid tank needs to be emptied as needed according to the instrument' s prompt for waste liquid level height alarm information. To empty the waste liquid tank, unscrew the waste liquid tank cover, empty the waste liquid from the waste liquid tank, place the waste liquid tank back to its original position, and screw the waste liquid tank cover.

☣ Biological risks

- Regarding the disposal and discharge of expired reagents, waste liquid, waste samples, consumables, etc., please comply with the relevant regulations of your region and country.
- The chemical components in the reagent or waste liquid may irritate the eyes, skin, and mucous membranes. Operators should abide by the laboratory safety operation regulations and wear personal protective equipment (such as laboratory protective clothing, gloves, and masks) when they are exposed to reagent-related items in the laboratory.
- If the reagent or waste liquid is accidentally splashed into the eyes or exposed to the skin, please rinse immediately with plenty of water and seek medical help.

4.1.3 Preparation of sequencing kit

- Take the sequencing kit out of the storage environment at -30 °C to -15 °C, and remove the outer packaging of the reagent kit.
- Remove the waste liquid bottle installed in the sequencing kit (if any). Place the sequencing kit in a water tank containing water at 20-25°C, with the water level of approximately 2/3 of the kit, until the reagents are completely thawed. Be careful not to soak the entire reagent kit.
- Wipe away water from the outer surface of the sequencing kit with laboratory dust-free lens wiping paper, and gently invert the whole kit up and down for 15-20 times to evenly mix the reagents. Make sure that the reagents are completely thawed and mixed before mixing. If ice crystals are found in the reagents, continue to thaw in water at room temperature. Gently tap the reagent kit on the workbench to reduce air bubbles at the bottom of the reagent kit. Place the waste liquid bottle (if any) back to the sequencing kit.

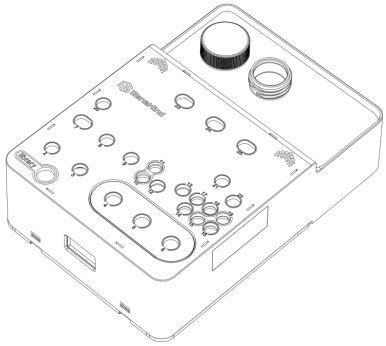


Figure 4-3 Prepared Sequencing Kit

- Place the prepared sequencing kit in a dark environment at 2-8°C, and complete the operation on the instrument within 24 h.

Notes:

- Option for reagent kit thawing: The reagent kit can be thawed at 2-8°C at least 12 h in advance.
- The insufficiently thawed kit may affect the sequencing results.
- There shall be no obvious big bubbles in the kit, and the existence of bubbles may affect the sequencing results.
- The kit cannot be repeatedly frozen and thawed.
  There should be no visible water drops in the RFID label, which may affect the identification of RFID.

☣ Biological risks

- Regarding the disposal and discharge of expired reagents, waste liquid, waste samples, consumables, etc., please comply with the relevant regulations of your region and country.
- The chemical components in the reagent or waste liquid may irritate the eyes, skin, and mucous membranes. Operators should abide by the laboratory safety operation regulations and wear personal protective equipment (such as laboratory protective clothing, gloves, and masks) when they are exposed to reagent-related items in the laboratory.
- If the reagent or waste liquid is accidentally splashed into the eyes or exposed to the skin, please rinse immediately with plenty of water and seek medical help.

4.1.4 Preparation of sequencing flow cell

- Take out the sequencing flow cell from the storage environment at 2-8°C, and allow it to stand for at least 30 min but not more than 12 h at 20-25°C.
- Tear open the packaging at the notch, and take out the sequencing flow cell.
- If there is lint or stains on the surface of the flow cell (glass), wet the laboratory dust-free lens wiping paper with a small amount of anhydrous ethanol, and then wipe the front surface of the flow cell (glass) 3-5 times as shown in Figure 4-4, until no visible lint or stain can be observed on the glass surface.

Notes:

- Wipe the entire glass surface of the flow cell at a time, rather than partitioning.
- Wipe in one direction at a time, rather than bi-directional reciprocation.

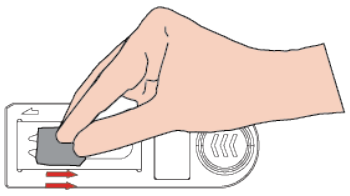


Figure 4-4 One-direction Flow Cell Wiping

- Wipe the back of the flow cell in the same way until there is no dust, impurities or burrs, or other stains.
- Store the wiped flow cells in a safe and clean place and wait for the operation on the instrument.

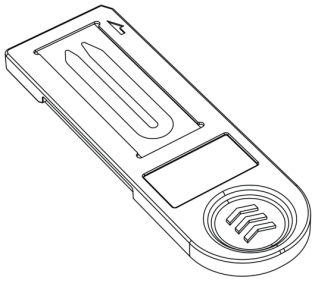


Figure 4-5 Prepared Sequencing Flow Cell

Note:

- Avoid the reagent inlet and outlet ports of the flow cell when wiping the sequencing flow cell to prevent absolute ethanol from entering the flow cell.
- There should be no visible water drops in the RFID label, which may affect the identification of RFID.

4.1.4 Preparation of sequencing library

- Denaturation and dilution of the library: Perform denaturation and dilution of the prepared library samples according to the User Manual for FASTASeq Sequencing Kit, and put the library into the 2-mL library tube provided with the sequencing kit.
- Putting sequencing library: Place a 2-ml library tube containing the library into the library well 1 of the sequencing kit, and confirm that it has been inserted in place. Store the sequencing kit in a dark environment at 2-8°C and wait for operation on the instrument.

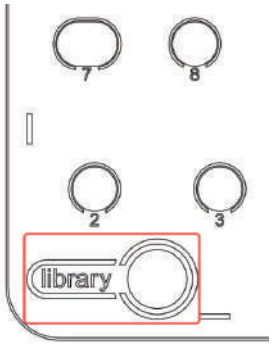


Figure 4-6 Schematic Diagram of Well Positions in the Sequencing Kit Library

- Please start the sequencing operation as soon as the sequencing library is ready.

Biological risks

- Regarding the disposal and discharge of expired reagents, waste liquid, waste samples, consumables, etc., please comply with the relevant regulations of your region and country.
- The chemical components in the reagent or waste liquid may irritate the eyes, skin, and mucous membranes. Operators should abide by the laboratory safety operation regulations and wear personal protective equipment (such as laboratory protective clothing, gloves, and masks) when they are exposed to reagent-related items in the laboratory.
- If the reagent or waste liquid is accidentally splashed into the eyes or exposed to the skin, please rinse immediately with plenty of water and seek medical help.

4.1.6 Flow cell platform cleaning

- Wet the laboratory dust-free lens wiping paper with a small amount of anhydrous ethanol, and then wipe the heating platform.
- Blow air into the whole supporting platform and flow cell loading area of the flow cell platform by using a dust removal tank until there is no visible dust or impurities on the surface.

⚠ Caution

- Avoid the reagent inlet and outlet ports of the converge block when wiping the heating platform to prevent absolute ethanol from entering the hole.
- Check the converge block and make sure that the inlet and outlet of the block are clean and free of foreign objects.
- If there are any stubborn stains that cannot be removed by direct wiping on the flow cell loading position or the back of the flow cell, you can use a plastic tool such as a pipette tip to scrape it off.

Laser radiation

- The lasers of the equipment are classified as Class 1 laser product, and the laser used inside is classified as a Class 3B laser source. The beam produced by the laser encased in the flow cell compartment may be potentially hazardous to humans. Laser irradiation on human eyes in any case will hurt human eyes, please do not look directly at the light beam to avoid accidental injury to eyes by laser. Seek medical care in case of discomfort.
- Please make sure that the sequencing flow cell compartment is closed and the equipment is used in accordance with the operating procedures when the instrument is running; otherwise, it may cause harmful radiation exposure.
- During the sequencing process, if the flow cell compartment door is open during the photographing process, the device will pause photographing to avoid the leakage of radiation. However, the flow cell compartment door is required to be closed within 15 minutes; otherwise, the sequencing quality will be lowered.

- Laser parameters: The wavelength of green light is 532 ± 20 nm with a maximum output power of NMT 1.2 W, the wavelength of red light is 639 ± 20 nm with a maximum output power of NMT 1.2 W, and the laser on the equipment is located at the exit of the objective lens. The laser on the equipment is emitted from the internal objective lens. The laser is emitted in a flashing cycle during normal use, with red and green lasers emitted periodically. The red and green lasers are not emitted simultaneously during the emission process. This complete unit is classified as Class 1 laser product. The classification is based on IEC 60825-1 Safety of laser products—Part 1: Equipment classification and requirements. A high-power laser is installed internally. It is forbidden to open it for maintenance. Only professional personnel approved or authorized by GeneMind Biosciences can open it for maintenance, and the power supply must also be disconnected during maintenance. During maintenance, the accessible emission level for intrabeam viewing may exceed this category, and should therefore be prevented during maintenance. The maintenance personnel should wear safety goggles for eye protection against laser during maintenance, and reflective safety goggles with an optical density of ⩾8, and protection against laser wavelengths of 532 nm and 639 nm will be preferable. The laser should be checked annually by a qualified institution for laser power. If the power is found to be abnormal, you should stop using the instrument and contact the manufacturer for repair. It is forbidden to disassemble the instrument and adjust the laser power without authorization.
- The laser beam of Class 1 laser products can cause glare, flash blindness, and afterimage in the visible range, especially in a dim environment. Temporary visual disturbance or startle response may cause indirect general safety problems. Class 1 lasers should only be used where direct intrabeam viewing is unlikely to occur.

⚠ Pinching of hands

- Take precautions and do not pinch your hands when placing the flow cell!

4.2 Sequencing

Introduction to sequencing process on the instrument:

- Turn on the sequencing system.
- Perform washing (if necessary).
- Set up a new sequencing run.
- Automatic washing after sequencing.

4.2.1 Instrument power-on

Press “I” to turn on the sequencing system through the power switch on its side. Enter the user name and password to log in to the operating system after the system login screen is displayed.

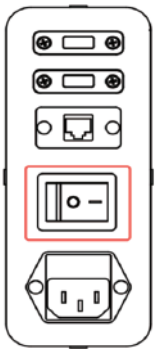


Figure 4-7 Power Switch of Sequencing System

After logging into the system, the software is automatically opened and initialized. During the initialization process, the system self-check will be triggered and the internal and external devices of the system will be initialized. During initialization, the progress bar will indicate the progress of initialization. Normally, the software will enter the main interface of the control software after 100% initialization, and a control software user login box will pop up. Select the username and enter the password to log in to the software. After logging in to the control software, enter the main interface of the control software.

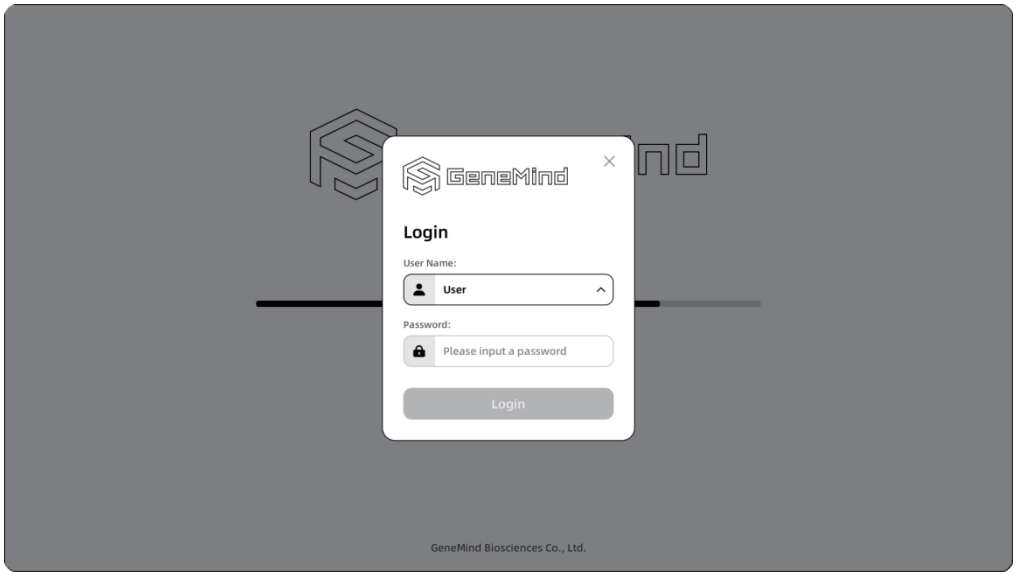


Figure 4-8 Log in to Control Software

4.2.2 Washing (if necessary)

If the time elapsed since the liquid pipe washing in the last sequencing experiment is not more than 48 h for this sequencing experiment, it is not necessary to perform pre-sequencing liquid pipe washing, which will be required if the interval is more than 48 h. Please refer to step 4.3.4 for specific procedures of liquid pipe washing.

4.2.3 Sequencing setup

Basic steps of new sequencing: setting experiment information, loading consumables, reviewing information, and sequencing run.

1) Enter the main page of the sequencing system control software, click “SEQ” .

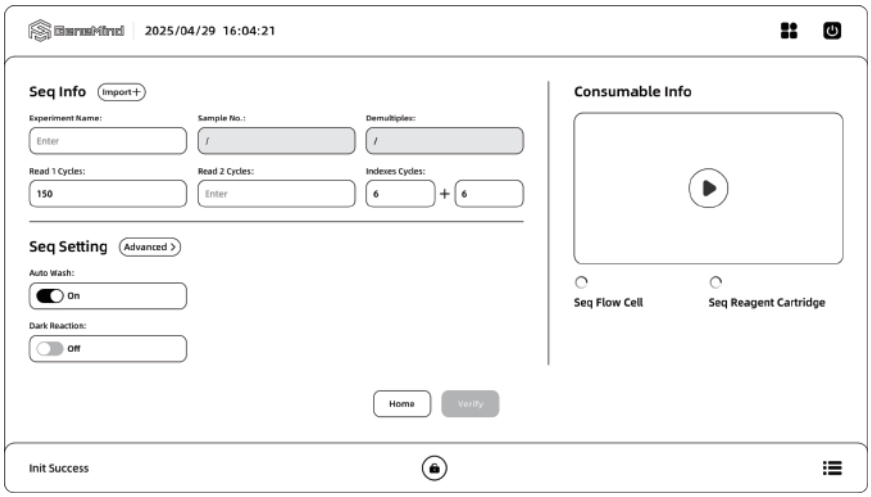


Figure 4-9 Experiment Setting Page

2) The upper left corner of the page is the “Seq Info” area, where you can manually enter the determined key experiment information or import experiment information from the previously edited experiment information sheet. To import experiment information using the experiment information sheet, click “Import” to import the edited experiment information sheet (*.csv format). After successful import, the basic information of the sequencing experiment will be displayed on this page. Please check the sequencing parameters carefully.

The basic information of the experiment is as follows:

Experiment name	Displaying the name of the current experiment
Sample size	Sample size information. If the index sequence is not configured, the parameter is displayed as “N/A”.
index splitting	index “Split” or “Not Split”. If the index sequence is not configured, this information will not be displayed.
Number of the first-strand sequencing cycles	The length of single-end sequencing or the length of the first strand of double-end sequencing
Number of the second-strand sequencing cycles	The length of the second strand is sequenced by double-end sequencing, and this parameter is displayed as “N/A” when sequencing by single-end.
index length	index 1 sequence length + index 2 sequence length of the sample. When no corresponding index is configured, the index sequence length is displayed as “0”.

Table 4-10 Description of Experiment Information Parameters

3) The lower left corner of the page is the “Seq Setting” area, which includes both general and advanced settings.

Automatic washing	Able to turn off and on the automatic washing function
Dark reaction	Able to turn on and off the dark reaction function. After dark reaction is turned on, the number of the first-strand cycles and the second-strand cycles for the dark reaction can be set.

Table 4-11 Description of Experiment Setting Parameters

Click the “Advanced” button to set the sequencing mode. Set the “Re-Seq Mode” to “Yes” and the sequencing will execute the retest mode, that is, the hybridization amplification stage will not be executed. Set the “Re-Seq Mode” to “No” and the sequencing will simulate the standard mode and the sequencing will execute the hybridization amplification stage. The software defaults to standard mode.

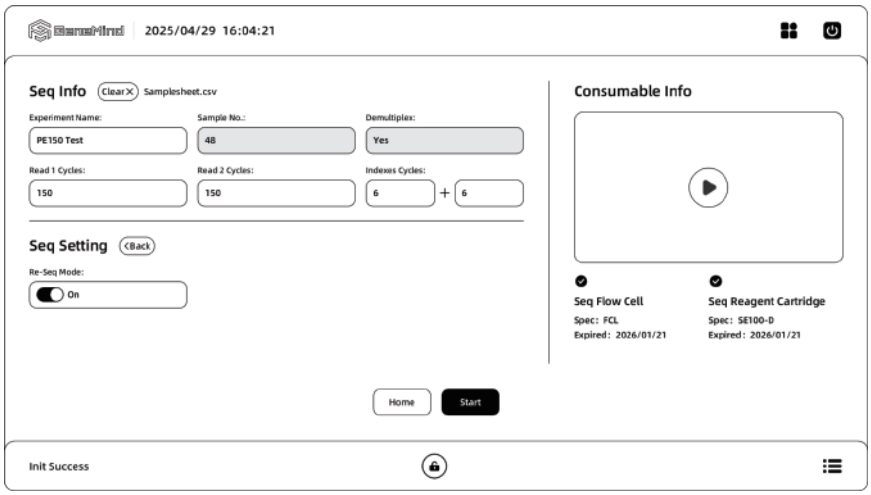


Figure 4-12 Advanced Settings Page

Note:
You can use the same flow cell for Re-Seq only if you stop the sequencing run at the following time points:

- After cycle 10: Although you can safely stop the run after cycle 1, but it is recommended to stop the run when image templating is complete. Do not stop the run during cluster generation.
- During the first-strand sequencing or index 1 sequencing: the run must be stopped before the start of the second-strand synthesis. Once second-strand synthesis starts, the same sequencing flow cell cannot be used for sequencing in Re-Seq mode.

4) The right side of the page is the “Consumables Info” area, which displays the loading animation of the sequencing kit and sequencing flow cell, as well as the consumables loading status and verification results.

① Loading the sequencing kit: Remove the cap of the library tube in the library well of the sequencing kit, open the compartment door, and push the sequencing kit horizontally into the reagent compartment.
② Loading the sequencing flow cell: Insert the sequencing flow cell horizontally into the flow cell compartment.
③ Click the “Verify” button at the bottom of the page. After the consumables are verified, the verification results of the flow cell and reagent kit, as well as information such as specifications and expiration dates are displayed. If both the flow cell and reagent kit are verified, switch the “Verify” button to the “Start” button.

⚠ Caution

- When loading the sequencing kit, make sure that the centrifuge tube cap in library wells of the sequencing kit has been cut off; otherwise, the reagent probe of the sequencing system will be damaged.
- Do not force the flow cell and reagent kit into the corresponding compartment.

5) Once the consumables are loaded, click the “Start” button and the sequencing “Info Review” page will pop up, where the main parameter settings of this sequencing experiment are confirmed. If the information is correct, click the “OK” button to start sequencing; if the information is incorrect, click the “Cancel” button to close the “Info Review” page and not start sequencing.

6) Click “Start” to start sequencing. The sequencing progress will be displayed when sequencing enters the first reaction cycle. The page will display sequencing quality information in real time when sequencing enters the tenth reaction cycle.

7) You can control the sequencing process, during sequencing, through the buttons as follows:
Pause: This button can pause the current round of sequencing;
Resume: This button can be used with the pause button to resume the paused sequencing;
End: This button allows the user to voluntarily end this round of sequencing, and directly enter the preparation page for post-sequencing liquid pipe washing.

This folder contains five subfolders, namely:
Imagefile: a folder to store images acquired during sequencing and thumbnails thereof.
LogFiles: a folder to store run logs of the sequencing process.
Quality: a folder to store images acquired while focusing.
Report: a folder to store temporary reports generated during sequencing.
Results: a folder to store final sequencing result data (fastq) and offline reports

⚠ Caution

- During sequencing, the system also needs to cache some temporary files on disk D, so it is necessary to ensure that disk D has some available memory before sequencing starts.
- When starting sequencing, the software system will automatically check the available space of Disk D. If the available space is insufficient, it will prompt the required space and current available space.

4.4.2 Brief description of Results folder

The sequencing result data and offline report output are stored in the Results folder, which contains three additional types of files:

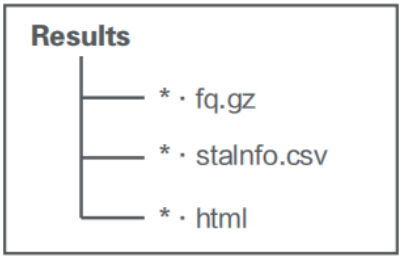


Figure 4-20 Structural Diagram of Results Folder

- Read zip file *.fq.gz: It may be one file or more, depending on the experiment setting. The users can conduct subsequent bioinformatics analysis based on the Read zip file *.fq.gz to obtain test reports for guiding clinical practice.
- Statistics file *.statInfo.csv: statistics of sequencing data, including cluster density and Q30, etc.
- Offline report file *.html: including *.summary.html and *.cycHeat.html, which show the relevant quality information and fastq result information during sequencing. The “Total information” in *.summary.html is the basic display of the test results, including the following parameters and indicators:

Table 1. Sequencing Information

Items	Value
Cycle Number	316
Density(K/mm^2)	1504
Output Reads(M)	63.51
Q30(%)	93.81
Read1 Q30(%)	94.9
Read2 Q30(%)	92.72
GC(%)	48.96
Read1 GC(%)	48.96
Read2 GC(%)	48.96
Demultiplex Ratio(%)	7.64

Figure 4-21 Parameters (Table 1) in Report

⚠ Caution

- When the “Pause” button is clicked during sequencing, the pause confirmation box will pop up, while the sequencing is running in the background. The system will not pause the sequencing cell under operation until the “OK” button in the pause confirmation box is clicked.
- When the “Stop” button is clicked during sequencing, the end confirmation box will pop up, while the sequencing is running in the background. The system will not end the sequencing cell under operation until the “OK” button in the end confirmation box is clicked.
- The sequencing actively ended by users cannot be resumed, which is the only safe way for users to actively exit the sequencing process during sequencing, and you cannot directly exit the sequencing system control software.

4.2.4 Automatic washing after sequencing

After the sequencing is completed, the system will automatically enter the automatic washing page to complete the post-sequencing liquid pipe washing operation.
If the automatic washing function is ticked before sequencing, the system will enter the automatic washing page automatically if the sequencing ends normally or terminates prematurely.

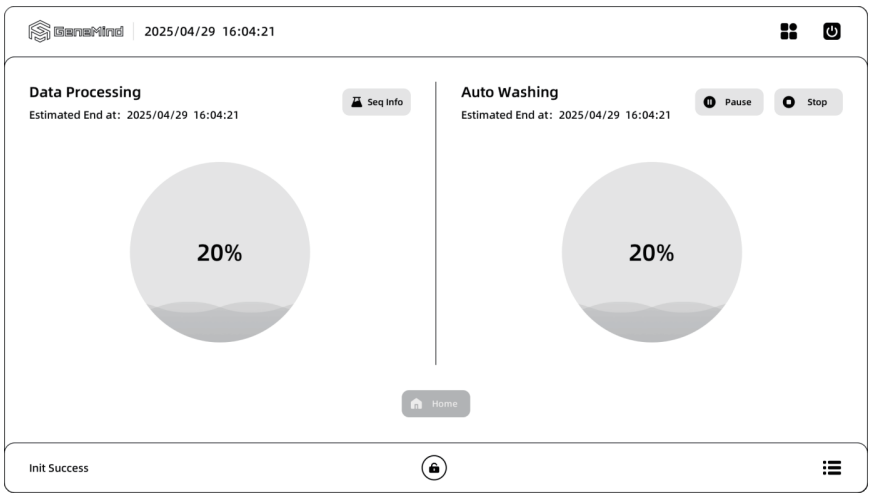


Figure 4-13 Automatic Washing after Sequencing

During automatic washing, the washing function can be paused and stopped. Click “Pause” and washing will be automatically paused. Click “Stop” to stop washing and it prompts “Automatic washing ends in advance”.

4.3 Washing

Click the “Wash” button in the main interface to enter the wash mode selection interface.

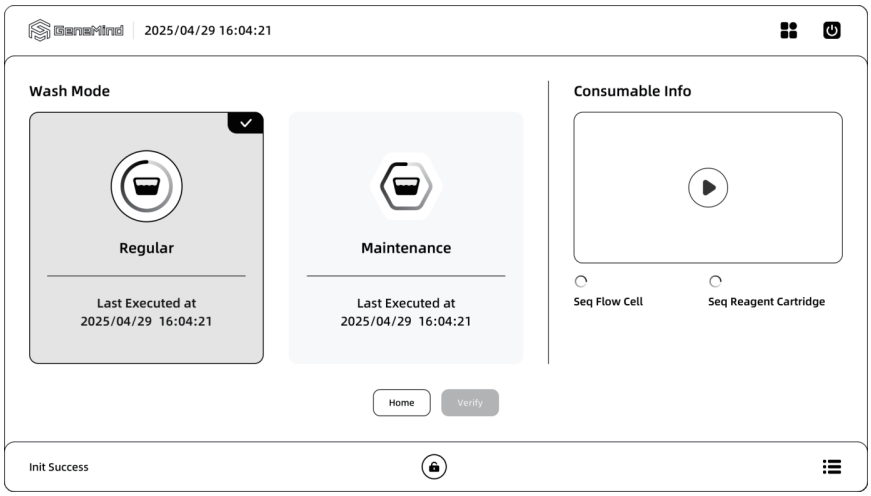


Figure 4-14 Wash Mode Selection Interface

Biological risks

- Chemicals in reagents and waste liquids can irritate eyes, skin and mucous membranes, which may cause personal injury. Operators should abide by the laboratory safety operation regulations and wear personal protective equipment (such as laboratory protective clothing, gloves, and masks) when they are exposed to reagent-related items in the laboratory.
- If the reagent or waste liquid is accidentally splashed into the eyes or exposed to the skin, please rinse immediately with plenty of water and seek medical help.

⚠ Caution

- It is recommended not to use washing reagents not mentioned in this User Manual. Other washing reagents have not been verified and their impact on the instrument has not been evaluated.

4.3.1 Wash mode

The instrument wash modes includes regular wash and maintenance wash. Please select the wash mode as applicable.

Function description of wash modes:

Wash Mode	Wash Process	Application
Regular wash	Other pipelines (0.05% Tween 20); Library valve port (mixed solution with 0.05% Tween 20 and 0.12% NaClO)	If automatic washing is not performed after sequencing, regular washing must be performed.
Maintenance wash	0.05% Tween 20 for wash pipelines	Once every 7 days; The automatic washing or regular washing after the last sequencing has exceeded 2 days.
	75% Alcohol sterilization	

Table 4-15 Introduction to Wash Mode

4.3.2 Preparation of wash reagent

Name of Wash Buffer	Formula	
0.05% Tween 20 (500 mL)	Tween 20	250 µL
	Ultrapure water	499.75 mL
0.05% Tween 20 wash buffer (20 mL) containing 0.12% sodium hypochlorite	5% sodium hypochlorite solution	480 µL
	0.05% Tween 20	19.52 mL
75% Alcohol (500 mL)	Absolute ethanol	375 mL
	Ultrapure water	125 mL

Table 4-16 Introduction to Wash Reagents

- Preparation of 0.05% Tween 20 (500 mL): Measure 499.75 mL of purified water, add 0.25 mL of 100% Tween 20 to it, and mix well. The prepared solution is stable up to 1 d when stored at room temperature. Tween 20 is viscous. Make sure to measure accurately.
- Preparation of 0.05% Tween 20 + 0.12% NaClO (20 mL): Measure 19.52 mL of 0.05% Tween 20, add 480 µL of 5% sodium hypochlorite solution, and mix well. The prepared reagent is stored at 2-8°C, protected from light, with a validity period of 1 day. Tween 20 is viscous. Make sure to measure accurately.
- 75% alcohol solution (500 mL): Measure 375 mL of absolute alcohol, add 125 mL of ultrapure water into it and mix well. Keep tightly closed for later use.

4.3.3 Preparation of wash consumables

- Preparation of the washing flow cell: Directly use the washing flow cell provided by GeneMind Biosciences or use the flow cell used in the sequencing experiment as the washing flow cell.
- Preparation of the reagent washing cartridge: Please use the reagent washing cartridge provided by GeneMind Biosciences.

Note:

- The sequencing kit that is not used for automatic washing contains all the washing reagents required for one regular wash and can be directly used for one regular wash.

4.3.4 Wash operation

4.3.4.1 Regular wash

1) Prepare at least 50 mL of 0.05% Tween 20 wash buffer; 2 mL of 0.05% Tween 20 wash buffer containing 0.12% sodium hypochlorite.
2) Add 50 mL of 0.05% Tween wash buffer and 2 mL of 0.05% Tween 20 wash buffer containing 0.12% sodium hypochlorite to corresponding well of the reagent washing tank.

Wash buffer	Volume (mL)
0.05% Tween 20	50
0.05% Tween 20 containing 0.12% sodium hypochlorite	2

Table 4-17 Description of Adding Wash Buffer for Regular Wash

3) Click “Wash”. Select the “Regular” mode.
4) Open the compartment door, load the washing flow cell and the reagent washing tank containing the wash buffer into the consumable compartment.
5) Once the washing consumables are loaded into place, the “Start” button lights up.
6) Click “Start ” to start regular wash.
7) After the liquid pipe washing is completed, the system automatically jumps to the completion page and prompts that the washing is completed.

4.3.4.2 Maintenance wash

1) 1)Prepare at least 100 mL of 0.05% Tween 20 wash buffer and at least 50 mL of 75% alcohol wash buffer. Add 100 mL of 0.05% Tween 20 wash buffer and 50 mL of 75% alcohol wash buffer to the corresponding
2) wells of the reagent washing tank:

Wash buffer	Volume (mL)
75% Alcohol	50
0.05% Tween 20	100

Table 4-18 Description of Adding Wash Buffer for Maintenance Wash

3) Click “Wash”. Select the “Maintenance” mode.
4) Open the compartment door, load the washing flow cell and the reagent washing cartridge containing the wash buffer into the consumable compartment.
5) Once the washing consumables are loaded into place, the “Start” button lights up.
6) Click “Start” to start maintenance washing.
7) After the liquid pipe washing is completed, the system automatically jumps to the completion page and prompts that the washing is completed.

4.4 Viewing sequencing results

4.4.1 Structure of sequencing output folder

The sequencing results and log files are stored in “D:\GeneMind\Output”, and a sequencing output folder will be generated in this sequencing experiment, with the naming rules as follows:
Sequencing start time_instrument number_flow cell SN_experiment name, example:
202504021724_AH01250401003_7P250224120US291191D2_TEST
The schematic diagram of sequencing output folder structure is as follows:



Figure 4-19 Structural Diagram of Sequencing Output Folder

S/N	Designation	Function
1	Cycle Number	The total number of cycles performed in the sequencing experiment, including the number of sequencing the first-strand cycles, sequencing the second-strand cycles and index length
2	Density(K/mm^2)	The number of clusters per square millimeter
3	Output Reads (M)	The number of Reads contained in the output fastq file
4	Q30 (%)	The percentage of bases with a quality score of 30 or higher in the total Read output fastq file
5	Read1 Q30(%)	The percentage of bases with a quality score of 30 or higher in the Read 1 output fastq file
6	Read2 Q30 (%)	The percentage of bases with a quality score of 30 or higher in the Read 2 output fastq file
7	GC(%)	The GC content of the total Read output
8	Read1 GC(%)	The GC content of the Read1 output
9	Read2 GC(%)	The GC content of the Read2 output
10	Demultiplex Ratio(%)	The split rate of the output file

Table 4-22 Description of Parameters (Table 1) in Sequencing Offline Report

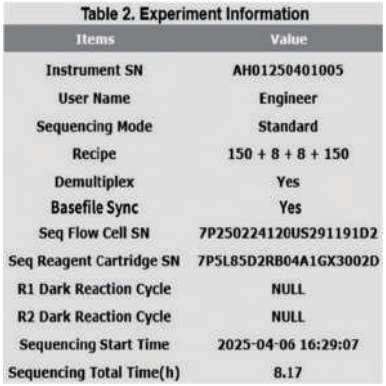


Table 2. Experiment Information

Items	Value
Instrument SN	AH01250401005
User Name	Engineer
Sequencing Mode	Standard
Recipe	150 + 8 + 8 + 150
Demultiplex	Yes
Basefile Sync	Yes
Seq Flow Cell SN	7P250224120US291191D2
Seq Reagent Cartridge SN	7P5L85D2RB04A1GX3002D
R1 Dark Reaction Cycle	NULL
R2 Dark Reaction Cycle	NULL
Sequencing Start Time	2025-04-06 16:29:07
Sequencing Total Time(h)	8.17

Figure 4-23 Parameters (Table 2) inReport

S/N	Designation	Function
1	Instrument SN	The instrument SN
2	User Name	The user name of sequencing software
3	Sequencing Mode	The sequencing mode
4	Recipe	The sequencing strategy of the experiment, in which Read1 and Read2 measure 1bp more by default for parameter correction, but are not included in the off-line data
5	Demultiplex	Whether sequencing requires splitting
6	Basefile Sync	Whether the Basefile real-time upload function is turned on
7	Seq Flow Cell SN	The SN of the flow cell
8	Seq Reagent Cartridge SN	The SN of the sequencing reagent
9	R1 Dark Reaction Cycle	The number of cycles set for the Read1 dark reaction
10	R2 Dark Reaction Cycle	The number of cycles set for the Read2 dark reaction
11	Sequence Start Time	The start time of sequencing
12	Sequence Total Time(h)	The total sequencing time

Table 4-24 Description of Parameters (Table 2) in Sequencing Report

4.4.3 Data setting

After sequencing, the folders of “fastq”, “Basefile” and “Log” in the sequencing results can be automatically uploaded to the target server or in-service computer.

The specific operation method for FTP upload is as follows:

1) Click the setting icon in the upper right corner of the display screen and select the “Data Settings” tab;
2) Tick “fastq”, “Basefile”, and “Log”, which will be effective in real time after ticking.
3) The upload mode can be FTP upload;
4) At the upload destination, enter the IP address of the target server or in-service computer, the user name and login password of the FTP site;
5) Click “Communication Test” to confirm that the network connection is normal, and then click “Save”.

Note:

- The target server or in-service computer has been available in FTP communication and configured a site named “FTP” then fix its IP address, FTP site user name and login password. If you need help in setting up an automatic upload environment, please contact the after-sales service provider.

The specific operation method for FTP upload is as follows:

1) Click the setting icon in the upper right corner of the display screen and select the “Data Settings” tab;
2) Tick “fastq”, “Basefile”, and “Log”, which will be effective in real time after ticking.
3) The upload method can be “Shared Folder”;
4) At the upload destination, select the target disk.

4.5 Other settings

4.5.1 Log management

The log management page supports the display of log contents.
The specific operation method is as follows:
Click the setting icon in the upper right corner of the display screen, and select the “Log Management” tab. The pop-up page displays the contents of the operation log. You can filter the display by the log category, and may also specify the date display.

4.5.2 Maintenance

The “Maintenance” page supports system self-check, pipeline emptying, and waste liquid tank emptying.
System self-check: used to communicate with software and hardware modules and initialize the detection process.
Pipeline emptying: Drain the liquid in the pipeline to the waste liquid tank or bottle.
The specific operation method is as follows:
Click the setting icon in the upper right corner of the display screen, select the “Maintenance” tab, and select the corresponding maintenance function for detection or evacuation.

4.5.3 System settings

The system settings page supports language switching between Chinese and English, LIMS enabling, and screen lock time settings.
The specific operation method is as follows:
Click the settings icon in the upper right corner of the display screen and select the “System Settings” tab. The pop-up page displays language switching settings, LIMS start settings and screen lock time settings.

4.5.4 Help

Information, such as the model, software version and help, can be viewed on the “Help” page.
Click the help icon in the upper right corner of the display screen. Select “Help” to enter the “Help” page to view required information.

4.5.5 About

nformation, such as the model, software version, and firmware version of the instrument, can be viewed on the “About” page.
The specific operation method is as follows:
Click the setting icon in the upper right corner of the display screen, and select “About”. The software version and firmware version information are displayed on the popped-up page.

4.6 Power button

Restart/shutdown operation is supported on the main interface.
The specific operation method is as follows:
Click the icon ⏻ in the upper right corner of the display screen, click “Shutdown” or “Restart” on the popped-up page.

Chapter 5 Instrument Repair and Maintenance

In order to ensure the normal operation of the instrument within its service life, it is necessary to carry out routine repair and maintenance of the instrument.

5.1 Maintenance content and frequency

Please carry out maintenance according to the following table.

Item	Frequency
Regular wash	If automatic wash is not performed after sequencing, regular wash must be performed
Maintenance wash	Every 7 days The automatic wash or regular wash after the last sequencing has exceeded 2 days
Reagent compartment maintenance	After each sequencing
System shutdown	As needed
Complete instrument inspection	Monthly
Washing dust screen	Once every six months
Overheating protection device check	Annually

Table 5-1 Maintenance Content and Periods

5.2 Instrument liquid pipe maintenance

Be sure to perform a post-sequencing automatic washing or regular washing of the instrument after each sequencing run.

Washing the instrument pipeline ensures the continuous performance in the following aspects:

- Flush out any remaining reagents in the pipelines and reagent probes.
- Avoid salt accumulation and crystallization in pipelines and reagent probes.
- Avoid cross-contamination from previous operations.

Please refer to the following table for the frequency of pipeline washing, and refer to 4.3 for the specific process in each washing mode.

Precondition	Maintenance Wash	Regular Wash
The automatic wash or regular wash after the last sequencing has exceeded 2 days, or no maintenance wash for more than 7 days	✓	-
No automatic wash is performed after sequencing	-	✓
The automatic wash or regular wash after the last sequencing has not exceeded 2 days	No need wash, perform sequencing directly	

Figure 5-2 Suggested Washing Modes in Different Situations

⚠ Caution

- Automatic wash or regular wash must be performed after sequencing.

5.3 Reagent compartment maintenance

After each sequencing, check timely whether there is condensed water in the reagent compartment; if any, clean it with a lint-free cloth or lint-free paper.

5.4 Flowcell platform maintenance

- Before sequencing every time, wipe the flow cell loading area with a small amount of anhydrous alcohol moistened with dust-free lens wiping paper to ensure that there is no dust, impurities, burrs and stains.
- Observe and confirm that there is no foreign matter in each hole of the inlet and outlet channels of the bus bar. If there is dust or impurity, it can be cleaned by a dust removal tank.
- Place the sequencing flow cell after the ethanol volatilizes completely.
- High-power laser is installed inside, so it is forbidden to open it for maintenance, except for the authorized personnel of after-sales service provider, and the power supply must be disconnected during maintenance. The visible emission of laser beam during maintenance may exceed the threshold specified for this category, so the laser beam shall be prevented from being visible during maintenance. Maintenance personnel shall wear laser goggles to protect their eyes during maintenance, and the reflective goggles are recommended as they can protect the laser band from 532 nm and 640 nm at the same time, with the optical density of at least level 8.
- The laser power shall be checked in a qualified organization every year. If the power is abnormal, stop using it and contact the after-sales service provider for maintenance. It is forbidden to disassemble the instrument without permission to adjust the laser power.

5.5 Mainframe and power module maintenance

- If the instrument will not be running for a long time, please turn off the power supply of the instrument and unplug the power cord;
- Before each use, check the power switch, power cord and connector socket of the instrument for aging, damage or poor contact. If cables need to be replaced, please contact the after-sales service provider.
- When powered on, check whether the cooling fan is running normally. If the cooling fan is not running after starting, please contact the after-sales service provider in time.
- Clean the dust around the fan hole with a small brush to ensure the normal heat dissipation of the instrument;
- Wash the dust screen at least once every six months. Please contact the after-sales service provider for related matters.
- Check the instrument overheating protection device at least once every six months. Please contact the after-sales service provider for related matters.

5.6 Waste liquid bottle/tank maintenance

- Please dispose of waste liquid in accordance with local laboratory requirements and laws and regulations, and during which please wear personal protective equipment, so as not to damage skin, mucous membrane and eyes;
- Please check the joint of waste liquid pipeline regularly for looseness, aging, bending and waste liquid leakage. If so, please contact the after-sales service provider in time.

5.7 Complete instrument inspection

At least once a month, and perform the following maintenance with the power off:

- Wipe the mainframe casing (including the touch screen) with a cleanroom wiper dipped in 75% alcohol, to ensure no residual samples and reagents left in the casing;
- Check the switch, connector and socket of the instrument for looseness and misplacement;
- Check the contacts of plugs and sockets for oxidation, rust or other poor contact;
  Check the power cord for aging.

⚠ Caution

- Please power on after natural air drying.

With the power on, perform the following maintenance:

- Start the sequencer and start the system self-check to detect the working state of some devices.
- Periodically back up the offline sequencing data in the hard disk, and clean the hard disk of the sequencer workstation to free up the memory.

5.8 Shutdown maintenance

If the sequencer will not be used for a long time, it is recommended to shut it down. Please perform the following steps:

- Perform one-button emptying: Click the setting icon in the upper right corner of the display screen. Select the “Maintenance”, and enter the “Maintenance” page. Click “Empty Pipeline”;
- Take out the reagent washing tank and close the door of the reagent compartment;
- Close sequencing system control software;
- Turn off the mainframe of the sequencing system;
- Disconnect all power supplies.

⚠ Caution

Before starting the instrument next time, make sure to complete the following operations:

- Check the connection of power cables, and the connection between the instrument and the work station;
- Clean the instrument, and perform maintenance washing;
- After shutting down off the instrument every time, wait at least 60 s before switching the power switch back to the “I” position.

5.9 Instrument disposal

See the label of the instrument for its date of manufacture, and the service life is 10 years. The service life of this instrument is determined using the simulated life evaluation method. During the use, the product shall be maintained and repaired according to the User Manual. After overhauling, maintenance or repair, products that can still maintain basic safety and effectiveness can be used normally. When the instrument and its accessories reach the end of their service life, they must be treated in accordance with the treatment guidelines for managing such products and the relevant regulations of the country (or region) on the discharge and treatment of reagents, waste liquid, waste samples, consumables, etc.

Chapter 6 Solutions to Common Abnormalities

This section mainly introduces the steps for troubleshooting common abnormalities before the after-sales service provider. Please contact the after-sales service provider if there are other abnormalities, or there are abnormalities that cannot be solved.

⚠ Caution

- When handling abnormalities, please wear personal protective equipment (such as laboratory protective clothing, protective glasses, gloves, etc.) to avoid damaging skin, mucosa and eyes.
- Ensure that the components of the instrument are installed properly before operation to avoid personal injury.
- If dangerous substances leak on the surface of the device or fall into the inside of the device, appropriate disinfection measures shall be taken.
- Do not use washing agents or disinfectants that react chemically with parts or materials contained in the equipment and cause danger thereby.
- If there is any doubt about the compatibility of disinfectant or washing agent with parts or materials contained in the device, please contact the after-sales service provider.

6.1 Abnormal start-up of the instrument

If the instrument can’ t be started and doesn’ t run, please check by the following steps in turn:

- Make sure that the power supply voltage of the power socket is normal and the power supply is greater than or equal to 1,000 VA.
- Check whether the instrument power switch is turned on. If not, please turn on the power switch.
- Check whether the power cord and power socket are loose. If so, reconnect the power cord.
- Check whether the instrument data cable is connected or loose. If so, reconnect the data cable.
- Check whether the network cable between the instrument and the workstation is connected or loose. If so, reconnect the network cable.
- Check whether the data connection port number is consistent with the workstation port number. Please confirm that it is consistent.

6.2 Abnormal operation

1) After initialization, the system status light turns red:

◆ Communication between software and instrument failed.

Please make sure that the instrument is powered on for 5 minutes, and then restart the software to see if it is running correctly.

2) The sequencing interface prompts “TO BE FULL”

◆ Please empty the waste liquid tank.

3) Failed to read the flow cell label or kit label.

◆ If ID expires, please contact the after-sales service provider.
◆ There are dirty marks or water stains on the label, please contact the after-sales service provider.
◆ If height out of range, please contact after-sales service provider.

4) The sequencing interface prompts “Warning, Ambient Temperature Abnormal”.

◆ Please check whether the temperature in the room where the instrument is placed is too high and adjust the room temperature to 19-25°C.
◆ Check for foreign objects on the cooling fans on the back of the instrument; if any, restart the instrument and the software in turn after clearing them.
◆ Please check whether there are obvious obstructions within 40 cm from the side and back of the instrument.

5) The sequencing interface prompts “Warning, Flow Cell Temperature Abnormal”

◆ Open the compartment door and check for foreign objects around flow cell; if any, clear them up. Observe whether the flow cell temperature returns to normal.

6) The computer automatically restarts during sequencing.

◆ Please turn off the system automatic update restart function.
◆ Please remove external devices that are not declared by the manufacturer.

7) The screen turns blue during sequencing.

◆ Please restart the instrument.
◆ Avoid external devices not declared by the manufacturer.

8) The sequencing software quits abnormally.

◆ Please restart the software to see if the problem reappears.

9) There is insufficient free disk space.

◆ Manually delete the corresponding directory file according to the required disk space indicated by the displayed message.

10) Other faults.

◆ Please contact the after-sales service provider.

6.3 Sequencing quality problems

- Please confirm whether the library sample preparation and sequencing kit preparation are strictly in accordance with SOP.
- Please check whether the remaining dose in the kit is normal.
- Please check whether the flow cell looks normal.

6.4 Troubleshooting of common faults

Fault Symptom	Fault Cause Analysis	Troubleshooting
Star-tup failed	The power is not connected and the switch is not turned on	Check whether the power is connected correctly and turned on
Software initialization failed	Some components initialization failed	Handle subject to the message displayed
Error reported when software is running	Error in setting software parameters. Some hardware connections not correct	Check the software parameter settings. Check the log and troubleshoot the corresponding faults. Restart the instrument
Focus failed	Instrument autofocus failed	Replace the flow cell with known good image quality and take a new photo. At this time, the instrument will be reset according to the results
Poor air tightness of fluid	Flowcell gasket defective Fluid pipeline blockage	Check the appearance of the converge block for defects Observe whether 4 syringes are full of liquid during regular washing
Sequencing paused	An abnormality that affects the sequencing quality has occurred, and it may be harmful if it lasts	Handle subject to the prompt message
Insufficient memory space	Insufficient disk space	Delete and empty the recycle bin after properly handling the data
Display offset	Resolution setting not correct	Reset the resolution to 1092*1080 or set other lower resolutions and then reset it to 1092*1080

Table 6-1 Troubleshooting of Common Faults

Appendix A Parts List

S/N	Part Name	Quantity	Quantity
1	User Manual	1	
2	Warranty card	1	
3	Certificate of Conformity	1	
4	Cables	2	
5	Reagent wash cartridge	1	
6	Waste liquid tank	1	Optional
7	Objective lens	1	
8	Mouse and keyboard set	1	
9	Touch screen	1	

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