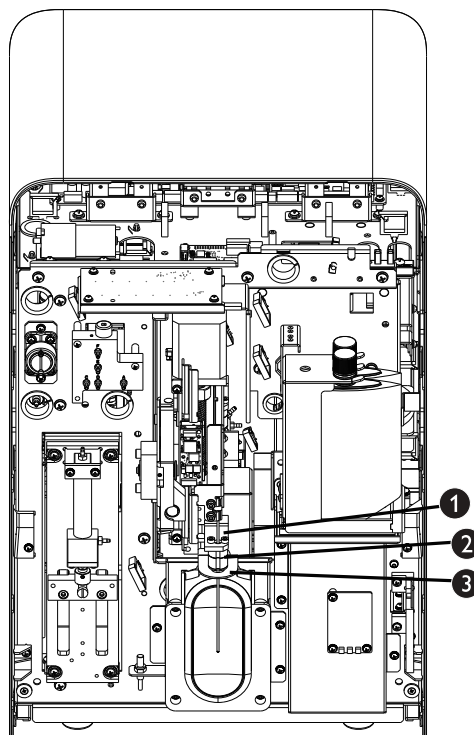




Item	Name
1.	sample probe assembly
2.	Probe wipe
3.	Blood barrier bracket

- b. Use a sterilized cotton swab dipped with probe cleanser to wipe the surface of the probe wipe. Then, use a sterilized cotton swab dipped with clean water to wipe the surface until no blood residue or other residues are visible.
 - c. Use a sterilized cotton swab dipped with alcohol to wipe the surface of the blood barrier bracket until no blood residue or other residues are visible.
3. Close the front cover of the analyzer
Gently lower the cover and close it.

CAUTION

Closing the front cover gently to prevent the vibration from damaging internal parts of the analyzer.

12.6.2 Cleaning the Analyzer Front Cover

BIOLOGICAL RISK

Mindray Animal Medical does not claim the validity of the listed chemicals in infection control. For effective control of infection, please consult the Infection Prevention Department of the hospital or the epidemic professionals.

⚠ CAUTION

- The user shall perform regular cleaning and sterilization to the cover of the instrument. Use the specified materials to sterilize the instrument only. For any damage to the instrument or other accidents caused by using materials other than specified, Mindray Animal Medical will not provide any warranty.
 - The cleaning and sterilization may damage the instrument to some extent. It is recommended to perform sterilization only when necessary according to your laboratory protocol. Remember to clean the instrument before sterilizing.
 - Do not use any decontamination or cleaning agents which could cause a HAZARD as a result of a reaction with parts of the instrument or with material contained in it.
 - If you accidentally spill hazardous material (for example, reagents or samples) on the instrument, clean the instrument with specified disinfectant. Wear proper personal protective equipment (e.g. gloves, lab coat, etc.) and follow safe laboratory procedures when handling them and the contacted areas in the laboratory.
-

Perform regular cleaning on the covers of the analyzer.

- Recommended disinfectant: water, 75% ethanol.
- Prohibited disinfectant: 3% hydrogen peroxide.

12.7 Preparing to Pack-up

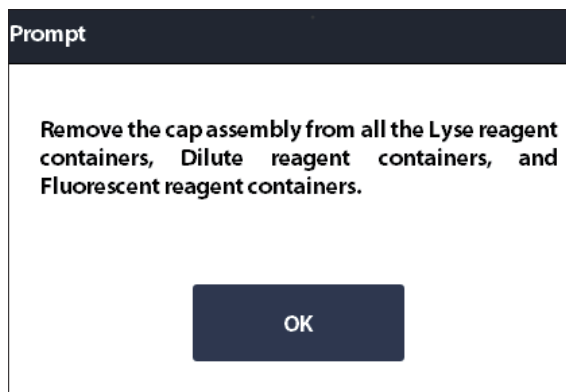
If the analyzer is not to be used for a long time (over 10 days), you should perform this procedure.

Perform the following procedure:

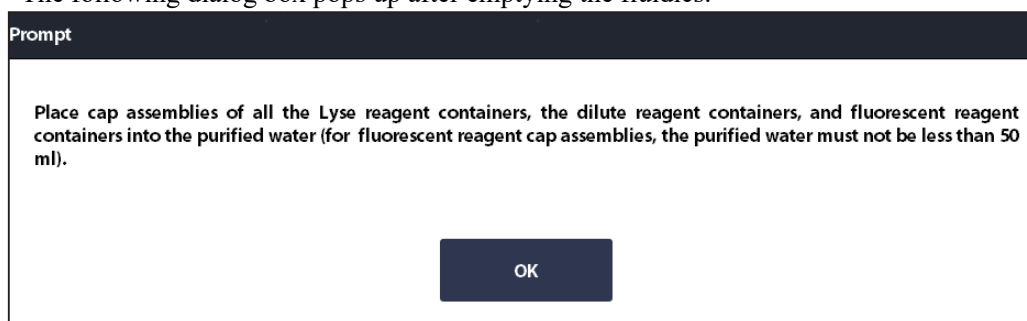
1. Tap “Menu > Service > Maintenance > Fluidics” to enter the “Fluidics” screen.
2. Tap “Pack-up”, a dialog box pops up.



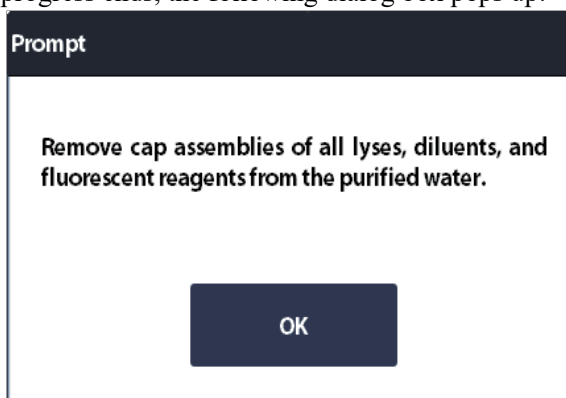
3. Tap “Yes” to perform the pack-up procedure. The following dialog box pops up.



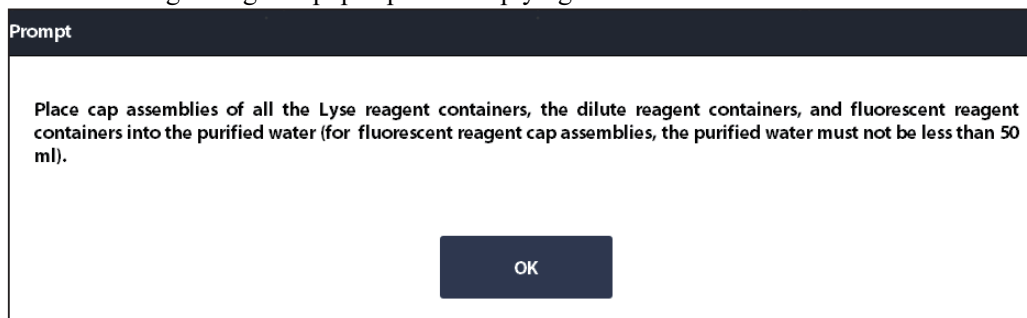
4. Follow instructions in the dialog box and then tap “**OK**” to empty the fluidics.
5. The following dialog box pops up after emptying the fluidics.



6. Follow instructions in the dialog box and then tap “**OK**” to start priming.
7. When the priming progress ends, the following dialog box pops up.

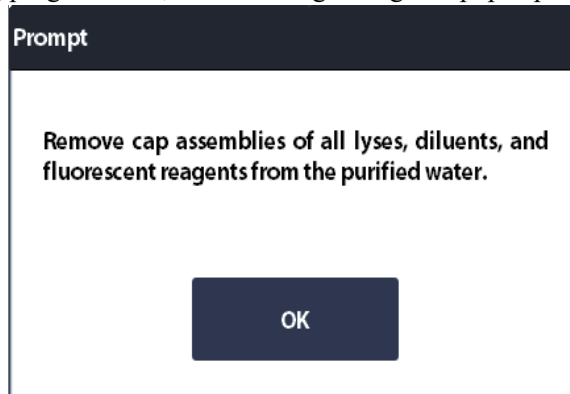


8. Follow instructions in the dialog box and then tap “**OK**” to empty the fluidics.
9. The following dialog box pops up after emptying the fluidics.



10. Follow instructions in the dialog box and then tap “**OK**” to start priming.

11. When the priming progress ends, the following dialog box pops up.



12. Follow instructions in the dialog box and then tap “OK” to empty the fluidics.
13. When the pack-up is finished, shut down the analyzer as prompted.

12.8 Screen Calibration

If the touch screen does not correctly respond to the positions you touched, perform the procedure to calibrate the touch screen.

NOTE:

Do not click with the mouse to calibrate the touch screen.

Perform the following procedure:

1. Tap “**Menu > Service > Screen Cal.**” to enter the touch screen calibration screen.
2. Tap “**Screen Cal.**” in the middle of the screen.
3. Tap the black plus sign at the upper left corner of the screen as instructed by the screen display to start the calibration.

After the calibration is completed, the software displays “**Calibration succeeded.**” on the screen.

12.9 Viewing and Exporting Logs

The “Log” screen records all activities of the analyzer. It contributes significantly to searching for operation history and troubleshooting the analyzer.

The analyzer can save logs of the recent two years. If number of logs exceeds the upper limit, the latest log will overwrite the oldest one. You can browse and print logs, but cannot delete them.

Administrators and common users have different authorities:

Table 12-5 Log Types

Item	Administrator's level	Common user's level
All Logs	View all types of logs	View the logs for analyzer startup and shutdown, user logging in and logging out at the operator's level.

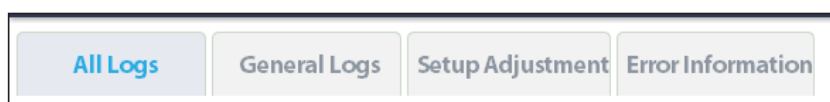
Table 12-5 Log Types

Item	Administrator's level	Common user's level
General Logs	View all operation-related logs at both administrator's and operator's levels.	View the logs for analyzer startup and shutdown, user logging in and logging out at the operator's level.
Setup Adjustment	View all setting adjustment logs at both administrator's and operator's levels.	Cannot review
Error Information	View error information and troubleshooting information of the analyzer.	Cannot review

12.9.1 Viewing Logs

Perform the following procedure:

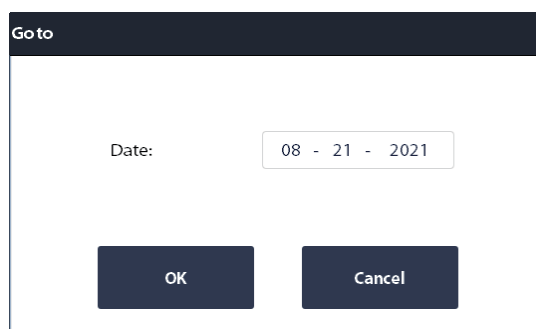
1. Tap “**Menu > Service > Log**” in turn to enter the “**Log**” screen.
2. Tap a type of logs to be viewed.



3. (Optional) Review the logs at specified date range.

- a. Tap “**Go to**”.

A confirm dialog box displays.



- b. In the “**Date**” edit box, specify the date on which the logs need to be viewed.
- c. Tap “**OK**”.

The screen displays the logs at the specified date.

12.9.2 Exporting Logs

You may export the logs in specified time range to the USB device.

Before exporting sample records, make sure that you have inserted a safe USB flash drive into the USB port on the analyzer.

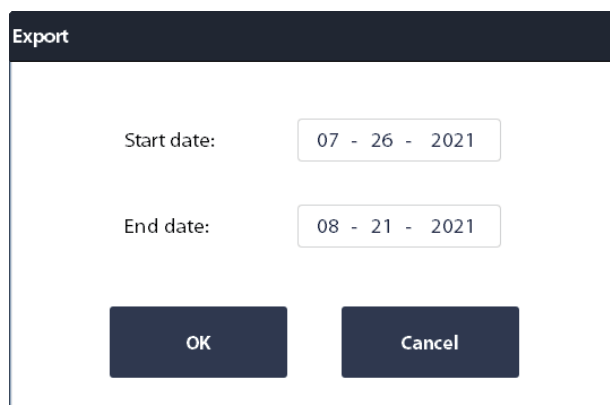
NOTE:

The user should ensure the data safety of the USB devices connecting to the analyzer.

Perform the following procedure:

1. Tap “**Menu > Service > Log**” in turn to enter the “**Log**” screen.
2. Tap “**Export**”.

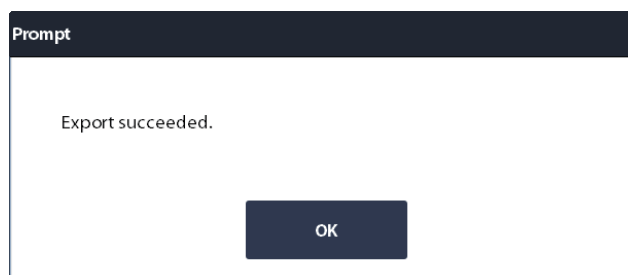
A confirm dialog box displays.

A dialog box titled "Export" with a dark header. It contains two date selection fields: "Start date:" with the value "07 - 26 - 2021" and "End date:" with the value "08 - 21 - 2021". At the bottom, there are two buttons: "OK" and "Cancel".

3. In the “**Start date:**” and “**End date:**” edit boxes, specify the time range in which logs need to be exported.
4. Tap “**OK**”.

The analyzer automatically exports the logs in specified time range to the USB device.

After export ends, the screen displays the “**Export succeeded.**” dialog box.

A dialog box titled "Prompt" with a dark header. It contains the text "Export succeeded." and a single "OK" button at the bottom.**NOTE:**

Analyzer upgrade may only be performed under the instruction from a Mindray Animal Medical-authorized service personnel. Do not perform the procedure by yourself.

13 Troubleshooting

13.1 Overview

This chapter contains information that is helpful in locating and correcting problems that may occur during operation of your analyzer.

NOTE:

This chapter is not a complete service manual and is limited to problems that are readily diagnosed and/or corrected by the user of the analyzer.

13.2 Checking Analyzer Status

You can check analyzer information from the “**Status**” menu, including statistics, temperature and pressure, floater status, sensor status, voltage and current, as well as version information. Checking the status information on the “**Status**” screen is significant for you to locate and remove errors of the analyzer.

Follow the path below to review analyzer status:

Item/Software Access	Status	Path	Access Level Requirement
Statistics	Runs since latest initialization	Menu > Status > Statistics	All
	Sample Runs		
	QC Runs		
	Calibration Runs		
	Valid Sample Runs		
	Valid Runs After Latest Startup		
	Runs after Probe Cleanser Maintain		
	Clogs in Impedance Channel		
	Background Runs		

Temp.&Pressure	- Displays the current temperature and pressure as well as the acceptable range for various items. - Out-of-range values are highlighted in red background.	Menu > Status > Temp.&Pressure	Administrator's level
Floater Status	Displays the full or empty status of the bathes and waste cistern.	Menu > Status > Floater Status	Administrator's level
Sensor	Displays the status of fluorescent reagent detect sensor and motherboard sensor.	Menu > Status > Sensor	Administrator's level
Voltage & Current	- Displays the voltage and current information. - Out-of-range values are highlighted in red background.	Menu > Status > Voltage & Current	Administrator's level
Version Info.	Review the analyzer software version information	Menu > Status > Version Info.	All

13.3 Error Messages and Solutions

During the operation, if error(s) is detected, “**Error Information**” dialog box will pop up and the analyzer will beep.

The background colors of error messages turn red, orange, blue, and green according to error severity.

- Red: fatal error When this kind of error occurs, the analyzer will stop running immediately, and any further operation is prohibited.
- Orange: error that stops operation. When this kind of error occurs, the analyzer will stop running immediately.
- Blue: error that restricts certain operations. When this kind of error occurs, the analyzer can still continue with the current operation, but any other operations related to the error will be restricted.
- Green: prompting error When this kind of error occurs, the analyzer can still continue with the current operation, and other operations are not restricted.

The name and troubleshooting method of the errors are displayed in the “**Error Information**” dialog box. Names of the errors are displayed by the order of their occurrence.

You may tap to select the error, and view its troubleshooting information in the “**Error Description**”. The troubleshooting information of the first error is displayed by default. Follow the instructions in the dialog box to remove error(s).

The following functions are provided:

- Remove error

Tap the “Remove Error” button to clear all the errors that can be removed automatically. For the errors that cannot be removed automatically, follow the troubleshooting method to solve them.

- Mute the alarm sound

Tap the touch screen to eliminate the alarm sound of the main unit.

- Close the “**Error Information**” dialog box

Tap “**Off**” to close the dialog box, but the errors will still be displayed in the error info. area on the screen. Tap the error info. area again, the dialog box will be displayed.

Error ID	Error Message	Description	Solution
0x10103	Waste Container Full	Waste Container Full	Perform the following procedure: 1. Replace the waste container with an empty one; 2. Tap the “Remove Error” button to remove this error; 3. If the error still exists, contact our customer service department.
0x10000	No DS Diluent. Replace the reagent	No DS Diluent. Replace the reagent	Perform the following procedure: 1. Touch “Remove Error” button and register new reagent information into the reagent setup dialog box displayed. 2. Touch “Replace” to prime reagent after replacing the reagent container. 3. If error persists, contact Technical Support Services.
0x10001	No LD Lyse. Replace the reagent	No LD Lyse. Replace the reagent	Perform the following procedure: 1. Touch “Remove Error” button and register new reagent information into the reagent setup dialog box displayed. 2. Touch “Replace” to prime reagent after replacing the reagent container. 3. If error persists, contact Technical Support Services.
0x10003	No LH Lyse. Replace the reagent	No LH Lyse. Replace the reagent	Perform the following procedure: 1. Touch “Remove Error” button and register new reagent information into the reagent setup dialog box displayed. 2. Touch “Replace” to prime reagent after replacing the reagent container. 3. If error persists, contact Technical Support Services.

Error ID	Error Message	Description	Solution
0x10002	No DR Diluent. Replace the reagent	No DR Diluent. Replace the reagent	Perform the following procedure: 1. Touch “Remove Error” button and register new reagent information into the reagent setup dialog box displayed. 2. Touch “Replace” to prime reagent after replacing the reagent container. 3. If error persists, contact Technical Support Services.
0x10005	No FD Dye. Replace the reagent	No FD Dye. Replace the reagent	Perform the following procedure: 1. Touch “Remove Error” button and register new reagent information into the reagent setup dialog box displayed. 2. Touch “Replace” to prime reagent after replacing the reagent container. 3. If error persists, contact Technical Support Services.
0x10006	No FR Dye. Replace the reagent	No FR Dye. Replace the reagent	Perform the following procedure: 1. Touch “Remove Error” button and register new reagent information into the reagent setup dialog box displayed. 2. Touch “Replace” to prime reagent after replacing the reagent container. 3. If error persists, contact Technical Support Services.
0x10200	DS Diluent expires. Replace the reagent	DS Diluent expires. Replace the reagent	Perform the following procedure: 1. Touch “Remove Error” button and register new reagent information into the reagent setup dialog box displayed. 2. Touch “Replace” to prime reagent after replacing the reagent container. 3. If error persists, contact Technical Support Services.

Error ID	Error Message	Description	Solution
0x10201	LD Lyse expires. Replace the reagent	LD Lyse expires. Replace the reagent	Perform the following procedure: 1. Touch “Remove Error” button and register new reagent information into the reagent setup dialog box displayed. 2. Touch “Replace” to prime reagent after replacing the reagent container. 3. If error persists, contact Technical Support Services.
0x10202	LH Lyse expires. Replace the reagent	LH Lyse expires. Replace the reagent	Perform the following procedure: 1. Touch “Remove Error” button and register new reagent information into the reagent setup dialog box displayed. 2. Touch “Replace” to prime reagent after replacing the reagent container. 3. If error persists, contact Technical Support Services.
0x10203	DR Diluent expires. Replace the reagent	DR Diluent expires. Replace the reagent	Perform the following procedure: 1. Touch “Remove Error” button and register new reagent information into the reagent setup dialog box displayed. 2. Touch “Replace” to prime reagent after replacing the reagent container. 3. If error persists, contact Technical Support Services.
0x10204	FD Dye expires. Replace the reagent	FD Dye expires. Replace the reagent	Perform the following procedure: 1. Touch “Remove Error” button and register new reagent information into the reagent setup dialog box displayed. 2. Touch “Replace” to prime reagent after replacing the reagent container. 3. If error persists, contact Technical Support Services.

Error ID	Error Message	Description	Solution
0x10205	FR Dye expires. Replace the reagent	FR Dye expires. Replace the reagent	Perform the following procedure: 1. Touch “Remove Error” button and register new reagent information into the reagent setup dialog box displayed. 2. Touch “Replace” to prime reagent after replacing the reagent container. 3. If error persists, contact Technical Support Services.
0x10400	DS Diluent low volume. Replace the reagent	DS Diluent low volume. Replace the reagent	Perform the following procedure: 1. Touch “Remove Error” button and register new reagent information into the reagent setup dialog box displayed. 2. Touch “Replace” to prime reagent after replacing the reagent container. 3. If error persists, contact Technical Support Services.
0x10401	LD Lyse low volume. Replace the reagent	LD Lyse low volume. Replace the reagent	Perform the following procedure: 1. Touch “Remove Error” button and register new reagent information into the reagent setup dialog box displayed. 2. Touch “Replace” to prime reagent after replacing the reagent container. 3. If error persists, contact Technical Support Services.
0x10402	LH Lyse low volume. Replace the reagent	LH Lyse low volume. Replace the reagent	Perform the following procedure: 1. Touch “Remove Error” button and register new reagent information into the reagent setup dialog box displayed. 2. Touch “Replace” to prime reagent after replacing the reagent container. 3. If error persists, contact Technical Support Services.

Error ID	Error Message	Description	Solution
0x10403	DR Diluent low volume. Replace the reagent	DR Diluent low volume. Replace the reagent	Perform the following procedure: 1. Touch “Remove Error” button and register new reagent information into the reagent setup dialog box displayed. 2. Touch “Replace” to prime reagent after replacing the reagent container. 3. If error persists, contact Technical Support Services.
0x10404	FD Dye low volume. Replace the reagent	FD Dye low volume. Replace the reagent	Perform the following procedure: 1. Touch “Remove Error” button and register new reagent information into the reagent setup dialog box displayed. 2. Touch “Replace” to prime reagent after replacing the reagent container. 3. If error persists, contact Technical Support Services.
0x10405	FR Dye low volume. Replace the reagent	FR Dye low volume. Replace the reagent	Perform the following procedure: 1. Touch “Remove Error” button and register new reagent information into the reagent setup dialog box displayed. 2. Touch “Replace” to prime reagent after replacing the reagent container. 3. If error persists, contact Technical Support Services.
0x40003	Import “Key.” file	Import “Key.” file	Perform the following procedure: 1. Tap Menu - “Service” - “Advanced Toolbox” - “Debug Setup” - “Import Password”, otherwise, reagents cannot be replaced when built-in authorization run out.
0x10100	DIL preheating bath sensor abnormal	DIL preheating bath sensor abnormal	Perform the following procedure: 1. Tap the “Remove Error” button to remove this error; 2. If the error still exists, contact our customer service department.
0x10102	Waste cistern floater status abnormal	WC2 waste cistern floater status abnormal	Perform the following procedure: 1. Tap the “Remove Error” button to remove this error; 2. If the error still exists, contact our customer service department.

Error ID	Error Message	Description	Solution
0x10101	Cistern floater status abnormal	SCI cistern floater status abnormal	Perform the following procedure: 1. Tap the “Remove Error” button to remove this error; 2. If the error still exists, contact our customer service department.
0x30105	FS baseline abnormal	FS baseline abnormal	Perform the following procedure: 1. Tap the “Remove Error” button to remove the error; 2. Switch off and then switch on the instrument power; 3. If the error still exists after the restart, contact our customer service department.
0x30106	FS baseline abnormal	SS baseline abnormal	Perform the following procedure: 1. Tap the “Remove Error” button to remove the error; 2. Switch off and then switch on the instrument power; 3. If the error still exists after the restart, contact our customer service department.
0x30107	FS baseline abnormal	FL baseline abnormal	Perform the following procedure: 1. Tap the “Remove Error” button to remove the error; 2. Switch off and then switch on the instrument power; 3. If the error still exists after the restart, contact our customer service department.
0x30200	HGB baseline abnormal	HGB baseline abnormal	Perform the following procedure: 1. Tap the “Remove Error” button to remove the error; 2. Switch off and then switch on the instrument power; 3. If the error still exists after the restart, contact our customer service department.
0x00300	DIL syringe action abnormal	Invalid command to DIL syringe	Perform the following procedure: 1. Tap the “Remove Error” button to remove this error; 2. If the error still exists, contact our customer service department.

Error ID	Error Message	Description	Solution
0x00301	DIL syringe action abnormal	Conflicting DIL syringe actions	Perform the following procedure: 1. Tap the “Remove Error” button to remove this error; 2. If the error still exists, contact our customer service department.
0x00303	DIL syringe action abnormal	Error occurs when DIL syringe leaves sensor area	Perform the following procedure: 1. Tap the “Remove Error” button to remove this error; 2. If the error still exists, contact our customer service department.
0x00302	DIL syringe action abnormal	Error occurs when DIL syringe returns to home position	Perform the following procedure: 1. Tap the “Remove Error” button to remove this error; 2. If the error still exists, contact our customer service department.
0x00305	DIL syringe action abnormal	DIL syringe aspiration/ dispensation action failure 1	Perform the following procedure: 1. Tap the “Remove Error” button to remove this error; 2. If the error still exists, contact our customer service department.
0x00304	DIL syringe action abnormal	DIL syringe aspiration/ dispensation action failure 2	Perform the following procedure: 1. Tap the “Remove Error” button to remove this error; 2. If the error still exists, contact our customer service department.
0x00307	DIL syringe action abnormal	DIL syringe aspiration/ dispensation action not allowed 1	Perform the following procedure: 1. Tap the “Remove Error” button to remove this error; 2. If the error still exists, contact our customer service department.
0x00306	DIL syringe action abnormal	DIL syringe aspiration/ dispensation action not allowed 2	Perform the following procedure: 1. Tap the “Remove Error” button to remove this error; 2. If the error still exists, contact our customer service department.
0x00308	DIL syringe action abnormal	DIL syringe aspirated volume too high	Perform the following procedure: 1. Tap the “Remove Error” button to remove this error; 2. If the error still exists, contact our customer service department.

Error ID	Error Message	Description	Solution
0x00310	DIL syringe action abnormal	DIL syringe action time out	Perform the following procedure: 1. Tap the “Remove Error” button to remove this error; 2. If the error still exists, contact our customer service department.
0x00309	DIL syringe action abnormal	DIL syringe dispensed volume too high	Perform the following procedure: 1. Tap the “Remove Error” button to remove this error; 2. If the error still exists, contact our customer service department.
0x00200	SP syringe action abnormal	Invalid command to SP syringe	Perform the following procedure: 1. Tap the “Remove Error” button to remove this error; 2. If the error still exists, contact our customer service department.
0x00201	SP syringe action abnormal	Conflicting SP syringe actions	Perform the following procedure: 1. Tap the “Remove Error” button to remove this error; 2. If the error still exists, contact our customer service department.
0x00203	SP syringe action abnormal	Error occurs when SP syringe leaves sensor area	Perform the following procedure: 1. Tap the “Remove Error” button to remove this error; 2. If the error still exists, contact our customer service department.
0x00202	SP syringe action abnormal	Error occurs when SP syringe returns to home position	Perform the following procedure: 1. Tap the “Remove Error” button to remove this error; 2. If the error still exists, contact our customer service department.
0x00205	SP syringe action abnormal	SP syringe aspiration/ dispensation action failure 1	Perform the following procedure: 1. Tap the “Remove Error” button to remove this error; 2. If the error still exists, contact our customer service department.
0x00204	SP syringe action abnormal	SP syringe aspiration/ dispensation action failure 2	Perform the following procedure: 1. Tap the “Remove Error” button to remove this error; 2. If the error still exists, contact our customer service department.

Error ID	Error Message	Description	Solution
0x00206	SP syringe action abnormal	SP syringe aspiration/ dispensation action not allowed 1	Perform the following procedure: 1. Tap the “Remove Error” button to remove this error; 2. If the error still exists, contact our customer service department.
0x00207	SP syringe action abnormal	SP syringe aspiration/ dispensation action not allowed 2	Perform the following procedure: 1. Tap the “Remove Error” button to remove this error; 2. If the error still exists, contact our customer service department.
0x00208	SP syringe action abnormal	SP syringe aspirated volume too high	Perform the following procedure: 1. Tap the “Remove Error” button to remove this error; 2. If the error still exists, contact our customer service department.
0x00210	SP syringe action abnormal	SP syringe action time out	Perform the following procedure: 1. Tap the “Remove Error” button to remove this error; 2. If the error still exists, contact our customer service department.
0x00209	SP syringe action abnormal	SP syringe dispensed volume too high	Perform the following procedure: 1. Tap the “Remove Error” button to remove this error; 2. If the error still exists, contact our customer service department.
0x10308	Auto pressure building out of time	Auto pressure building out of time	Perform the following procedure: 1. Tap the “Remove Error” button to remove this error; 2. If the error still exists, contact our customer service department.
0x99800	Startup initiation not performed	Startup initiation not performed	Perform the following procedure: 1. Tap the “Remove Error” button to remove this error; 2. If the error still exists, contact our customer service department.
0x20012	Drive board communication out of time	Drive board communication out of time	Perform the following procedure: 1. Tap the “Remove Error” button to remove this error; 2. If the error still exists, contact our customer service department.

Error ID	Error Message	Description	Solution
0x10107	SCI priming out of time	SCI priming out of time	Perform the following procedure: 1. Tap the “Remove Error” button to remove this error; 2. If the error still exists, contact our customer service department.
0x99805	Background abnormal	Background abnormal	Perform the following procedure: 1. Tap the “Remove Error” button to remove this error; 2. If the error still exists, contact our customer service department.
0x10306	Fluidic system status abnormal	Sampling probe clogged	Perform the following procedure: 1. Tap the “Remove Error” button to remove this error; 2. If the error still exists, contact our customer service department.
0x10307	Fluidic system status abnormal	Flow cell clogged	Perform the following procedure: 1. Tap the “Remove Error” button to remove this error; 2. If the error still exists, contact our customer service department.
0x99801	Exiting standby status failed	Exiting standby status failed	Perform the following procedure: 1. Tap the “Remove Error” button to remove this error; 2. If the error still exists, contact our customer service department.
0x99802	Exiting standby status failed	Exiting standby status failed	Perform the following procedure: 1. Tap the “Remove Error” button to remove this error; 2. If the error still exists, contact our customer service department.
0x99803	Auto startup failed	Auto startup failed	Perform the following procedure: 1. Tap the “Remove Error” button to remove this error; 2. If the error still exists, contact our customer service department.
0x10111	SCI priming failed	SCI syringe is busy	Perform the following procedure: 1. Tap the “Remove Error” button to remove this error; 2. If the error still exists, contact our customer service department.

Error ID	Error Message	Description	Solution
0x20008	Closed-reagent RFID board communication timeout	Closed-reagent RFID board communication timeout	Perform the following procedure: 1. Tap the “Remove Error” button to remove this error; 2. If the error still exists, contact our customer service department.
0x30109	Optical signal board communication timeout	Optical signal board communication timeout	Perform the following procedure: 1. Tap the “Remove Error” button to remove this error; 2. If the error still exists, contact our customer service department.
0x20011	Power supply board communication timeout	Power supply board communication timeout	Perform the following procedure: 1. Tap the “Remove Error” button to remove this error; 2. If the error still exists, contact our customer service department.
0x10300	50kPa pressure out of range	50kPa pressure out of range	Perform the following procedure: 1. Tap the “Remove Error” button to remove this error; 2. If the error still exists, contact our customer service department.
0x10304	-40kPa pressure out of range	-40kPa pressure out of range	Perform the following procedure: 1. Tap the “Remove Error” button to remove this error; 2. If the error still exists, contact our customer service department.
0x10302	40 kPa pressure out of range	40 kPa pressure out of range	Perform the following procedure: 1. Tap the “Remove Error” button to remove this error; 2. If the error still exists, contact our customer service department.
0x10104	Waste channel abnormal	Waste channel abnormal	Perform the following procedure: 1. Tap the “Remove Error” button to remove this error; 2. If the error still exists, contact our customer service department.
0x10301	Pressure cell pressure release abnormal	Pressure cell pressure release abnormal	Perform the following procedure: 1. Tap the “Remove Error” button to remove this error; 2. If the error still exists, contact our customer service department.

Error ID	Error Message	Description	Solution
0x10303	SCI bath pressure release abnormal	SCI bath pressure release abnormal	Perform the following procedure: 1. Tap the “Remove Error” button to remove this error; 2. If the error still exists, contact our customer service department.
0x10305	WC2 bath pressure release abnormal	WC2 bath pressure release abnormal	Perform the following procedure: 1. Tap the “Remove Error” button to remove this error; 2. If the error still exists, contact our customer service department.
0x30000	Reaction bath temperature high	Reaction bath temperature high	Perform the following procedure: 1. Click “Remove Error” button and recheck the temperature? 2. If the error still exists, contact our customer service department.
0x30001	Preheating bath temperature control abnormal	Preheating bath temperature out of the upper limit for counting	Perform the following procedure: 1. Tap the “Remove Error” button to remove this error; 2. If the error still exists, contact our customer service department.
0x30005	Ambient temperature is high	Ambient temperature is high	Perform the following procedure: 1. Make sure the ambient temperature is within acceptable range. 2. Tap the “Remove Error” button to re-test the temperature. 3. If the error still exists, contact our customer service department.
0x30002	Temperature inside analyzer out of range	Temperature inside analyzer out of range	Perform the following procedure: 1. Make sure the analyzer is placed in a place with good ventilation, heat dispersion and with no direct sunlight. 2. Tap the “Remove Error” button to re-test the temperature. 3. If the error still exists, contact our customer service department.
0x30003	Reaction bath temperature low	Reaction bath temperature low	Perform the following procedure: 1. Click “Remove Error” button and recheck the temperature? 2. If the error still exists, contact our customer service department.

Error ID	Error Message	Description	Solution
0x30004	Preheating bath temperature control abnormal	Preheating bath temperature out of the lower limit for counting	Perform the following procedure: 1. Tap the “Remove Error” button to remove this error; 2. If the error still exists, contact our customer service department.
0x30006	Ambient temperature low	Ambient temperature low	Perform the following procedure: 1. Make sure the ambient temperature is within acceptable range. 2. Tap the “Remove Error” button to re-test the temperature. 3. If the error still exists, contact our customer service department.
0x30007	Ambient temperature is high	Ambient temperature is high	Perform the following procedure: 1. Make sure the ambient temperature is within acceptable range. 2. Tap the “Remove Error” button to re-test the temperature. 3. If the error still exists, contact our customer service department.
0x30008	Ambient temperature low	Ambient temperature low	Perform the following procedure: 1. Make sure the ambient temperature is within acceptable range. 2. Tap the “Remove Error” button to re-test the temperature. 3. If the error still exists, contact our customer service department.
0x30009	Reaction bath temperature control assembly is damaged	Reaction bath temperature control assembly is damaged	Perform the following procedure: 1. Click “Remove Error” button and recheck the temperature? 2. If the error still exists, contact our customer service department.
0x30010	Preheating bath temperature control abnormal	Preheating bath does not achieve target temperature after startup procedure	Perform the following procedure: 1. Perform the following procedure: 2. Tap the “Remove Error” button to remove this error; 3. If the error still exists, contact our customer service department.

Error ID	Error Message	Description	Solution
0x30100	Optical system working voltage abnormal	PMT voltage abnormal	Perform the following procedure: 1. Tap the “Remove Error” button to remove the error; 2. Switch off and then switch on the instrument power; 3. If the error still exists after the restart, contact our customer service department.
0x30201	HGB blank voltage abnormal	HGB blank voltage abnormal	Perform the following procedure: 1. Tap the “Remove Error” button to remove this error; 2. If the error still exists, contact our customer service department.
0x30103	Flow cell contaminated	DIFF channel FS blank voltage abnormal	Perform the following procedure: 1. On the instrument main unit software, tap Menu - “Service” - “Maintenance” - “Fluidics” to enter the “Fluidics” maintenance screen, and perform the daily probe cleanser maintenance procedure; 2. Tap the “Remove Error” button to remove this error; 3. If the error still exists, contact our customer service department.
0x30104	Flow cell contaminated	RET channel FS blank voltage abnormal	Perform the following procedure: 1. On the instrument main unit software, tap Menu - “Service” - “Maintenance” - “Fluidics” to enter the “Fluidics” maintenance screen, and perform the daily probe cleanser maintenance procedure; 2. Tap the “Remove Error” button to remove this error; 3. If the error still exists, contact our customer service department.
0x20203	Fan in the analyzer faulty	Radiator fan in the analyzer is blocked	Perform the following procedure: 1. Check if the fan located on the back of the analyzer main unit is stuck by any foreign objects; 2. Tap the “Remove Error” button to remove the error; 3. If the error still exists after restarting the instrument, contact our customer service department.

Error ID	Error Message	Description	Solution
0x99804	Front cover is open	Front cover is open	Perform the following procedure: 1. Tap the “Remove Error” button to remove this error; 2. If the error still exists, contact our customer service department.
0x30108	Optical system shielding box is open	Optical system shielding box is open	Perform the following procedure: 1. Close the Optical system shielding box; 2. Tap the “Remove Error” button to remove this error; 3. If the error still exists, contact our customer service department.
0x40001	System time error	System time error	Perform the following procedure: 1. On the instrument main unit screen, tap “Menu”- “Setup” - “Date/Time Setup” to enter the “Date/Time Setup” screen and set up the correct system time; 2. Tap the “Remove Error” button to remove this error; 3. If the error still exists, contact our customer service department.
0x30300	Clog	Aperture voltage abnormal	Perform the following procedure: 1. Aperture voltage abnormal. 2. Tap the “Remove Error” button to remove this error. 3. If the error still exists, contact our customer service department.
0x30301	Clog	Aperture voltage abnormal	Perform the following procedure: 1. Aperture voltage abnormal. 2. Tap the “Remove Error” button to remove this error. 3. If the error still exists, contact our customer service department.
0x30302	Clog	RBC sample preparation abnormal	Perform the following procedure: 1. RBC sample preparation abnormal. 2. Tap the “Remove Error” button to remove this error. 3. If the error still exists, contact our customer service department.

Error ID	Error Message	Description	Solution
0x30303	Clog	RBC sample preparation abnormal	Perform the following procedure: 1. RBC sample preparation abnormal. 2. Tap the “Remove Error” button to remove this error. 3. If the error still exists, contact our customer service department.
0x20200	Power fan error	Power fan blocked	Perform the following procedure: 1. Check whether the power fan is stuck. 2. If the error persists, contact our Customer Service Department.
0x20201	Board fan faulty	Board radiator fan is blocked	Perform the following procedure: 1. Check if the fan located on the back of the analyzer main unit is stuck by any foreign objects; 2. Tap the “Remove Error” button to remove the error; 3. If the error still exists after restarting the instrument, contact our customer service department.
0x20202	Board fan faulty	Board radiator fan is blocked	Perform the following procedure: 1. Check if the fan located on the back of the analyzer main unit is stuck by any foreign objects; 2. Tap the “Remove Error” button to remove the error; 3. If the error still exists after restarting the instrument, contact our customer service department.
0x20002	Air pressure detection board error	Air pressure detection board communication error	Perform the following procedure: 1. Tap the “Remove Error” button to remove the error; 2. Switch off and then switch on the instrument power; 3. If the error still exists after the restart, contact our customer service department.

Error ID	Error Message	Description	Solution
0x20003	Air pressure detection board error	Air pressure detection board calibration parameter error	Perform the following procedure: 1. Tap the “Remove Error” button to remove the error; 2. Switch off and then switch on the instrument power; 3. If the error still exists after the restart, contact our customer service department.
0x30202	Waste channel abnormal	HGB waste channel clogged	Perform the following procedure: 1. Tap the “Remove Error” button to remove this error; 2. If the error still exists, contact our customer service department.
0x30203	Waste channel abnormal	HGB waste channel clogged	Perform the following procedure: 1. Tap the “Remove Error” button to remove this error; 2. If the error still exists, contact our customer service department.
0x30204	Waste channel abnormal	HGB waste channel clogged	Perform the following procedure: 1. Tap the “Remove Error” button to remove this error; 2. If the error still exists, contact our customer service department.
0x30600	Waste channel abnormal	DIFF waste channel clogged	Perform the following procedure: 1. Tap the “Remove Error” button to remove this error; 2. If the error still exists, contact our customer service department.
0x30601	Waste channel abnormal	DIFF waste channel clogged	Perform the following procedure: 1. Tap the “Remove Error” button to remove this error; 2. If the error still exists, contact our customer service department.
0x30602	Waste channel abnormal	DIFF waste channel clogged	Perform the following procedure: 1. Tap the “Remove Error” button to remove this error; 2. If the error still exists, contact our customer service department.

Error ID	Error Message	Description	Solution
0x30603	Waste channel abnormal	RET waste channel clogged	Perform the following procedure: 1. Tap the “Remove Error” button to remove this error; 2. If the error still exists, contact our customer service department.
0x30604	Waste channel abnormal	RET waste channel clogged	Perform the following procedure: 1. Tap the “Remove Error” button to remove this error; 2. If the error still exists, contact our customer service department.
0x30605	Waste channel abnormal	RET waste channel clogged	Perform the following procedure: 1. Tap the “Remove Error” button to remove this error; 2. If the error still exists, contact our customer service department.
0x10108	Waste channel abnormal	Probe wipe waste channel clogged	Perform the following procedure: 1. Tap the “Remove Error” button to remove this error; 2. If the error still exists, contact our customer service department.
0x10109	Waste channel abnormal	Probe wipe waste channel clogged	Perform the following procedure: 1. Tap the “Remove Error” button to remove this error; 2. If the error still exists, contact our customer service department.
0x10110	Waste channel abnormal	Probe wipe waste channel clogged	Perform the following procedure: 1. Tap the “Remove Error” button to remove this error; 2. If the error still exists, contact our customer service department.
0x30304	Waste channel abnormal	Cleaning channel of RBC sample preparation clogged	Perform the following procedure: 1. Tap the “Remove Error” button to remove this error; 2. If the error still exists, contact our customer service department.
0x30305	Waste channel abnormal	Cleaning channel of RBC sample preparation clogged	Perform the following procedure: 1. Tap the “Remove Error” button to remove this error; 2. If the error still exists, contact our customer service department.

Error ID	Error Message	Description	Solution
0x30306	Waste channel abnormal	Cleaning channel of RBC sample preparation clogged	Perform the following procedure: 1. Tap the “Remove Error” button to remove this error; 2. If the error still exists, contact our customer service department.

13.4 Fault Diagnosis

When errors occur in the analyzer and cannot be cleared by tapping the “**Remove Error**” button, operators at administrator level can perform error diagnosis on the “**Precise Fault Diagnosis**” screen to know the source of errors.

Perform the following procedure:

1. Enter the “**Precise Fault Diagnosis**” screen by one of the following ways:
 - Tap “**Menu > Service > Precise Fault Diagnosis**” to enter the “**Precise Fault Diagnosis**” screen.
 - When “**Precise Fault Diagnosis**” button displays in “**Error Information**” dialog box, tap the button to enter the “**Precise Fault Diagnosis**” screen.
2. Select an error message from the “**Error Information**” pull-down list.
Corresponding diagnosis program displays on the screen.
3. Check the diagnosis program to be diagnosed.
4. Tap the “**Start**” button.
Diagnosis results displays in the “**Diagnosis Results**” column.

NOTE:

Please contact our Customer Service Department to give us diagnosis results.

This page intentionally left blank.

A Index

A

Analyzer shutdown 7-12

C

Calibrate

Calibrate with Calibrators 10-3

Calibration History 10-5

Calibration Programs 10-1

Manual calibration 10-2

Notes before Calibration 10-2

Verify calibration factors 10-4

When to Calibrate 10-1

Customizing the Analyzer Software 6-1

D

Daily Operations

Preparations 7-2

DIFF Scattergram B-3

F

Flags

Abnormal Blood Cell Differential Or Morphology 8-12

Parameter Flags 8-11

J

Installation Requirements 5-1

Environment Requirements 5-2

Power Requirements 5-2

Space Requirements 5-1

M

Maintenance and Service

Probe Cleanser Maintenance to Parts and Components 12-9

maintenance and service

daily probe cleanser maintenance 12-8

maintenance of parts and components 12-1

replacing parts and components 12-3

timing and purpose 12-1

O

Operating Your Analyzer 7-1

P

Parameters B-1

HGB 4-5

Microscopic Parameters

Define Microscopic Parameters 6-10

Print Microscopic Parameter Results 11-2

RBC-related Parameters 4-6

Reticulocyte Parameters 4-8

WBC-Related Parameters 4-3

Prepare to Pack-up 12-12

Print

Auto Print 6-3

Print Manual Calibration Factors 11-3

Print QC Result Report 11-3

Print Sample Test Result Report 11-1

Print Setup 11-1

Probe Cleanser Maintenance 12-8

R

Reagent 3-9

LH LYSE 3-10

Replace Reagent 12-5

Reagent Connection

Connecting Lyses and Diluent 5-4

S

Sample Result Review

Calculate CV 8-9

Communicate Sample Records 8-7

Delete Sample Records 8-11

Export Sample Results 8-8

Graph Review 8-5

Review Special Information 8-6

Review Traceability Information 8-7

RUO Parameter Results 8-5

Validate Sample Results 8-10

Screen Cal. 12-14

Setting

Lab Info. 6-5

Setup

Auto Standby 7-11

Date/Time 6-5

Flag Alarm Sensitivity 6-5

HGB Gains 6-11

Permissions 6-1

Save Changes 6-2

System Principles

SF CUBE Cell Analysis Technology 4-5

Sheath Flow Impedance Method 4-5

T

Troubleshooting

Check Analyzer Status 13-1

W

WBC Measurement 4-1

Working Principles

RBC/PLT Measurement 4-5

B Specification

B.1 Test Parameters

Table B-1 Blood sample test report parameters

Group	Name	Abbreviation
WBC group (11 items)	White blood cell count	WBC
	Neutrophil count	Neu#
	Lymphocyte count	Lym#
	Monocyte count	Mon#
	Eosinophil count	Eos#
	Basophil count	Bas#
	Neutrophil percentage	Neu%
	Lymphocyte percentage	Lym%
	Monocyte percentage	Mon%
	Eosinophil percentage	Eos%
	Basophil percentage	Bas%
RBC group (8 items)	Red blood cell count	RBC
	Hemoglobin concentration	HGB
	Mean corpuscular volume	MCV
	Mean corpuscular hemoglobin	MCH
	Mean corpuscular hemoglobin concentration	MCHC
	Red blood cell distribution width coefficient of variation	RDW-CV
	Red blood cell distribution width standard deviation	RDW-SD
	Hematocrit	HCT
Platelet group (7 items)	Platelet count	PLT
	Mean platelet volume	MPV
	Platelet distribution width	PDW
	Plateletcrit	PCT
	Platelet-large cell ratio	P-LCR
	Platelet-large cell count	P-LCC
	Immature platelet fraction	IPF

Table B-1 Blood sample test report parameters

Group	Name	Abbreviation
RET group (7 items)	Reticulocyte count	RET#
	Reticulocyte percentage	RET%
	Reticulocyte hemoglobin expression	RHE
	Immature reticulocyte fraction	IRF
	Low fluorescent ratio	LFR
	Middle fluorescent ratio	MFR
	High fluorescent ratio	HFR

NOTE:

- The P-LCR and P-LCC parameters do not apply to blood samples of cats.
- For avian, fish, amphibians, and reptile, the analyzer only provides RBC parameters (8 items).
- The PLT, MPV, PDW, PCT, P-LCR, and P-LCC parameters do not apply to blood samples of goat.

Table B-2 Blood sample test RUO parameters

Name	Abbreviation
Optical red blood cell count	RBC-O
Optical platelet count	PLT-O
Platelet count- impedance	PLT-I
Optical white blood cell count	WBC-O
White blood cell count -DIFF	WBC-D
Reticulocyte production index	RPI
Immature platelet count	IPF#
Mean reticulocyte volume	MRV
Platelet distribution width standard deviation	PDW-SD

NOTE:

- RUO parameters are for research purpose only. They cannot be used for diagnosis purpose.
- RUO parameters only apply to LabH 63, LabH 65, LabH 66, and LabH 68.

Table B-3 Blood sample test histogram

Name	Abbreviation
White Blood Cell Histogram	WBC Histogram
Platelet-I Histogram	PLT-I Histogram

Table B-4 Blood sample test scattergrams

Name	Abbreviation
Differential scattergram	DIFF Scattergram
Reticulocyte scattergram	RET Scattergram
Optical platelet scattergram	PLT-O Scattergram
Reticulocyte - extension scattergram	RET-EXT Scattergram

Table B-5 Body fluid sample test report parameters

Name	Abbreviation
White blood cell count-body fluid	WBC-BF
Total nucleated cell counts-body fluid	TC-BF#
Mononuclear cell number	MN#
Mononuclear cell percentage	MN%
Polymorphonuclear cell number	PMN#
Polymorphonuclear cell percentage	PMN%
Red blood cell count-body fluid	RBC-BF

NOTE:

Body fluid parameters only apply to LabH 66 and LabH 68.

Table B-6 Body fluid sample test histogram

Name	Abbreviation
White Blood Cell Histogram	WBC Histogram

Table B-7 Body fluids sample test scattergram

Name	Abbreviation
Differential scattergram	DIFF Scattergram

B.2 Sampling Features

B.2.1 Sample Volumes Required for Each Analysis

Table B-8 Sample volumes required for each analysis

Test mode	Sample volume required for each analysis (μL)
Whole blood	≤ 34
Predilute	≤ 20

B.2.2 Throughput

Table B-9 Throughput

Test mode	Throughput (test/hour)
Whole blood	40
Predilute	29

B.3 Performance Specifications

B.3.1 Display Ranges for Major Parameters

Table B-10 Display ranges for major parameters

Parameter	Display range
WBC	$0.00 \times 10^9/\text{L} \sim 999.99 \times 10^9/\text{L}$
RBC	$0.00 \times 10^{12}/\text{L} \sim 99.99 \times 10^{12}/\text{L}$
HGB	0 g/L ~ 350 g/L
PLT	$0 \times 10^9/\text{L} \sim 9999 \times 10^9/\text{L}$
MCV	0.0 fL ~ 450.0 fL

B.3.2 Background/Blank Count Requirements

Table B-11 Background/blank count requirements for blood samples

Parameter	Acceptable range
WBC	$\leq 0.10 \times 10^9/\text{L}$
RBC	$\leq 0.02 \times 10^{12}/\text{L}$
HGB	$\leq 1 \text{ g/L}$

Table B-11 Background/blank count requirements for blood samples

Parameter	Acceptable range
PLT	$\leq 5 \times 10^9/\text{L}$

Table B-12 Background/blank count requirements for body fluid samples

Parameter	Acceptable range
WBC-BF	$\leq 0.003 \times 10^9 / \text{L}$
RBC-BF	$\leq 0.003 \times 10^{12} / \text{L}$

B.3.3 Linearity Requirements

Table B-13 Linearity requirements for blood samples

Parameter	Linearity range	Deviation range (WB)	Deviation range (PD)
WBC	$(0 \sim 100.00) \times 10^9/\text{L}$	$\pm 0.20 \times 10^9/\text{L}$ or $\pm 3\%$	$\pm 0.50 \times 10^9/\text{L}$ or $\pm 5\%$
	$(100.01 \sim 350.00) \times 10^9/\text{L}$	$\pm 6\%$	$\pm 6\%$
	$(350.01 \sim 500.00) \times 10^9/\text{L}$	$\pm 11\%$	$\pm 11\%$
RBC	$(0 \sim 8.00) \times 10^{12}/\text{L}$	$\pm 0.03 \times 10^{12}/\text{L}$ or $\pm 2\%$	$\pm 0.10 \times 10^{12}/\text{L}$ or $\pm 8\%$
	$(8.01 \sim 16.99) \times 10^{12}/\text{L}$	$\pm 0.06 \times 10^{12}/\text{L}$ or $\pm 4\%$	$\pm 0.12 \times 10^{12}/\text{L}$ or $\pm 10\%$
HCT	$(0 \sim 75)\%$	± 1.0 (HCT value) or $\pm 2\%$	± 2.0 (HCT value) or $\pm 4\%$
HGB	$(0 \sim 250)\text{g/L}$	$\pm 2\text{g/L}$ or $\pm 2\%$	$\pm 4\text{g/L}$ or $\pm 4\%$
PLT	$(0 \sim 1000) \times 10^9/\text{L}$	$\pm 10 \times 10^9/$ or $\pm 5\%$	$\pm 15 \times 10^9/\text{L}$ or $\pm 10\%$
	$(1001 \sim 5000) \times 10^9/\text{L}$	$\pm 6\%$	$\pm 10\%$
RET#	$(0.0000 \sim 0.8000) \times 10^{12}/\text{L}$	$\pm 0.0150 \times 10^{12}/\text{L}$ or $\pm 20\%$	/
RET%	$(0.00 \sim 30.00\%)$	± 0.30 (RET% value) or $\pm 20\%$	/

Table B-14 Linearity requirements for body fluid samples

Parameter	Linearity range	Deviation range
WBC-BF/TC-BF#	$(0 \sim 0.050) \times 10^9/\text{L}$	$\pm 0.010 \times 10^9/\text{L}$
	$(0.051 \sim 1.000) \times 10^9/\text{L}$	$\pm 20\%$
	$(1.001 \sim 10.000) \times 10^9/\text{L}$	$\pm 20\%$
RBC-BF	$(0.000 \sim 0.100) \times 10^{12}/\text{L}$	$\pm 0.010 \times 10^{12}/\text{L}$ or $\pm 5\%$
	$(0.000 \sim 0.100) \times 10^{12}/\text{L}$	$\pm 0.030 \times 10^{12}/\text{L}$ or $\pm 2\%$

B.3.4 Repeatability

Table B-15 Repeatability requirements for QC in blood samples

Parameter	Range	Whole blood (CV/Absolute deviation d*/SD)	Predilute (CV/Absolute deviation d*/SD)
WBC	$(3.50 \sim 4.50) \times 10^9/L$	$\leq 3.0\%$	$\leq 4.0\%$
	$\geq 4.50 \times 10^9/L$	$\leq 2.5\%$	$\leq 3.5\%$
RBC	$\geq 3.50 \times 10^{12}/L$	$\leq 1.5\%$	$\leq 2.0\%$
HGB	$(110 \sim 180) g/L$	$\leq 1.0\%$	$\leq 2.0\%$
MCV	$(80.0 \sim 100.0) fL$	$\leq 1.0\%$	$\leq 3.0\%$
HCT	$(30.0 \sim 50.0)\%$	$\leq 1.5\%$	$\leq 3.0\%$
MCH	/	$\leq 1.5\%$	/
MCHC	/	$\leq 1.5\%$	/
RDW-SD	/	$\leq 2.0\%$	/
RDW-CV	/	$\leq 2.0\%$	/
PLT	$\geq 100 \times 10^9/L$	$\leq 4.0\%$	$\leq 8.0\%$
PDW	$PLT \geq 100 \times 10^9/L$	$\leq 10.0\%$	/
MPV	$PLT \geq 100 \times 10^9/L$	$\leq 3.0\%$	/
P-LCR	$PLT \geq 100 \times 10^9/L$	$\leq 15.0\%$	/
P-LCC	$PLT \geq 100 \times 10^9/L$	$\leq 15.0\%$	/
PCT	$PLT \geq 100 \times 10^9/L$	$\leq 5.0\%$	/
Neu%	Neu% $\geq 30.0\%$ WBC $\geq 4.00 \times 10^9/L$	$\leq 6.0\%$	$\leq 12.0\%$
Lym%	Lym% $\geq 15.0\%$ WBC $\geq 4.00 \times 10^9/L$	$\leq 6.0\%$	$\leq 12.0\%$
Mon%	Mon% $\geq 5.0\%$ WBC $\geq 4.00 \times 10^9/L$	$\leq 16.0\%$	$\leq 32.0\%$
Eos%	WBC $\geq 4.00 \times 10^9/L$	$\leq 20.0\%$ or $\pm 1.5\%(d)$	$\leq 40.0\%$ or $\pm 3.0\%(d)$
Bas%	WBC $\geq 4.00 \times 10^9/L$	$\leq 30.0\%$ or $\pm 1.0\%(d)$	$\leq 60.0\%$ or $\pm 2.0\%(d)$
Neu#	$\geq 1.20 \times 10^9/L$	$\leq 6.0\%$	$\leq 12.0\%$
Lym#	$\geq 0.60 \times 10^9/L$	$\leq 6.0\%$	$\leq 12.0\%$
Mon#	$\geq 0.20 \times 10^9/L$	$\leq 16.0\%$	$\leq 32.0\%$
Eos#	WBC $\geq 4.00 \times 10^9/L$	$\leq 20.0\%$ or $\pm 0.12 \times 10^9/L(d)$	$\leq 40.0\%$ or $\pm 0.24 \times 10^9/L(d)$
Bas#	WBC $\geq 4.00 \times 10^9/L$	$\leq 30.0\%$ or $\pm 0.06 \times 10^9/L(d)$	$\leq 60.0\%$ or $\pm 0.12 \times 10^9/L(d)$
RET#	RBC $\geq 3.00 \times 10^{12}/L$ RET%: 1.00% ~ 4.00%	$\leq 15\%$	$\leq 30\%$

Table B-15 Repeatability requirements for QC in blood samples

Parameter	Range	Whole blood (CV/Absolute deviation d*/SD)	Predilute (CV/Absolute deviation d*/SD)
RET%	RBC $\geq 3.00 \times 10^{12}/L$ RET%: 1.00% ~ 4.00%	$\leq 15\%$	$\leq 30\%$
RHE	RET# $\geq 0.0200 \times 10^{12}/L$	$\leq 5\%$	/
LFR	RBC $\geq 3.00 \times 10^{12}/L$ RET%: 1.00% ~ 4.00%	$\leq 30\%$	/
	LFR $\geq 20\%$		/
MFR	RBC $\geq 3.00 \times 10^{12}/L$ RET%: 1.00% ~ 4.00%	$\leq 50\%$	/
	MFR $\geq 20\%$		/
HFR	RBC $\geq 3.00 \times 10^{12}/L$ RET%: 1.00% ~ 4.00%	$\leq 100\%$ or $\pm 2.0\%(d)$	/
IRF	RBC $\geq 3.00 \times 10^{12}/L$ RET%: 1.00% ~ 4.00%	$\leq 30\%$	/
	IRF $\geq 20\%$		/
IPF	PLT $\geq 50 \times 10^9/L$ IPF $\geq 3.0\%$	$\leq 25\%$	/

Table B-16 Repeatability requirements for QC in body fluid samples

Parameter	Range	Precision or absolute deviation (d)
WBC-BF	$(0.015-0.100) \times 10^9/L$	$\leq 30\%$
RBC-BF	$(0.003-0.050) \times 10^{12}/L$	$\leq 40\%$ or $\leq 7000/\mu L (d)$

B.3.5 Carryover

Table B-17 Carryover requirements for blood samples

Parameters	Carryover
WBC	$\leq 1.0\%$
RBC	$\leq 1.0\%$
HGB	$\leq 1.0\%$
HCT	$\leq 1.0\%$
PLT	$\leq 1.0\%$

Table B-18 Carryover requirements for body fluid samples

Parameters	Carryover
WBC-BF	$\leq 0.3\%$ or $\leq 0.03 \times 10^9/\text{L}$
RBC-BF	$\leq 0.3\%$ or $\leq 0.03 \times 10^{12}/\text{L}$

B.4 Input/Output Devices.

B.4.1 Keyboard

USB port (supporting the protocol of USB 2.0 and above) keyboard.

B.4.2 Mouse

USB port (supporting the protocol of USB 2.0 and above) mouse.

B.4.3 External Barcode Scanner

USB port (supporting the protocol of USB 2.0 and above) hand-held barcode scanner.

B.4.4 Printer

USB port (supporting the protocol of USB 2.0 and above) printer.

Supported printer model includes:

- Black and white printer: HP Laser Jet Pro M404n
- Color printer: HP Office Jet Pro 8210

B.4.5 USB Drive

Supporting the protocol of USB 2.0 and above.

B.5 Interfaces

NOTE:

The USB interfaces on the back of the analyzer shall only be used to connect the peripheral devices specified in this manual. For details about supported devices and models, see “B.4 Input/Output Devices.”.

-
- One network port (compatible with 10/100/1000M Ethernet and complying with the 802.3u/802.3ab standard)
 - Four USB ports including three supporting USB2.0 and one supporting USB 3.0 (specification: DC 5V; 500 mA)

B.6 Fuse

WARNING

The fuse of the analyzer is not replaceable. In case of any questions, contact Customer Service Department or your local distributor.

B.7 Temperature Protection Switch

- Rated voltage: 9V
- Rated current: 25A

NOTE:

If the temperature protection switch is damaged, please contact Customer Service Department or the local distributor. Operators can not replace or repair the temperature protection switch by themselves.

B.8 EMC Description

Statement and warning:

- This equipment complies with the emission and immunity requirements described in IEC 61326-1:2012 / EN 61326-1:2013.
- The intended use environments of this equipment includes typical healthcare environments (hospitals, clinics, doctor's offices), this equipment has been designed and tested to CISPR 11 Class A. In a domestic environment it may cause radio interference, in which case, you may need to take measures to mitigate the interference.
- Advise that the electromagnetic environment should be evaluated prior to operation of the device.
- Do not use this device in close proximity to sources of strong electromagnetic radiation (e.g. unshielded intentional RF sources), as these can interfere with the proper operation.

NOTE:

- It is the manufacturer's responsibility for providing equipment electromagnetic compatibility information of the equipment to the customer or user.
- It is the user's responsibility for ensuring that a compatible electromagnetic environment for the equipment can be maintained so that the equipment will operate normally.

Table B-19 Electromagnetic emission

Emission test	Compliance
Conducted RF EMISSIONS CISPR 11	Group 1 Class A
Radiated RF EMISSIONS CISPR 11	
IEC 61000-3-2 Harmonic distortion	Not applicable

Table B-19 Electromagnetic emission

Emission test	Compliance
IEC 61000-3-3 Voltage fluctuations and flicker	Not applicable

Table B-20 Electromagnetic immunity

Immunity test	Basic standard	Test value	Performance criterion
Electrostatic discharge (ESD)	IEC 61000-4-2	± 2 kV, ± 4 kV contact ± 2 kV, ± 4 kV, ± 8 kV air	B
Electromagnetic field	IEC 61000-4-3	3 V/m, 80 MHz to 270 MHz 80%AM	A
Burst	IEC 61000-4-4	± 1 kV (15ms, 5 kHz)	B
Surge	IEC 61000-4-5	± 2 kV line-to-ground ± 1 kV line-to-line	B
Conducted RF	IEC 61000-4-6	3 V, 150 kHz to 80 MHz, 80% AM	A
Power frequency magnetic fields	IEC 61000-4-8	3A/m, 50 Hz and 60 Hz	A
Voltage dip Short interruptions	IEC 61000-4-11	0% during 1 cycle 40% during 5/6 cycles 70% during 25/30 cycles 5% during 250/300 cycles	B C C C

Note:

“5/6 cycles” means “5 cycles for 50 Hz test” or “6 cycles for 60 Hz test”.

Performance criteria:

A: No degradation of performance or loss of function is allowed below a performance level.

B: A permissible degradation of performance or loss of function is allowed if self-recoverable.

C: Degradation of performance or loss of function is self-recoverable or can be restored by the operation of the controls.

FCC Caution:

Part 15.21

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

Part 15.19

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.

Part 15.105

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

FCC RF Radiation Exposure Statement:

1. This Transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.
2. This equipment complies with RF radiation exposure limits set forth for an uncontrolled environment.
3. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

User manuals for licence-exempt radio apparatus shall contain the following or equivalent notice in a conspicuous location in the user manual or alternatively on the device or both.

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions:

- (1) this device may not cause interference, and
- (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'ISED applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

- (1) l'appareil ne doit pas produire de brouillage, et
- (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Radio apparatus containing digital circuitry which can function separately from the operation of a transmitter or an associated transmitter, shall comply with ICES-003. In such cases, the labelling requirements of the applicable RSS apply, rather than the labelling requirements in ICES-003. This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada

IC SAR Warning:

This equipment should be installed and operated with minimum distance 20 cm between the radiator and your body.

Lors de l'installation et de l'exploitation de ce dispositif, la distance entre le radiateur et le corps est d'au moins 20 cm.

B.9 Noise Level

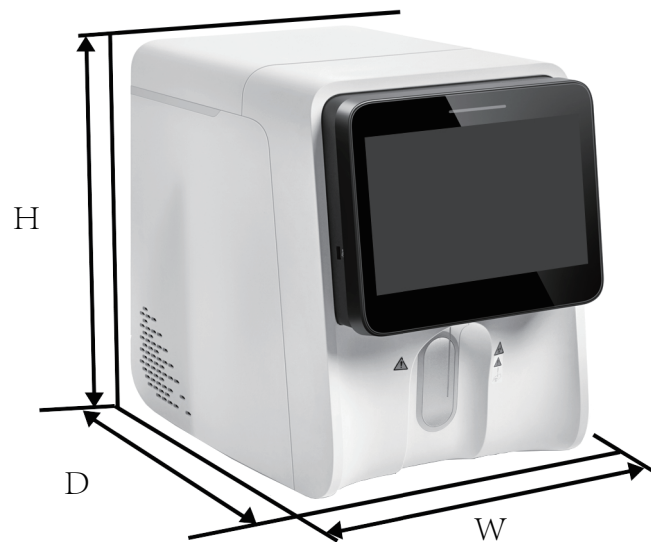
Maximal noise level: 80 dBA

NOTE:

Be sure to use and store the analyzer under the specified environment conditions.

B.10 Dimensions and Weight

Figure B-1 Main Unit Dimensions



Main Unit Dimensions and Weight	Value
Width (W)	≤ 325 mm
Height (H)	≤ 450 mm
Depth (D)	≤ 490 mm
Weight	≤ 31 kg

B.11 Contraindication

None

B.12 Safety Classification

- Level of transient overvoltage: Category II.
- Rated pollution degree: 2.

C Accessories and Packing List

C.1 Accessories of the Analyzer

- Reagent cap assembly
- Waste tube assembly
- Main power cords

NOTE:

The accessories actually attached to the product depend on your product configuration. For details about the configured/optional accessories, consult your sales representative.

C.2 Optional Accessories of the Analyzer

- Computer
- Display

C.3 Packing List

- Main power cords
- Network cable
- Display
- Computer
- Lyse cap assembly (green, die sinking connector)
- Lyse cap assembly (red, die sinking connector)
- Lyse cap assembly (black, die sinking connector)
- Cap assembly (orange, die sinking connector)
- DS diluent cap assembly
- Waste container cap assembly
- Reagent bag
- 20L reagent soft bottle
- Operator's Manual
- Main Unit (Analyzer)
- Quick Reference Guide

This page intentionally left blank.

D Communication

The LIS/HIS function of this analyzer enables the communication between the analyzer and the PC in laboratory through Ethernet, including sending analysis results to and receiving worklist from PC.

In the LIS/HIS communication process of the analyzer involves the HL7 communication protocol. For details about the connection control, and the introduction, message definition and examples, please contact the Customer Service Department or your local distributor.

This page intentionally left blank.

E Declaration of Conformity

Hereby, Shenzhen Mindray Animal Medical Technology Co., Ltd. declares that the radio equipment type **LabH 60/LabH 63/LabH 65/LabH 66/LabH 68 Animal-Dedicated Hematology Analyzer** is in compliance with Directive 2014/53/EU.

The full text of the EU declaration of conformity is available at the following Internet address:

Site Location	QR Code
https://ims.mindrayanimal.com/pub/detail.aspx?tid=14&rid=25002	

This page intentionally left blank.

F

References

1. CLSI. Interference Testing in Clinical Chemistry; Approved Guideline; Second Edition. CLSI document EP7-A2. Clinical and Laboratory Standards Institute; 2005.
2. Levey S, Jennings ER. The use of control charts in the clinical laboratory. *Am J Clin Pathol.* 1950;20” 1059-1066
3. Westgard, J.O., P.L. Barry, and M.R. Hunt (1981). “A Multi-rule Shewhart Chart for Quality Control in Clinical Chemistry,”*Clinical Chemistry*, vol. 27, pp. 493-501.
4. Westgard, J.O., P.L. Barry (1986). “Cost-Effective Quality Control: Managing the Quality and Productivity of Analytical Processes”*AACC Press*.
5. Bull BS. A statistical approach to quality control. *Quality Control in Hematology*, Symposium of the International Committee for Standardization in Haematology. Lewis SM and Coster JF, eds, Academic Press, London, England, 1975.
6. International Committee for Standardization in Haematology. Lewis SM and Coster JF, eds, Academic Press, London, England, 1975.
7. Bull BS. A study of various estimations for the derivation of quality control procedures from patient erythrocyte indexes [J]. *Am J Clin Pathol* 1974.61(4):473-481
8. M.W. Rampling, G. Martin. A comparison of the Myrenne erythrocyte aggregometer with older techniques for estimating erythrocyte aggregation, *Biorheology* 9 (1989), 41–46.
9. M. Plebani, S. De Toni, M.C. Sanzari, et al., The TEST 1 automated system – A new method for measuring the erythrocyte sedimentation rate, *Am J Clin Pathol* 110 (1998), 334–340.
10. Bull BS. A study of various estimations for the derivation of quality control procedures from patient erythrocyte indexes [J]. *Am J Clin Pathol* 1974.61(4):473-481

This page intentionally left blank.

G Maintenance Logs

NOTE:

- You are advised to prepare a maintenance checklist suitable for the operating environment of the analyzer.
 - For more information about the maintenance procedure, see “12 Service”.
-

This page intentionally left blank.

Routine Maintenance Items

Date	Probe Cleanser Maintenance	Cleaning the Analyzer Front Cover	Probe wipe cleaning	Date	Probe Cleanser Maintenance	Cleaning the Analyzer Front Cover	Probe wipe cleaning
1				17			
2				18			
3				19			
4				20			
5				21			
6				22			
7				23			
8				24			
9				25			
10				26			
11				27			
12				28			
13				29			
14				30			
15				31			
16							

