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Automatic Hematology Analyzer

Vcheck H6



BIONOTE

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Copyright and Declaration

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Congratulations on becoming a valued customer of BIONOTE. We welcome you to experience the Vcheck H6 Analyzer, designed to deliver enhanced convenience and an improved user experience.

Declaration

All of the contents in this Manual have been strictly compiled in accordance with relevant local laws and regulations, as well as the specific conditions of the Vcheck H6 Analyzer (hereinafter referred to as the “Analyzer”). All of the information contained herein is up to date as of the time of printing. BIONOTE is fully responsible for the revision and interpretation of this Manual and reserves the right to update its contents without prior notice. Illustrations in this Manual are for reference only; in the event of any discrepancies, the actual product shall prevail.

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All instructions must be followed strictly during operation. BIONOTE shall not be held responsible for failures, errors, or other liabilities resulting from the user’s noncompliance with the procedures and precautions outlined herein.

Limited Responsibility for Quality Warranty

This Manual defines the rights and obligations between BIONOTE and its customers regarding quality warranty, after-sales service, and related agreements on commencement and termination.

BIONOTE warrants that the Vcheck H6 Analyzer, sold by BIONOTE or its authorized agents, is free from defects in workmanship and materials during normal use by the original purchaser. This warranty is valid for one year from the date of installation. The expected service life of the Analyzer is ten years.

The operator and laboratory must meet the following requirements:

- 1 The Analyzer must be operated according to the instructions in this Manual.
2. The software and hardware installed on the Analyzer must comply with the provisions of this Manual.
3. Maintenance and repair must be performed only by engineers authorized by BIONOTE, and only spare parts approved by BIONOTE may be used.
4. The laboratory power supply must comply with national or international laws and regulations.
5. Samples must be collected and stored under standard clinical laboratory conditions.
6. Reagents must comply with the provisions outlined in this User Manual.
7. Proper tools must be used for Analyzer maintenance or troubleshooting.

BIONOTE assumes no liability in the following situations, even during the warranty period:

1. Failures resulting from misuse of the Analyzer or neglect of maintenance.
2. Use of reagents and accessories not manufactured or recommended by BIONOTE.
3. Failures caused by operation that does not comply with the instructions outlined in this Manual.
4. Replacement of accessories not specified by BIONOTE or maintenance/repair performed by an unauthorized or non-approved service agent.



THE ANALYZER IS INTENDED FOR PROFESSIONAL AND PRESCRIPTION USE ONLY.

Technical service and troubleshooting are provided by BIONOTE. Professional technicians and sale representatives will be sent to offer you timely service when necessary.

Basic information

Product name: Automatic Hematology Analyzer

Model: Vcheck H6



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REF VC7806EA

FCC ID: 2BQN5VC7806EA



Doc. No.: I7806-4E

Issue Date: 2025-10-15

Chapter 1 Introduction

1.1 Overview

Welcome to the Vcheck H6 Analyzer User Manual. This User Manual provides detailed instructions for the operation, maintenance and precautions of the Analyzer. To ensure optimal performance, the Analyzer must be operated and maintained in strict accordance with the guidelines provided in this User Manual. The Vcheck H6 Analyzer is designed for *in vitro* diagnostic use in clinical laboratories. The whole blood test provides 35 reportable parameters and 6 reportable plots. Additionally, the Analyzer provides 12 research parameters and 2 research plots. The Vcheck H6 Analyzer utilizes laser flow cytometry combined with nucleic acid fluorescent staining to analyze WBC count and classification. It employs the sheath flow impedance method to measure the counts and volume distribution of RBC and PLT. Additionally, platelet count is further validated using nucleic acid fluorescent staining. Hemoglobin concentration is determined through a cyanide-free spectrophotometric method. Reticulocytes are detected using laser flow cytometry combined with nucleic acid fluorescent staining.

1.2 Intended use

The Analyzer is used to quantitatively analyze the formed elements of blood and provide relevant information.

NOTE

- Read the User Manual carefully before using the Analyzer, especially the safety information, and keep it for future reference.
- Failure to operate the Analyzer in accordance with the User Manual may result in inaccurate measurements, misdiagnosis, treatment delays, user hazards, or damage to the Analyzer due to improper use.
- Any modification of procedures—including attempts to simplify, optimize, improve, or omit steps described in the User Manual—may compromise the accuracy of test results.
- Operators must strictly follow the procedures in the User Manual. Any attempt to simplify or optimize the inspection process is likely to affect the accuracy of test results.

1.3 Scope of application

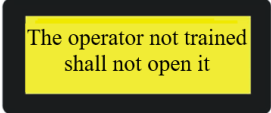
This User Manual is intended for veterinary medical laboratory professionals. Untrained personnel should not operate the Analyzer. This Manual provides guidance on:

- Understanding the hardware and software of the Vcheck H6
- Setting system parameters
- Performing routine operations
- Conducting system maintenance and troubleshooting

1.4

Hazard signs

The following symbols indicate potential hazards or highlight important information that requires special attention:

Symbols	Meaning
	Indicates that the operator must follow the instructions under this symbol; otherwise, personal injury may occur.
	Indicates that the operator must follow the instructions under this symbol to avoid product faults, damage, or inaccurate test results.
	Highlights important information in the operation steps that require the operator's special attention.
	Biohazard: Indicates the presence of biological hazards that require caution.
	Laser Hazard: Indicates the risk of laser exposure, which may cause harm to human eyes if proper procedures or controls are not followed.
	Indicates caution due to the danger of electric shock.
	Warning: Check the accompanying documents to understand the potential hazard and required countermeasures.
	Untrained personnel must not open marked objects to avoid accidents and personal injury.

Statement

- This Analyzer complies with the emission and immunity requirements outlined in GB7247.1-2012.
- This equipment is classified as Class A under GB 4824. It is not intended for use in residential environments and may not provide adequate protection against radio reception interference in such settings.
- Avoid using the Analyzer near strong radiation sources (e.g., unshielded RF sources), as this may interfere with its normal operation.

NOTE

- Anyone operating, maintaining, or moving this Analyzer must read the User Manual carefully.
- Ensure strict adherence to the instructions provided in the Manual.
- Using the Analyzer in a dry environment, especially in the presence of synthetic materials (e.g., man-made fabrics or carpets), may result in damaging electrostatic discharge and lead to incorrect results.
- Avoid using the Analyzer near strong radiation sources, as this may interfere with its normal operation.

1.5**Navigation of User Manual**

The operator can locate the required information using the table below:

When you need to	Refer to
Understand the technical parameters of Vcheck H6	Chapter 1 Introduction
Check the operation precautions of the Vcheck H6	Chapter 2 Safety Information of Analyzer Operation
Understand the structure and purpose of Vcheck H6	Chapter 3 Analyzer System and Function
Understand the installation requirements of Vcheck H6	Chapter 4 Installation
Understand the measurement principle and process of Vcheck H6	Chapter 5 Operation Principles
Set the system parameters of Vcheck H6	Chapter 6 Introduction of Analyzer Menu
Understand the routine operation of Vcheck H6	Chapter 7 Daily Operation
Understand QC requirements and QC methods provided by Vcheck H6	Chapter 8 Quality Control
Understand the basic requirements on calibration and calibration methods provided by Vcheck H6	Chapter 9 Calibration
Understand the maintenance methods of Vcheck H6	Chapter 10 Maintenance
Understand the troubleshooting methods of Vcheck H6	Chapter 11 Troubleshooting
Understand the detailed specifications of Vcheck H6	Appendix A
Understand the name and content of toxic and hazardous substances or elements	Appendix B
Understand the routine operating procedures	Appendix C
Understand the key components of the Analyzer	Appendix D
Understand the list of accessories	Appendix E

1.6

Technical Data Sheet

Table 1 Technical Data Sheet

ITEMS	DESCRIPTION
Measurement parameters	The whole blood test provides 35 reportable parameters and 6 reportable plots. Additionally, the Analyzer offers 12 research parameters and 2 research plots.
Measuring channel	The Analyzer features a built-in independent RET test channel, enabling quantitative analysis and generating RET two-dimensional scatter diagrams through laser flow cytometry and cell nucleic acid fluorescent staining technology. Additionally, it can output fluorescence platelet (PLT-O) test results. The Analyzer includes a built-in independent WBC differential (DIFF) test channel, allowing for quantitative analysis and providing WBC differential two-dimensional scatter diagrams using laser flow cytometry and cell nucleic acid fluorescent staining technology. The DIFF test channels also support quantitative analysis of total WBC and WBC classification. The Analyzer is equipped with a built-in independent RBC/PLT test channel to perform quantitative analysis of RBC and PLT, generating RBC and PLT histograms using the sheath flow impedance method. A built-in independent HGB test channel facilitates quantitative analysis of HGB through colorimetry. The Analyzer utilizes two methodologies for platelet detection: RET and RBC/PLT.
Sampling method	The Analyzer offers a single-sample input method for sample loading. The single-sample input supports the open mode for whole blood.
Testing speed	CBC+DIFF: ≥ 60 samples per hour; CBC+DIFF+RET: ≥ 40 samples per hour.
Analysis mode	CBC+DIFF (CD), CBC+DIFF+RET. (CDR)
Sample type	Venous whole blood, capillary whole blood.
Sample demand	For venous whole blood CD mode: $\leq 28\mu\text{L}$. CDR mode: $\leq 34\mu\text{L}$. For pre-diluted mode: $20\mu\text{L}$.
Operating software	Full English Operating System
Input method	Supports English input for animal information and hospital information.
Output method	The system supports an external printer and offers report formats in both Chinese and English. It allows for the printing of histograms and includes various warning symbols to indicate potential anomalies in samples. Additionally, it provides the option to print reference value ranges.

Data storage	Supports up to ≥80,000 test results (including graphics).	
Calibration and QC	The system offers both automatic and manual calibration modes, supporting calibration with calibrators and fresh blood. It utilizes the L-J quality control mode and is capable of automatically generating QC charts.	
Clogging removal methods	High-pressure burning, positive and negative pressure flushing, and intelligent automatic cleaning.	
Reference range	The system allows for parameter limit settings for a wide range of animals, including dogs and cats. Additionally, it supports custom parameter settings for other animals.	
Network data transmission and interfaces	The Analyzer is equipped with an Ethernet port, allowing for data transmission over a network. It supports LIS/HIS systems, facilitating the integration and networking of laboratory department information.	
Cleaning functions	The system features Integrated Automatic Flushing, including: Automatic cleaning of the sample probe, scheduled liquid circuit cleaning, automatic cleaning during power-up and shutdown.	
Unit conversion	For WBC, RBC, PLT and HGB items, the test results are available in two units.	
Maintenance alerts	The system includes automatic monitoring capabilities, which prompt operators to perform scheduled maintenance tasks or troubleshooting procedures as needed.	
Abnormal cell prompt	The system includes an alert function to indicate the presence of insoluble red blood cells and abnormal cells.	
Alarm function	The system features an abnormal parameter value alarm, reagent test alarm, fault prompt alarm, and automatic system diagnosis.	
Abnormal cell alerts	The system provides notifications for the presence of abnormal cells and allows for customization of alert rules. It supports intelligent multiplication analysis for low white blood cell values and generates alerts for special samples.	
Automatic Sleep	The Analyzer features an automatic sleep mode with user-configurable settings.	
Security	The system features a liquid-electric isolation design, ensuring good electrical safety.	
Screen size	12 inches.	
Software use restrictions	Users are categorized into two permission levels: Regular User (User) and Administrator (Admin).	Regular User permissions cover routine testing operations, including: Sample testing, Result review/query/printing, Quality control and menu settings. Administrator permissions encompass all regular user permissions, along with

		additional rights for user account management and advanced analyzer settings.
Host size	474mm×320mm×471mm (Height × Width × Depth)	
Power consumption	300VA	
Fuse	T6.3A 250V	
Weight	31kg	

FCC Declaration of Conformity

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

RF Exposure Statement

The device has been evaluated to meet general RF exposure requirement. The device can be used in portable exposure condition without restriction.

Chapter 2 Safety Information

2.1 Overview

In addition to ensuring the safe use of the Analyzer, this chapter also outlines safety precautions for the operator. It should be read carefully before operating the Analyzer.

2.2 Special requirements for use

- Vcheck H6 is designed for blood analysis, including cell counting, WBC classification, HGB measurement, and RET measurement in clinical testing.
- Only use the reagents and detergents specified in this User Manual. Proper cleaning and maintenance of the Analyzer, as outlined in the Manual, are required to ensure optimal performance.

2.3 General requirements

- Read this User Manual thoroughly before operating the Vcheck H6. Ensure you understand all signs and markings in the Manual and on the Analyzer. Keep the Manual in a safe place for future reference.
- The Analyzer must be started according to the instructions in the Manual. Failure to do so may lead to electrical or mechanical faults due to accidental damage or an unsuitable working environment, potentially resulting in loss of function and operational risks.
- The Analyzer must be operated strictly as specified in this User Manual.
- Keep long hair, fingers, and clothing away from rotating parts to prevent injuries.
- If the Analyzer emits a peculiar smell or smoke, immediately turn off the power switch and unplug the power cord. Continuing to use the Analyzer in such a state may cause fire, electric shock, or personal injury. Contact BIONOTE immediately for assistance.
- Avoid spilling blood samples or reagents inside the Analyzer, and do not allow foreign objects to fall into the system. Such incidents may cause short circuits. If any of these occur, immediately turn off the power switch, unplug the power cord, and contact BIONOTE.
- Do not touch the circuits, especially with wet hands, as this may result in electric shock.
- The Analyzer must be connected to a power outlet with the correct voltage and proper grounding to ensure safe operation.
- Do not damage the power cord. Avoid placing objects on it or pulling it forcefully.
- Power off the Analyzer before connecting external devices such as a computer or printer.

- The Analyzer is connected to AC mains power, and the interface is marked with a dangerous voltage symbol. A leakage fault may pose a risk to personal safety. Using non-original power adapters can lead to incorrect test results due to non-compliant specifications. Additionally, improper grounding may cause analyzer malfunctions.
- Upon retirement, the Analyzer must be disposed of in compliance with the Regulations on the Administration of the Recycling and Disposal of Waste Electrical Appliances and Electronic Products.

2.4 Electromagnetic safety

- The Analyzer contains an internal motor, which generates alternating electric and magnetic fields during operation.
- Strong electromagnetic interference may cause operational anomalies in the Analyzer.
- Exposure to strong electromagnetic interference or poor grounding may lead to data conversion errors and incorrect test results.
- This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:
 - (1) This device may not cause harmful interference, and
 - (2) This device must accept any interference received, including interference that may cause undesired operation.

2.5 Installation

- The Analyzer must be installed in a dry, dust-free environment. It must not be placed in areas with high humidity, poor ventilation, dirt, or air containing salt or sulfur. The Analyzer housing is made of ABS PC, which may corrode in environments with high pH values.
- Do not splash or sprinkle water on the Analyzer.
- Avoid exposing the Analyzer to extreme temperature fluctuations or direct sunlight.
- Protect the Analyzer from shocks or vibrations.
- During storage and shipping, place the Analyzer inside a carton box with foam padding to prevent damage. Improper packaging may lead to operational failure.
- The installation site must be well ventilated.
- While the Analyzer does not produce ionizing radiation, it may be affected by external ionizing radiation sources such as X-rays or γ -rays, which could lead to erroneous test results.
- Do not install the Analyzer near chemical storage areas or in environments where gases are generated.

- Ensure the power supply frequency and voltage match the specifications provided in the User Manual. A precision manostat or UPS should be used exclusively for the Analyzer.
- Handle the Analyzer carefully to prevent slippage or accidental injury.
- Using incorrect reagents or improper operation may result in inaccurate test results.

2.6 Prevention of infection

- All parts and surfaces of the Analyzer are potentially infectious. When measuring samples, maintain a proper distance between the sample probe and surrounding objects to ensure smooth operation.
- Always wear protective clothing and rubber gloves during operation, maintenance, servicing, or repair of the Analyzer. After completing work, wash hands thoroughly with disinfectants. Do not touch waste materials or contaminated parts with bare hands.
- If accidental contact occurs with infectious substances or contaminated surfaces, immediately wash the skin thoroughly with water and follow lab disinfection protocols.
- The Analyzer uses blood samples, which may contain pathogenic micro-organisms, posing a risk of infection. Therefore, operate the Analyzer with caution and, if necessary, wear protective gloves to prevent infection risk to both the operator and surrounding individuals. Even control materials and calibrators may be contagious. Wear protective clothing and rubber gloves when performing quality control (QC) or calibration.

2.7 Reagent processing

- Check the labels and markings on the reagent packaging before use.
- Avoid direct contact with reagents as they may irritate the eyes, skin, and mucous membranes.
- If skin contact occurs with the reagent, rinse immediately with plenty of water.
- If eye contact occurs with the reagent, rinse immediately with plenty of water and seek medical advice.
- Laboratories should establish proper first-aid measures for handling reagent-related incidents.
- Prevent reagent contamination by avoiding contact with dust, dirt, or bacteria.
- Use reagents only within their shelf life to ensure accurate results and safety.
- Properly handle reagents to prevent air bubbles. Do not shake the reagent. Reagents must not be used immediately after shipping—allow them to stabilize before use.
- Avoid spilling reagents. If a spill occurs, wipe it dry immediately with a cloth.

- If a reagent is accidentally swallowed, seek medical attention immediately.
- Diluent is a good conductor of electricity, and if accidentally spilled near electric wires or the Analyzer, it poses a risk of electric shock. In such cases, immediately turn off the power, unplug the Analyzer, and safely remove the spilled diluent.
- The probe cleaner is a strong alkaline solution. Avoid contact with skin or clothing. If contact occurs, rinse immediately with plenty of water to prevent damage to skin or clothing.
- The probe cleaner contains sodium hypochlorite, which can corrode the surface of the Analyzer. If it comes into contact with the Analyzer, wipe it dry immediately with a cloth to prevent damage.
- Ensure that the reagents are placed at the same level or lower than the Analyzer. Do not place reagents on top of the Analyzer to prevent accidental spills or damage.

2.8 Maintenance

- The Analyzer is a precision electronic optical device, and proper maintenance is essential to ensure normal operation.
- The Analyzer must be taken care of by a dedicated person.
- Infrequent cleaning may result in minor deviations in test data. In rare cases, operators have contracted diseases due to inadequate cleaning.
- To prevent infection, electric shock, or burns, always wear rubber gloves before performing any maintenance work, and wash hands with disinfectants afterward.
- Specialized tools must be used for Analyzer maintenance.
- All cleaning and maintenance procedures must be performed in strict accordance with the User Manual.
- The Analyzer requires daily, weekly, and monthly maintenance as specified in the User Manual.
- If the Analyzer has not been used for an extended period, the rinse fluid circuit must be emptied before use according to the specified procedure. Ensure the Analyzer is in proper working condition before operation.
- The Analyzer should be reinstalled only when spare parts are replaced.

2.9 Laser

The Analyzer's laser is a visible Class 3B laser with a wavelength λ of 638 ± 3 nm and a maximum output power of 11 mW.

⚠ WARNING

- The Analyzer uses a semiconductor laser, which is a visible Class 3B laser. To prevent beam exposure, the laser is enclosed within a housing and a protective cover. Removing the cover may cause eye injury and harmful radiation exposure. Do not open the cover. Only BIONOTE-authorized service technicians are permitted to access it.

NOTE

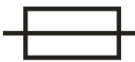
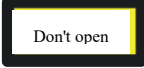
- Note that laser radiation is present when the cover is open. Avoid beam exposure and do not look directly into the laser beam.
- Before powering on the laser, ensure that all safety devices intended for the Analyzer are used correctly. These include: an opaque baffle, non-reflective fire-resistant surfaces, goggles, masks, door interlocks, and a ventilation system for toxic substances.
- Do not stare directly into the laser beam. Service technicians must wear appropriate safety goggles during laser commissioning. Only service technicians authorized by BIONOTE are permitted to perform commissioning.
- Do not place objects with specular (mirror-like) reflective surfaces near the laser module.
- When using optical analyzers such as binocular vertical tubes, microscopes, or telescopes to observe the laser beam, the risk of laser-induced eye damage significantly increases.

2.10 Disposal of consumables

- Remaining reagents, cleaning agents, and all waste must be disposed of in accordance with local laws and regulations. Used samples and reagents should be separated from regular waste to prevent environmental pollution. Contaminants may also interfere with the normal operation of the Analyzer.

2.11 Explanation of graphic symbols

	Caution		Warning, dangerous voltage		Biological risks
	Use-by date		“ON” (power)		Alternating current

	"OFF" (power)		Serial number		Keep away from sunlight
	Environment-friendly use period		Protective conductor terminal		Fuse
	Do not use if packaging is damaged		Warning, laser beam		Computer network
	Waste electrical and electronic equipment		This way up		USB interface
	Consult instructions for use		Do not roll		Watch your finger and hand
	Keep dry		Stacking limit		Reagent encryption card reading label
	Fragile, handle with care		Warning	LD	LD lyse connector
	Fluorescent reagent replacement window		Don't open	LH	LH lyse connector
DS	DS diluent connector	SENSOR	Liquid waste sensor connector	DR	DR diluent connector
	Manufacturer		Date of manufacture		Batch code

	Catalogue number		Do not reuse		Temperature limit
	FCC Symbol The FCC symbol indicates that this product complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation. The FCC mark signifies that the equipment has been tested and found to comply with the limits for a Class A/B digital device pursuant to Part 15 of the FCC Rules.				

2.12 Operator

- The Analyzer must be operated by specially trained personnel. Use by untrained or unskilled individuals may result in improper operation or inaccurate measurements, leading to misdiagnosis, delayed treatment, harm to the user, or damage to the Analyzer. To eliminate these risks, operator training must emphasize the importance of proper handling and a full understanding of potential hazards.
- Failure to follow the User Manual may lead to incorrect operation or improper parameter settings, resulting in inaccurate diagnostic results and potential harm to the Analyzer. For example, incorrect test parameter settings can lead to erroneous results.
- Maintenance and repairs must be performed by professional technicians. If unauthorized personnel or companies not trained and certified by BIONOTE attempt repairs in a non-standard or improper manner, including inadequate post-repair inspections, measurement errors may occur.
- Hardware or software malfunctions can impact test accuracy. Operators should contact BIONOTE for maintenance as soon as possible.

WARNING

- The Analyzer's sample probe is sharp and moves during operation. Do not approach the sample probe when the Analyzer is in use. Always follow the correct operating procedure to avoid the risk of hand injury.

2.13	When the Analyzer is not in use
------	---------------------------------

- (1) In the event of a sudden power failure, turn off the power immediately.
- (2) If the Analyzer stops operating due to an anomaly, first turn off the power, clean any parts with biological risks, and inform relevant personnel of the associated risks. Then, identify and address the issue by referring to the 'Troubleshooting' chapter. If the issue cannot be resolved, contact BIONOTE technical service or after-sales support personnel.
- (3) For short-distance transport, follow the proper shutdown procedure, unplug the waste pipe and power cord, and then carefully transport the Analyzer. Ensure that the Analyzer remains upright and stable at all times. Avoid shaking, laying it down, or placing it upside down during transport.
- (4) For long-distance transport, please contact BIONOTE technical service personnel.

Chapter 3 Analyzer System and Function

3.1 Overview

The Vcheck H6 Automatic Hematology Analyzer is designed for whole blood analysis, including cell counting, WBC classification, HGB measurement, and RET measurement.

The Analyzer enables rapid, fully automated measurement and result output. Simply place the sample under the sample probe, press the Start button, and the Analyzer will automatically initiate the counting process. The graphical data and results will be displayed on the screen and can be printed or transmitted to the LIS system.

3.2 Test parameters

The Analyzer can automatically analyze, organize, and display blood sample data on the screen. Refer to the following table for specific parameters.

The Analyzer can provide 27 blood routine test report parameters, which are shown in Table 2 below.

Table 2 Blood routine test report parameters

Number	Full name	Abbreviation	Default unit
1	White blood cell	WBC	$10^9/L$
2	Lymphocyte percentage	LYM%	%
3	Lymphocyte counts	LYM#	$10^9/L$
4	Monocyte percentage	MON%	%
5	Monocyte counts	MON#	$10^9/L$
6	Neutrophil percentage	NEU%	%
7	Neutrophil counts	NEU#	$10^9/L$
8	Eosinophil percentage	EOS%	%
9	Eosinophil counts	EOS#	$10^9/L$
10	Basophil percentage	BASO%	%
11	Basophil counts	BASO#	$10^9/L$
12	Immature granulocyte percentage	IMG%	%
13	Immature granulocyte counts	IMG#	$10^9/L$
14	Red blood cell	RBC	$10^{12}/L$
15	Hemoglobin concentration	HGB	g/L

Number	Full name	Abbreviation	Default unit
16	Hematocrit	HCT	%
17	Mean corpuscular volume	MCV	fL
18	Mean corpuscular hemoglobin	MCH	pg
19	Mean corpuscular hemoglobin concentration	MCHC	g/L
20	Coefficient of variation of red blood cell distribution width	RDW_CV	%
21	Red blood cell distribution width standard deviation	RDW_SD	fL
22	Platelet	PLT	10 ⁹ /L
23	Mean platelet volume	MPV	fL
24	Platelet distribution width	PDW	fL
25	Plateletcrit	PCT	%
26	Platelet - larger cell ratio	P_LCR	%
27	Platelet - larger cell counts	P_LCC	10 ⁹ /L

The routine blood test can provide 5 report plots, as detailed in Table 3.

Table 3 Blood test report plots

Number	Full name	Abbreviation
1	Red blood cell histogram	RBC Histogram
2	Platelet histogram	PLT Histogram
3	DIFF channel 2D scatter diagram 1	DIFF (2D) scatter 1
4	DIFF channel 2D scatter diagram 2	DIFF (2D) scatter 2
5	DIFF channel 3D scatter diagram	DIFF(3D) Scattergram

The routine blood test can provide 7 research parameters, as detailed in Table 4.

Table 4 Blood test research parameters

Number	Full name	Abbreviation	Default unit
1	Impedance channel platelet counts	PLT-I	10 ⁹ /L
2	Optical WBC counts	WBC-O	10 ⁹ /L
3	DIFF channel WBC counts	WBC-D	10 ⁹ /L
4	Nucleated red blood cell counts	NRBC#	10 ⁹ /L
5	Nucleated red blood cell percentage	NRBC%	/100WBC
6	Neutrophil to lymphocyte ratio	NLR	%
7	Platelet to lymphocyte ratio	PLR	%

The RET test can provide 8 report parameters, as detailed in Table 5.

Table 5 RET test reportable parameters

Number	Full name	Abbreviation	Default unit
1	Immature platelet fraction	IPF	%
2	Reticulocyte percentage	RET%	%
3	Reticulocyte counts	RET#	10 ⁹ /L
4	Immature reticulocyte fraction	IRF	%
5	High fluorescent reticulocyte fraction	HFR	%
6	Medium fluorescent reticulocyte fraction	MFR	%
7	Low fluorescent reticulocyte fraction	LFR	%
8	Reticulocyte hemoglobin expression	RET-HE	pg

The RET test can provide 5 research parameters, as detailed in Table 6.

Table 6 RET test research parameters

Number	Full name	Abbreviation	Default unit
1	Immature platelet fraction	IPF#	10 ⁹ /L
2	Reticulocyte production index	RPI	10 ⁹ /L
3	Mean reticulocyte volume	MRV	fL
4	Optical RBC counts	RBC-O	10 ¹² /L
5	Optical PLT counts	PLT-O	10 ⁹ /L

The RET test can provide 1 report plot, as detailed in Table 7.

Table 7 RET test report plot

Number	Full name	Abbreviation
1	RET channel 2D scatter diagram	RET(2D) Scattergram

The RET test can provide 2 research plots, as detailed in Table 8.

Table 8 RET test research plots

Number	Full name	Abbreviation
1	Reticulocyte 2D extended scatter diagram	RET-EXT (2D) Scattergram
2	Platelet 2D optical scatter diagram	PLT-O (2D) Scattergram

3.3 System structure composition

WARNING

- The Analyzer should be carried by at least two people. When handling the Analyzer, firmly hold the four corners at the bottom, keeping it level with the shoulders. Follow appropriate safety procedures and use proper handling tools.
- After unpacking the Analyzer, inspect it for any physical damage and ensure that it was not damaged during transport.

The Analyzer consists of four main components: the analysis unit, the information processing unit, the display unit, and the result output unit.

Analysis unit: The analysis unit primarily includes the optical circuit, fluid circuit, sampling mechanism, data acquisition device, and data preprocessing unit. It is responsible for processing and analyzing samples, converting the analog signals of sample characteristics into digital signals.

Information processing unit: The information processing unit is primarily the main control board, which performs the following functions:

- (1) Calculates sample parameters using an algorithm that processes the initial characteristic digital signal for storage, display, and output.
- (2) Handles human-machine interactions by processing user input and sending analysis commands to the analysis part to initiate sample analysis.
- (3) Stores and manages user-defined parameters, allowing users to modify settings.

Display unit: The display unit consists of a screen and touch panel, primarily used for data visualization, interactive interfaces, and user input.

Result output unit: The result output unit is responsible for printing test reports.

⚠ CAUTION

- When using the touch screen, do not use sharp objects or apply excessive force.
- For routine cleaning of the touch screen, use clean, soft cloth with water. Do not use chemical solvents or acidic or alkaline solutions.

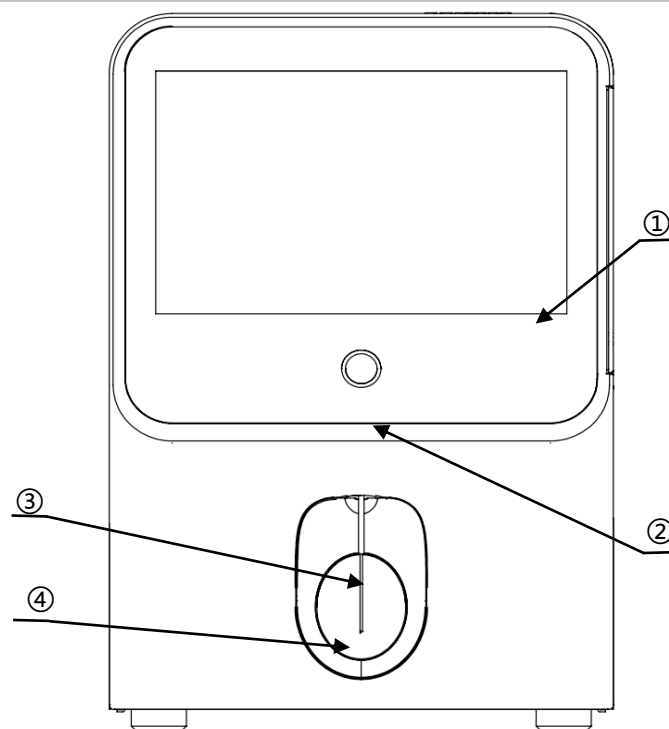


Figure 1 Front view of Analyzer

Table 9 Description of main parts of the Analyzer's front view

No.	Name	Description
①	Display screen	A 12-inch touch screen that displays graphic data and test results.
②	Working status indicator	An indicator light that shows the Analyzer's operation status, standby, or error. * Green light ON: Standby mode (no active operation) * Green light blinking: Analyzer is in operation * Red light ON: An error has occurred
③	Sample probe	A probe that draws in the sample for testing.
④	Count button	Button used to start the test.

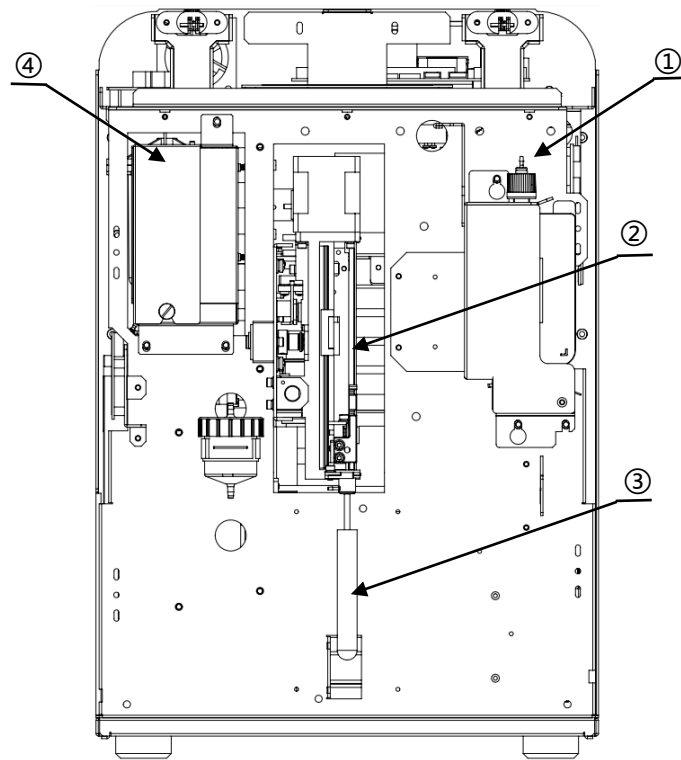


Figure 2 Front view of Analyzer (with the front housing removed)

Table 10 Description of the Analyzer's front view(with the front housing removed)

Position	Name
①	Fluorescent dye bottle
②	Sampling mechanism
③	Sample probe
④	Sheath flow impedance module

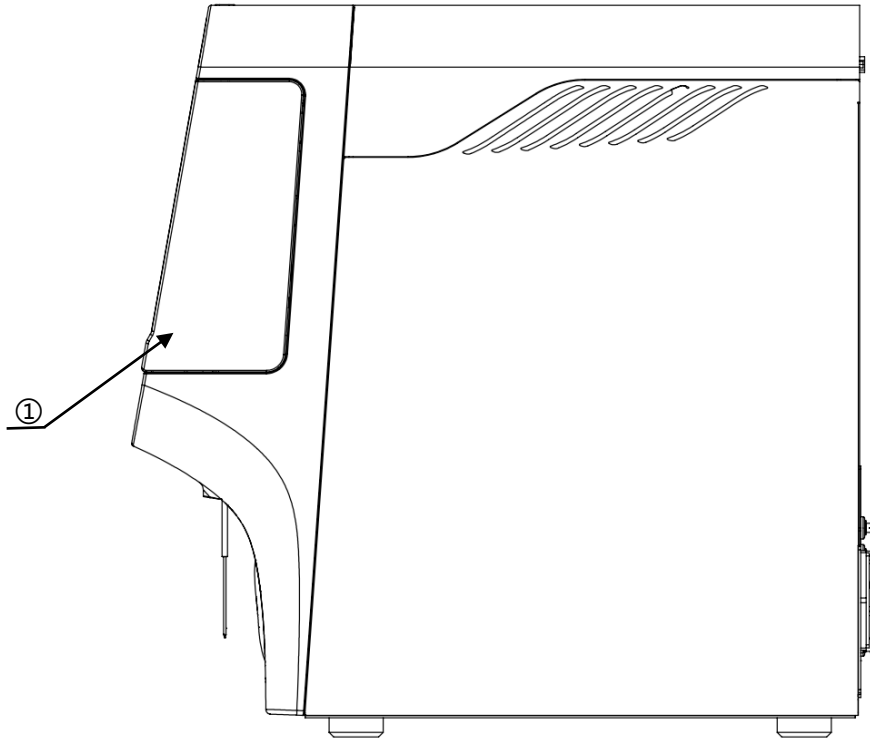


Figure 3 Right view of Analyzer

Table 11 Description of main parts of the Analyzer's right view

No.	Name	Description
①	Fluorescent dye chamber	Connection port for FD and FR fluorescent dyes

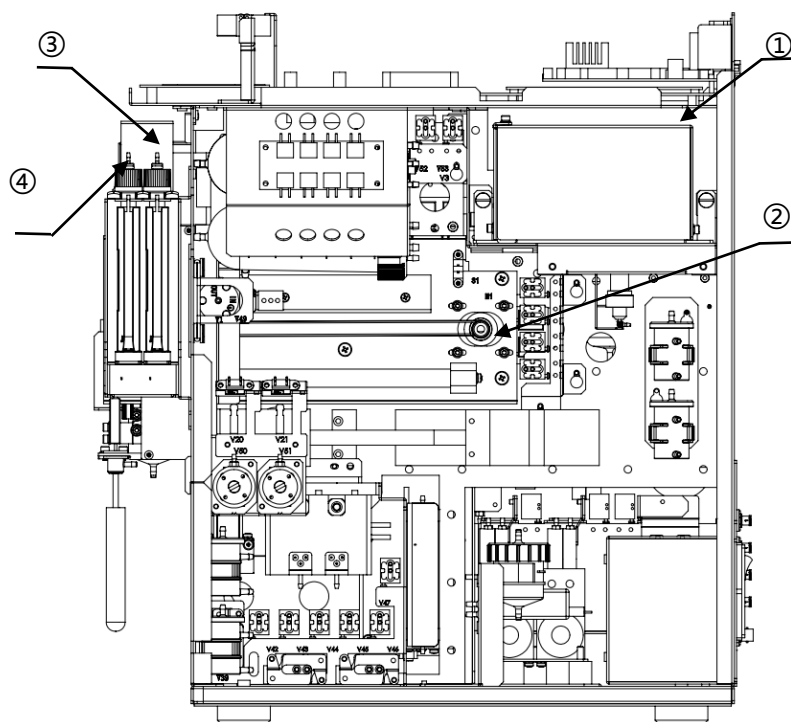


Figure 4 Right view of Analyzer (with the right door removed)

Table 12 Description of the Analyzer's right view(with the right door removed)

Position	Name
①	Optical module
②	Sample Horizontal Movement Mechanism
③	FR fluorescent dye
④	FD fluorescent dye



- The optical module, which uses a semiconductor laser, is located at the top of the Analyzer. For safety reasons, do not open the top cover. Only personnel authorized by BIONOTE are permitted to access this area.

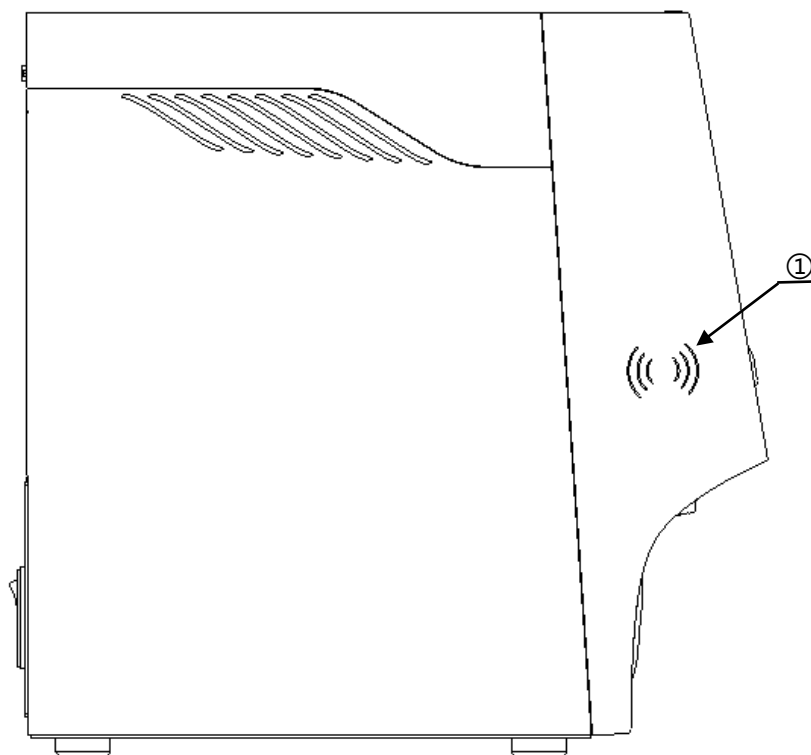


Figure 5 Left view of Analyzer

Table 13 Description of left view of Analyzer

No.	Name	Description
①	Reagent card reader	Performs and manages reagent priming

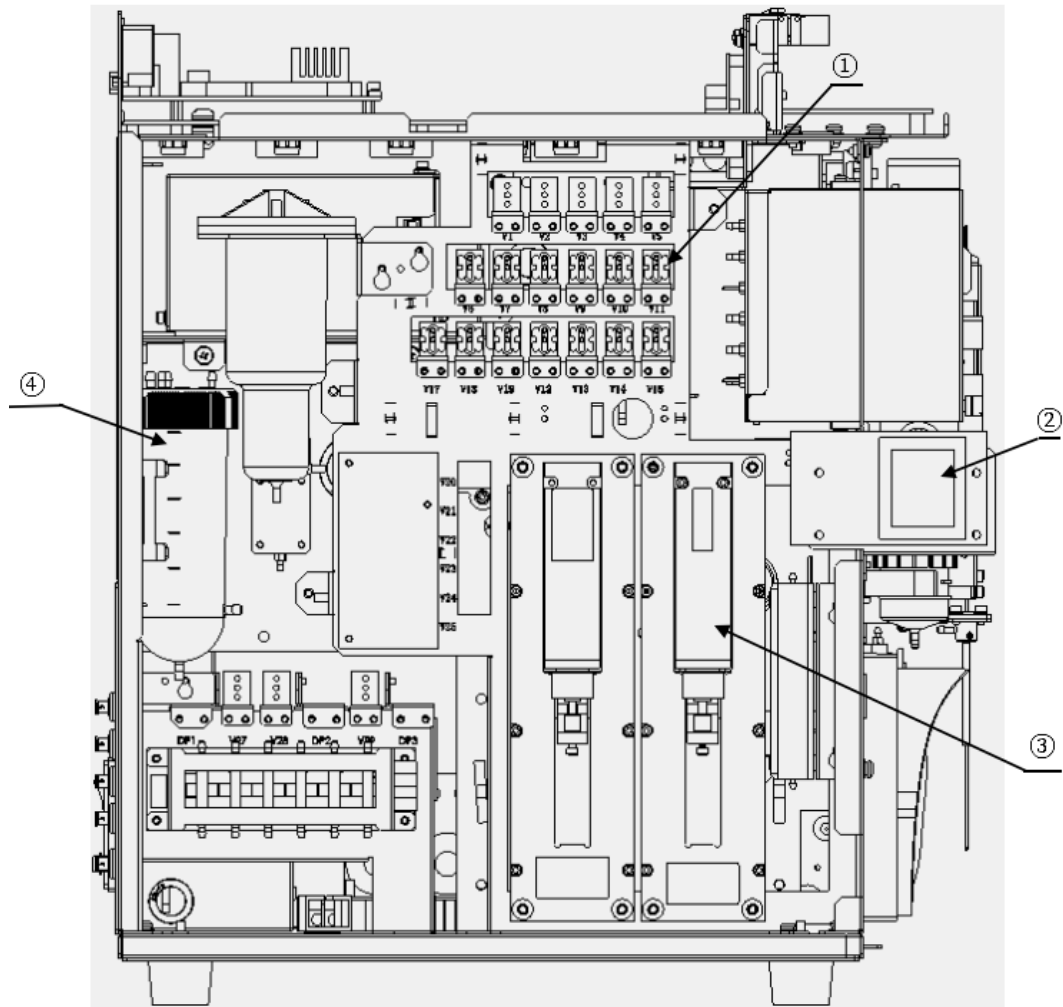


Figure 6 Left view of Analyzer (with the housing removed)

Table 14 Description of the Analyzer's left View (with the housing removed)

Position	Name
①	Solenoid valve group
②	Card reading area
③	Syringe group
④	Fluid reservoir

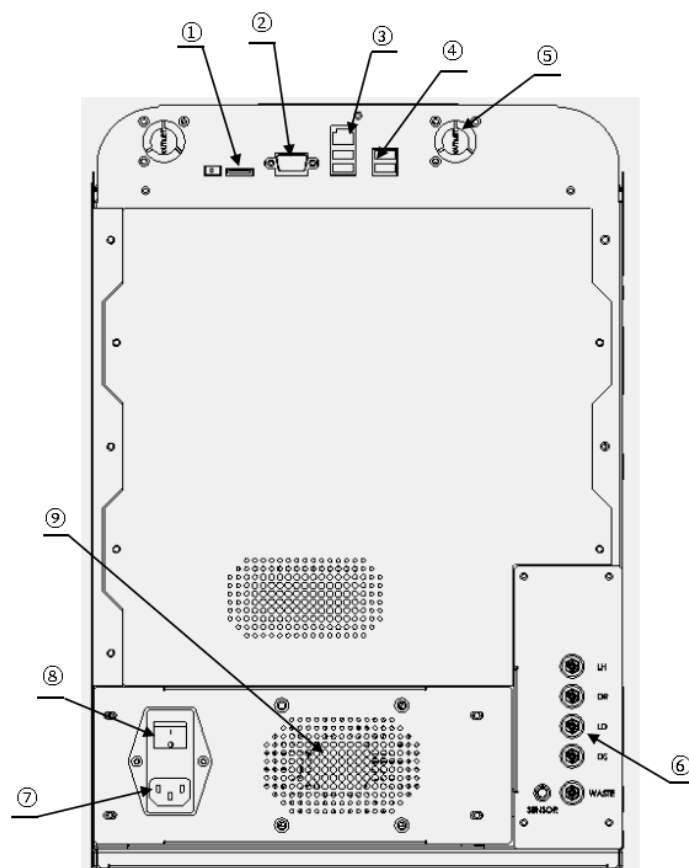


Figure 7 Rear view of Analyzer

Table 15 Description of the Analyzer's rear view

No.	Name	Description
①	SD card slot	SD card insertion port
②	Serial port	Disabled (present but not in use)
③	Network port	Connects to a printer, scanner, or other output devices as needed.
④	USB interfaces	Four USB 2.0 ports are available for connecting output devices such as printers and scanners
⑤	Mainboard cooling fan	Prevents mainboard overheating
⑥	External reagent and waste liquid ports, waste liquid full sensor connector	Connects reagent and waste liquid tubes
⑦	Power supply interface	Power input and connection

⑧	Rocker switch	Power control switch
⑨	Power supply cooling fan	Prevents power supply board overheating

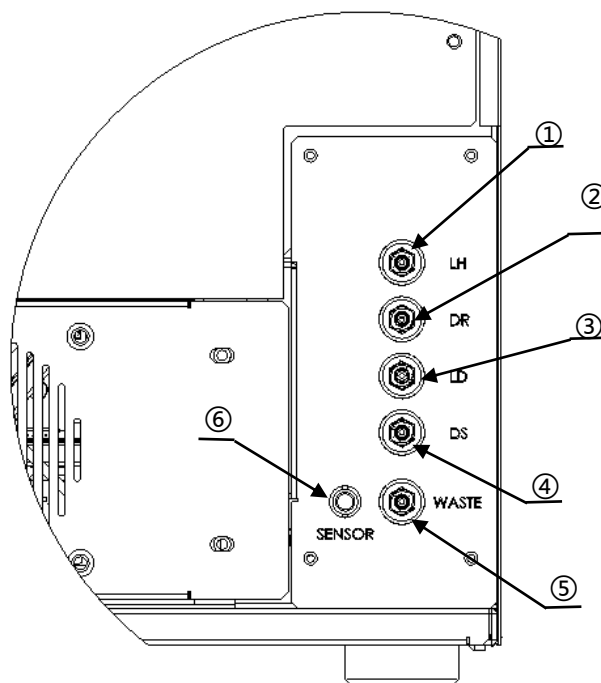


Figure 8 Reagent connectors on the back of Analyzer

Table 16 Description of reagent connectors

No.	Name	Description
①	LH lyse connector	Connects LH lyse supply tube
②	DR diluent connector	Connects DR diluent supply tube
③	LD lyse connector	Connects LD lyse supply tube
④	DS diluent connector	Connects DS diluent supply tube
⑤	Waste connector	Connects waste fluids drainage tube
⑥	Waste sensor connector (SENSOR)	Connects waste sensor

3.4 Analyzer startup interface

After switching on the power switch on the back side of the Analyzer, the status indicator will turn blue as the system starts and enters the self-test interface, followed by the initialization process.

The Analyzer will automatically initialize, and once complete, the status indicator will turn green and the login interface will appear.

Click the blank space in the input box to display the on-screen keyboard, as shown in Figure 9.

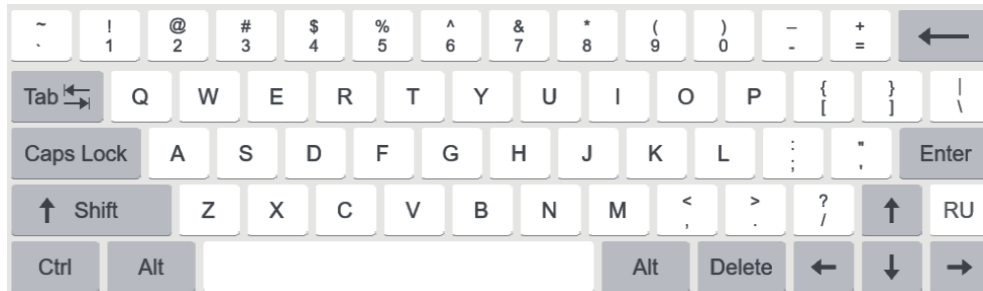


Figure 9 Soft keyboard

Enter the registered name and password.

The default administrator name and password are both “Admin”, and the default operator name and password are both “User”.

Click “Sign In” to access the test interface.

User login

Vcheck H6

Figure 10 Login interface

3.5 Introduction of Menu

Click “Menu” in the upper left corner to open the system menu.

The menu level is classified as Table 17:

Table 17 Menu content

NO.	Level I	Level II	Level III
1	Reagent	/	/
2	Cal	Manual	/
		Standard	/
		Blood	/
		History	/
3	QC	L-J	Setup
			Test
		X-B	Setup
			Test
		X-R	Setup
			Test
		X	Setup
			Test
4	Setup	User	
		General	
		Parameter	Unit
			Display
			Limit
			Warning
		Optional	/
		Print setup	
		Lis Transmission	
		Laboratory	/
		Version	/
5	Performance	Blank test	/
		Precision test	/
6	Logout	/	/
7	Shut down	/	/

3.6 Test interface

After startup and successful login, the Analyzer enters the test interface, as shown in Figure 11.

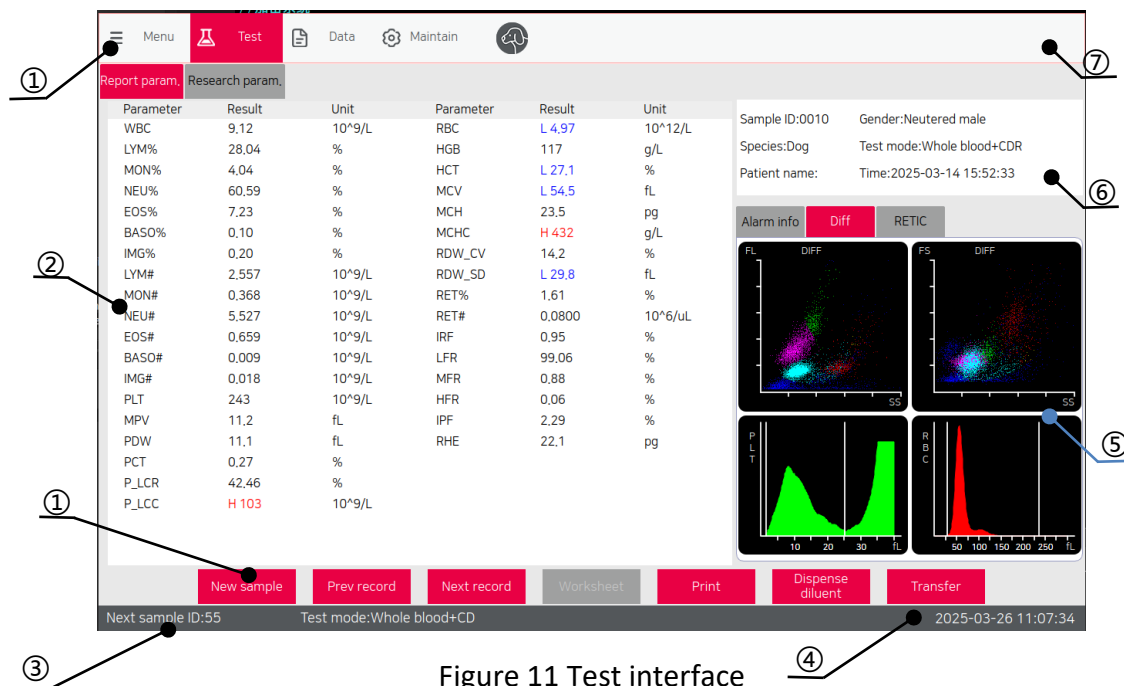


Figure 11 Test interface

The interface is divided into the following functional areas:

- ① Function button area
- ② Parameter information display area
- ③ System status area
- ④ Date display area
- ⑤ Information and graphic display area
- ⑥ Sample information area
- ⑦ Working status indication area

① Function button area

Displays various function buttons that the operator can select and use. The display screen is divided into upper and lower groups of function buttons.

1. Function button 1 (Upper group): As shown in Figure 12.

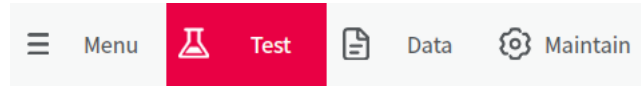


Figure 12 Function button 1

Table 18 Description of function button 1

Name	Icon	Function
Menu	 Menu	Opens the main menu interface.
Test	 Test	Displays the test interface. Allows viewing data results, creating new samples, switching between data entries, and changing modes.
Data	 Data	Opens the data storage interface. Enables querying detailed information, transferring data, calculating CV values, deleting entries, and performing audits.
Maintain	 Maintain	Opens the maintenance interface. Used for full system maintenance, reagent priming, soaking, and flushing.

2. Function button 2 (Lower group): As shown in Figure 13.

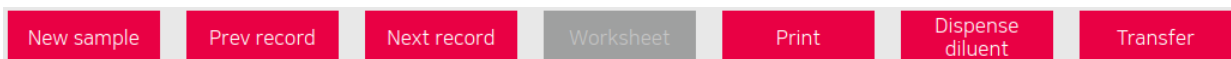
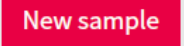


Figure 13 Function button 2

Table 19 Description of function button 2

Icon	Function
	Opens the new sample interface, where you can select the animal category and enter relevant information such as sample ID, patient name, age, etc.
	Navigates to the previous test sample results interface.
	Navigates to the next test sample results interface.

Worksheet	Used to view sample information transmitted by LIS.
Print	Print data results after connecting an external printer.
Dispense diluent	For pre-diluent mode, dispense the diluent into a plastic tube and mix it with the blood sample.
Transfer	Used to transfer sample information to LIS.

- ② Parameter information display area: Displays the result information for each parameter
 - ③ System status area: Displays the next sample ID and current test mode.
 - ④ Date display area: Display the current date and time.
 - ⑤ Information and graphic display area: Displays prompt information, scatter diagrams, and histograms of parameters.
- a. Click 'Alarm info' to view WBC, RBC, and PLT parameter information, as shown in Figure 14.

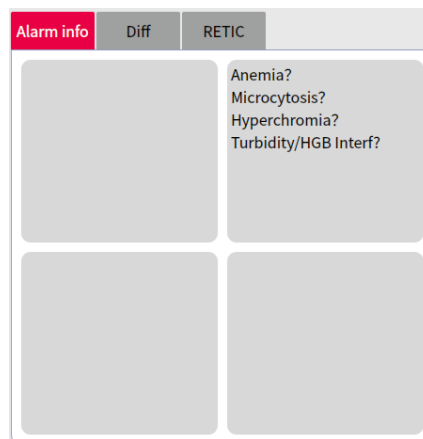


Figure 14 Parameter information

- b. Click 'Diff' to display the differential scatter diagrams and histograms for blood routine, as shown in Figure 15.

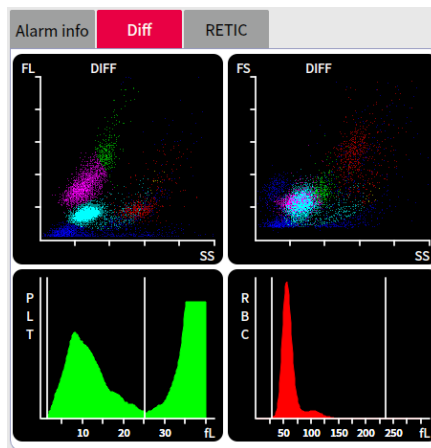


Figure 15 Scatter diagrams

- c. Click 'RETIC' to display the RET scatter diagram, as shown in Figure 16.

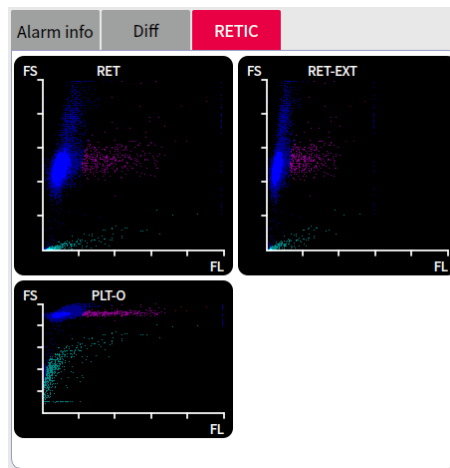


Figure 16 RET scatter diagram

- ⑥ Sample information area: Displays the sample ID, species, patient name, gender, test mode, and test time.
- ⑦ Working status indication area: Different colors indicate different analyzer statuses. No indicator means the Analyzer is functioning normally.

NOTE

- When the Analyzer indicator turns red, it indicates a fault. Testing must resume only after the issue is resolved.

3.7 Reagents, control materials and calibrators

BIONOTE provides specialized reagents for the Analyzer to ensure optimal test performance. These reagents undergo delivery inspection and are accepted based on product standards. The Analyzer's nominal measurement indicators are obtained using these specified reagents. The use of non-specified reagents may compromise Analyzer performance, lead to significant

measurement errors, or even cause Analyzer malfunctions. In this User Manual, 'reagents' refer to the specific reagents intended for use with the Analyzer.

NOTE

- All reagents must be stored at room temperature to maintain their optimal chemical properties and must be protected from excessive cooling, heating, or direct sunlight exposure.
- The operator must perform a blank test after replacing the diluent and lyse to ensure that the blank value is within the normal range.
- To minimize reagent evaporation and prevent contamination from external conditions, reagent containers must be sealed with their covers, and the pipes should be inserted through the container cover.
- Ensure that all reagents are used within their shelf life.
- Before use, reagents should be left undisturbed for a period to stabilize.

3.7.1 DS diluent

DS diluent is an odorless, clear isotonic fluid used for counting and classifying hemocytes. It serves the following purposes:

- (1) Dilutes collected blood samples.
- (2) Maintains cell morphology to ensure accurate counts and sizes.
- (3) Provides a conductive environment for cell counting.
- (4) Flushes test micropores and fluid circuits.

Storage and use after opening:

- (1) Before opening: Store DS diluent at 2–40 °C (protect from direct sunlight). It can be stored for up to 24 months.
- (2) After opening (when connected to the Analyzer): Store DS diluent at 15–30 °C (protect from direct sunlight). It remains usable for up to 60 days.

3.7.2 DR diluent

DR diluent is used to dilute samples before testing. During the testing process, it sphericizes RBCs to facilitate the rapid staining of RET with the staining components of FR fluorescent dye. It then enables RET testing using a combination of the laser scattering method and fluorescent staining cytometry.

Storage and use after opening:

- (1) Before opening: Store DR diluent at 2–40 °C (protect from direct sunlight). It can be stored for up to 24 months.
- (2) After opening (when connected to the Analyzer): Store DR diluent at 15–30 °C (protect from direct sunlight). It remains usable for up to 90 days.

3.7.3 LH lyse

LH lyse is a new-generation reagent free of azide and cyanide, designed to meet the following testing requirements:

- (1) Rapidly lyses RBCs with minimal matrix synthesis.
- (2) Modifies the WBC membrane, allowing the cytoplasm to diffuse gradually while the membrane shrinks around the nucleus, making WBCs appear granular.
- (3) Converts HGB into an HGB complex suitable for testing under 540 nm wavelength light.
- (4) It is cyanide-free, eliminating the serious health and environmental hazards associated with cyanide.

Storage and use after opening:

- (1) Before opening: Store LH lyse at 2–40 °C (protect from direct sunlight). It can be stored for up to 24 months.
- (2) After opening (when connected to the Analyzer): Store LH lyse at 15–30 °C (protect from direct sunlight). It remains usable for up to 60 days.

3.7.4 LD lyse

LD lyse is used before cell testing to destroy RBCs, maintain cell morphology for analysis, and enable differential cell counting and testing.

During blood cell testing, it:

- (1) Dissolves hemocytes for further WBC processing
- (2) Enhances the distinction between different WBC groups
- (3) Facilitates WBC staining using the staining components of FD fluorescent dye.
- (4) Enables DIFF channel WBC testing through a combination of the laser scattering method and fluorescent staining flow cytometry.

Storage and use after opening:

- (1) Before opening: Store LD lyse at 2–40 °C (protect from direct sunlight). It can be stored for up to 24 months.
- (2) After opening (when connected to the Analyzer): Store LD lyse at 15–30 °C (protect from direct sunlight). It remains usable for up to 60 days.

3.7.5 FR fluorescent dye

FR fluorescent dye is used to stain hemocytes, allowing for the observation of cell morphology and structure for differential hemocyte counting.

During testing, it:

- (1) Rapidly stains RET under the action of DR diluent.
- (2) Enables RET testing through a combination of the laser scattering method and fluorescent staining flow cytometry.

Storage and use after opening:

- (1) Before opening: Store FR fluorescent dye at 2–30 °C (store in dark place). It can be stored for up to 12 months.
- (2) After opening (when connected to the Analyzer): Store FR fluorescent dye at 15–30 °C (store in dark place). It remains usable for up to 90 days.

3.7.6 FD fluorescent dye

FD fluorescent dye is used to stain hemocytes, allowing for the observation of cell morphology and structure for differential hemocyte counting.

During testing, it:

- (1) Stains WBCs under the action of LD lyse.
- (2) Enables DIFF channel WBC testing through a combination of the laser scattering method and fluorescent staining flow cytometry

Storage and use after opening:

- (1) Before opening: Store FD fluorescent dye at 2–30 °C (store in dark place). It can be stored for up to 12 months.
- (2) After opening (when connected to the Analyzer): Store FD fluorescent dye at 15–30 °C (store in dark place). It remains usable for up to 90 days.

3.7.7 Probe cleaner

The probe cleaner contains high-efficiency oxides designed to clean the Analyzer's probe by removing protein stains. It effectively prevents data instability caused by repeated hole blockages and sample cup contamination.

WARNING

- The probe cleaner is a strong alkaline cleaning agent. Follow these safety guidelines:
 1. Avoid contact with skin or eyes.

2. If it comes into contact with skin, rinse immediately with water.
3. If it enters the eyes, rinse immediately with water and seek medical attention.
4. If swallowed, induce vomiting and seek medical attention immediately.

➤ Waste container replacement

1. The Analyzer must be in standby mode before replacing the waste container.
2. Dispose of waste liquid properly to prevent environmental contamination. Do not spill or discharge it outside the container.

⚠ CAUTION

- After replacing reagent drums or bags, ensure that the connected pipes are not bent or obstructed.
- When replacing the fluorescent reagent, do not squeeze the bottle, as this may cause the reagent to spill.
- To ensure accurate measurement results, do not mix fresh reagents with remaining reagents.

3.7.8 Control materials and calibrators

Control materials and calibrators are used for quality testing and calibration of the Analyzer. Control materials are industrially produced whole blood products used to verify whether the Analyzer's test results are within the normal range. The Analyzer typically uses three types of control materials: high, medium, and low. To ensure reliable analysis of blood samples, all three control materials must be tested daily to monitor the Analyzer's operating status. Calibrators are also industrially produced whole blood products, specifically used for analyzer calibration. For detailed use and storage instructions, please refer to the control material and calibrator guidelines.

In this User Manual, the terms "control materials" and "calibrators" refer to BIONOTE-designated products, which can be purchased from BIONOTE or its authorized agents.

Chapter4 Installation

4.1 Overview

This Analyzer undergoes strict testing and inspection before leaving the factory. To prevent damage during shipping, it is carefully packaged before delivery. Upon arrival, carefully inspect the packaging for any physical damage. If damage is found, immediately notify BIONOTE or your local agent.

CAUTION

- Operating environmental requirements: Temperature: 15–35 °C, relative humidity: 30–85 %, atmospheric pressure: 60 kPa–106 kPa
- Installation guidelines: Place the Analyzer on a stable platform to ensure easy operation. Do not place the Analyzer in direct sunlight.
- Use a dedicated AC socket and install a manostat or UPS. Do not share the AC socket with devices that may cause interference, such as: centrifuges, thermostats, refrigerators, air conditioners, and ultrasonic cleaners.

WARNING

- Unpacking and installation warning: Only BIONOTE-authorized and trained personnel may unpack or install the Analyzer. Unpacking or installation by unauthorized individuals may result in personal injury or Analyzer damage.

4.2 Training instructions

Only personnel trained by BIONOTE are authorized to use the Analyzer. BIONOTE-authorized personnel will conduct on-site training for those who need to operate the Analyzer.

4.3 Unpacking and inspection

Carefully remove the Analyzer and accessories from the packaging and properly keep the packing materials for future shipping or storage.

- (1) Verify all accessories against the packing list.
- (2) Check for any signs of water exposure.
- (3) Inspect for mechanical damage.
- (4) Examine all exposed wires, connectors, and accessories.

If any issues are found, contact BIONOTE or your local agent immediately.

4.4 Installation space requirements

The dimensions and weight of the Analyzer can be referenced in Section A.5.7: Analyzer Dimensions and Weight.

To ensure adequate space for operation, maintenance, reagent replacement, and heat dissipation, the Analyzer's installation location must meet the following requirements:

- (1) Select a location with a nearby power source.
- (2) Maintain at least 20 cm (8 inches) of space behind the Analyzer to allow for proper ventilation.
- (3) Ensure at least 50 cm (20 inches) of space on both sides of the Analyzer for maintenance and repair. Avoid installing the Analyzer in a location where the power switch is difficult to access.
- (4) Ensure sufficient space on the operating surface and underneath the Analyzer for reagent storage and waste container placement. The diluent must be placed within 1 meter above or below the Analyzer level to maintain proper flow and system stability. The lyse should be placed at the same level as the Analyzer or no more than 500 mm (50 cm) below it.
- (5) The surface where the Analyzer is placed must be sturdy enough to support the weight of both the Analyzer and the reagents.
- (6) Position the waste container at least 50 cm (20 inches) below the Analyzer level.

4.5 Power requirements

Before installing the Analyzer, ensure that the power supply at the installation site meets the Analyzer's requirements.

Refer to Table 20 for specific power requirements.

Table 20 Power requirements

Optimal working voltage	Operating voltage range	Frequency
220V AC	100-240V AC	50/60Hz

UPS power requirement: 3000VA (user-supplied).

When the printer starts, it generates high voltage that may interfere with the Analyzer's operation. Therefore, do not connect the printer to the UPS (Uninterruptible Power Supply). Keep the printer away from equipment that may cause interference, such as: centrifuges, thermostats, refrigerators, air conditioners, and ultrasonic cleaners. Keep the printer away from devices that emit electromagnetic waves, such as mobile phones and radio transceivers.

Avoid sources of loud noise and power supply interference.

⚠ WARNING

- The Analyzer must be operated with proper grounding to ensure both measurement accuracy and operator safety.
- Frequent voltage fluctuations can affect the performance and reliability of the Analyzer. This issue should be resolved before use, such as by installing an AC manostat (user-supplied).
- In the event of a sudden power outage during use, immediately turn off the Analyzer's power.
- Frequent power outages can degrade the Analyzer's performance and reliability. To prevent this, the operator should install a UPS (user-supplied).

4.6 Environment requirements

- (1) Operating ambient temperature range: 15–35 °C (optimum operating temperature: 25 °C).
- (2) Operating relative humidity range: 30–85%.
- (3) Atmospheric pressure: 60 kPa–106 kPa.
- (4) Installation of a heating/cooling air conditioner is recommended.
- (5) Do not operate the Analyzer at extremely high or low temperatures.
- (6) Avoid direct sunlight exposure.
- (7) Select a well-ventilated location.
- (8) Keep the Analyzer away from wireless communication devices, high-frequency equipment, and areas with potential radio wave interference.
- (9) Do not place the Analyzer on an inclined surface.
- (10) The Analyzer's electromagnetic compatibility is designed as per Group 1 Class A equipment. An electromagnetic environment assessment must be conducted before use.
- (11) The operating altitude must not exceed 4,000 m.

⚠ WARNING

- The Analyzer's design fully considers electromagnetic compatibility, ensuring that any electromagnetic interference generated will not affect the Analyzer itself or nearby equipment.
- If there is a significant deviation in test results, check whether the Analyzer is placed near electromagnetic fields or short-wave radiation sources such as: radar, X-ray machines,

centrifuges, scanners, and cellular phones.

- To ensure normal operation, the electromagnetic compatibility environment must be properly maintained.

4.7 Disposal of waste liquid

For 20L of waste liquid, it is recommended to add the following substances to the waste container:

- (1) 50 mL of sodium hydroxide solution (200 g/L) to prevent gas formation.
- (2) 250 mL of sodium hypochlorite solution (12 % chlorine) to neutralize biological hazards before disposal.



- To prevent environmental pollution, waste liquid must not be poured directly into the sewer. Waste liquid must undergo biological or chemical treatment before being discharged into the sewer. Hospitals and laboratories are required to comply with local environmental protection regulations.

4.8 Connection of Analyzer system

4.8.1 Connection of reagent pipes of Analyzer

The rear panel of the Analyzer is equipped with five fluid circuit interfaces: DS diluent, DR diluent, LH lyse, LD lyse, and waste liquid. Before factory delivery, the manufacturer installs protective caps on the pipe interfaces to prevent contamination. During initial installation, these caps must be removed and stored properly.

NOTE

- After installing all pipes, ensure they remain naturally positioned and are not twisted, folded, or bent.
- Do not use tools to install pipe connectors; install by hand only.
- If a reagent bottle is damaged, leaking, expired, or shows any other abnormality during installation, do not connect it to the Analyzer. Contact your local supplier or BIONOTE directly for a replacement.
- When connecting reagents, ensure that the reagent connector matches the color and label of the reagent bottle cap to prevent misconnection.

(1) LH Lyse pipe connection

Remove the LH lyse pipe with the red-labeled connector from the accessory packing box. Connect the red-labeled connector to the “LH lyse” fluid interface on the rear panel of the Analyzer. Insert the other end of the pipe into the LH lyse bottle. Tighten the cap of the LH lyse bottle securely.

(2) LD lyse pipe connection

Remove the LD lyse pipe with the yellow-labeled connector from the accessory packing box. Connect the yellow-labeled connector to the “LD lyse” fluid interface on the rear panel of the Analyzer. Insert the other end of the pipe into the LD lyse bottle. Tighten the cap of the LD lyse bottle securely.

(3) DS diluent pipe connection

Remove the DS diluent pipe with the blue-labeled connector from the accessory packing box. Connect the blue-labeled connector to the “DS diluent” fluid interface on the rear panel of the Analyzer. Insert the other end of the pipe into the DS diluent container. Tighten the cap of the DS diluent container securely. Install the reagent container cover bracket onto the container cover.

(4) DR diluent pipe connection

Remove the DR diluent pipe with the black-labeled connector from the accessory packing box. Connect the black-labeled connector to the “DR diluent” fluid interface on the rear panel of the Analyzer. Insert the other end of the pipe into the DR diluent container. Tighten the cap of the DR diluent container securely.

(5) Waste (WASTE) outlet pipe connection

Remove the waste outlet pipe from the accessory packing box. Connect the pipe’s connector to the “WASTE” fluid interface on the rear panel of the Analyzer. Insert the BNC plug into the “SENSOR” socket. Securely tighten the waste outlet pipe cap clockwise onto the waste container mouth. Ensure that the waste container is placed at least 50 cm below the Analyzer’s level.

(6) FR fluorescent dye pipe connection

Open the front cover of the Fluorescent dye chamber on the right side of the Analyzer. Remove the empty reagent bottle from the rack. Unscrew the cap of the empty bottle. Insert the pipe needle into the newly opened FR fluorescent dye bottle (black). Screw the cap on tightly. Place the reagent bottle back into the rack.

(7) FD fluorescent dye pipe connection

Open the front cover of the fluorescent dye chamber on the right side of the Analyzer. Remove the empty reagent bottle from the reagent bottle rack. Unscrew the cap of the empty bottle. Insert the pipe needle into the opened FD fluorescent dye bottle (yellow). Tighten the cap securely. Place the reagent bottle back into the rack.

⚠ CAUTION

- After connecting the reagent pipes, ensure they are not bent or obstructed.
- When connecting the fluorescent dye, do not squeeze the reagent bottle, as this may cause the reagent to spill.
- Ensure the fluorescent dye bottle is properly fixed to the metal support plate to prevent it from falling.

The connection diagram of the reagent pipes is shown below:

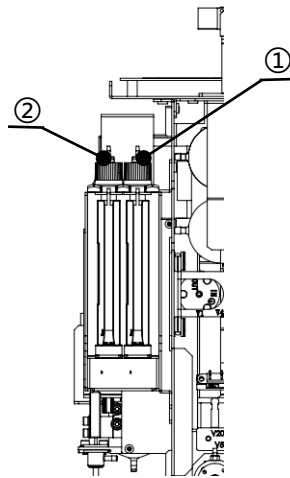


Figure 17 Location of the dye in the right view of the Analyzer

Table 21 Description of dye

Position	Name
①	FR fluorescent dye
②	FD fluorescent dye

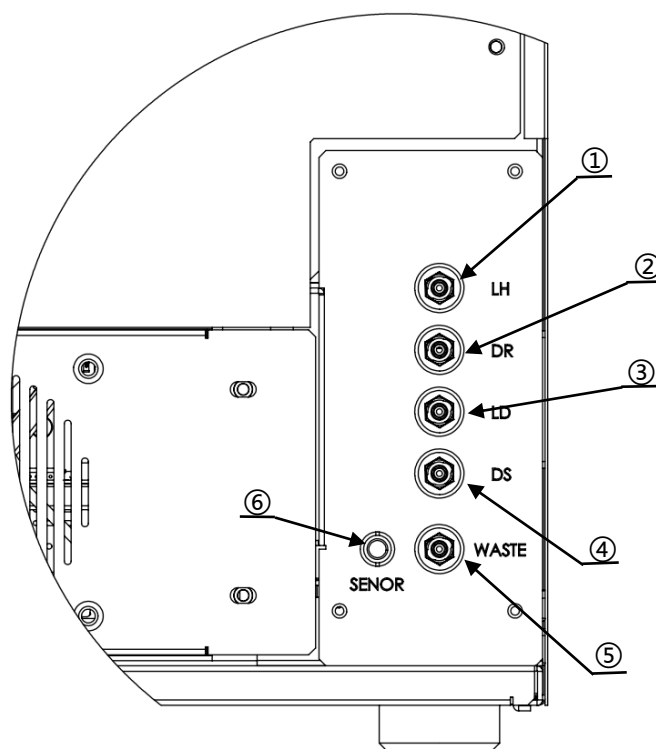


Figure 18 Reagent connection

Table 22 Description of reagents

Position	Name
①	LH lyse connector
②	DR diluent connector
③	LD lyse connector
④	DS diluent connector
⑤	Waste liquid connector
⑥	Waste liquid sensor connector (SENSOR)

NOTE

- The waste container must not be placed at the same level as the Analyzer.
- When connecting the Analyzer to the waste pipe, ensure the pipe is not compressed or bent. This helps maintain smooth waste discharge and prevents the pipe from collapsing or becoming detached.

4.9 Transport and storage conditions

If the Analyzer is not used for an extended period, the “Empty package” procedure must be performed either during storage or before transport. For details, please refer to Chapter 10: Maintenance.

The operation steps are as follows:

- (1) Click “Maintain” → “Whole machine”, and select “Empty package” program;
- (2) Follow the on-screen prompts of the Analyzer.
- (3) The Analyzer will begin the emptying process.
- (4) After emptying, turn off the Analyzer’s power.
- (5) Properly store all reagent pipes.

NOTE

- Storage temperature: -10–55 °C; relative humidity: 10–93 %; atmospheric pressure: 50kPa–106kPa.
- The Analyzer must be externally sterilized before transport, regardless of the destination.