Automated Hematology Analyzer
XN-L series

XN-530/XN-430 /XN-330

Troubleshooting

Read this manual when you encounter a problem, and to perform instrument maintenance.
The explanations in this manual assume that you have already read "General Information".

The following manuals are provided as Instructions for Use:

- General Information
- Basic Operation
- Troubleshooting

Sysmex Corporation
KOBE, JAPAN

Code No. BA229091 en-eu
PRINTED IN JAPAN
Date of Last Revision: 04/2020
Software Version: Ver. 5 onwards

Revision History

06/2016

Initial issue

Software version: Ver. 5

02/2017

Software version: Ver. 5

05/2017

Software version: Ver. 5

01/2018

Software version: Ver. 5

08/2018

Software version: Ver. 5

06/2019

Software version: Ver. 5

04/2020

Software version: Ver. 5

Changes are listed below:

Revised section	Page
Addition of descriptions related to XN-530 and XN-430	Throughout the manual

Table of Contents

Chapter 1 Troubleshooting

1.1 Error message list (in alphabetical order)

The following is an alphabetical list of error messages.

Note:

In the situations below, remove the sample tubes from the instrument and turn OFF the power.
- An error message marked with ☎ (phone sign) appears in the error message list.
- An error persists after the indicated action is taken.

Instrument repair or replacement of parts is necessary. Contact your Sysmex service representative.

		Error message	Action
Numeric		-0.03 MPa pressure error	⇒ 13
		0.06 MPa pressure error	⇒ 12
A		Abnormal pressure loss	⇒ 12
		Analysis item not specified	⇒ 30
	☎	Aspiration Sensor error	⇒ 29
		Aspiration unit front-back motor error	⇒ 25
		Aspiration unit up-down motor error	⇒ 25
B		Background check error	⇒ 33
		Barcode reader communication error	⇒ 31
		Blood cannot be aspirated.	⇒ 26
		Bubbles in RBC detector	⇒ 40
C		Cannot recognize Fluorocell WDF information	⇒ 63
		Cannot recognize sampler adapter	⇒ 67
		CELLPACK DCL has expired	⇒ 57
		Check Measurement Mode	⇒ 33
		Control has expired.	⇒ 32
		Control is not entered.	⇒ 32
D		Data Errors	⇒ 46
E		Environment temperature is high	⇒ 15
		Environment temperature is low	⇒ 15
	☎	Environment temperature thermistor error	⇒ 15
		Execute Routine Cleaning	⇒ 51
		Execute Routine Cleaning (warning)	⇒ 51

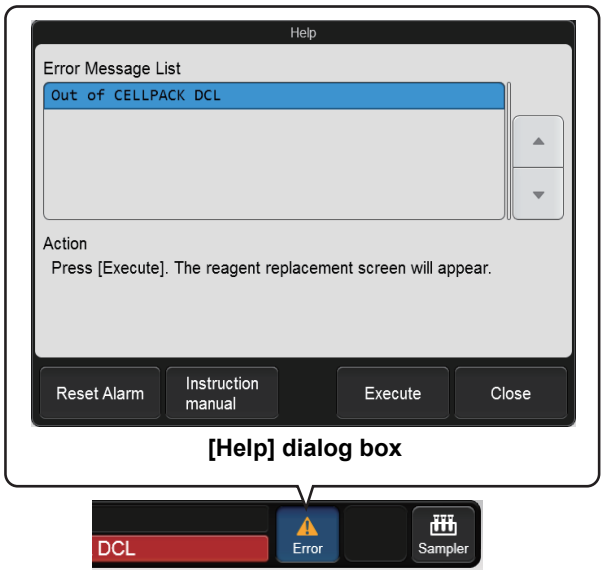
		Error message	Action
F		Failed to acquire items.	⇒ 30
		Failed to read sample number.	⇒ 30
	☎	FCM cover is open.	⇒ 50
		FCM reaction chamber temperature is high	⇒ 15
		FCM reaction chamber temperature is low	⇒ 15
	☎	FCM reaction chamber thermistor error	⇒ 15
		FCM sheath aspiration error	⇒ 19
	☎	FCM sheath thermistor error	⇒ 15
		Fluorocell WDF aspiration error	⇒ 19
		Fluorocell WDF has already been used	⇒ 61
		Fluorocell WDF has expired	⇒ 58
		Fluorocell WDF is not installed	⇒ 60
		Fluorocell WDF RFID tag error	⇒ 64
H		Hand F-B motor error	⇒ 67
		Hand L-R motor error	⇒ 67
		Hand open/close error	⇒ 67
		Hand up-down error	⇒ 67
		HGB error	⇒ 42
I		Insufficient blood volume (short sample)	⇒ 26
	☎	Internal Error	⇒ 32
		Invalid analysis item is specified	⇒ 31
		Invalid analysis item is specified (sampler analysis)	⇒ 31
L		L-J Control Error	⇒ 32
	☎	Laser life	⇒ 31
	☎	Laser output error	⇒ 31
		Low count error	⇒ 47
		Lysercell WDF has expired	⇒ 57
M		Mixing error	⇒ 67
O		Out of CELLPACK DCL	⇒ 16
		Out of diluted CELLPACK DST	⇒ 24
		Out of Fluorocell WDF	⇒ 17
		Out of Lysercell WDF	⇒ 16
		Out of SULFOLYSER	⇒ 16

		Error message	Action
P		Piercer replacement is required.	⇒ 51
		PLT channel error	⇒ 43
		PLT sampling error	⇒ 34
		Press Start SW	⇒ 60
	☎	Pressure Sensor Error	⇒ 14
Q		QC not executed.	⇒ 33
R		RBC channel error	⇒ 43
		RBC detector clog	⇒ 40
		RBC sampling error	⇒ 34
		RBC sheath fluid aspiration error	⇒ 19
		RBC/HGB chamber not draining	⇒ 22
		Reagent heater temperature is high	⇒ 15
		Reagent heater temperature is low	⇒ 15
	☎	Reagent heater thermistor error	⇒ 15
		Replace air pump.	⇒ 54
		RFID communication error	⇒ 32
		Right cover is open	⇒ 50
		Right cover is opened	⇒ 50
		Rinse cup pinch valve move error	⇒ 23
S		Sample number not input	⇒ 30
		Sampler Adapter holder is open.	⇒ 66
		Sampler Adapter holder is opened.	⇒ 67
		Sampler adapter is not placed	⇒ 67
		Sampler cover (front) is open.	⇒ 66
		Sampler cover (front) is opened.	⇒ 66
		Sampler cover (manual unit) is open.	⇒ 66
		Sampler cover (manual unit) is opened.	⇒ 66
		Sheath motor error	⇒ 25
		SULFOLYSER has expired	⇒ 57
T	☎	Temperature stabilizing error	⇒ 15
		The dye holder is open.	⇒ 50
		The tube holder is opened.	⇒ 50
		Tube holder motor move error	⇒ 25
		Tube remains in tube holder	⇒ 30
		Two tubes are in tube holder	⇒ 30

		Error message	Action
V	☎	Vacuum Sensor Error	⇒ 14
W		Waste chamber 1 not draining	⇒ 20
		Waste chamber1 pinch valve move error	⇒ 23
		Waste chamber 2 not draining	⇒ 20
		Waste chamber2 pinch valve move error	⇒ 23
		Waste container is full	⇒ 23
	☎	Water leak detected	⇒ 24
	☎	Water leak detected (analysis not possible)	⇒ 24
	☎	Water leak sensor error	⇒ 24
		WB aspiration motor error	⇒ 24
		WBCchamb not draining	⇒ 23
		WDF channel error	⇒ 43
		WDF sampling error	⇒ 37
		WDF Scattergram sensitivity error	⇒ 33
		Wrong reagent installed in Fluorocell WDF holder	⇒ 60
X		X-bar control error	⇒ 32
		X-barM control error	⇒ 32

1.2 [Help] dialog box

When an error occurs, the [Help] dialog box appears.
If an error occurs while another dialog box is displayed, [Error] will appear in the control menu at the bottom of the screen.
Close the dialog box that appear, and touch [Error]. The [Help] dialog box appears.
You can check details on the error and what action to take in the [Help] dialog box. Respond to the error according to the message shown in the [Action] field.



[Help] dialog box

[Error Message List]	Displays the current errors. If multiple errors exist, errors that have higher priority are displayed at the top.
[Action]	Displays the troubleshooting actions for the selected error. Depending on the type of error, this field may be blank.
[Reset Alarm]	Touch to stop the alarm.
[Instruction manual]	Touch to display the section of the manual that explains the selected error. This button cannot be selected if there are no relevant sections.
[Execute]/[Accept]	Depending on the error type, either the [Execute] button or the [Accept] button appears. Touch [Execute] to execute the action indicated in the [Action] field. Touch [Accept] to clear the error. Execute the action indicated in the [Action] field.
[Close]	Touch to close the [Help] dialog box.

Note:

- After you have closed the [Help] dialog box by touching [Close], you can re-display the dialog box by touching [Error] in the control menu.
- Even if the [Help] dialog box does not open, you can stop the alarm by touching any part of the screen.

1.3 Causes of errors and remedial actions

When an error occurs, the [Help] dialog box appears. Refer to the causes and actions described below and take appropriate action.
If there is more than 1 possible cause, take action in order from case 1.

Risk of infection

When taking remedial action to handle an error, wear adequate personal protective equipment, such as protective gloves, a protective mask, protective eyewear, and a lab coat. Wash your hands after completing the task.
There is a risk of infection.

Errors related to the pressure

Abnormal pressure loss	
Probable cause	Actions
The air pump has malfunctioned.	Touch [Execute] in the [Help] dialog box. An air pump test is executed.

0.06 MPa pressure error	
Probable cause	Actions
The 0.06 MPa relief valve has malfunctioned.	Touch [Execute] in the [Help] dialog box. An air pump test is executed.

-0.03 MPa pressure error	
Probable cause	Actions
Case 1: The -0.03 MPa relief valve has malfunctioned.	Touch [Execute] in the [Help] dialog box. An air pump test is executed.
Case 2: The pneumatic trap chamber is full of water.	Drain the pneumatic trap chamber. For details, see the following.

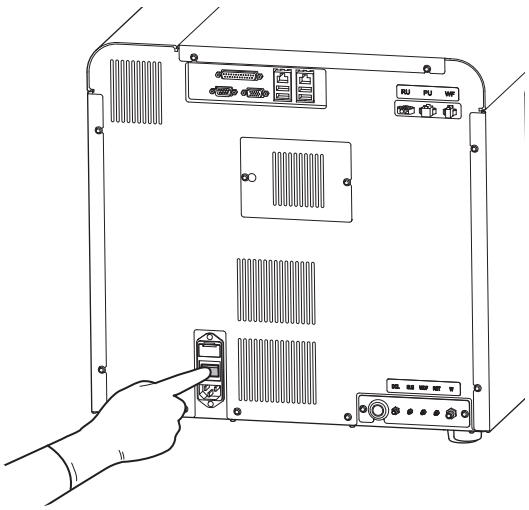
Draining the pneumatic trap chamber

Caution!
If water collects every day, it is possible that a failure has occurred in the analyzer.
Contact your Sysmex service representative.

1 Shut down the instrument.

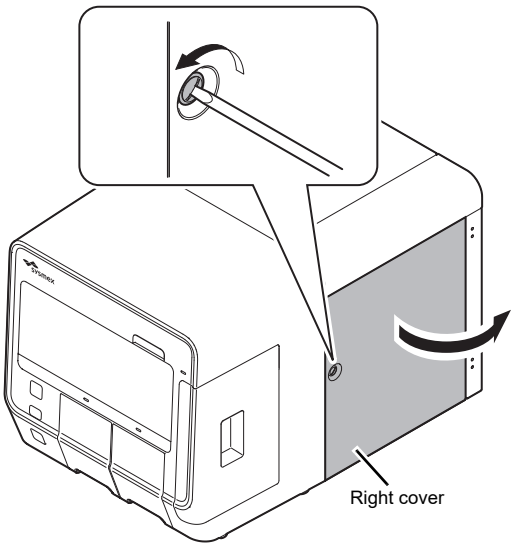
1. **Make sure the instrument is not in operation.**
2. **Remove the sample tube from the sample tube holder. (XN-530/XN-430 only)**
3. **Touch the [Menu] button on the toolbar.**
   The [Menu] screen appears.
4. **Touch the [Shutdown] icon.**
   The [Shutdown] dialog box appears.
5. **Touch [OK].**
   The instrument power automatically turns OFF.

2 Turn OFF the main power switch.



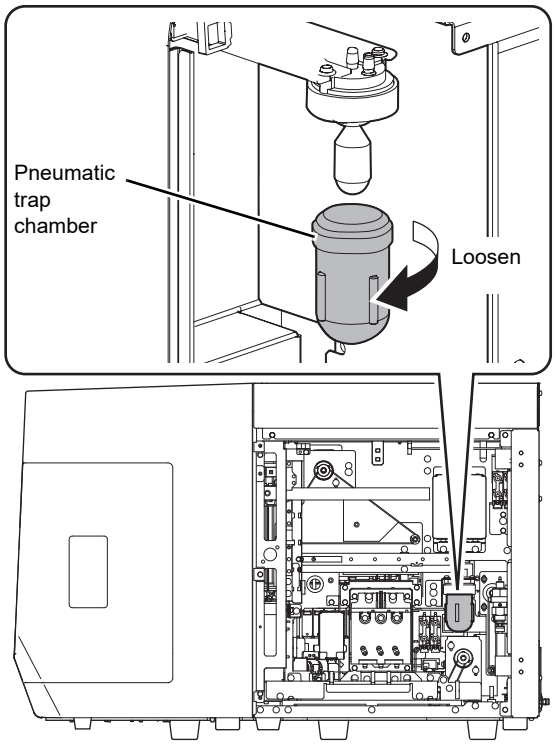
3 Open the right cover.

Release the lock by turning to the left with a flathead screwdriver, and open the right cover.



Example: XN-530

4 Turn the pneumatic trap chamber in the direction of the arrow to remove.

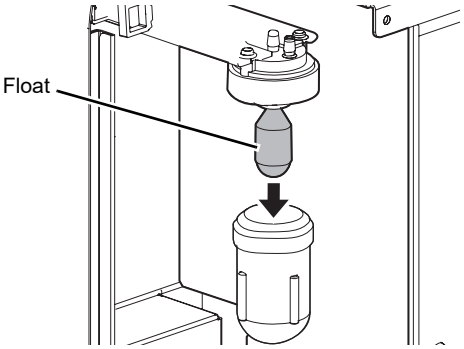


Example: XN-530

5 Dispose of the water in the chamber.

6 Remove the float, and insert into the pneumatic trap chamber.

Insert the float into the pneumatic trap chamber in the same orientation as when you removed it.



7 Turn the pneumatic trap chamber in the direction opposite to that of step 4 to attach.

8 Close the right cover and lock.

9 Turn ON the main power switch.

10 Press the power switch.

Pressure Sensor Error	
Probable cause	Actions
The pressure sensor has malfunctioned.	Remove the sampler adapter (XN-530 only) and sample tubes from the instrument, and then touch [Execute] in the [Help] dialog box. Instrument shutdown is executed. When shutdown is finished, turn OFF the main power switch. The instrument requires servicing. Contact your Sysmex service representative.

Vacuum Sensor Error	
Probable cause	Actions
The vacuum sensor has malfunctioned.	Remove the sampler adapter (XN-530 only) and sample tubes from the instrument, and then touch [Execute] in the [Help] dialog box. Instrument shutdown is executed. When shutdown is finished, turn OFF the main power switch. The instrument requires servicing. Contact your Sysmex service representative.

Errors related to the temperature

FCM reaction chamber temperature is high, FCM reaction chamber temperature is low, Reagent heater temperature is high, Reagent heater temperature is low	
Probable cause	Actions
The temperature of the unit has fallen out of the monitored range.	Touch [Execute] in the [Help] dialog box. While checking the [Sensor Display] dialog box that appears, wait for the temperature to return within the monitored range. (➤**P.83** "Chapter 2: 2.11 Checking the instrument status (sensor)") If the error has not cleared after 30 minutes, contact your Sysmex service representative.

Environment temperature is high, Environment temperature is low	
Probable cause	Actions
The ambient temperature of the instrument has fallen out of the usable range (7 to 40°C).	Touch [Execute] in the [Help] dialog box. Check [Environment Temp.] in the [Sensor Display] dialog box that appears and adjust the room temperature. (➤**P.83** "Chapter 2: 2.11 Checking the instrument status (sensor)")

FCM reaction chamber thermistor error, Reagent heater thermistor error, Environment temperature thermistor error, FCM sheath thermistor error	
Probable cause	Actions
The thermistor in the unit has malfunctioned, or there is a circuit break.	Remove the sampler adapter (XN-530 only) and sample tubes from the instrument, and then touch [Execute] in the [Help] dialog box. Instrument shutdown is executed. When shutdown is finished, turn OFF the main power switch. The instrument requires servicing. Contact your Sysmex service representative.

Temperature stabilizing error	
Probable cause	Actions
The temperature of the unit is not stabilizing.	Remove the sampler adapter (XN-530 only) and sample tubes from the instrument, and then touch [Execute] in the [Help] dialog box. Instrument shutdown is executed. When shutdown is finished, turn OFF the main power switch. The instrument requires servicing. Contact your Sysmex service representative.

Errors related to the reagents and chambers

Out of CELLPACK DCL, Out of SULFOLYSER, Out of Lysercell WDF	
Probable cause	Actions
Case 1: There is a foreign object pressing on the tubing connected to the reagent container, or there is a kink in the tubing.	Remove the object that is pressing on the tubing, and straighten the tubing.
Case 2: The reagent has run out.	Touch [Execute] in the [Help] dialog box. The [Reagent Replacement] dialog box appears. Replace the reagent. For details, see the following.

Replacing the diluent and hemolytic agent

1 Prepare a new reagent.

Make sure the reagent has not expired.

Caution!

- Place the reagent container at a level no more than 1 meter above or below the bottom of the analyzer. Do not place reagents on top of the instrument.
- The new reagent must be allowed to sit for at least 24 hours at room temperature (15 to 35°C) before use.
- If reagent spills, immediately wipe up the spill using a moistened cloth.

2 Touch [Execute] in the [Help] dialog box.

The [Reagent Replacement] dialog box appears.

(➤**P.84** "Chapter 2: 2.12.1 [Reagent Replacement] dialog box")

3 Input the reagent code (barcode) of the new reagent.

Input by reading the barcode

Scan the reagent code (barcode) on the outer box of the new reagent with the hand-held barcode reader. The reagent code is as shown below.

Make sure the barcode scanning surface is flat before scanning.

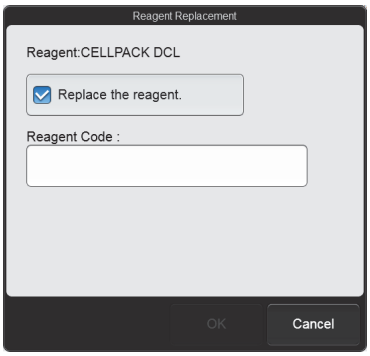
Note:

In case the reagent outer box label shows a "XN Reagent Code" or "Reagent Code 2" barcode, please scan this barcode.

When the reagent code is entered, the reagent in the dialog box shows [Received]. The lot number and expiration date show the information of the new reagent.

Note:

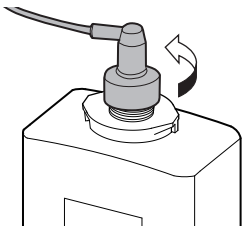
When inputting manually, touch the name of the reagent to be replaced in the [Reagent Replacement] dialog box. The dialog box below appears.



Touch [Replace the reagent.] to select the checkbox, enter the [Reagent Code :], and touch [OK].

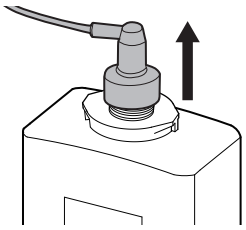
4 Remove the cap from the new reagent container.

5 Remove the cap from the old reagent container.



Example: Lysercell WDF (2 L)

6 Pull the spout set straight up and out.



Caution!
Do not touch the aspiration nozzle on the spout set. Take care that dust does not get on the spout set.

7 Insert the spout set straight into the new reagent container and close the cap.

8 Touch [Execute].

Reagent replacement starts. Wait until this process finishes. When replacement finishes, the [Reagent Replacement] dialog box closes.

Time guidelines for reagent replacement are shown below.

Reagent name	Time
CELLPACK DCL	Approx. 1 minute
SULFOLYSER	Approx. 2 1/2 minutes
Lysercell WDF	Approx. 3 1/2 minutes

Out of Fluorocell WDF	
Probable cause	Actions
The reagent has run out.	Replace the reagent. For details, see the following.

Replacing the dye

Caution!
While performing replacement, always wear adequate personal protective equipment.

1 Touch [Execute] in the [Help] dialog box.

The [Reagent Replacement] dialog box appears.

(➤**P.84** "Chapter 2: 2.12.1 [Reagent Replacement] dialog box")

When touching [Close] in the [Help] dialog box:
Follow the steps below to display the [Reagent Replacement] dialog box.

***1* Touch the [Maintenance] icon in the [Menu] screen.**

The [Maintenance] menu screen appears.

***2* Touch the [Exchange] icon.**

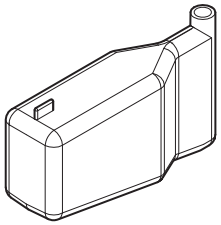
The [Exchange] dialog box appears.

***3* Touch [Reagent Replacement].**

The [Reagent Replacement] dialog box appears.

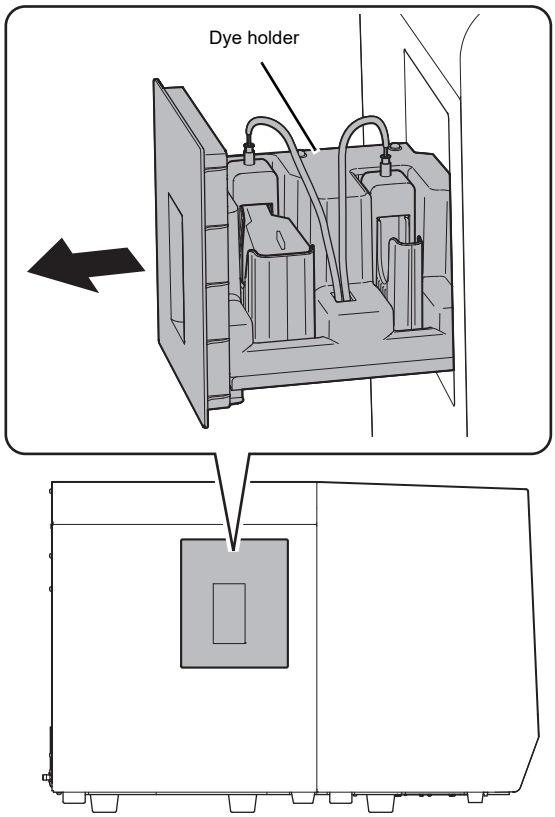
2 Prepare a new reagent cartridge.

Make sure the reagent has not expired.



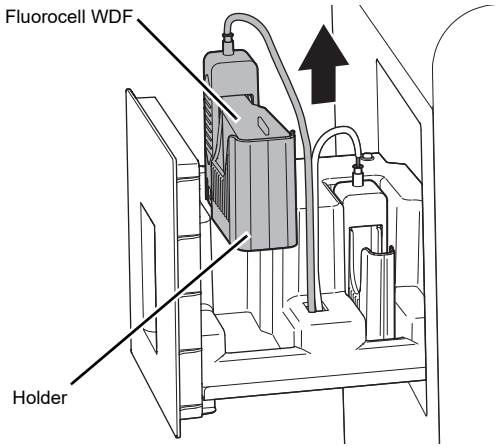
Example: Fluorocell WDF

3 Pull out the dye holder.

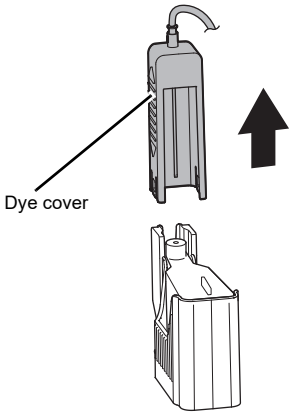


Example: XN-530

4 Remove the entire dye holder.



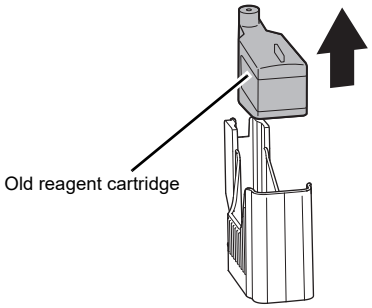
5 Slowly remove the dye cover, taking care that the dye does not drip.



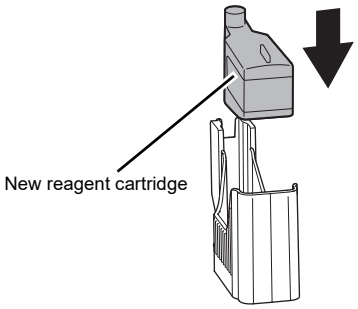
⚠ Caution!

Dye may drip from the nozzle on the dye cover.
If dye drips onto the instrument, immediately wipe it off using a moistened cloth. Otherwise, the coated surface of the instrument may become discolored.

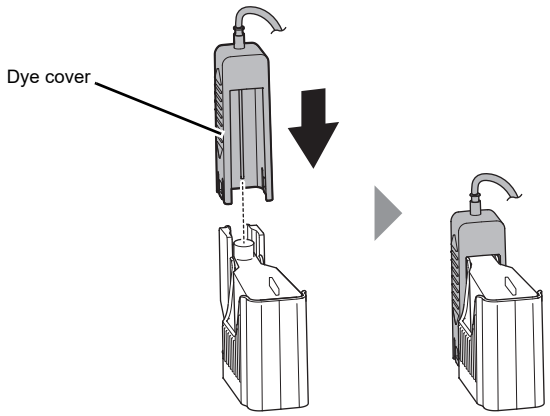
6 Remove the old reagent cartridge from the holder.



7 Insert the new reagent cartridge in the holder.



8 Place the dye cover.



9 Place the holder in the dye holder.

10 Close the dye holder.

The information on the RFID tag of the cartridge is read, and if normal, a beep sounds. The lot number and expiration date show the information of the new reagent.

Information

Be sure to push the dye holder all the way in.

FCM sheath aspiration error, RBC sheath fluid aspiration error	
Probable cause	Actions
• The tubing connected to the reagent container is clogged. • There is a foreign object pressing on the tubing connected to the reagent container, or there is a kink in the tubing.	Check the condition of the tubes, and then touch [Execute] in the [Help] dialog box. Reagent replacement takes place.

Fluorocell WDF aspiration error	
Probable cause	Actions
• The dye cover opened. • Air bubbles have formed in the tubing connected to the cartridge.	Check the condition of the dye cover, and then touch [Execute] in the [Help] dialog box. Reagent replacement takes place.

Waste chamber 1 not draining, Waste chamber 2 not draining	
Probable cause	Actions
The drain tubing is clogged.	Touch [Execute] in the [Help] dialog box. The waste chamber is drained. If the error does not clear, rinse the waste chamber. For details, see the following. XN-530 (➤**P.20** "Rinsing the waste chamber (XN-530)") XN-430 (➤**P.21** "Rinsing the waste chamber (XN-430)") XN-330 (➤**P.22** "Rinsing the waste chamber (XN-330)")

Rinsing the waste chamber (XN-530)

1 Touch the [Maintenance] icon in the [Menu] screen.

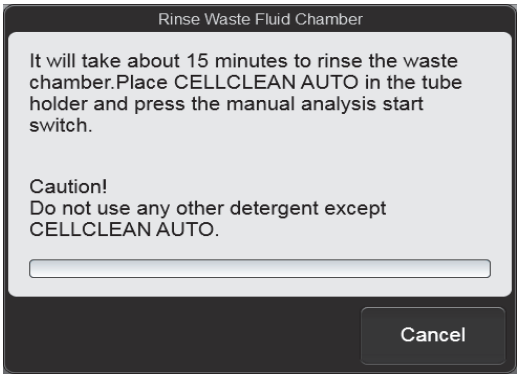
The [Maintenance] menu screen appears.

2 Touch the [Rinse Instrument] icon.

The [Rinse Instrument] dialog box appears.

3 Touch [Rinse Waste Fluid Chamber].

The [Rinse Waste Fluid Chamber] dialog box appears.

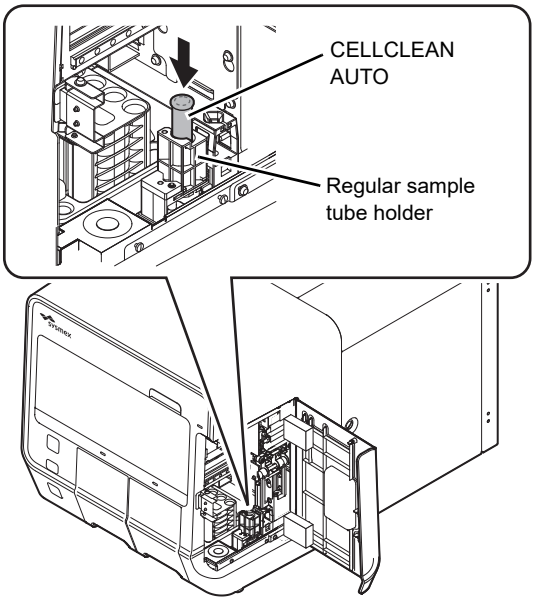


[Rinse Waste Fluid Chamber] dialog box

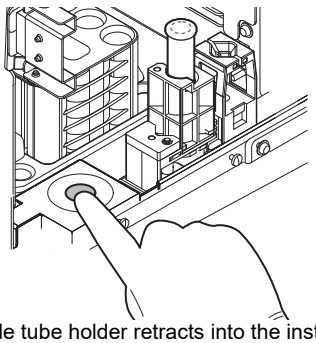
4 Open the sampler cover (manual unit).

5 Place CELLCLEAN AUTO in the sample tube holder.

Place in the regular sample tube holder.



6 Press the start switch.



The sample tube holder retracts into the instrument and aspiration starts. When aspiration finishes, cleaning starts and the sample tube holder is ejected.

7 **Remove CELLCLEAN AUTO.**

8 **Close the sampler cover (manual unit).**

9 **Wait until cleaning finishes.**

When the process finishes, the dialog box closes.

Rinsing the waste chamber (XN-430)

1 **Touch the [Maintenance] icon in the [Menu] screen.**

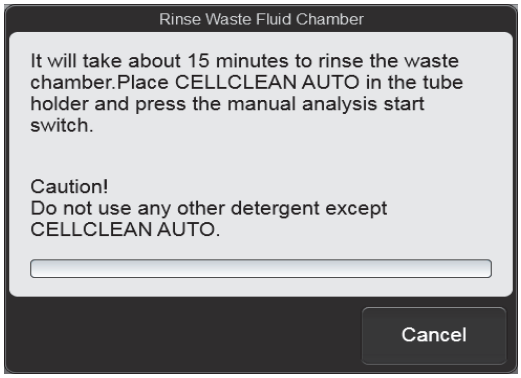
The [Maintenance] menu screen appears.

2 **Touch the [Rinse Instrument] icon.**

The [Rinse Instrument] dialog box appears.

3 **Touch [Rinse Waste Fluid Chamber].**

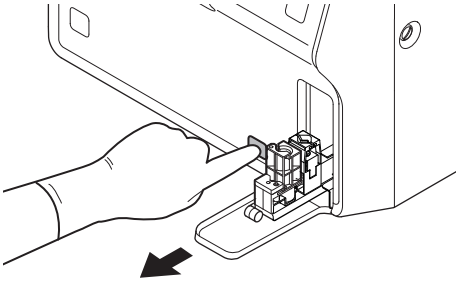
The [Rinse Waste Fluid Chamber] dialog box appears.



[Rinse Waste Fluid Chamber] dialog box

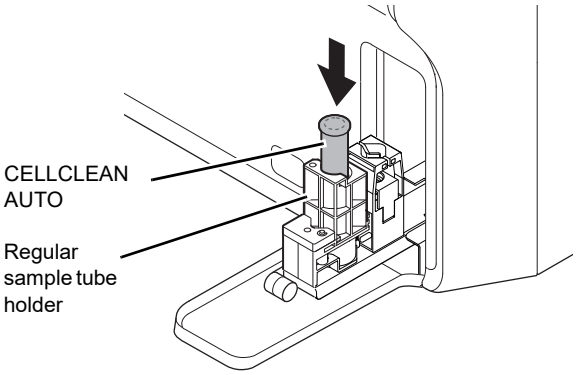
4 **If the sample tube holder is not ejected, press the sample tube holder open/close switch.**

The sample tube holder is ejected.

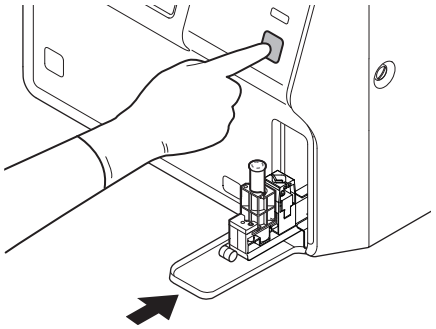


5 **Place CELLCLEAN AUTO in the sample tube holder.**

Place in the regular sample tube holder.



6 **Press the start switch.**



The sample tube holder retracts into the instrument and aspiration starts. When aspiration finishes, cleaning starts and the sample tube holder is ejected.

7 **Remove CELLCLEAN AUTO.**

8 **Wait until cleaning finishes.**

When the process finishes, the dialog box closes.

Rinsing the waste chamber (XN-330)

1 Touch the [Maintenance] icon in the [Menu] screen.

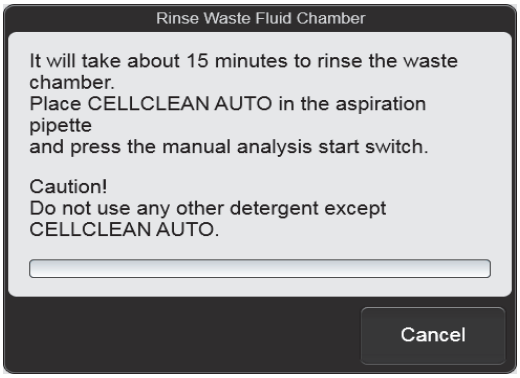
The [Maintenance] menu screen appears.

2 Touch the [Rinse Instrument] icon.

The [Rinse Instrument] dialog box appears.

3 Touch [Rinse Waste Fluid Chamber].

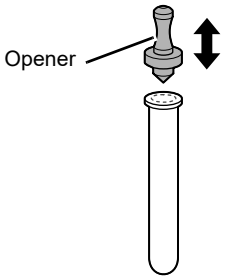
The [Rinse Waste Fluid Chamber] dialog box appears.



[Rinse Waste Fluid Chamber] dialog box

4 Open CELLCLEAN AUTO with the special CELLCLEAN AUTO opener.

With CELLCLEAN AUTO held straight as shown, press the opener down until you hear a “pop” sound.

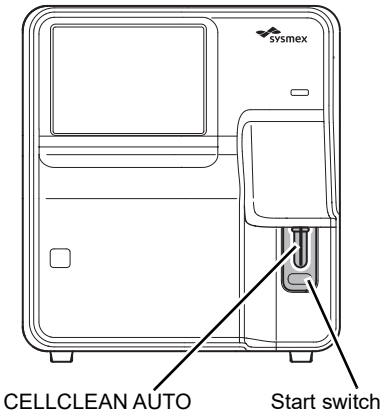


Keep the opener attached, and remove immediately before you use CELLCLEAN AUTO.

⚠ Caution!

- Always wear adequate personal protective equipment when opening CELLCLEAN AUTO.
- Press down slowly so that the fluid does not spill.
- Store opened CELLCLEAN AUTO standing on the rack with the opener attached. If CELLCLEAN AUTO is tilted, the fluid may leak even with the opener attached.

5 Insert the pipette all the way to the bottom of the CELLCLEAN AUTO, and press the start switch.



Aspiration starts.

During aspiration, the analysis status indicator LED blinks green and the beeper sounds repeatedly.

When aspiration finishes, the analysis status indicator LED turns off and the beeping stops. Cleaning starts.

6 Remove CELLCLEAN AUTO from the pipette.

Remove CELLCLEAN AUTO without bending the pipette.

7 Wait until cleaning finishes.

When the process finishes, the dialog box closes.

RBC/HGB chamber not draining	
Probable cause	Actions
The drain tubing is clogged.	Touch [Execute] in the [Help] dialog box. The sample is drained from the reaction chamber.

WBCchamb not draining	
Probable cause	Actions
The drain tubing is clogged.	Touch [Execute] in the [Help] dialog box. The sample is drained from the reaction chamber.

Rinse cup pinch valve move error, Waste chamber1 pinch valve move error, Waste chamber2 pinch valve move error	
Probable cause	Actions
The pinch valve has malfunctioned.	Touch [Execute] in the [Help] dialog box. A pinch valve test is executed. If the error does not clear, the device requires servicing. Contact your Sysmex service representative.

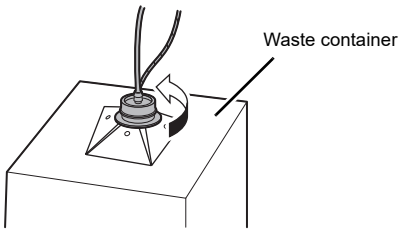
Waste container is full	
Probable cause	Actions
The waste container is full.	Replace the waste container, and then touch [Accept] in the [Help] dialog box. To replace the waste container, see the following.

Replacing the waste container

Risk of infection
Take care that waste fluid does not splash.

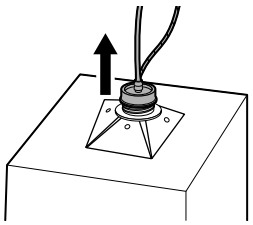
1 **Prepare an empty waste container and remove the cap.**

2 **Turn the cap on the full waste container in the direction of the arrow to loosen.**



3 **Lift the cap with the tube connected straight up.**

Dispose of the full waste container in accordance with local laws and regulations.



4 **Insert the cap with the tube connected straight into the new waste container.**

5 **Close the cap by turning it in the direction opposite to that of step 2.**

6 **Touch [Accept] in the [Help] dialog box.**

Caution!
Install the waste container below the bottom of the instrument.

Water leak detected	
Probable cause	Actions
There is a water leak inside the instrument.	Touch [Execute] in the [Help] dialog box. Instrument shutdown is executed. When shutdown is finished, turn OFF the main power switch, and wipe off the water when the instrument is wet. The instrument requires servicing. Contact your Sysmex service representative.

Water leak detected (analysis not possible)	
Probable cause	Actions
There is a water leak inside the instrument.	Touch [Execute] in the [Help] dialog box. Instrument shutdown is executed. When shutdown is finished, turn OFF the main power switch. The instrument requires servicing. Contact your Sysmex service representative.

Water leak sensor error	
Probable cause	Actions
The water leak sensor has malfunctioned.	Remove the sampler adapter (XN-530 only) and sample tubes from the instrument, and then touch [Execute] in the [Help] dialog box. Instrument shutdown is executed. When shutdown is finished, turn OFF the main power switch. The instrument requires servicing. Contact your Sysmex service representative.

Out of diluted CELLPACK DST	
Probable cause	Actions
CELLPACK DST has run out.	Check the RU-20. If being prepared, wait briefly. If the error does not clear, the replacement of CELLPACK DST is required. For details, see "RU-20 Instructions for Use". (➤RU-20 Instructions for Use, "Chapter 6: 6.3 Replacing the reagent")

Errors related to the motors

WB aspiration motor error	
Probable cause	Actions
The whole blood aspiration motor has malfunctioned.	Touch [Execute] in the [Help] dialog box. A whole blood aspiration motor test is executed. If the error does not clear, the instrument requires servicing. Contact your Sysmex service representative.

Sheath motor error	
Probable cause	Actions
The sheath motor has malfunctioned.	Touch [Execute] in the [Help] dialog box. A sheath motor test is executed. If the error does not clear, the instrument requires servicing. Contact your Sysmex service representative.

Aspiration unit up-down motor error	
Probable cause	Actions
The aspiration unit up-down motor has malfunctioned.	Touch [Execute] in the [Help] dialog box. Instrument shutdown is executed. When shutdown is finished, turn the main power switch OFF and then ON. If the error does not clear, the instrument requires servicing. Contact your Sysmex service representative.

Aspiration unit front-back motor error	
Probable cause	Actions
The aspiration unit front-back motor has malfunctioned.	Touch [Execute] in the [Help] dialog box. An aspiration unit motor test is executed. If the error does not clear, the instrument requires servicing. Contact your Sysmex service representative.

Tube holder motor move error	
Probable cause	Actions
The sample tube holder motor has malfunctioned.	Remove the sample tubes, and then touch [Execute] in the [Help] dialog box. A sample tube holder motor test is executed. If the error does not clear, the instrument requires servicing. Contact your Sysmex service representative.

Errors related to the blood aspiration

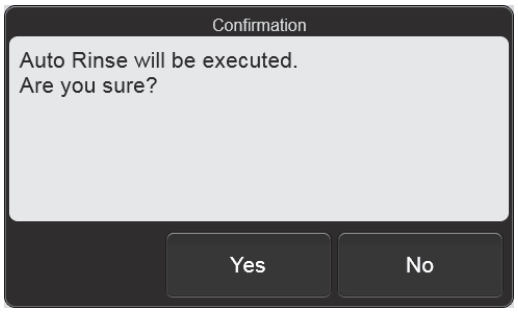
Insufficient blood volume (short sample)	
Probable cause	Actions
Case 1: Insufficient blood volume.	Touch [Accept] in the [Help] dialog box. Prepare sufficient amount of blood.
Case 2: The blood is very thin. (The aspiration sensor cannot detect the blood.)	Touch [Accept] in the [Help] dialog box. Stop use of the aspiration sensor temporarily in the settings and repeat analysis. For details on the aspiration sensor settings, see "Basic Operation". (➤Basic Operation, "Chapter 7: 7.9.1 Aspiration sensor settings")
Case 3: The piercer (XN-530/XN-430), pipette (XN-330), or whole blood aspiration line tubing is clogged.	Touch [Accept] in the [Help] dialog box. Execute auto rinse. For details, see the following. (➤**P.27** "Executing auto rinse") If the error persists Execute routine cleaning. For details, see the following. XN-530 (➤**P.27** "Executing routine cleaning (XN-530)") XN-430 (➤**P.28** "Executing routine cleaning (XN-430)") XN-330 (➤**P.29** "Executing routine cleaning (XN-330)") If the error persists Replace the piercer (XN-530/XN-430). Contact your Sysmex service representative.

Blood cannot be aspirated.	
Probable cause	Actions
Case 1: The density of the sample is inconsistent.	Touch [Accept] in the [Help] dialog box. Mix the sample well and then analyze.
Case 2: The piercer (XN-530/XN-430), pipette (XN-330), or whole blood aspiration line tubing is clogged.	Execute auto rinse. For details, see the following. (➤**P.27** "Executing auto rinse") If the error persists Execute routine cleaning. For details, see the following. XN-530 (➤**P.27** "Executing routine cleaning (XN-530)") XN-430 (➤**P.28** "Executing routine cleaning (XN-430)") XN-330 (➤**P.29** "Executing routine cleaning (XN-330)") If the error persists Replace the piercer (XN-530/XN-430). Contact your Sysmex service representative.

Executing auto rinse

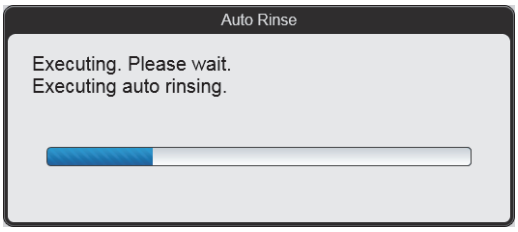
1 Touch the [Auto Rinse] icon in the [Menu] screen.

The following dialog box appears.



2 Touch [Yes].

Auto rinse starts and the [Auto Rinse] dialog box appears.



[Auto Rinse] dialog box

Wait until this process finishes. When the process finishes, the dialog box closes and a background check starts.

Executing routine cleaning (XN-530)

1 Touch the [Maintenance] icon in the [Menu] screen.

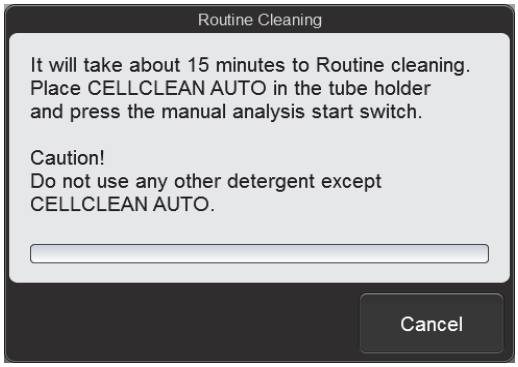
The [Maintenance] menu screen appears.

2 Touch the [Rinse Instrument] icon.

The [Rinse Instrument] dialog box appears.

3 Touch [Routine Cleaning].

The [Routine Cleaning] dialog box appears.

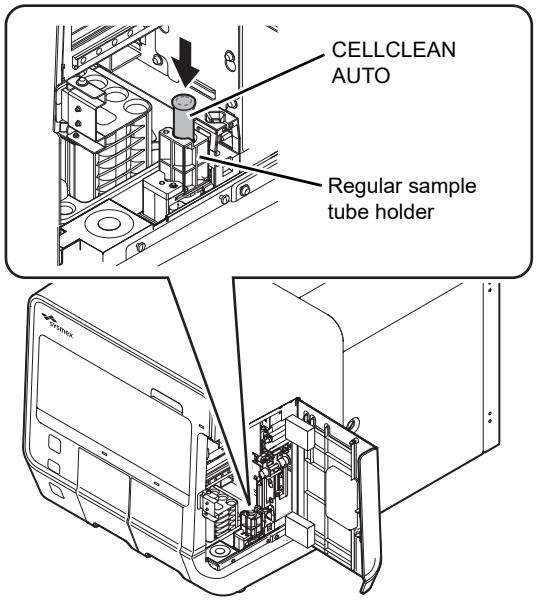


[Routine Cleaning] dialog box

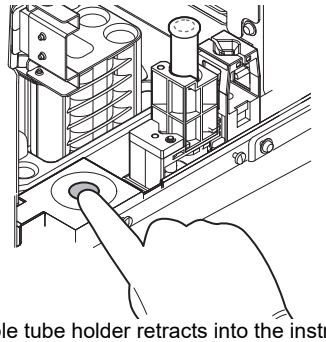
4 Open the sampler cover (manual unit).

5 Place CELLCLEAN AUTO in the sample tube holder.

Place in the regular sample tube holder.



6 **Press the start switch.**



The sample tube holder retracts into the instrument and aspiration starts. When aspiration finishes, cleaning starts and the sample tube holder is ejected.

7 **Remove CELLCLEAN AUTO.**

8 **Close the sampler cover (manual unit).**

9 **Wait until cleaning finishes.**

When the process finishes, the dialog box closes, and the instrument power automatically turns OFF.

Executing routine cleaning (XN-430)

1 **Touch the [Maintenance] icon in the [Menu] screen.**

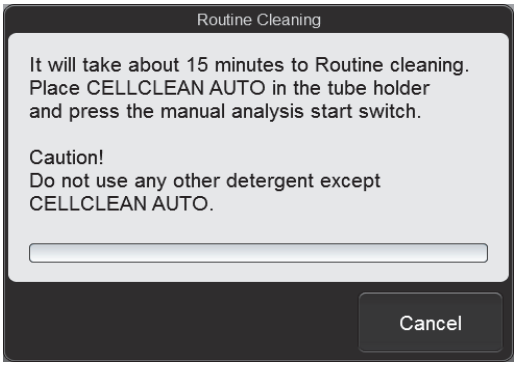
The [Maintenance] menu screen appears.

2 **Touch the [Rinse Instrument] icon.**

The [Rinse Instrument] dialog box appears.

3 **Touch [Routine Cleaning].**

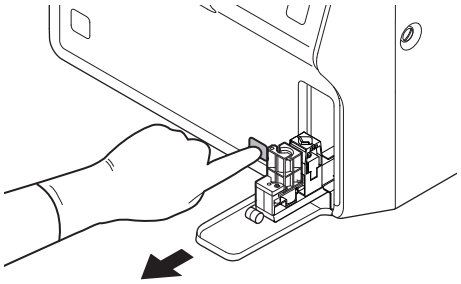
The [Routine Cleaning] dialog box appears.



[Routine Cleaning] dialog box

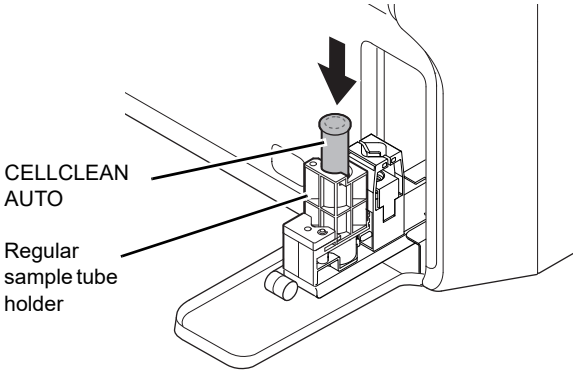
4 **If the sample tube holder is not ejected, press the sample tube holder open/close switch.**

The sample tube holder is ejected.

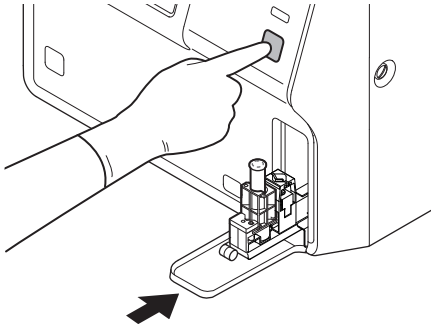


5 **Place CELLCLEAN AUTO in the sample tube holder.**

Place in the regular sample tube holder.



6 **Press the start switch.**



The sample tube holder retracts into the instrument and aspiration starts. When aspiration finishes, cleaning starts and the sample tube holder is ejected.

7 **Remove CELLCLEAN AUTO.**

8 **Wait until cleaning finishes.**

When the process finishes, the dialog box closes, and the instrument power automatically turns OFF.

Executing routine cleaning (XN-330)

1 Touch the [Maintenance] icon in the [Menu] screen.

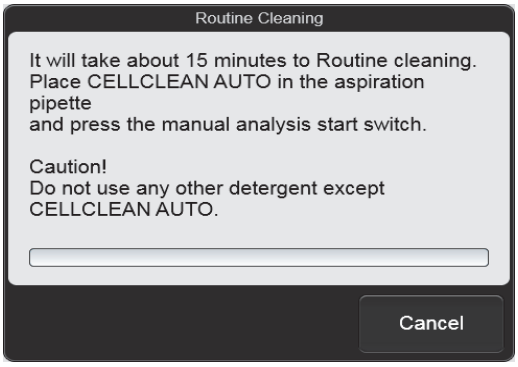
The [Maintenance] menu screen appears.

2 Touch the [Rinse Instrument] icon.

The [Rinse Instrument] dialog box appears.

3 Touch [Routine Cleaning].

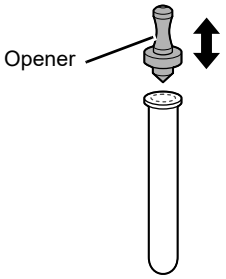
The [Routine Cleaning] dialog box appears.



[Routine Cleaning] dialog box

4 Open CELLCLEAN AUTO with the special CELLCLEAN AUTO opener.

With CELLCLEAN AUTO held straight as shown, press the opener down until you hear a “pop” sound.

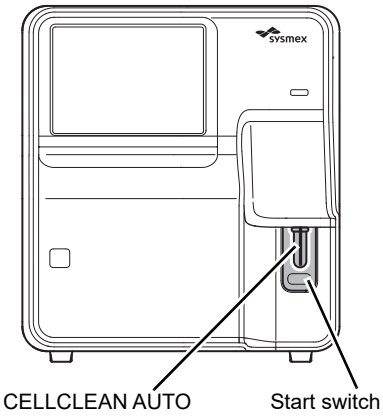


Keep the opener attached, and remove immediately before you use CELLCLEAN AUTO.

⚠ Caution!

- Always wear adequate personal protective equipment when opening CELLCLEAN AUTO.
- Press down slowly so that the fluid does not spill.
- Store opened CELLCLEAN AUTO standing on the rack with the opener attached. If CELLCLEAN AUTO is tilted, the fluid may leak even with the opener attached.

5 Insert the pipette all the way to the bottom of the CELLCLEAN AUTO, and press the start switch.



Aspiration starts.

During aspiration, the analysis status indicator LED blinks green and the beeper sounds repeatedly.

When aspiration finishes, the analysis status indicator LED turns off and the beeping stops. Cleaning starts.

6 Remove CELLCLEAN AUTO from the pipette.

Remove CELLCLEAN AUTO without bending the pipette.

7 Wait until cleaning finishes.

When the process finishes, the dialog box closes, and the instrument power automatically turns OFF.

Aspiration Sensor error	
Probable cause	Actions
The aspiration sensor has malfunctioned.	Touch [Accept] in the [Help] dialog box. The instrument requires servicing. Contact your Sysmex service representative.

Errors related to the sample tube holder

Tube remains in tube holder	
Probable cause	Actions
A sample tube was still in the sample tube holder when analysis started. The hand did not work properly during sampler analysis.	Remove the sample tube, and then touch [Accept] in the [Help] dialog box.

Two tubes are in tube holder	
Probable cause	Actions
Both a regular sample tube and a micro collection tube were set for manual analysis.	Remove the sample tube that will not be analyzed, and then touch [Accept] in the [Help] dialog box.

Failed to acquire items.	
Probable cause	Actions
The set amount of time (60 seconds) elapsed after the host computer was queried for analysis information during sampler analysis.	Pull out the sampler adapter holder and remix the sample tube in the starting tube position (adapter number – test tube position) shown in the instrument status on the left side of the control menu. Replace the sample tube in its original position, push in the sampler adapter holder, and touch [Accept] in the [Help] dialog box.

Errors related to the sample numbers

Sample number not input	
Probable cause	Actions
No sample number was specified at the time of manual analysis.	Touch [Accept] in the [Help] dialog box. Enter the sample number and then execute the analysis.

Failed to read sample number.	
Probable cause	Actions
The barcode label is dirty. The print condition of the barcode label is poor. The position or orientation of the barcode label is poor.	Touch [Accept] in the [Help] dialog box. Check the position and orientation of the barcode label, and if the barcode label is dirty.

Errors related to the orders

Analysis item not specified	
Probable cause	Actions
No analysis item was specified at the time of manual analysis.	Touch [Accept] in the [Help] dialog box. Specify the analysis item and then execute analysis.

Invalid analysis item is specified	
Probable cause	Actions
An invalid analysis item is specified.	Touch [Accept] in the [Help] dialog box. Change the analysis item and then execute analysis.

Invalid analysis item is specified (sampler analysis)	
Probable cause	Actions
During sampler analysis, a sample had an analysis parameter that cannot be analyzed.	Touch [Accept] in the [Help] dialog box. The error sample is skipped and sampler analysis continues. When sampler analysis finishes, change the analysis parameter of the skipped sample and then analyze the sample.

Errors related to the laser

Laser life	
Probable cause	Actions
It is time to replace the laser.	Laser replacement is required. Contact your Sysmex service representative.

Laser output error	
Probable cause	Actions
• The FCM cover opened. • The FCM cover sensor has malfunctioned.	Remove the sampler adapter (XN-530 only) and sample tubes from the instrument, and then touch [Execute] in the [Help] dialog box. Instrument shutdown is executed. When shutdown is finished, turn OFF the main power switch. The instrument requires servicing. Contact your Sysmex service representative.

Errors related to the system

Barcode reader communication error	
Probable cause	Actions
There was a communication error with the barcode reader.	Remove the sampler adapter (XN-530 only) and sample tubes from the instrument, and then touch [Execute] in the [Help] dialog box. Instrument shutdown is executed. When shutdown is finished, turn the main power switch OFF and then ON. If the error persists, contact your Sysmex service representative.

RFID communication error	
Probable cause	Actions
There was a communication error with the RFID reader/writer.	Remove the sampler adapter (XN-530 only) and sample tubes from the instrument, and then touch [Execute] in the [Help] dialog box. Instrument shutdown is executed. When shutdown is finished, turn the main power switch OFF and then ON. If the error persists, contact your Sysmex service representative.

Internal Error	
Probable cause	Actions
An error occurred in the operation of the program.	Remove the sampler adapter (XN-530 only) and sample tubes from the instrument, and then touch [Execute] in the [Help] dialog box. Instrument shutdown is executed. When shutdown is finished, turn OFF the main power switch. The instrument requires servicing. Contact your Sysmex service representative.

Errors related to the quality control (QC)

X-barM control error, L-J Control Error, X-bar control error	
Probable cause	Actions
A QC error (value out of the control limit range) occurred.	Touch [Accept] in the [Help] dialog box. Check the analysis results in the [QC Chart] screen, and perform calibration if necessary. For details on checking the QC results, see "Basic Operation". (➤Basic Operation, "Chapter 3: 3.7 Checking analysis results")

Control has expired.	
Probable cause	Actions
The control blood has expired.	Touch [Accept] in the [Help] dialog box. Use new control blood to execute QC analysis. When using a new lot, the lot information must be registered in a new QC file. For details on registering lot information, see "Basic Operation". (➤Basic Operation, "Chapter 3: 3.5 Registering lots")

Control is not entered.	
Probable cause	Actions
Control blood with an unregistered lot number was used.	Touch [Accept] in the [Help] dialog box. Register the control blood lot information. For details on registering lot information, see "Basic Operation". (➤Basic Operation, "Chapter 3: 3.5 Registering lots")

QC not executed.	
Probable cause	Actions
It is time to execute QC analysis.	Touch [Accept] in the [Help] dialog box. Execute QC. For details on QC, see "Basic Operation". (➤Basic Operation, "Chapter 3: Performing Quality Control (QC)")

WDF Scattergram sensitivity error	
Probable cause	Actions
A numerical value for a parameter in the scattergram is outside the specified range.	Touch [Accept] in the [Help] dialog box. Check the scattergram in the [Data Browser] screen. For details on the [Data Browser] screen, see "Basic Operation". (➤Basic Operation, "Chapter 6: Checking Detailed Analysis Information (Data Browser)")

Check Measurement Mode	
Probable cause	Actions
The analysis mode is not compatible with the control blood type.	Touch [Accept] in the [Help] dialog box. Change the analysis mode and then analyze.

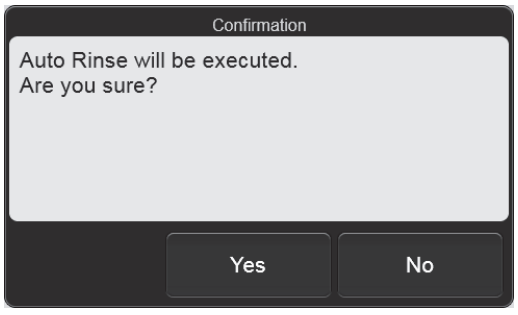
Errors related to the analysis

Background check error	
Probable cause	Actions
Air bubbles have formed in the detector. The detector is clogged. The detector is dirty.	Touch [Accept] in the [Help] dialog box. Execute auto rinse. For details, see the following.

Executing auto rinse

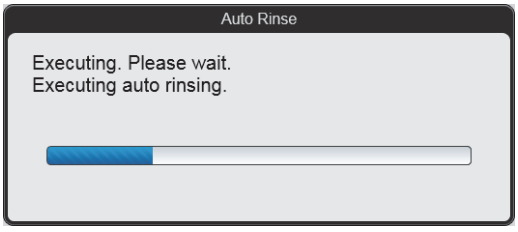
1 Touch the [Auto Rinse] icon in the [Menu] screen.

The following dialog box appears.



2 Touch [Yes].

Auto rinse starts and the [Auto Rinse] dialog box appears.



[Auto Rinse] dialog box

Wait until this process finishes. When the process finishes, the dialog box closes and a background check starts.

RBC sampling error, PLT sampling error	
Probable cause	Actions
Case 1: The density of the sample is inconsistent.	Touch [Accept] in the [Help] dialog box. Mix the sample well and then re-analyze.
Case 2: The detector suddenly became clogged.	[PLT sampling error] Drain the sample from the RBC isolation chamber. For details, see the following. (➤**P.34** "Draining the sample from the RBC isolation chamber") If the error persists Remove the clog from the RBC detector. For details, see the following. (➤**P.34** "Removing the RBC detector clog") If the error persists Rinse the RBC detector aperture. For details, see the following. (➤**P.35** "Rinsing the RBC detector aperture")

Draining the sample from the RBC isolation chamber

1 **Touch the [Maintenance] icon in the [Menu] screen.**

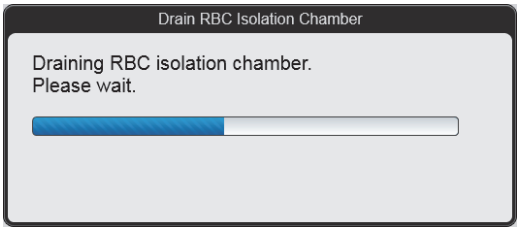
The [Maintenance] menu screen appears.

2 **Touch the [Rinse Instrument] icon.**

The [Rinse Instrument] dialog box appears.

3 **Touch [Drain RBC Isolation Chamber].**

Draining starts, and the [Drain RBC Isolation Chamber] dialog box appears.



[Drain RBC Isolation Chamber] dialog box

Wait until this process finishes. When the process finishes, the dialog box closes.

Removing the RBC detector clog

1 **Touch the [Maintenance] icon in the [Menu] screen.**

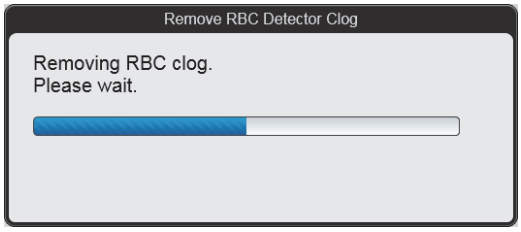
The [Maintenance] menu screen appears.

2 **Touch the [Rinse Instrument] icon.**

The [Rinse Instrument] dialog box appears.

3 **Touch [Remove RBC Detector Clog].**

Clog removal starts, and the [Remove RBC Detector Clog] dialog box appears.



[Remove RBC Detector Clog] dialog box

Wait until this process finishes. When the process finishes, the dialog box closes.

Rinsing the RBC detector aperture

⚠ Warning!

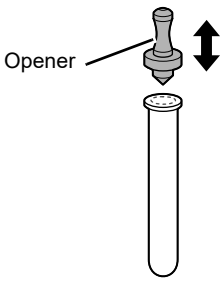
Never touch the detector when the power of the instrument is turned ON.
An electrical shock could occur.

⚠ Caution!

- Be sure to use CELLCLEAN AUTO only.
- When closing the detector cover, take care not to kink the tube. It may lead to incorrect analysis.
- When rinsing the detector aperture, use the supplied unclogging brush and lightly tap on the detector aperture.
  Excessive force will damage the detector aperture.

1 Open CELLCLEAN AUTO with the special CELLCLEAN AUTO opener.

With CELLCLEAN AUTO held straight as shown, press the opener down until you hear a “pop” sound.



Keep the opener attached, and remove immediately before you use CELLCLEAN AUTO.

⚠ Caution!

- Always wear adequate personal protective equipment when opening CELLCLEAN AUTO.
- Press down slowly so that the fluid does not spill.
- Store opened CELLCLEAN AUTO standing on the rack with the opener attached. If CELLCLEAN AUTO is tilted, the fluid may leak even with the opener attached.

2 Shut down the instrument.

1 **Touch the [Menu] button on the toolbar.**

The [Menu] screen appears.

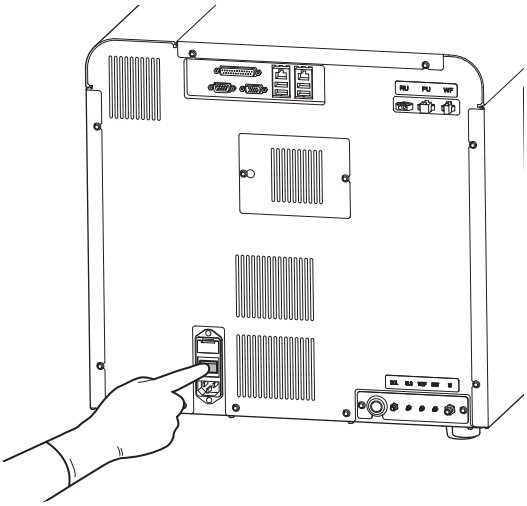
2 **Touch the [Shutdown] icon.**

The [Shutdown] dialog box appears.

3 **Touch [OK].**

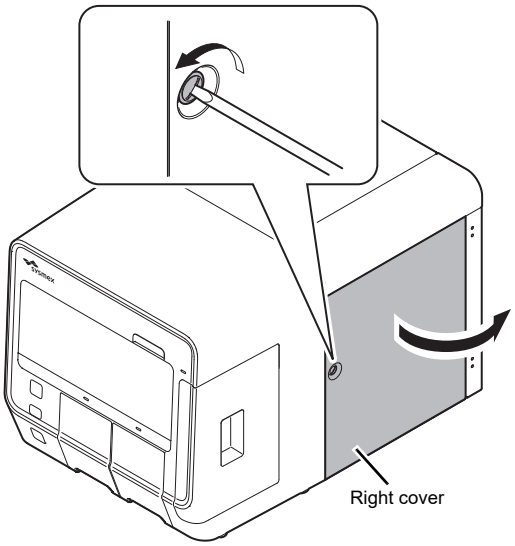
The instrument power automatically turns OFF.

3 Turn OFF the main power switch.



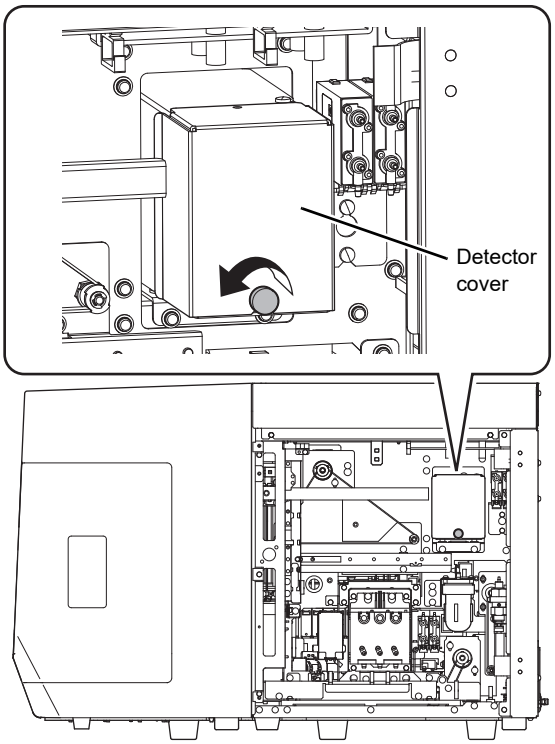
4 Open the right cover.

Release the lock by turning to the left with a flathead screwdriver, and open the right cover.



Example: XN-530

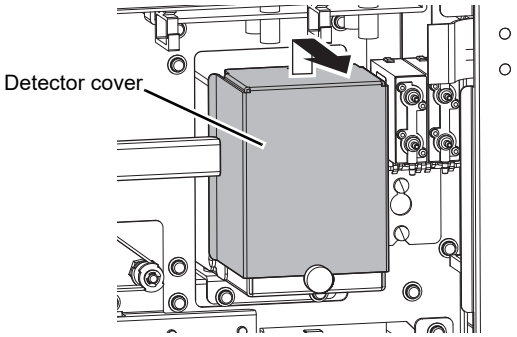
5 Loosen the screw that fastens the detector cover.



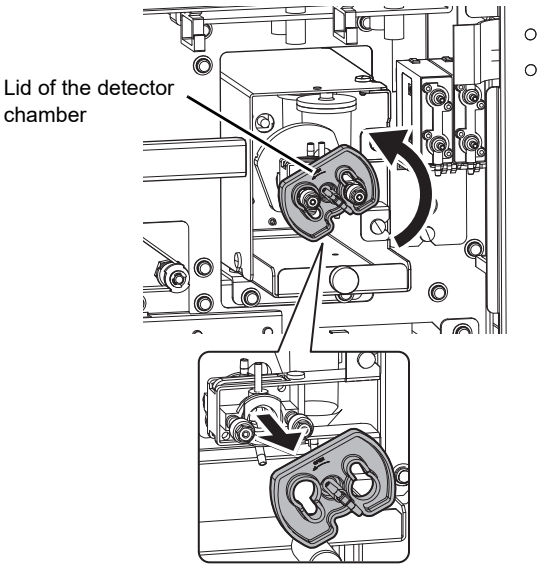
Example: XN-530

6 Remove the detector cover.

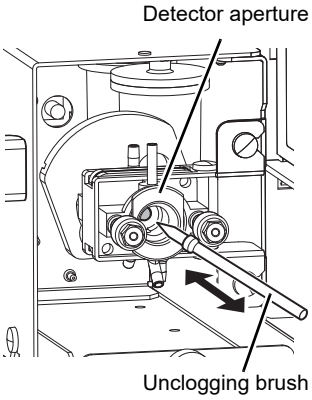
Lift and pull out toward you.



7 Turn the lid of the detector chamber in the direction of the arrow and pull out.



8 Soak the supplied unclogging brush in the CELLCLEAN AUTO fluid, and wash the detector aperture by lightly tapping it.

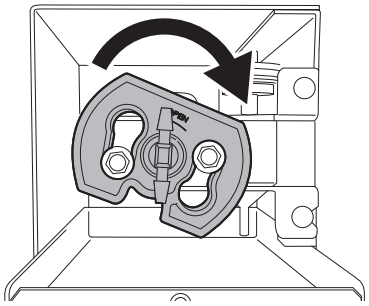


Note:

If fluid spills, wipe off the spilled fluid with a piece of tissue paper.

9 **Insert the lid of the detector chamber straight in, and turn in the direction of the arrow to lock.**

Insert the lid of the detector chamber all the way in, and turn to the position shown.



Caution!
When the lid of the detector chamber is not properly attached, correct results are not obtained.
The instrument may be damaged if leakage occurs.

10 **Install the detector cover, and fasten the screw with the flathead screwdriver.**

11 **Close the right cover and lock.**

12 **Turn ON the main power switch.**

13 **Press the power switch.**

Information
Wash the brush and opener well and store in a clean state.
There is a risk of instrument malfunctioning if there are small particles or other contaminants on the brush or opener.

WDF sampling error	
Probable cause	Actions
Case 1: The density of the sample is inconsistent.	Touch [Accept] in the [Help] dialog box. Mix the sample well and then re-analyze.
Case 2: The flowcell has suddenly become clogged.	Rinse the flowcell. For details, see the following. XN-530 (➤**P.37** "Rinsing the flowcell (XN-530)") XN-430 (➤**P.38** "Rinsing the flowcell (XN-430)") XN-330 (➤**P.39** "Rinsing the flowcell (XN-330)")

Rinsing the flowcell (XN-530)

1 **Touch the [Maintenance] icon in the [Menu] screen.**

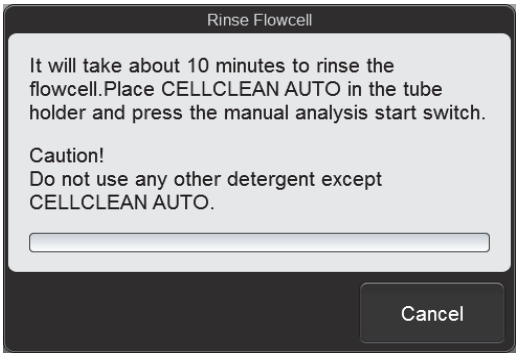
The [Maintenance] menu screen appears.

2 **Touch the [Rinse Instrument] icon.**

The [Rinse Instrument] dialog box appears.

3 **Touch [Rinse Flowcell].**

The [Rinse Flowcell] dialog box appears.

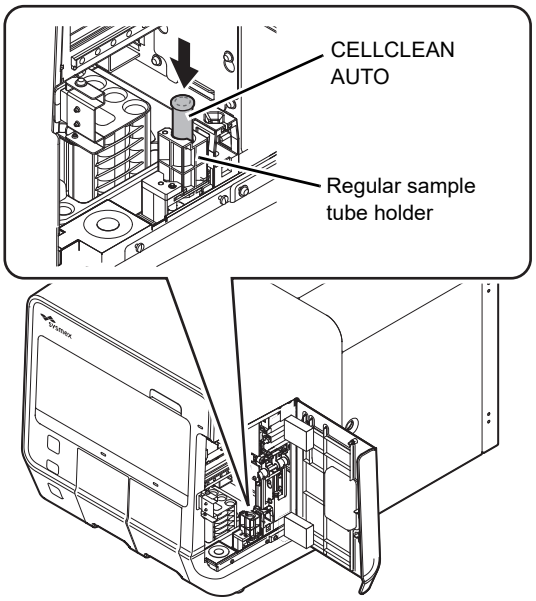


[Rinse Flowcell] dialog box

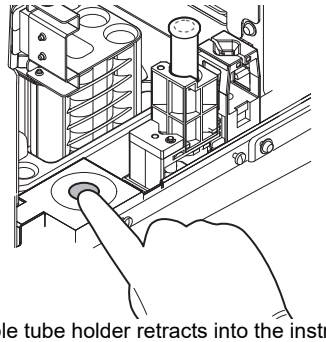
4 **Open the sampler cover (manual unit).**

5 Place CELLCLEAN AUTO in the sample tube holder.

Place in the regular sample tube holder.



6 Press the start switch.



The sample tube holder retracts into the instrument and aspiration starts. When aspiration finishes, cleaning starts and the sample tube holder is ejected.

7 Remove CELLCLEAN AUTO.

8 Close the sampler cover (manual unit).

9 Wait until cleaning finishes.

When the process finishes, the dialog box closes.

Rinsing the flowcell (XN-430)

1 Touch the [Maintenance] icon in the [Menu] screen.

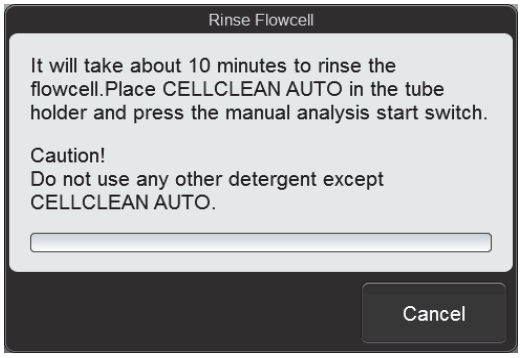
The [Maintenance] menu screen appears.

2 Touch the [Rinse Instrument] icon.

The [Rinse Instrument] dialog box appears.

3 Touch [Rinse Flowcell].

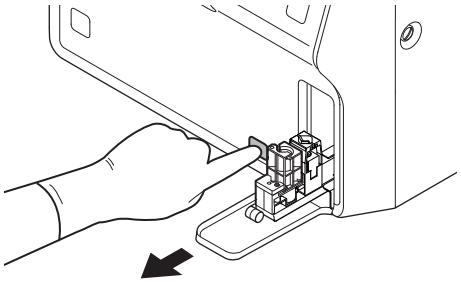
The [Rinse Flowcell] dialog box appears.



[Rinse Flowcell] dialog box

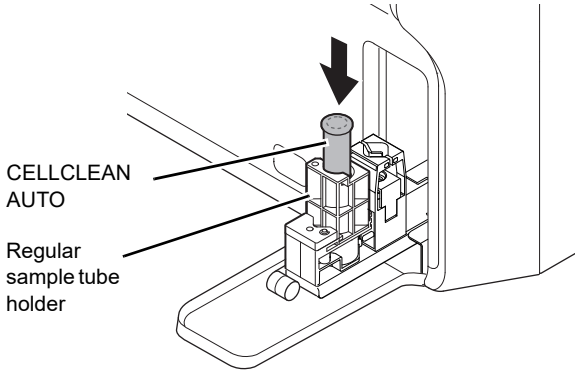
4 If the sample tube holder is not ejected, press the sample tube holder open/close switch.

The sample tube holder is ejected.

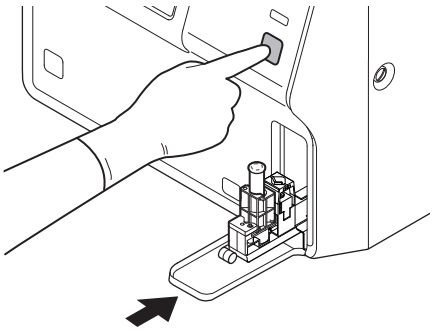


5 Place CELLCLEAN AUTO in the sample tube holder.

Place in the regular sample tube holder.



6 Press the start switch.



The sample tube holder retracts into the instrument and aspiration starts. When aspiration finishes, cleaning starts and the sample tube holder is ejected.

7 Remove CELLCLEAN AUTO.

8 Wait until cleaning finishes.

When the process finishes, the dialog box closes.

Rinsing the flowcell (XN-330)

1 Touch the [Maintenance] icon in the [Menu] screen.

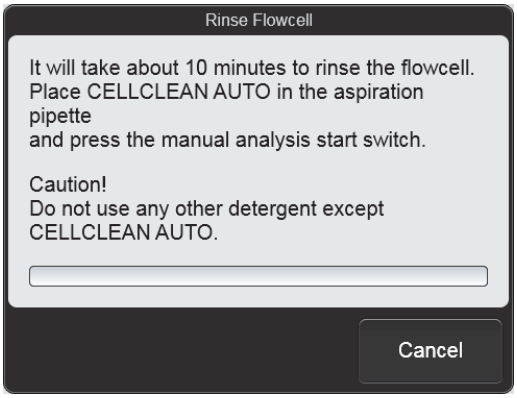
The [Maintenance] menu screen appears.

2 Touch the [Rinse Instrument] icon.

The [Rinse Instrument] dialog box appears.

3 Touch [Rinse Flowcell].

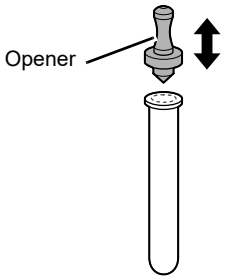
The [Rinse Flowcell] dialog box appears.



[Rinse Flowcell] dialog box

4 Open CELLCLEAN AUTO with the special CELLCLEAN AUTO opener.

With CELLCLEAN AUTO held straight as shown, press the opener down until you hear a “pop” sound.

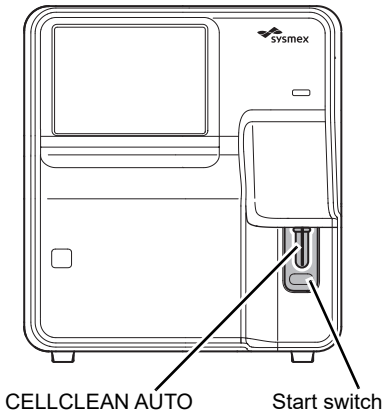


Keep the opener attached, and remove immediately before you use CELLCLEAN AUTO.

⚠ Caution!

- Always wear adequate personal protective equipment when opening CELLCLEAN AUTO.
- Press down slowly so that the fluid does not spill.
- Store opened CELLCLEAN AUTO standing on the rack with the opener attached. If CELLCLEAN AUTO is tilted, the fluid may leak even with the opener attached.

5 Insert the pipette all the way to the bottom of the CELLCLEAN AUTO, and press the start switch.



Aspiration starts.

During aspiration, the analysis status indicator LED blinks green and the beeper sounds repeatedly.

When aspiration finishes, the analysis status indicator LED turns off and the beeping stops. Cleaning starts.

6 Remove CELLCLEAN AUTO from the pipette.

Remove CELLCLEAN AUTO without bending the pipette.

7 Wait until cleaning finishes.

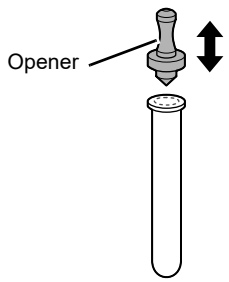
When the process finishes, the dialog box closes.

RBC detector clog, Bubbles in RBC detector	
Probable cause	Actions
The detector is clogged. Air bubbles have formed in the detector.	Touch [Execute] in the [Help] dialog box. Remove the clog from the RBC detector. If the error persists, rinse the RBC detector aperture. For details, see the following.

Rinsing the RBC detector aperture

1 Open CELLCLEAN AUTO with the special CELLCLEAN AUTO opener.

With CELLCLEAN AUTO held straight as shown, press the opener down until you hear a “pop” sound.



Keep the opener attached, and remove immediately before you use CELLCLEAN AUTO.

⚠ Caution!

- Always wear adequate personal protective equipment when opening CELLCLEAN AUTO.
- Press down slowly so that the fluid does not spill.
- Store opened CELLCLEAN AUTO standing on the rack with the opener attached. If CELLCLEAN AUTO is tilted, the fluid may leak even with the opener attached.

2 Shut down the instrument.

1 Touch the [Menu] button on the toolbar.

The [Menu] screen appears.

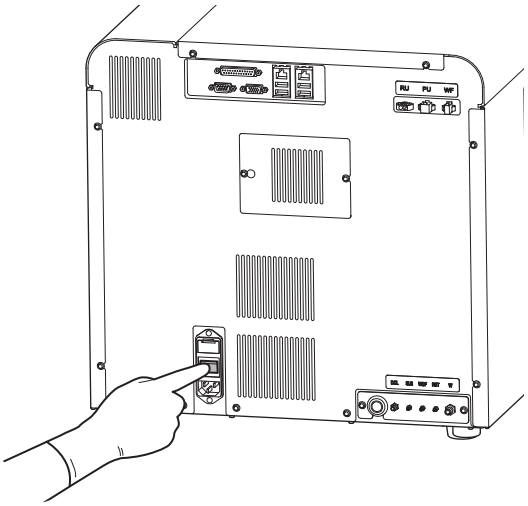
2 Touch the [Shutdown] icon.

The [Shutdown] dialog box appears.

3 Touch [OK].

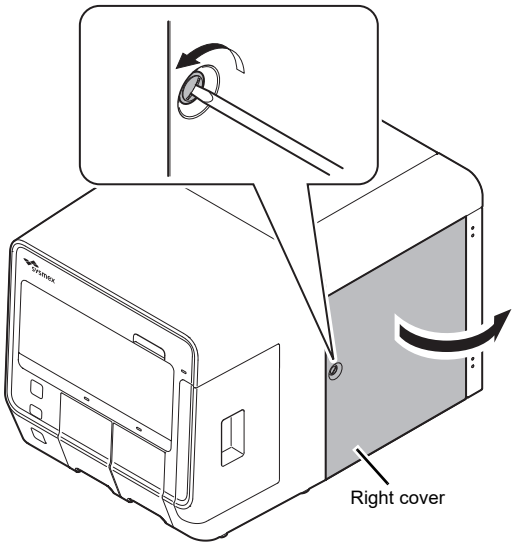
The instrument power automatically turns OFF.

3 Turn OFF the main power switch.



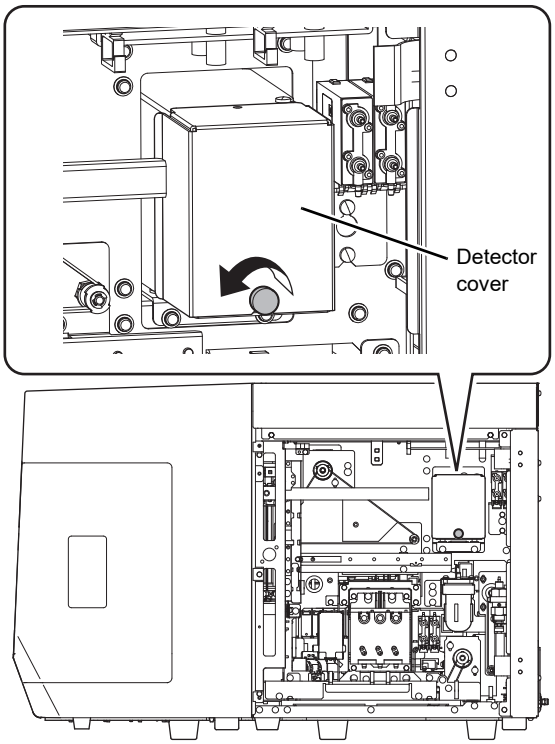
4 Open the right cover.

Release the lock by turning to the left with a flathead screwdriver, and open the right cover.



Example: XN-530

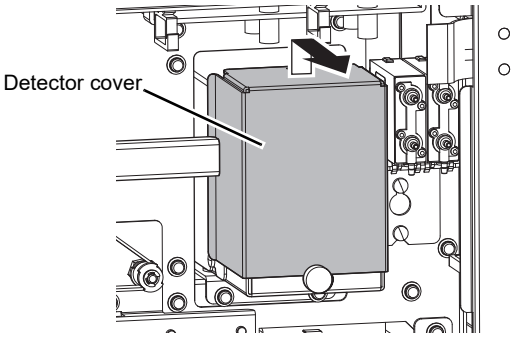
5 Loosen the screw that fastens the detector cover.



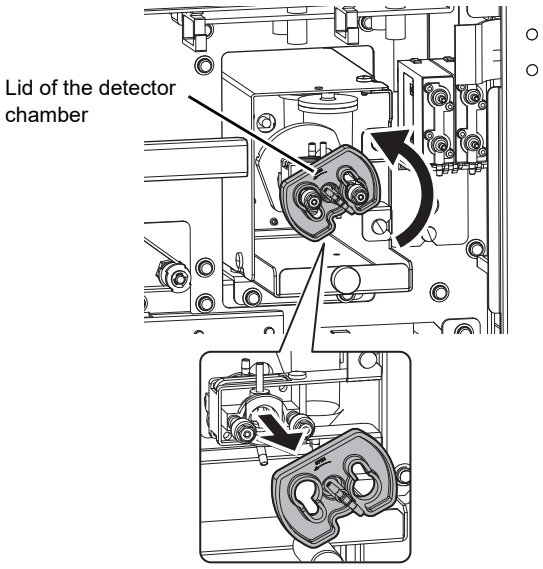
Example: XN-530

6 Remove the detector cover.

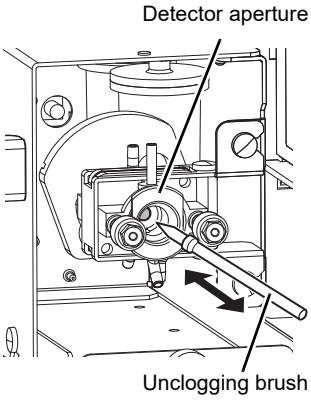
Lift and pull out toward you.



7 Turn the lid of the detector chamber in the direction of the arrow and pull out.



8 Soak the supplied unclogging brush in the CELLCLEAN AUTO fluid, and wash the detector aperture by lightly tapping it.

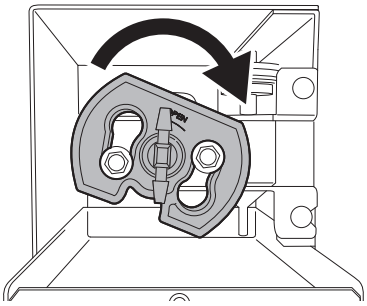


Note:

If fluid spills, wipe off the spilled fluid with a piece of tissue paper.

9 Insert the lid of the detector chamber straight in, and turn in the direction of the arrow to lock.

Insert the lid of the detector chamber all the way in, and turn to the position shown.



Caution!

When the lid of the detector chamber is not properly attached, correct results are not obtained.
The instrument may be damaged if leakage occurs.

10 Install the detector cover, and fasten the screw with the flathead screwdriver.

11 Close the right cover and lock.

12 Turn ON the main power switch.

13 Press the power switch.

Information

Wash the brush and opener well and store in a clean state.
There is a risk of instrument malfunctioning if there are small particles or other contaminants on the brush or opener.

HGB error	
Probable cause	Actions
The HGB blank value or the HGB sample value has fallen out of the specified range.	Touch [Accept] in the [Help] dialog box. Re-analyze.

RBC channel error, PLT channel error, WDF channel error	
Probable cause	Actions
Case 1: The density of the sample is inconsistent.	Touch [Accept] in the [Help] dialog box. Mix the sample well and then re-analyze.
Case 2: Because of external noise, the particle count has exceeded the limit of the display range.	Make sure there are no sources of noise near the instrument. Move any noise sources away from the instrument and re-analyze.

Rinsing the flowcell (XN-530)

1 Touch the [Maintenance] icon in the [Menu] screen.

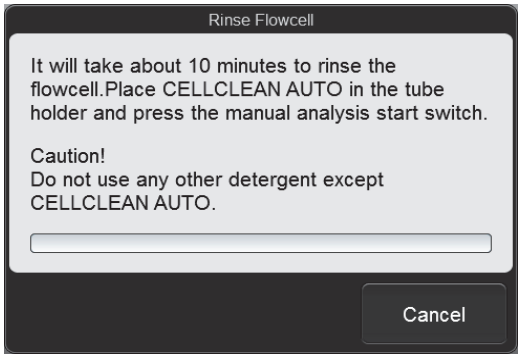
The [Maintenance] menu screen appears.

2 Touch the [Rinse Instrument] icon.

The [Rinse Instrument] dialog box appears.

3 Touch [Rinse Flowcell].

The [Rinse Flowcell] dialog box appears.

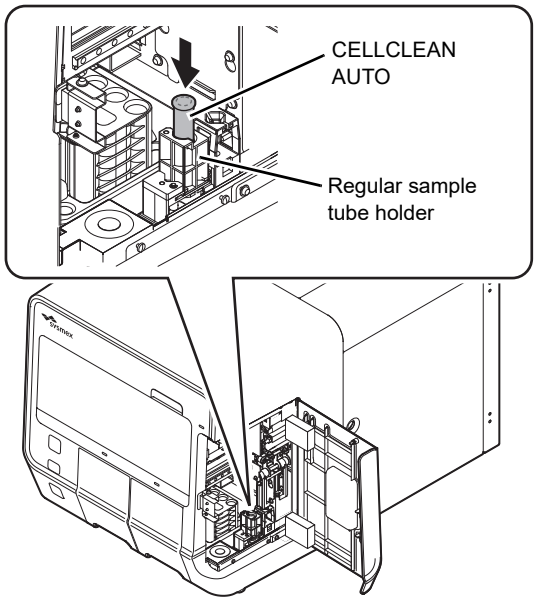


[Rinse Flowcell] dialog box

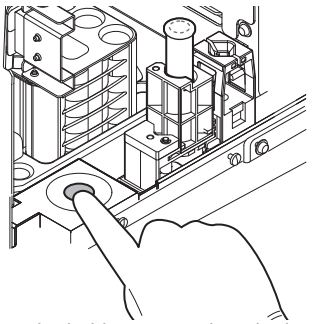
4 Open the sampler cover (manual unit).

5 Place CELLCLEAN AUTO in the sample tube holder.

Place in the regular sample tube holder.



6 Press the start switch.



The sample tube holder retracts into the instrument and aspiration starts. When aspiration finishes, cleaning starts and the sample tube holder is ejected.

7 Remove CELLCLEAN AUTO.

8 **Close the sampler cover (manual unit).**

9 **Wait until cleaning finishes.**

When the process finishes, the dialog box closes.

Rinsing the flowcell (XN-430)

1 **Touch the [Maintenance] icon in the [Menu] screen.**

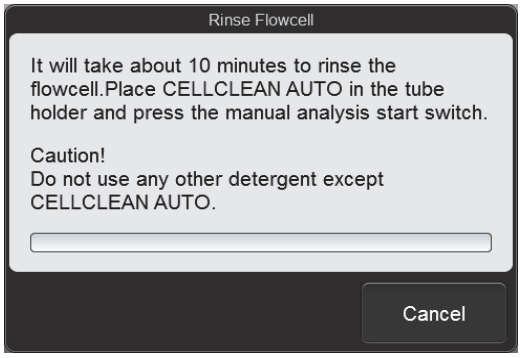
The [Maintenance] menu screen appears.

2 **Touch the [Rinse Instrument] icon.**

The [Rinse Instrument] dialog box appears.

3 **Touch [Rinse Flowcell].**

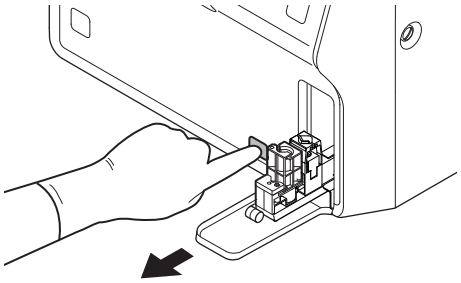
The [Rinse Flowcell] dialog box appears.



[Rinse Flowcell] dialog box

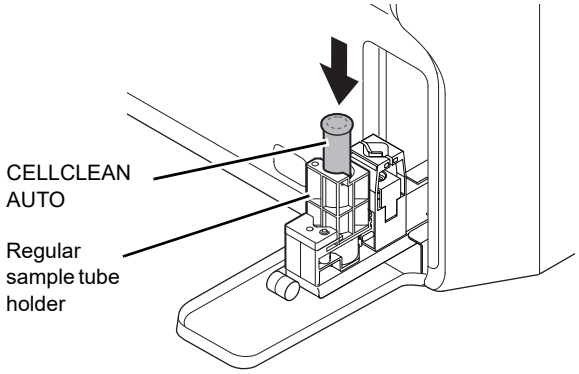
4 **If the sample tube holder is not ejected, press the sample tube holder open/close switch.**

The sample tube holder is ejected.

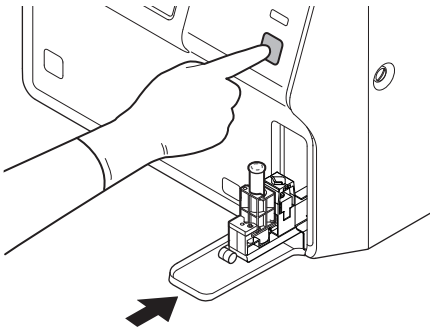


5 **Place CELLCLEAN AUTO in the sample tube holder.**

Place in the regular sample tube holder.



6 Press the start switch.



The sample tube holder retracts into the instrument and aspiration starts. When aspiration finishes, cleaning starts and the sample tube holder is ejected.

7 Remove CELLCLEAN AUTO.

8 Wait until cleaning finishes.

When the process finishes, the dialog box closes.

Rinsing the flowcell (XN-330)

1 Touch the [Maintenance] icon in the [Menu] screen.

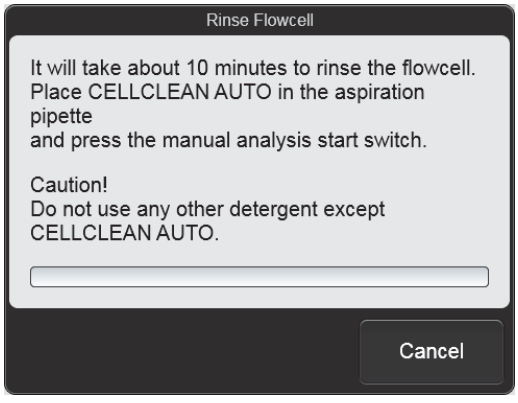
The [Maintenance] menu screen appears.

2 Touch the [Rinse Instrument] icon.

The [Rinse Instrument] dialog box appears.

3 Touch [Rinse Flowcell].

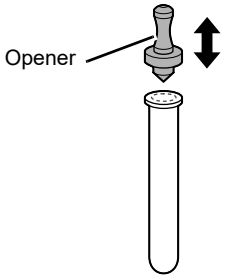
The [Rinse Flowcell] dialog box appears.



[Rinse Flowcell] dialog box

4 Open CELLCLEAN AUTO with the special CELLCLEAN AUTO opener.

With CELLCLEAN AUTO held straight as shown, press the opener down until you hear a “pop” sound.

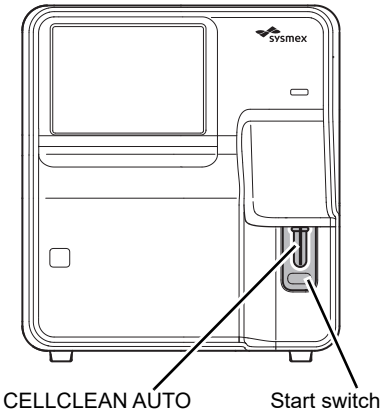


Keep the opener attached, and remove immediately before you use CELLCLEAN AUTO.

⚠ Caution!

- Always wear adequate personal protective equipment when opening CELLCLEAN AUTO.
- Press down slowly so that the fluid does not spill.
- Store opened CELLCLEAN AUTO standing on the rack with the opener attached. If CELLCLEAN AUTO is tilted, the fluid may leak even with the opener attached.

5 Insert the pipette all the way to the bottom of the CELLCLEAN AUTO, and press the start switch.



Aspiration starts.

During aspiration, the analysis status indicator LED blinks green and the beeper sounds repeatedly.

When aspiration finishes, the analysis status indicator LED turns off and the beeping stops. Cleaning starts.

6 Remove CELLCLEAN AUTO from the pipette.

Remove CELLCLEAN AUTO without bending the pipette.

7 **Wait until cleaning finishes.**

When the process finishes, the dialog box closes.

Removing air bubbles from the flowcell

1 **Touch the [Maintenance] icon in the [Menu] screen.**

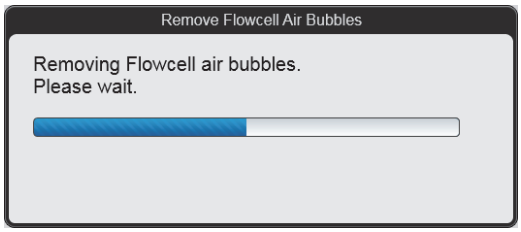
The [Maintenance] menu screen appears.

2 **Touch the [Rinse Instrument] icon.**

The [Rinse Instrument] dialog box appears.

3 **Touch [Remove Flowcell Air Bubbles].**

Bubble removal starts and the [Remove Flowcell Air Bubbles] dialog box appears.



[Remove Flowcell Air Bubbles] dialog box

Wait until this process finishes. When the process finishes, the dialog box closes.

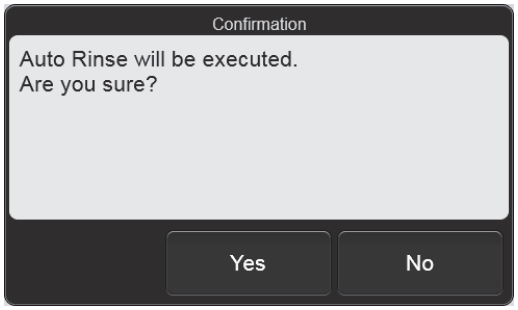
Data Errors	
Probable cause	Actions
An analysis value was outside the set upper/lower limit range.	Touch [Accept] in the [Help] dialog box. Check the analysis data and review the set upper and lower limit values.

Low count error	
Probable cause	Actions
The piercer (XN-530/XN-430), pipette (XN-330), or whole blood aspiration line tubing is clogged.	Touch [Accept] in the [Help] dialog box. Execute auto rinse. For details, see the following. (➤**P.47** "Executing auto rinse") If the error persists: Execute routine cleaning. For details, see the following. XN-530 (➤**P.47** "Executing routine cleaning (XN-530)") XN-430 (➤**P.48** "Executing routine cleaning (XN-430)") XN-330 (➤**P.49** "Executing routine cleaning (XN-330)") If the error persists Replace the piercer (XN-530/XN-430). Contact your Sysmex service representative.

Executing auto rinse

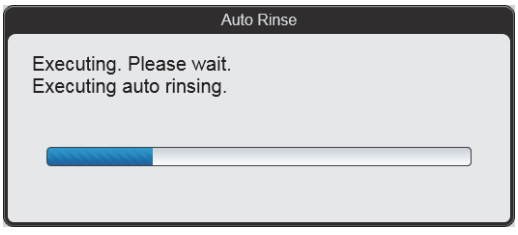
1 Touch the [Auto Rinse] icon in the [Menu] screen.

The following dialog box appears.



2 Touch [Yes].

Auto rinse starts and the [Auto Rinse] dialog box appears.



[Auto Rinse] dialog box

Wait until this process finishes. When the process finishes, the dialog box closes and a background check starts.

Executing routine cleaning (XN-530)

1 Touch the [Maintenance] icon in the [Menu] screen.

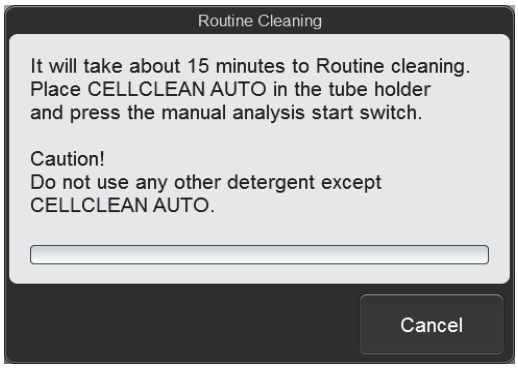
The [Maintenance] menu screen appears.

2 Touch the [Rinse Instrument] icon.

The [Rinse Instrument] dialog box appears.

3 Touch [Routine Cleaning].

The [Routine Cleaning] dialog box appears.

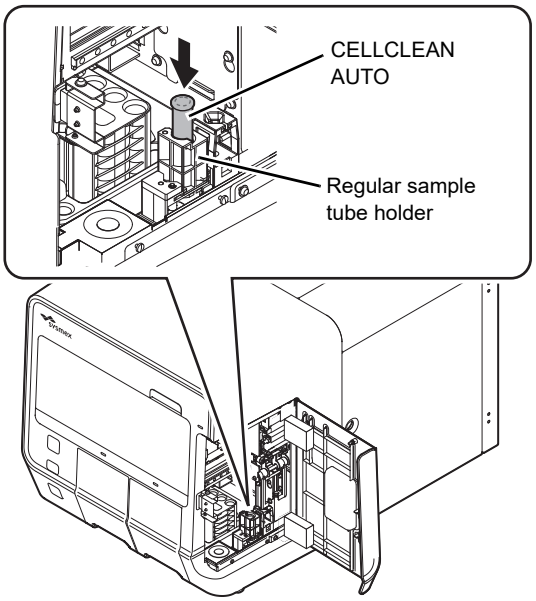


[Routine Cleaning] dialog box

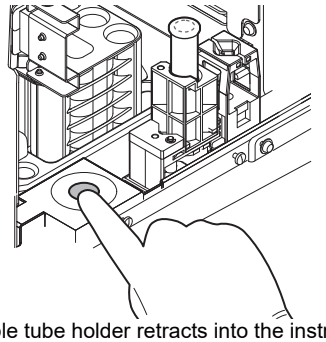
4 Open the sampler cover (manual unit).

5 Place CELLCLEAN AUTO in the sample tube holder.

Place in the regular sample tube holder.



6 Press the start switch.



The sample tube holder retracts into the instrument and aspiration starts. When aspiration finishes, cleaning starts and the sample tube holder is ejected.

7 Remove CELLCLEAN AUTO.

8 Close the sampler cover (manual unit).

9 Wait until cleaning finishes.

When the process finishes, the dialog box closes, and the instrument power automatically turns OFF.

Executing routine cleaning (XN-430)

1 Touch the [Maintenance] icon in the [Menu] screen.

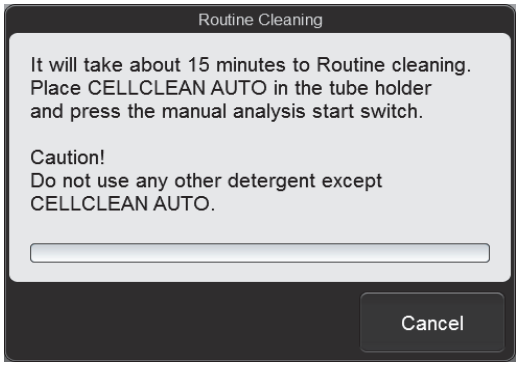
The [Maintenance] menu screen appears.

2 Touch the [Rinse Instrument] icon.

The [Rinse Instrument] dialog box appears.

3 Touch [Routine Cleaning].

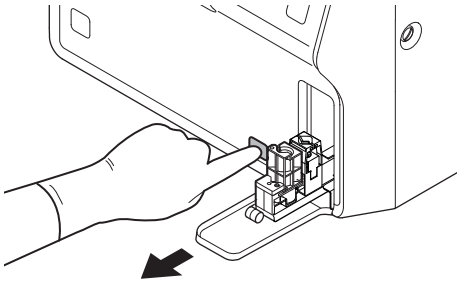
The [Routine Cleaning] dialog box appears.



[Routine Cleaning] dialog box

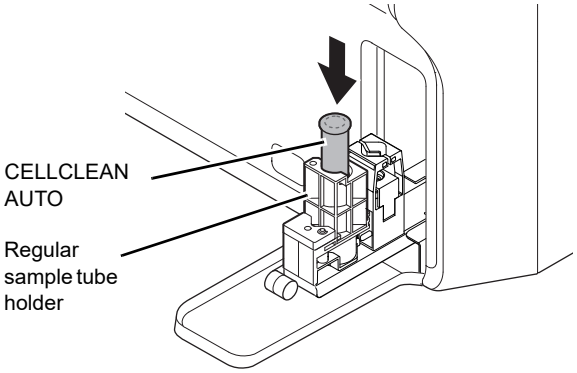
4 If the sample tube holder is not ejected, press the sample tube holder open/close switch.

The sample tube holder is ejected.

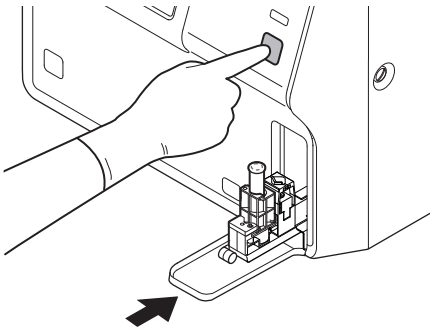


5 Place CELLCLEAN AUTO in the sample tube holder.

Place in the regular sample tube holder.



6 Press the start switch.



The sample tube holder retracts into the instrument and aspiration starts. When aspiration finishes, cleaning starts and the sample tube holder is ejected.

7 Remove CELLCLEAN AUTO.

8 Wait until cleaning finishes.

When the process finishes, the dialog box closes, and the instrument power automatically turns OFF.

Executing routine cleaning (XN-330)

1 Touch the [Maintenance] icon in the [Menu] screen.

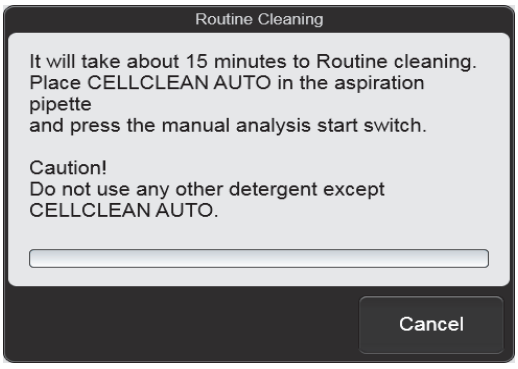
The [Maintenance] menu screen appears.

2 Touch the [Rinse Instrument] icon.

The [Rinse Instrument] dialog box appears.

3 Touch [Routine Cleaning].

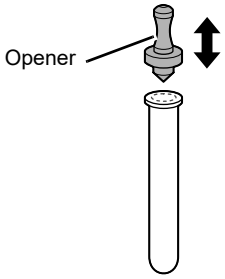
The [Routine Cleaning] dialog box appears.



[Routine Cleaning] dialog box

4 Open CELLCLEAN AUTO with the special CELLCLEAN AUTO opener.

With CELLCLEAN AUTO held straight as shown, press the opener down until you hear a “pop” sound.

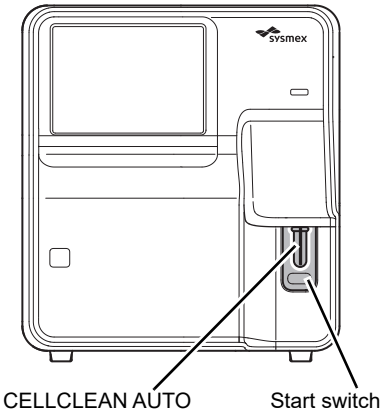


Keep the opener attached, and remove immediately before you use CELLCLEAN AUTO.

⚠ Caution!

- Always wear adequate personal protective equipment when opening CELLCLEAN AUTO.
- Press down slowly so that the fluid does not spill.
- Store opened CELLCLEAN AUTO standing on the rack with the opener attached. If CELLCLEAN AUTO is tilted, the fluid may leak even with the opener attached.

5 Insert the pipette all the way to the bottom of the CELLCLEAN AUTO, and press the start switch.



Aspiration starts.

During aspiration, the analysis status indicator LED blinks green and the beeper sounds repeatedly.

When aspiration finishes, the analysis status indicator LED turns off and the beeping stops. Cleaning starts.

6 Remove CELLCLEAN AUTO from the pipette.

Remove CELLCLEAN AUTO without bending the pipette.

7 Wait until cleaning finishes.

When the process finishes, the dialog box closes, and the instrument power automatically turns OFF.

Errors related to the covers

FCM cover is open.	
Probable cause	Actions
The FCM detector cover is open.	Contact your Sysmex service representative.

The dye holder is open.	
Probable cause	Actions
The dye holder has been pulled out.	Push the dye holder into the instrument.

Right cover is open	
Probable cause	Actions
The right cover is open.	Close the right cover.

Right cover is opened	
Probable cause	Actions
The right cover opened while the instrument was in operation.	Close the right cover and then touch [Execute] in the [Help] dialog box. When shutdown is finished, turn OFF the main power switch. Turn ON the main power switch again and press the power switch.

The tube holder is opened.	
Probable cause	Actions
The sample tube holder opened while the instrument was in operation.	Touch [Execute] in the [Help] dialog box. When shutdown is finished, turn OFF the main power switch. Turn ON the main power switch again and press the power switch.

Errors related to the user maintenance and warnings

Piercer replacement is required.	
Probable cause	Actions
It is time to replace the piercer.	Replace the piercer (XN-530/XN-430). Contact your Sysmex service representative.

Execute Routine Cleaning	
Probable cause	Actions
It is time to execute routine cleaning. (The cumulative analysis count since the previous routine cleaning was performed has exceeded 1,000, or 1 week has elapsed.)	Touch [Accept] in the [Help] dialog box. Execute routine cleaning. For details, see the following. XN-530 (➤**P.51** "Executing routine cleaning (XN-530)") XN-430 (➤**P.52** "Executing routine cleaning (XN-430)") XN-330 (➤**P.53** "Executing routine cleaning (XN-330)")

Execute Routine Cleaning (warning)	
Probable cause	Actions
Routine cleaning must be executed. (The cumulative analysis count since the previous routine cleaning was performed has exceeded 1,400.)	Touch [Execute] in the [Help] dialog box. The [Routine Cleaning] dialog box appears. Execute routine cleaning. For details, see the following. XN-530 (➤**P.51** "Executing routine cleaning (XN-530)") XN-430 (➤**P.52** "Executing routine cleaning (XN-430)") XN-330 (➤**P.53** "Executing routine cleaning (XN-330)")

Executing routine cleaning (XN-530)

When [Execute Routine Cleaning (warning)] appears, touch [Execute] in the [Help] dialog box. The [Routine Cleaning] dialog box appears. Follow the procedure from step 4.

1 Touch the [Maintenance] icon in the [Menu] screen.

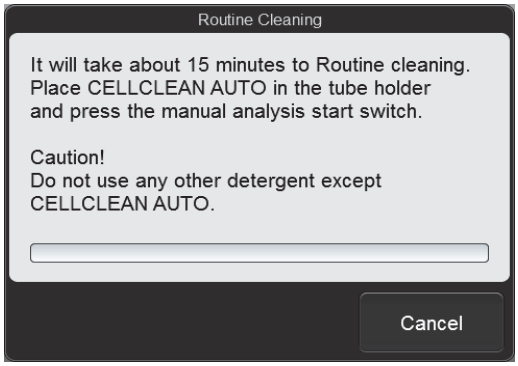
The [Maintenance] menu screen appears.

2 Touch the [Rinse Instrument] icon.

The [Rinse Instrument] dialog box appears.

3 Touch [Routine Cleaning].

The [Routine Cleaning] dialog box appears.

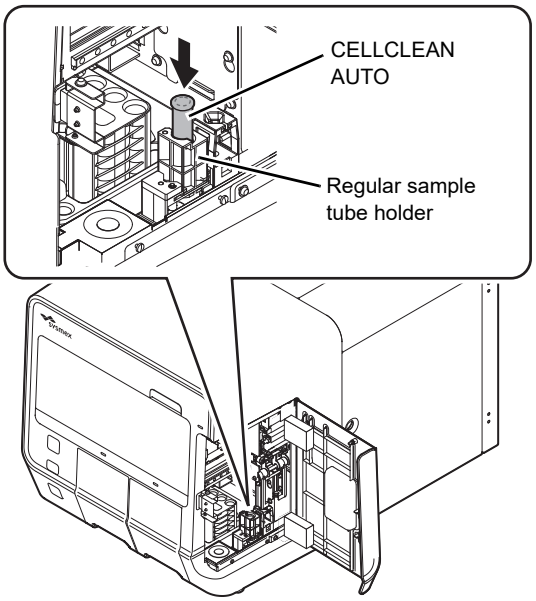


[Routine Cleaning] dialog box

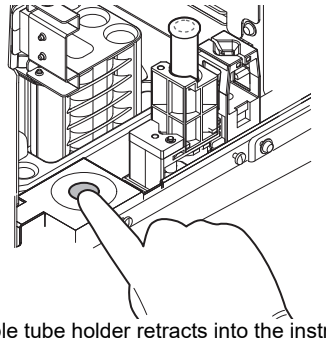
4 Open the sampler cover (manual unit).

5 Place CELLCLEAN AUTO in the sample tube holder.

Place in the regular sample tube holder.



6 Press the start switch.



The sample tube holder retracts into the instrument and aspiration starts. When aspiration finishes, cleaning starts and the sample tube holder is ejected.

7 Remove CELLCLEAN AUTO.

8 Close the sampler cover (manual unit).

9 Wait until cleaning finishes.

When the process finishes, the dialog box closes, and the instrument power automatically turns OFF.

Executing routine cleaning (XN-430)

When [Execute Routine Cleaning (warning)] appears, touch [Execute] in the [Help] dialog box. The [Routine Cleaning] dialog box appears. Follow the procedure from step 4.

1 Touch the [Maintenance] icon in the [Menu] screen.

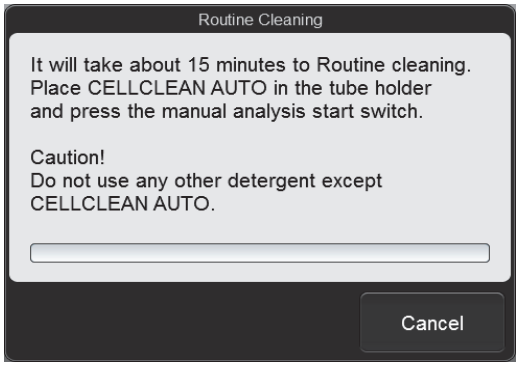
The [Maintenance] menu screen appears.

2 Touch the [Rinse Instrument] icon.

The [Rinse Instrument] dialog box appears.

3 Touch [Routine Cleaning].

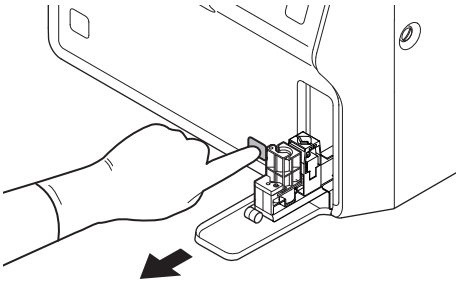
The [Routine Cleaning] dialog box appears.



[Routine Cleaning] dialog box

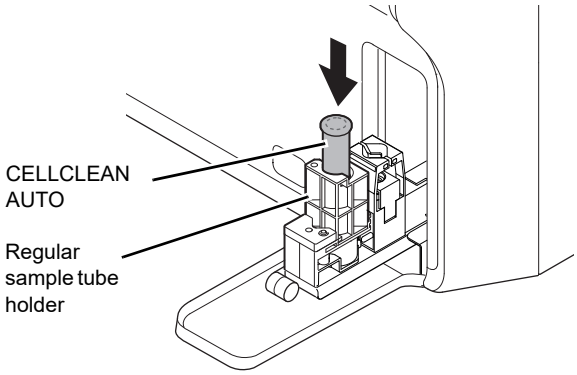
4 If the sample tube holder is not ejected, press the sample tube holder open/close switch.

The sample tube holder is ejected.

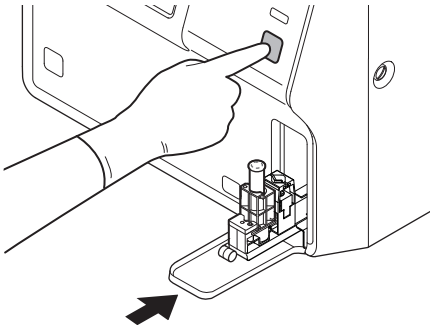


5 Place CELLCLEAN AUTO in the sample tube holder.

Place in the regular sample tube holder.



6 Press the start switch.



The sample tube holder retracts into the instrument and aspiration starts. When aspiration finishes, cleaning starts and the sample tube holder is ejected.

7 Remove CELLCLEAN AUTO.

8 Wait until cleaning finishes.

When the process finishes, the dialog box closes, and the instrument power automatically turns OFF.

Executing routine cleaning (XN-330)

When [Execute Routine Cleaning (warning)] appears, touch [Execute] in the [Help] dialog box. The [Routine Cleaning] dialog box appears. Follow the procedure from step 4.

1 Touch the [Maintenance] icon in the [Menu] screen.

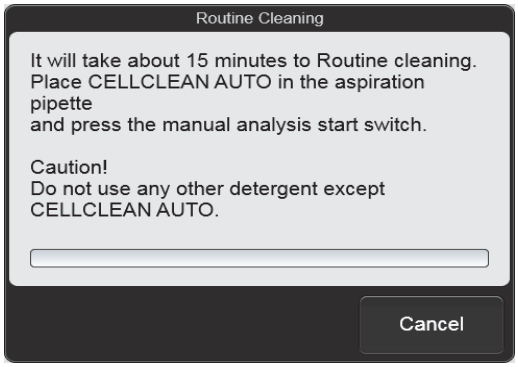
The [Maintenance] menu screen appears.

2 Touch the [Rinse Instrument] icon.

The [Rinse Instrument] dialog box appears.

3 Touch [Routine Cleaning].

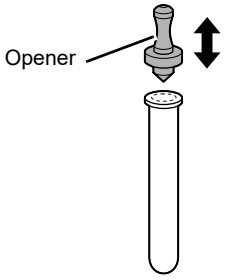
The [Routine Cleaning] dialog box appears.



[Routine Cleaning] dialog box

4 Open CELLCLEAN AUTO with the special CELLCLEAN AUTO opener.

With CELLCLEAN AUTO held straight as shown, press the opener down until you hear a “pop” sound.

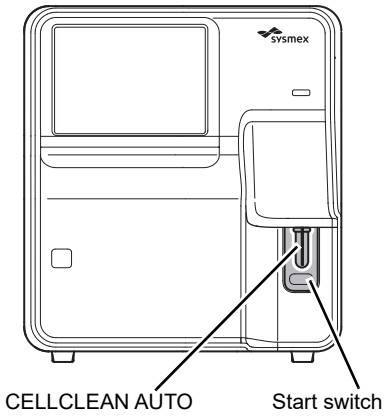


Keep the opener attached, and remove immediately before you use CELLCLEAN AUTO.

⚠ Caution!

- Always wear adequate personal protective equipment when opening CELLCLEAN AUTO.
- Press down slowly so that the fluid does not spill.
- Store opened CELLCLEAN AUTO standing on the rack with the opener attached. If CELLCLEAN AUTO is tilted, the fluid may leak even with the opener attached.

5 Insert the pipette all the way to the bottom of the CELLCLEAN AUTO, and press the start switch.



Aspiration starts.

During aspiration, the analysis status indicator LED blinks green and the beeper sounds repeatedly.

When aspiration finishes, the analysis status indicator LED turns off and the beeping stops. Cleaning starts.

6 Remove CELLCLEAN AUTO from the pipette.

Remove CELLCLEAN AUTO without bending the pipette.

7 Wait until cleaning finishes.

When the process finishes, the dialog box closes, and the instrument power automatically turns OFF.

Replace air pump.	
Probable cause	Actions
It is time to replace the air pump.	Touch [Accept] in the [Help] dialog box. Replace the air pump. For details, see the following.

Replacing the air pump

Caution, Hot!

The surface of the air pump is hot. After turning OFF the main power, make sure that the air pump has cooled sufficiently before replacing it.

Air pump that is used

Part number	Item name
05104711	Air pump set No. 1

1 Shut down the instrument.

1 Make sure the instrument is in the ready state.

If the instrument status at the bottom left of the screen is not green, wait until it becomes green.

2 Remove the sample tube from the sample tube holder. (XN-530/XN-430 only)

3 Touch the [Menu] button on the toolbar.

The [Menu] screen appears.

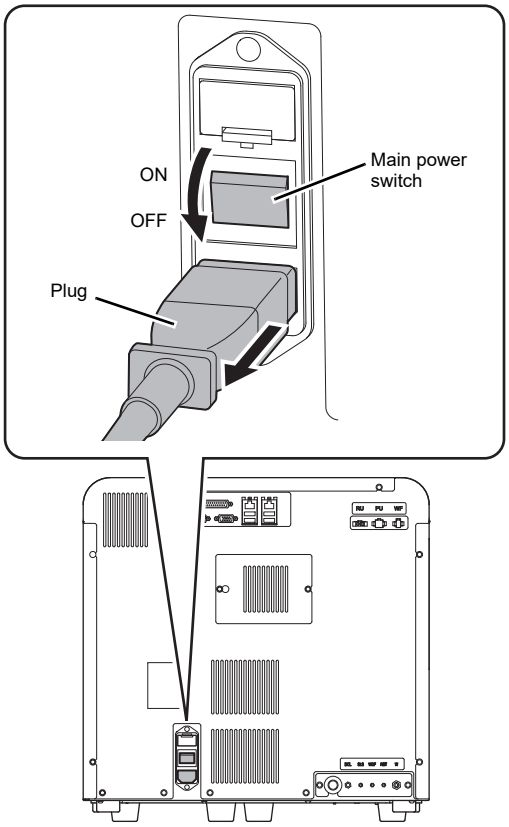
4 Touch the [Shutdown] icon.

The [Shutdown] dialog box appears.

5 Touch [OK].

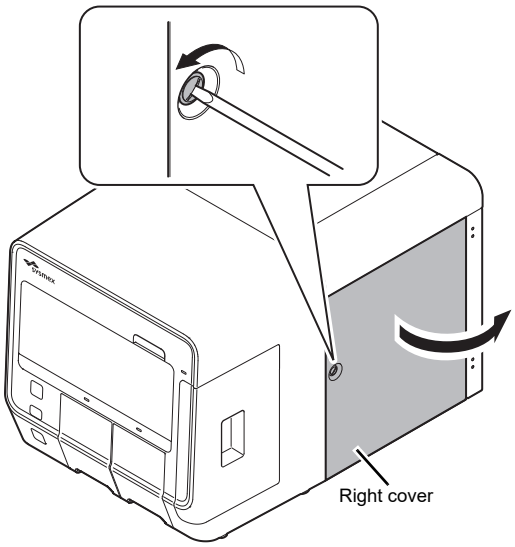
The instrument power automatically turns OFF.

2 Turn OFF the main power switch, and unplug the power cable.



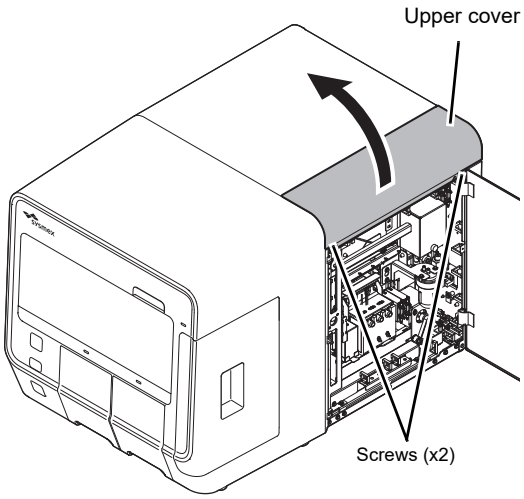
3 Open the right cover.

Release the lock by turning to the left with a flathead screwdriver, and open the right cover.



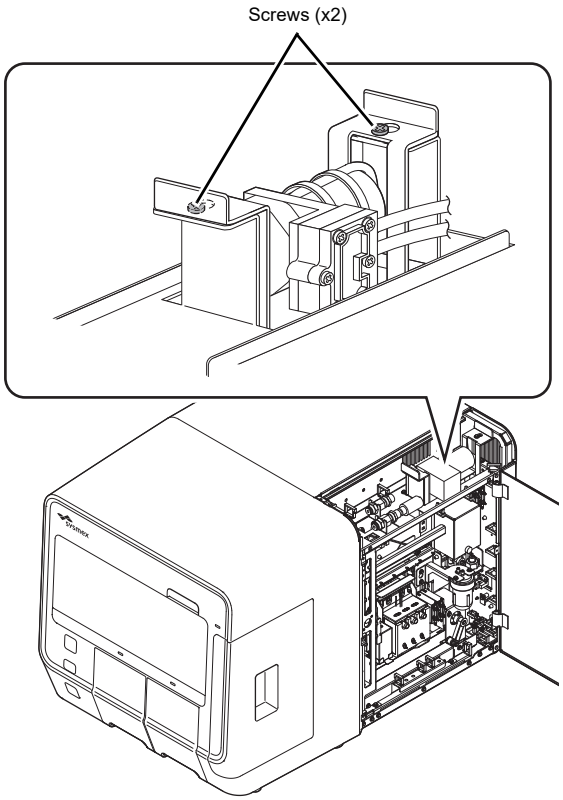
Example: XN-530

4 Remove the screws (x2) with a Phillips head screwdriver, and remove the upper cover.



Example: XN-530

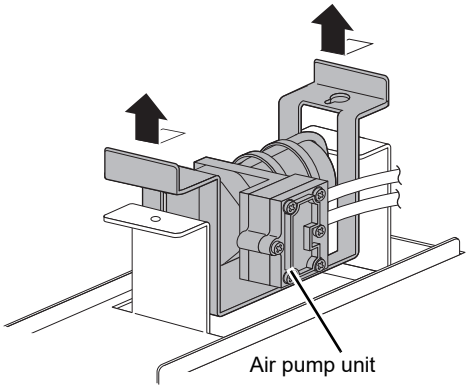
5 **Loosen the screws (x2) with a Phillips head screwdriver.**



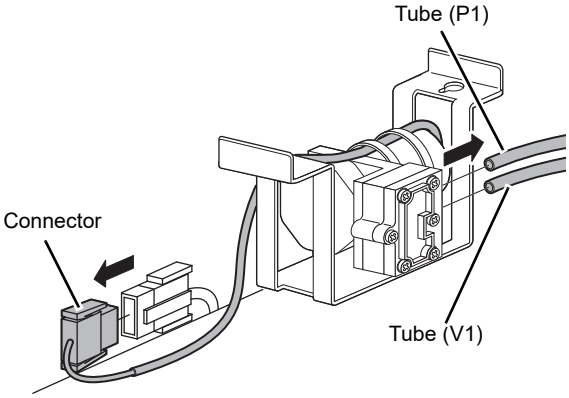
Example: XN-530

> **Caution!**
> Take care not to drop the screws.
> It may be very difficult to remove a screw that falls into the instrument.

6 **Pull up the air pump unit.**



7 **Remove the connectors and tubes (x2), and remove the air pump unit.**



8 **Connect the connectors and tubes (x2) to the new air pump.**

See the illustration of step 7.

> **Information**
> Connect the tube (P1) to the upper side.

9 **Place the air pump unit in the instrument, and fasten with the screws (x2) with a Phillips head screwdriver.**

10 **Attach the upper cover, and fasten with the screws (x2) with a Phillips head screwdriver.**

11 **Close the right cover and lock.**

Turn the lock to the right with a flathead screwdriver.

12 **Turn ON the main power switch.**

13 **Press the power switch.**

Start the instrument and log on.

14 **Reset the counter of the air pump to "0".**

Display the [Unit] tab of the [Counter] dialog box, and reset the count.

For details on the [Unit] tab and the reset procedure, see the following.

(➤**P.82** "2.10 Checking the cycle count (counter)")

CELLPACK DCL has expired, SULFOLYSER has expired, Lysercell WDF has expired	
Probable cause	Actions
The reagent has expired.	Touch [Execute] in the [Help] dialog box. The [Reagent Replacement] dialog box appears. Replace the reagent. For details, see the following.

Replacing the diluent and hemolytic agent

1 Prepare a new reagent.

Make sure the reagent has not expired.

Caution!

- Place the reagent container at a level no more than 1 meter above or below the bottom of the analyzer. Do not place reagents on top of the instrument.
- The new reagent must be allowed to sit for at least 24 hours at room temperature (15 to 35°C) before use.
- If reagent spills, immediately wipe up the spill using a moistened cloth.

2 Touch [Execute] in the [Help] dialog box.

The [Reagent Replacement] dialog box appears.

(➤**P.84** "Chapter 2: 2.12.1 [Reagent Replacement] dialog box")

3 Input the reagent code (barcode) of the new reagent.

Input by reading the barcode

Scan the reagent code (barcode) on the outer box of the new reagent with the hand-held barcode reader. The reagent code is as shown below.

Make sure the barcode scanning surface is flat before scanning.

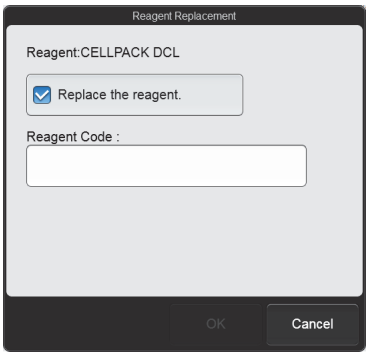
Note:

In case the reagent outer box label shows a "XN Reagent Code" or "Reagent Code 2" barcode, please scan this barcode.

When the reagent code is entered, the reagent in the dialog box shows [Received]. The lot number and expiration date show the information of the new reagent.

Note:

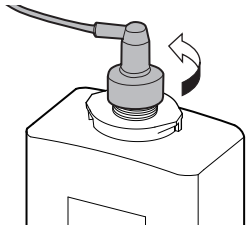
When inputting manually, touch the name of the reagent to be replaced in the [Reagent Replacement] dialog box. The dialog box below appears.



Touch [Replace the reagent.] to select the checkbox, enter the [Reagent Code :], and touch [OK].

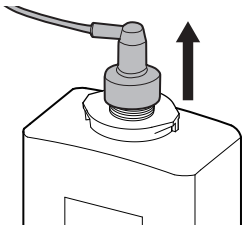
4 Remove the cap from the new reagent container.

5 Remove the cap from the old reagent container.



Example: Lysercell WDF (2 L)

6 Pull the spout set straight up and out.



Caution!
Do not touch the aspiration nozzle on the spout set.
Take care that dust does not get on the spout set.

7 Insert the spout set straight into the new reagent container and close the cap.

8 Touch [Execute].

Reagent replacement starts. Wait until this process finishes. When replacement finishes, the [Reagent Replacement] dialog box closes.

Time guidelines for reagent replacement are shown below.

Reagent name	Time
CELLPACK DCL	Approx. 1 minute
SULFOLYSER	Approx. 2 1/2 minutes
Lysercell WDF	Approx. 3 1/2 minutes

Fluorocell WDF has expired	
Probable cause	Actions
The reagent has expired.	Replace the reagent. For details, see the following.

Replacing the dye

Caution!
While performing replacement, always wear adequate personal protective equipment.

1 Touch [Execute] in the [Help] dialog box.

The [Reagent Replacement] dialog box appears.
(➤**P.84** "Chapter 2: 2.12.1 [Reagent Replacement] dialog box")

When touching [Close] in the [Help] dialog box:
Follow the steps below to display the [Reagent Replacement] dialog box.

1 Touch the [Maintenance] icon in the [Menu] screen.

The [Maintenance] menu screen appears.

2 Touch the [Exchange] icon.

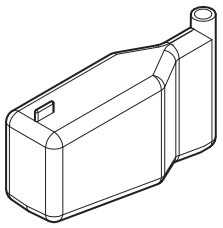
The [Exchange] dialog box appears.

3 Touch [Reagent Replacement].

The [Reagent Replacement] dialog box appears.

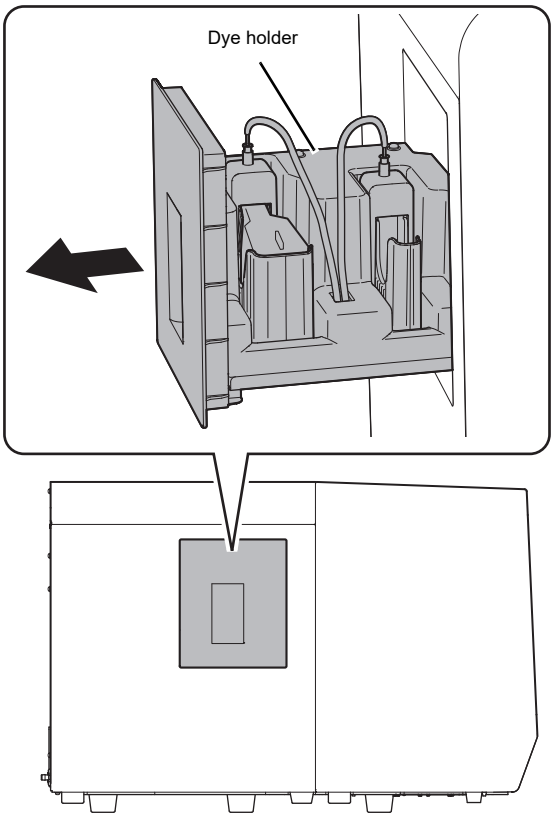
2 Prepare a new reagent cartridge.

Make sure the reagent has not expired.



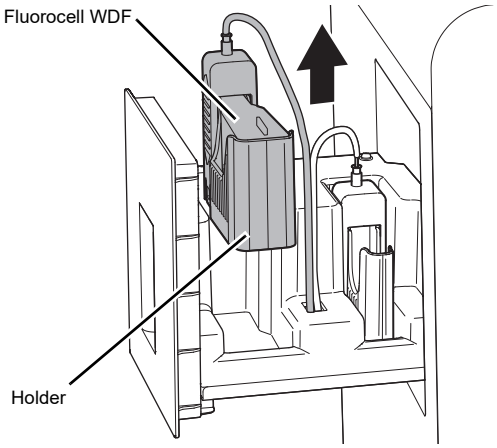
Example: Fluorocell WDF

3 Pull out the dye holder.

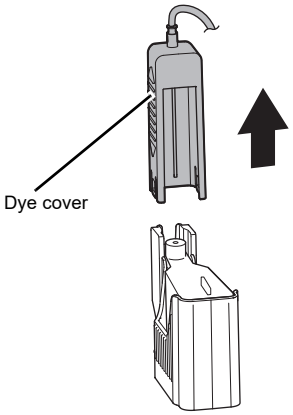


Example: XN-530

4 Remove the entire dye holder.



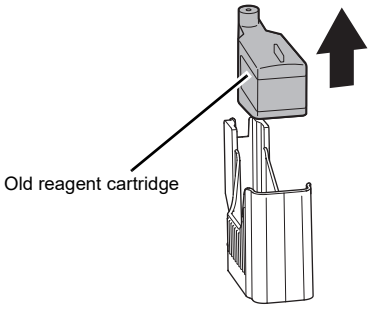
5 Slowly remove the dye cover, taking care that the dye does not drip.



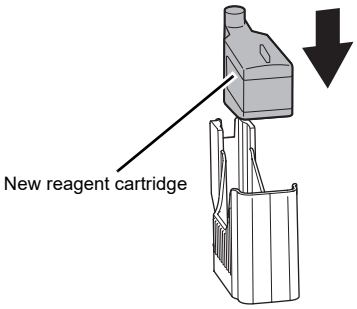
⚠ Caution!

Dye may drip from the nozzle on the dye cover.
If dye drips onto the instrument, immediately wipe it off using a moistened cloth. Otherwise, the coated surface of the instrument may become discolored.

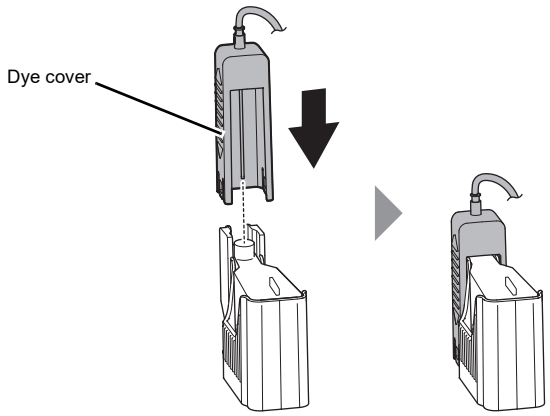
6 Remove the old reagent cartridge from the holder.



7 Insert the new reagent cartridge in the holder.



8 Place the dye cover.



9 Place the holder in the dye holder.

10 Close the dye holder.

The information on the RFID tag of the cartridge is read, and if normal, a beep sounds. The lot number and expiration date show the information of the new reagent.

Information

Be sure to push the dye holder all the way in.

Press Start SW	
Probable cause	Actions
This appears when the instrument is in the sleep state.	Press the start switch. The fluid path is rinsed and the instrument wakes up from the sleep state. On the XN-530, when the instrument is in sampler analysis mode, it can also be woken from the sleep state by pressing the sampler start/stop switch.

Errors related to the dye holder

Wrong reagent installed in Fluorocell WDF holder	
Probable cause	Actions
An incorrect dye type has been installed.	Remove the incorrect reagent, wipe the nozzle of the dye holder, and then install the correct reagent. Dispose of the incorrect reagent.

Fluorocell WDF is not installed	
Probable cause	Actions
The dye is not installed.	Install the reagent. For details, see the following. (➤**P.61** "Replacing the dye")

Fluorocell WDF has already been used	
Probable cause	Actions
A used dye has been installed.	Replace the reagent. For details, see the following.

Replacing the dye

> **⚠ Caution!**
> While performing replacement, always wear adequate personal protective equipment.

1 Touch [Execute] in the [Help] dialog box.

The [Reagent Replacement] dialog box appears.

(➤**P.84** "Chapter 2: 2.12.1 [Reagent Replacement] dialog box")

When touching [Close] in the [Help] dialog box:
Follow the steps below to display the [Reagent Replacement] dialog box.

1 Touch the [Maintenance] icon in the [Menu] screen.

The [Maintenance] menu screen appears.

2 Touch the [Exchange] icon.

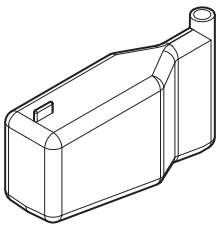
The [Exchange] dialog box appears.

3 Touch [Reagent Replacement].

The [Reagent Replacement] dialog box appears.

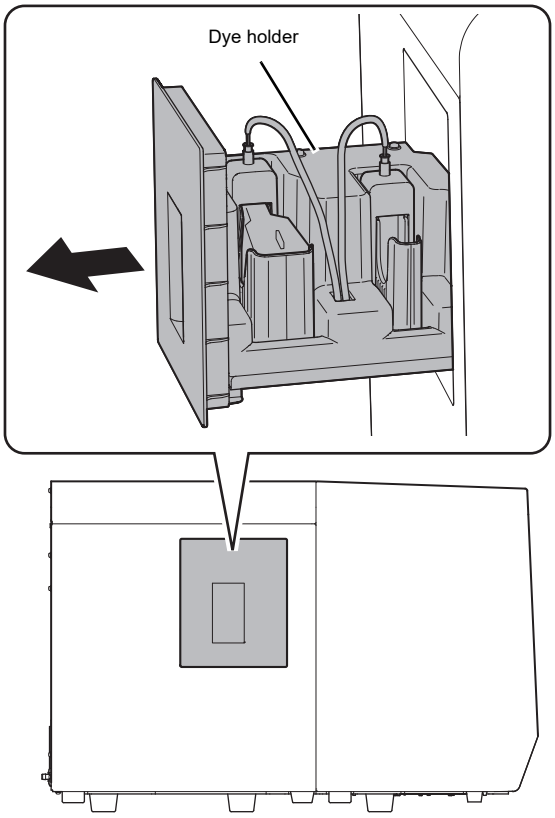
2 Prepare a new reagent cartridge.

Make sure the reagent has not expired.



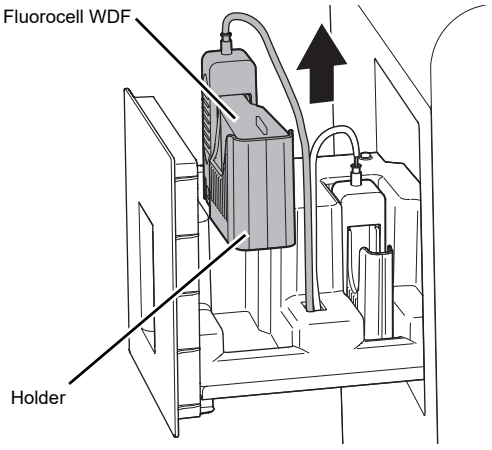
Example: Fluorocell WDF

3 Pull out the dye holder.

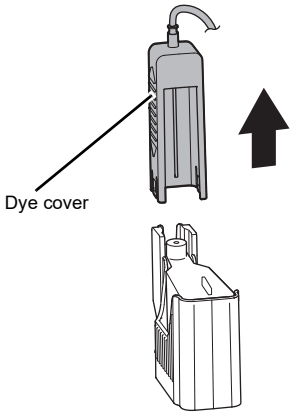


Example: XN-530

4 Remove the entire dye holder.



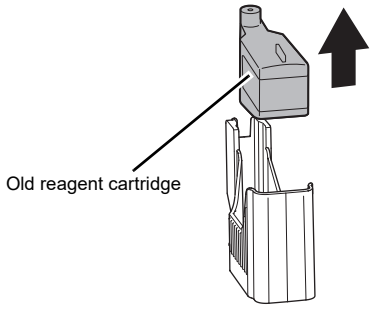
5 Slowly remove the dye cover, taking care that the dye does not drip.



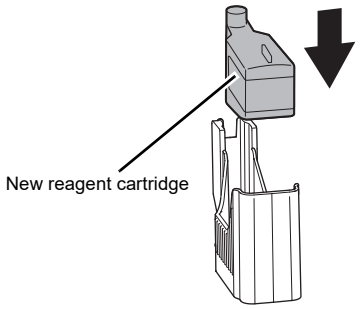
⚠ Caution!

Dye may drip from the nozzle on the dye cover.
If dye drips onto the instrument, immediately wipe it off using a moistened cloth. Otherwise, the coated surface of the instrument may become discolored.

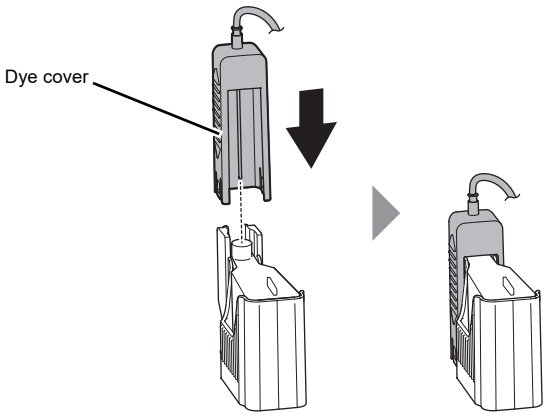
6 Remove the old reagent cartridge from the holder.



7 Insert the new reagent cartridge in the holder.



8 Place the dye cover.



9 Place the holder in the dye holder.

10 Close the dye holder.

The information on the RFID tag of the cartridge is read, and if normal, a beep sounds. The lot number and expiration date show the information of the new reagent.

ⓘ Information

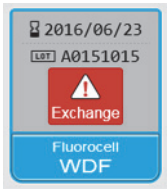
Be sure to push the dye holder all the way in.

Cannot recognize Fluorocell WDF information	
Probable cause	Actions
The RFID tag on the reagent cartridge is damaged.	Touch [Execute] in the [Help] dialog box. The [Reagent Replacement] dialog box appears. Touch the error dye and register the reagent information in the dialog box that appears. For details, see the following.

Registering reagent information

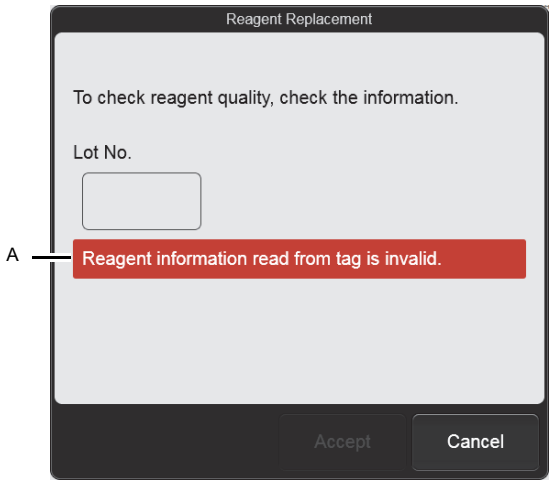
1 Touch [Execute] in the [Help] dialog box.

The [Reagent Replacement] dialog box appears. The error dye shows [Exchange], as shown on the right.



2 Touch the dye that indicates [Exchange].

The dialog box for lot number confirmation appears.



[Reagent Replacement] (lot number confirmation) dialog box

One of the messages below will appear (A) above to indicate whether the lot number was properly read from the RFID tag.

- Normal: [Check the contents.]
- Error: [Reagent information read from tag is invalid.]

3 After checking or entering the lot number, touch [Accept].

If the lot number displayed in the dialog box is invalid, touch the [Lot No.] field and enter the correct lot number.

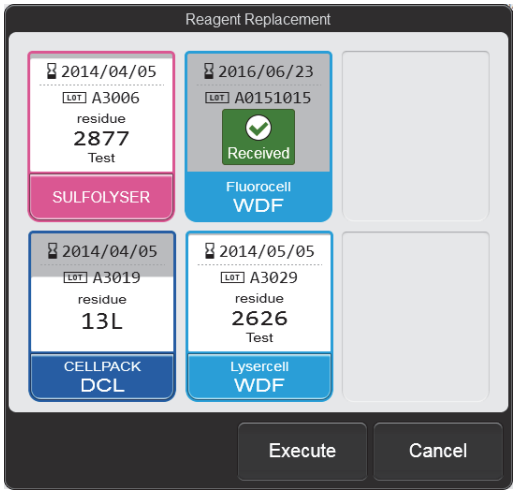
After [Accept] is touched, a dialog box appears for confirmation of the serial number.

Note:

[Accept] is enabled 5 seconds after the dialog box appears. If the lot number is invalid and appears in red, [Accept] will not be enabled.

4 Continue to check or enter the displayed parameters and touch [Accept].

Complete the procedure with entering the address of the manufacturer or vendor and touch [Register]. The dialog box closes and [Exchange] changes to [Received].



[Reagent Replacement] dialog box

5 Touch [Execute] in the [Reagent Replacement] dialog box.

Reagent replacement starts.

Fluorocell WDF RFID tag error	
Probable cause	Actions
Unable to write the information on the RFID tag of the reagent cartridge.	Replace the reagent (a reagent with a normal RFID tag). For details, see the following.

Replacing the dye

⚠ Caution!
While performing replacement, always wear adequate personal protective equipment.

1 Touch [Execute] in the [Help] dialog box.

The [Reagent Replacement] dialog box appears.

(➤**P.84** "Chapter 2: 2.12.1 [Reagent Replacement] dialog box")

When touching [Close] in the [Help] dialog box:
Follow the steps below to display the [Reagent Replacement] dialog box.

1 Touch the [Maintenance] icon in the [Menu] screen.

The [Maintenance] menu screen appears.

2 Touch the [Exchange] icon.

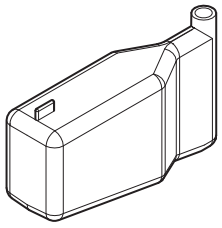
The [Exchange] dialog box appears.

3 Touch [Reagent Replacement].

The [Reagent Replacement] dialog box appears.

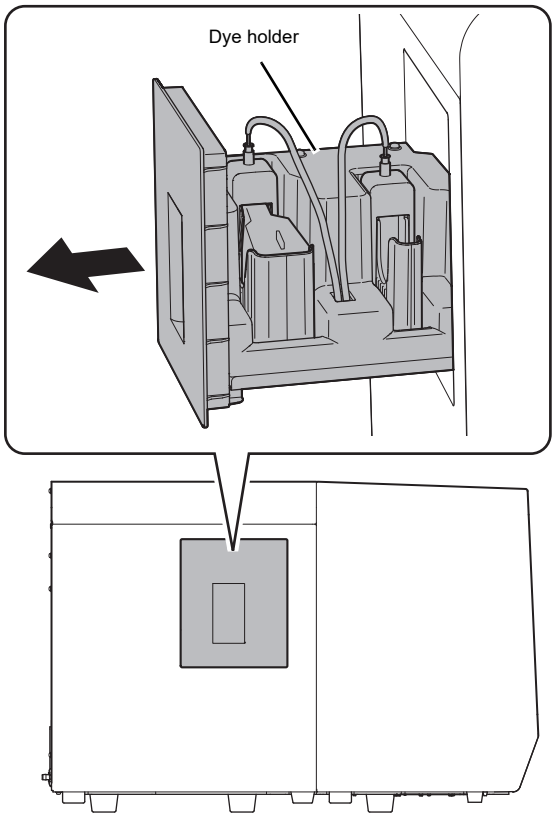
2 Prepare a new reagent cartridge.

Make sure the reagent has not expired.



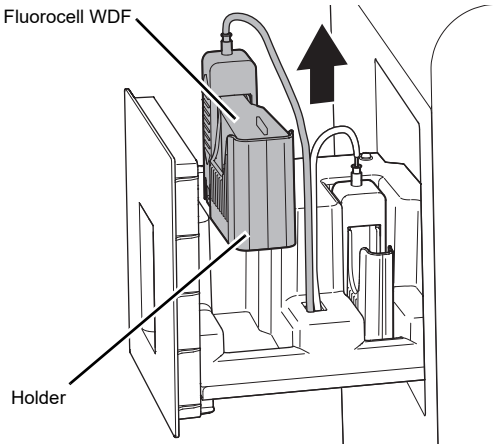
Example: Fluorocell WDF

3 Pull out the dye holder.

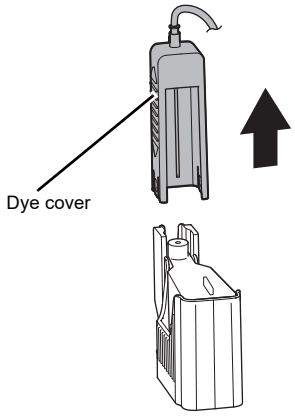


Example: XN-530

4 Remove the entire dye holder.



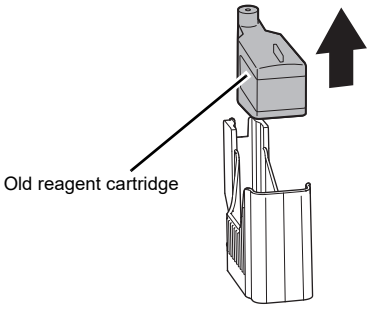
5 Slowly remove the dye cover, taking care that the dye does not drip.



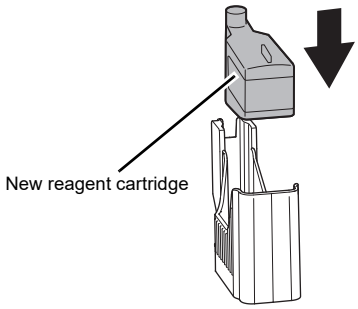
Caution!

Dye may drip from the nozzle on the dye cover.
If dye drips onto the instrument, immediately wipe it off using a moistened cloth. Otherwise, the coated surface of the instrument may become discolored.

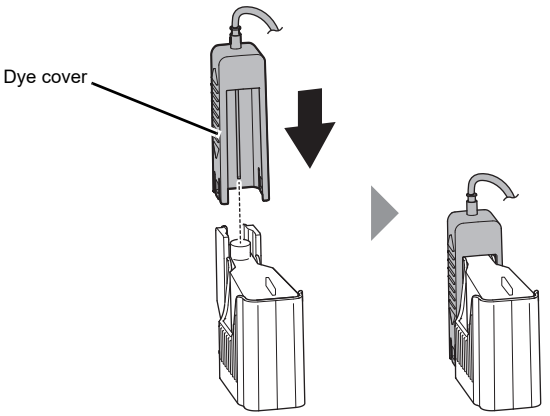
6 Remove the old reagent cartridge from the holder.



7 Insert the new reagent cartridge in the holder.



8 Place the dye cover.



9 Place the holder in the dye holder.

10 Close the dye holder.

The information on the RFID tag of the cartridge is read, and if normal, a beep sounds. The lot number and expiration date show the information of the new reagent.

Information

Be sure to push the dye holder all the way in.

Errors related to the sampler analysis operation

Sampler cover (front) is open.	
Probable cause	Actions
The sampler cover (front) is open.	Close the sampler cover (front).

Sampler cover (front) is opened.	
Probable cause	Actions
The sampler cover (front) opened while the sampler analysis was in operation.	Remove the sample tubes from the instrument. When the hand is gripping a sample tube, open the sampler cover (front or manual unit) and remove the sample tubes. Close the sampler cover (front and manual unit) and then touch [Execute] in the [Help] dialog box. The sampler test is executed. If an abnormality occurs during the operation test, the sensor that detects the cover has failed. Contact your Sysmex service representative. Sampler analysis cannot be performed, but manual analysis is possible.

Sampler cover (manual unit) is open.	
Probable cause	Actions
The sample cover (manual unit) is open.	Close the sample cover (manual unit).

Sampler cover (manual unit) is opened.	
Probable cause	Actions
The sampler cover (manual unit) opened while the sampler analysis was in operation.	Remove the sample tubes from the instrument. When the hand is gripping a sample tube, open the sampler cover (front or manual unit) and remove the sample tubes. Close the sampler cover (front and manual unit) and then touch [Execute] in the [Help] dialog box. The sampler test is executed. If an abnormality occurs during the operation test, the sensor that detects the cover has failed. Contact your Sysmex service representative. Sampler analysis cannot be performed, but manual analysis is possible.

Sampler Adapter holder is open.	
Probable cause	Actions
The sampler adapter holder (right)/(left) is open.	Close the sampler adapter holder (right)/(left).

Sampler Adapter holder is opened.	
Probable cause	Actions
The sampler adapter holder (right)/(left) opened while the sampler analysis was in operation.	Remove the sample tubes from the instrument. When the hand is gripping a sample tube, open the sampler cover (front or manual unit) and remove the sample tubes. Close the sampler cover (front and manual unit) and then touch [Execute] in the [Help] dialog box. The sampler test is executed. If an abnormality occurs during the operation test, the sensor that detects the cover has failed. Contact your Sysmex service representative. Sampler analysis cannot be performed, but manual analysis is possible.

Sampler adapter is not placed	
Probable cause	Actions
Sampler adapter is not placed.	Place the sampler adapter and press the sampler start/stop switch.

Cannot recognize sampler adapter	
Probable cause	Actions
An unregistered sampler adapter was placed. The sampler adapter is damaged.	Place an appropriate sampler adapter, and then execute sampler analysis. If the error persists, execute manual analysis, or execute sampler analysis using another sampler adapter.

Errors related to the hand and sample tube holders

Hand F-B motor error, Hand L-R motor error, Hand up-down error, Hand open/close error, Mixing error	
Probable cause	Actions
The hand did not work properly.	Remove the sample tubes from the instrument. When the hand is gripping a sample tube, open the sampler cover (front or manual unit) and remove the sample tubes. Close the sampler cover (front and manual unit) and then touch [Execute] in the [Help] dialog box. The sampler test is executed. If an abnormality occurs during the operation test, the hand has failed. Contact your Sysmex service representative. Sampler analysis cannot be performed, but manual analysis is possible. Before executing manual analysis, check if the hand is touching the sample tube holder. If so, move the hand.

Chapter 2 Maintenance

This chapter describes the procedures for maintenance, replacing and replenishing supplies, and checking instrument operation.

2.1 List of maintenance tasks

To maintain optimum instrument performance, periodic maintenance must be executed.
When using the instrument on a continuous basis, execute "Daily maintenance" once every 24 hours.
Execute maintenance according to the schedule below. Record the maintenance tasks that are executed in the maintenance and inspection checklist. (➤**P.100** "2.19 Maintenance and inspection checklist")

Risk of infection

While working, always wear adequate personal protective equipment, such as protective gloves, a protective mask, protective eyewear, and a lab coat. Wash your hands after completing the task. There is a risk of infection.

Maintenance task		Pages	
Daily maintenance	Shutdown	➤Basic Operation, "Chapter 1: 1.3 Shutdown"	
Weekly maintenance	Executing routine cleaning	XN-530	➤**P.74**
		XN-430	➤**P.75**
		XN-330	➤**P.76**
Maintenance once every 2 years	Replacing the air pump For product codes, see "General Information". (➤General Information, "Chapter 6: 6.1 Supplies")		➤**P.89**
As needed	Replenishing the reagent		➤**P.77**
	Replacing the waste container		➤**P.78**
	Replacing the reagent		➤**P.84**
	Replacing the piercer (XN-530/XN-430)		➤**P.88**
	Replacing the fuse For product codes, see "General Information". (➤General Information, "Chapter 6: 6.1 Supplies")		➤**P.92**
	Cleaning the aspiration unit tray	XN-530	➤**P.94**
		XN-430	➤**P.94**
		XN-330	➤**P.96**
	Adjusting the monitor image quality (XN-530)		➤**P.98**

2.2 Displaying maintenance screens

Maintenance tasks, checking of operation, and operation tests are executed in the maintenance screens that are opened from the [Maintenance] menu screen.

1 Make sure the instrument is in the ready state.

If the instrument status at the bottom left of the screen is not green, wait until it becomes green.

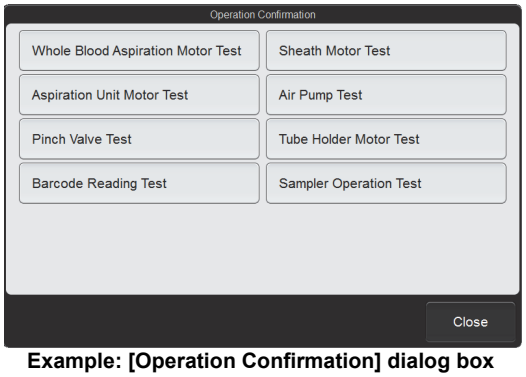
2 Touch the [Maintenance] icon in the [Menu] screen.

The [Maintenance] menu screen appears.

[Maintenance] menu screen

3 Touch the icon of the desired maintenance category.

The maintenance item menu dialog box appears.



Example: [Operation Confirmation] dialog box

2.3 Maintenance screens

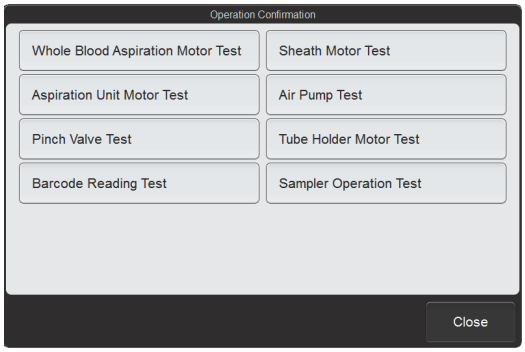
Touch the [Maintenance] icon in the [Menu] screen to display the [Maintenance] menu screen.
Open the menu dialog box of the desired maintenance items from the [Maintenance] menu screen.

● **[Maintenance] menu screen**

[Maintenance] menu screen

[Operation Confirmation]	Opens the [Operation Confirmation] dialog box. Select the unit you want to check. (➤**P.71** "● [Operation Confirmation] dialog box")
[Exchange]	Opens the [Exchange] dialog box. Select the item you want to replace. (➤**P.72** "● [Exchange] dialog box")
[Rinse Instrument]	Opens the [Rinse Instrument] dialog box. Select the unit to be rinsed and the rinsing method. (➤**P.72** "● [Rinse Instrument] dialog box")
[Status Confirmation]	Opens the [Status Confirmation] dialog box. Select the information (analysis or cycle count/unit status) you want to check. (➤**P.73** "● [Status Confirmation] dialog box")
[Back]	Touch to return to the [Menu] screen.

● **[Operation Confirmation] dialog box**

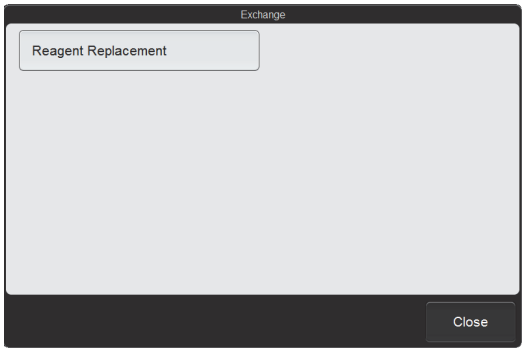


[Operation Confirmation] dialog box

[Whole Blood Aspiration Motor Test]	Touch to start the whole blood aspiration motor test. (➤**P.79** "2.9.1 Motor test")
[Sheath Motor Test]	Touch to start the sheath motor test. (➤**P.79** "2.9.1 Motor test")
[Aspiration Unit Motor Test]	Touch to start the aspiration unit motor test. (➤**P.79** "2.9.1 Motor test")
[Air Pump Test]	Touch to start the air pump test. (➤**P.79** "2.9.2 Air pump test")
[Pinch Valve Test]	Touch to start the pinch valve test. (➤**P.80** "2.9.3 Pinch valve test")
[Tube Holder Motor Test]*1	Touch to start the sample tube holder motor test. (➤**P.79** "2.9.1 Motor test")
[Barcode Reading Test]*2	Use to test the barcode reader in the instrument. (➤**P.80** "2.9.4 Barcode reader reading test (XN-530)")
[Sampler Operation Test]*2	Touch to start the sampler test. (➤**P.81** "2.9.5 Sampler operation test (XN-530)")
[Close]	The dialog box closes.

*1 Does not appear on the XN-330.
*2 XN-530 only.

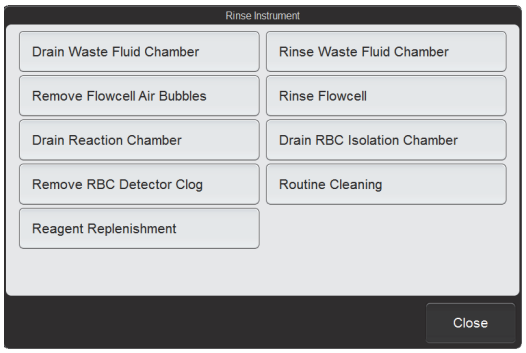
● **[Exchange] dialog box**



[Exchange] dialog box

[Reagent Replacement]	Touch to display the [Reagent Replacement] dialog box. Use this dialog box to replace a reagent. (➤**P.84** "2.12 Replacing the reagent")
[Close]	The dialog box closes.

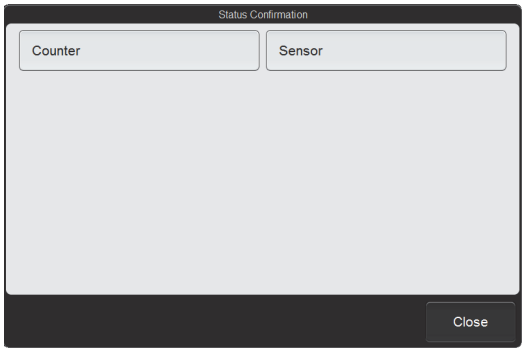
● **[Rinse Instrument] dialog box**



[Rinse Instrument] dialog box

[Drain Waste Fluid Chamber]	Touch to drain the waste fluid that has collected in the waste fluid chamber.
[Rinse Waste Fluid Chamber]	Touch to rinse the waste fluid chamber. XN-530 (➤**P.20** "Chapter 1: Rinsing the waste chamber (XN-530)") XN-430 (➤**P.21** "Chapter 1: Rinsing the waste chamber (XN-430)") XN-330 (➤**P.22** "Chapter 1: Rinsing the waste chamber (XN-330)")
[Remove Flowcell Air Bubbles]	Touch to remove bubbles from the flowcell. (➤**P.46** "Chapter 1: Removing air bubbles from the flowcell")
[Rinse Flowcell]	Touch to rinse the flowcell. XN-530 (➤**P.37** "Chapter 1: Rinsing the flowcell (XN-530)") XN-430 (➤**P.38** "Chapter 1: Rinsing the flowcell (XN-430)") XN-330 (➤**P.39** "Chapter 1: Rinsing the flowcell (XN-330)")
[Drain Reaction Chamber]	Touch to drain the sample that has collected in the reaction chamber.
[Drain RBC Isolation Chamber]	Touch to drain the sample that has collected in the RBC isolation chamber. (➤**P.34** "Chapter 1: Draining the sample from the RBC isolation chamber")
[Remove RBC Detector Clog]	Touch to remove a clog from the RBC detector. (➤**P.34** "Chapter 1: Removing the RBC detector clog")
[Routine Cleaning]	Touch to execute routine cleaning. XN-530 (➤**P.74** "2.4 Executing routine cleaning (XN-530)") XN-430 (➤**P.75** "2.5 Executing routine cleaning (XN-430)") XN-330 (➤**P.76** "2.6 Executing routine cleaning (XN-330)")
[Reagent Replenishment]	Use to replace the reagent in the fluid line. (➤**P.77** "2.7 Replenishing the reagent")
[Close]	The dialog box closes.

● **[Status Confirmation] dialog box**



[Status Confirmation] dialog box

[Counter]	Use to check the analysis count and cycle count of each unit. (➤**P.82** "2.10 Checking the cycle count (counter)")
[Sensor]	Use to check the status of each unit. (➤**P.83** "2.11 Checking the instrument status (sensor)")
[Close]	The dialog box closes.

2.4 Executing routine cleaning (XN-530)

The routine cleaning must be executed once every 1,000 analyses, or once a week. Routine cleaning consists of aspirating CELLCLEAN AUTO and rinsing the fluid line.

1 **Touch the [Maintenance] icon in the [Menu] screen.**

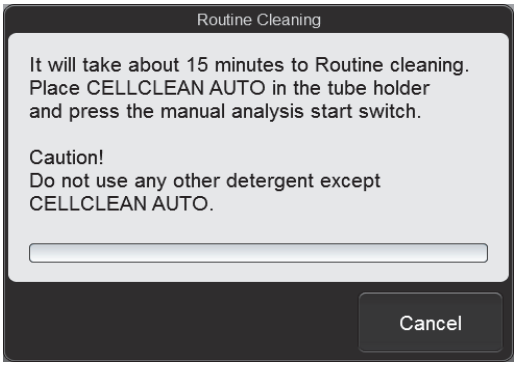
The [Maintenance] menu screen appears.

2 **Touch the [Rinse Instrument] icon.**

The [Rinse Instrument] dialog box appears.

3 **Touch [Routine Cleaning].**

The [Routine Cleaning] dialog box appears.

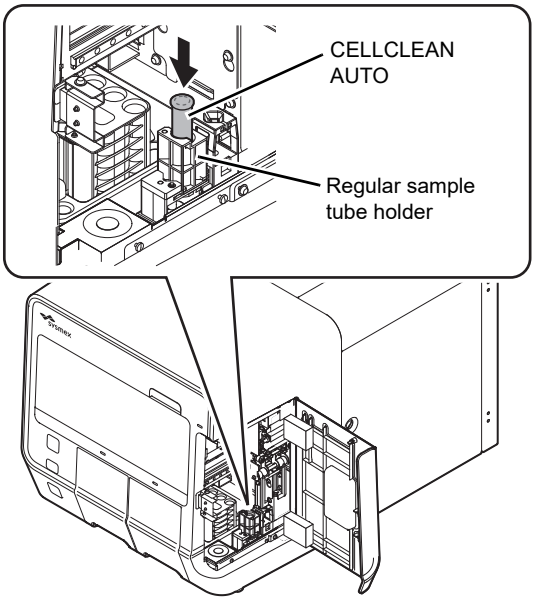


[Routine Cleaning] dialog box

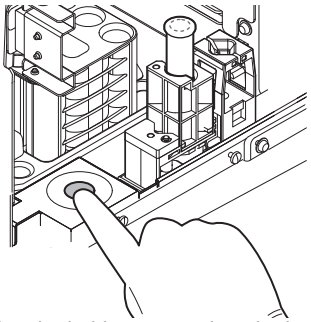
4 **Open the sampler cover (manual unit).**

5 **Place CELLCLEAN AUTO in the sample tube holder.**

Place in the regular sample tube holder.



6 **Press the start switch.**



The sample tube holder retracts into the instrument and aspiration starts. When aspiration finishes, cleaning starts and the sample tube holder is ejected.

7 **Remove CELLCLEAN AUTO.**

8 **Close the sampler cover (manual unit).**

9 **Wait until cleaning finishes.**

When the process finishes, the dialog box closes, and the instrument power automatically turns OFF.

2.5 Executing routine cleaning (XN-430)

The routine cleaning must be executed once every 1,000 analyses, or once a week. Routine cleaning consists of aspirating CELLCLEAN AUTO and rinsing the fluid line.

1 Touch the [Maintenance] icon in the [Menu] screen.

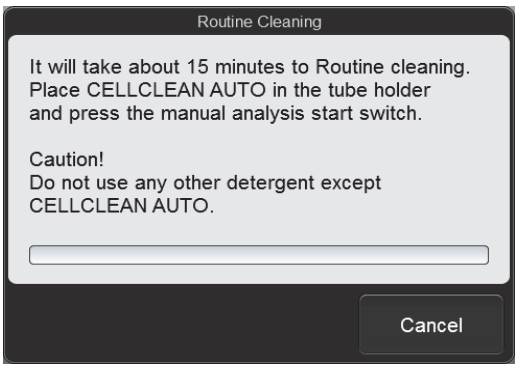
The [Maintenance] menu screen appears.

2 Touch the [Rinse Instrument] icon.

The [Rinse Instrument] dialog box appears.

3 Touch [Routine Cleaning].

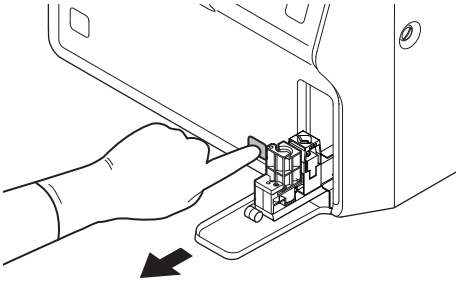
The [Routine Cleaning] dialog box appears.



[Routine Cleaning] dialog box

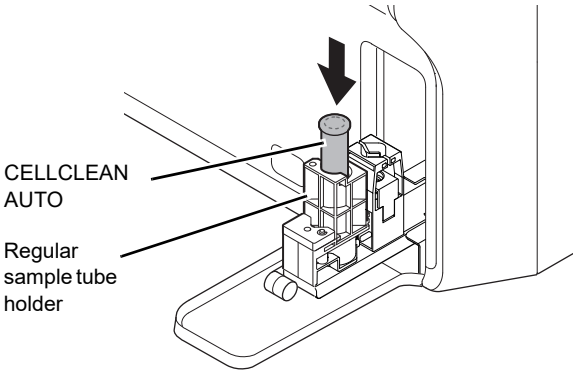
4 If the sample tube holder is not ejected, press the sample tube holder open/close switch.

The sample tube holder is ejected.

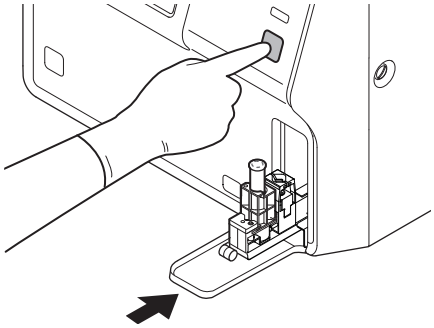


5 Place CELLCLEAN AUTO in the sample tube holder.

Place in the regular sample tube holder.



6 Press the start switch.



The sample tube holder retracts into the instrument and aspiration starts. When aspiration finishes, cleaning starts and the sample tube holder is ejected.

7 Remove CELLCLEAN AUTO.

8 Wait until cleaning finishes.

When the process finishes, the dialog box closes, and the instrument power automatically turns OFF.

2.6 Executing routine cleaning (XN-330)

The routine cleaning must be executed once every 1,000 analyses, or once a week. Routine cleaning consists of aspirating CELLCLEAN AUTO and rinsing the fluid line.

1 Touch the [Maintenance] icon in the [Menu] screen.

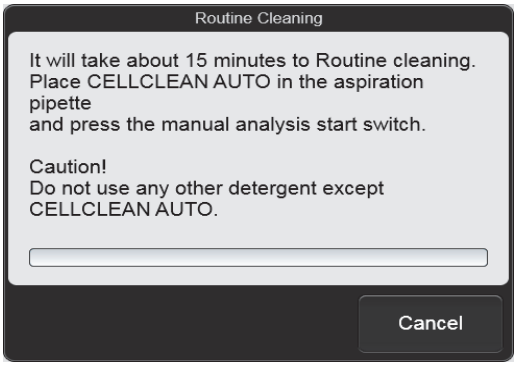
The [Maintenance] menu screen appears.

2 Touch the [Rinse Instrument] icon.

The [Rinse Instrument] dialog box appears.

3 Touch [Routine Cleaning].

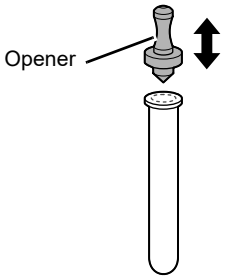
The [Routine Cleaning] dialog box appears.



[Routine Cleaning] dialog box

4 Open CELLCLEAN AUTO with the special CELLCLEAN AUTO opener.

With CELLCLEAN AUTO held straight as shown, press the opener down until you hear a “pop” sound.

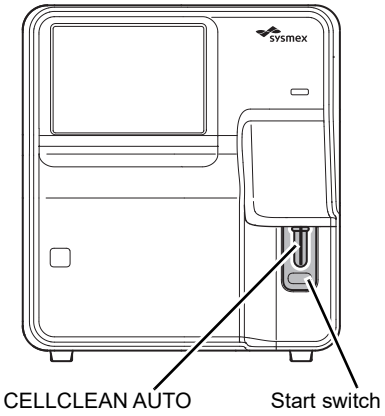


Keep the opener attached, and remove immediately before you use CELLCLEAN AUTO.

⚠ Caution!

- Always wear adequate personal protective equipment when opening CELLCLEAN AUTO.
- Press down slowly so that the fluid does not spill.
- Store opened CELLCLEAN AUTO standing on the rack with the opener attached. If CELLCLEAN AUTO is tilted, the fluid may leak even with the opener attached.

5 Insert the pipette all the way to the bottom of the CELLCLEAN AUTO, and press the start switch.



Aspiration starts.

During aspiration, the analysis status indicator LED blinks green and the beeper sounds repeatedly.

When aspiration finishes, the analysis status indicator LED turns off and the beeping stops. Cleaning starts.

6 Remove CELLCLEAN AUTO from the pipette.

Remove CELLCLEAN AUTO without bending the pipette.

7 Wait until cleaning finishes.

When the process finishes, the dialog box closes, and the instrument power automatically turns OFF.

2.7 Replenishing the reagent

If an incorrect reagent is accidentally connected, the reagent in the fluid line can be replenished.

1 Make sure that the correct reagent is connected.

2 Touch the [Maintenance] icon in the [Menu] screen.

The [Maintenance] menu screen appears.

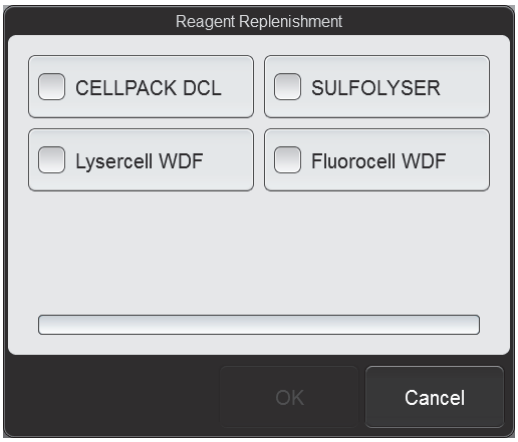
3 Touch the [Rinse Instrument] icon.

The [Rinse Instrument] dialog box appears.

4 Touch [Reagent Replenishment].

The [Reagent Replenishment] dialog box appears.

The content that appears depends on your system configuration.



[Reagent Replenishment] dialog box

5 Select the checkbox of the reagent you want to replenish.

Touch the reagent name to select or unselect the checkbox.

The selected reagent will be replenished.

6 Touch [OK].

Reagent replenishing starts.

Wait until this process finishes. When the process finishes, the dialog box closes.

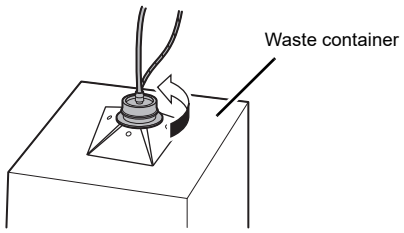
2.8 Replacing the waste container

When a waste container is installed, this procedure is used to replace the waste container. When the waste container becomes full, replace the waste container.
If you are using a waste container full sensor and the waste container becomes full, [Waste container is full] appears in the [Help] dialog box. Promptly replace the waste container.
Follow the procedure below to replace the waste container when using a waste container full sensor.

Risk of infection
Take care that waste fluid does not splash.

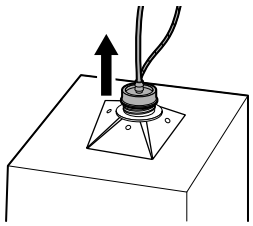
1 **Prepare an empty waste container and remove the cap.**

2 **Turn the cap on the full waste container in the direction of the arrow to loosen.**



3 **Lift the cap with the tube connected straight up.**

Dispose of the full waste container in accordance with local laws and regulations.



4 **Insert the cap with the tube connected straight into the new waste container.**

5 **Close the cap by turning it in the direction opposite to that of step 2.**

6 **Touch [Accept] in the [Help] dialog box.**

Caution!
Install the waste container below the bottom of the instrument.

2.9 Testing instrument operation

The operation of each unit can be tested. These procedures can be used to identify the cause of an error.
To execute an operation test, the instrument must be in the ready state. Operation tests cannot be executed in any other state. Analysis is not possible while an operation test is in progress.

2.9.1 Motor test

The following motor operations can be tested.

Name	Operation
Whole blood aspiration motor	Aspirates and discharges samples.
Sheath motor	Feeds reaction sample to the FCM detector or RBC/PLT detector.
Aspiration unit motor	Moves the piercer (XN-530/ XN-430) or pipette (XN-330) that aspirates the sample.
Sample tube holder motor*	Ejects and retracts the sample tube holder.

* XN-530/XN-430 only.

1 Touch the [Maintenance] icon in the [Menu] screen.

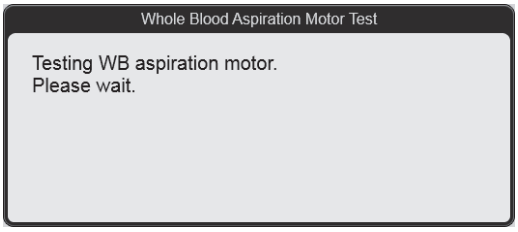
The [Maintenance] menu screen appears.

2 Touch the [Operation Confirmation] icon.

The [Operation Confirmation] dialog box appears.

3 Touch the motor test button.

The operation test starts, and the dialog box appears.



Example: [Whole Blood Aspiration Motor Test] dialog box

Wait until this process finishes. When the process finishes, the dialog box closes.

If an error occurred during the test, an error message appears.

2.9.2 Air pump test

Activate the air pump and execute the operation test.

1 Touch the [Maintenance] icon in the [Menu] screen.

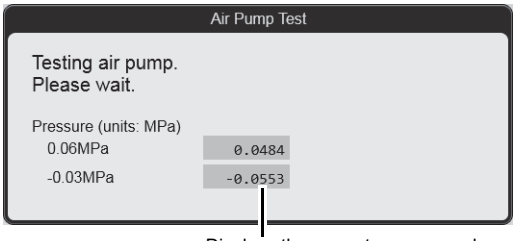
The [Maintenance] menu screen appears.

2 Touch the [Operation Confirmation] icon.

The [Operation Confirmation] dialog box appears.

3 Touch [Air Pump Test].

The operation test starts, and the [Air Pump Test] dialog box appears.



[Air Pump Test] dialog box

Wait until this process finishes. When the process finishes, the dialog box closes.

If an error occurred during the test, an error message appears.

2.9.3 Pinch valve test

There is a pinch valve in the waste chamber and in the rinse cup aspiration unit.

1 Touch the [Maintenance] icon in the [Menu] screen.

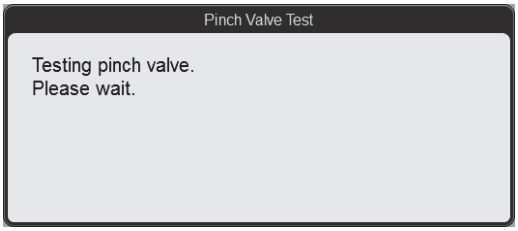
The [Maintenance] menu screen appears.

2 Touch the [Operation Confirmation] icon.

The [Operation Confirmation] dialog box appears.

3 Touch the [Pinch Valve Test] icon.

The operation test starts, and the [Pinch Valve Test] dialog box appears.



[Pinch Valve Test] dialog box

Wait until this process finishes. When the process finishes, the dialog box closes.

If an error occurred during the test, an error message appears.

2.9.4 Barcode reader reading test (XN-530)

When a barcode read error occurs, execute the barcode reader reading test to identify the cause of the error.

1 If the button at the right edge of the control menu is [Manual], press the mode switch.

Change to sampler analysis mode.

2 Touch the [Maintenance] icon in the [Menu] screen.

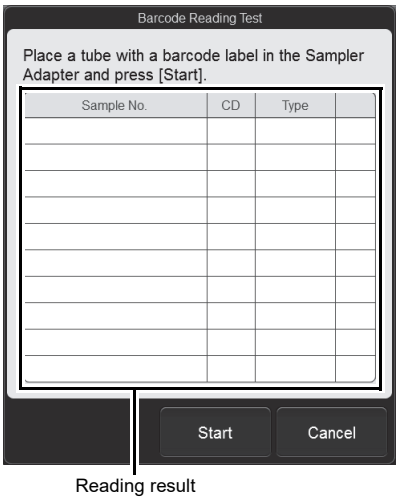
The [Maintenance] menu screen appears.

3 Touch the [Operation Confirmation] icon.

The [Operation Confirmation] dialog box appears.

4 Touch [Barcode Reading Test].

The [Barcode Reading Test] dialog box appears.



[Barcode Reading Test] dialog box

[Sample No.]	Displays the sample number that was read from the barcode.
[CD]	Displays the check digit of the barcode.
[Type]	Displays the type of barcode.
Reading result	Displays the read result. One of the following symbols is displayed, depending on the result. If there was no problem with reading, nothing is displayed. [E]: Reading error or invalid check digit. [+]: A value that is longer than the specified number of digits was read. [-]: A value that is shorter than the specified number of digits was read.

5 Pull out the sampler adapter holder (left), and remove the sampler adapter.

6 Place a sample tube with a barcode label in the sampler adapter.

7 Place the sampler adapter in the sampler adapter holder (left).

8 Push in the sampler adapter holder (left).

9 **Touch [Start].**

The reading test starts.

If a previous test result was displayed, it is cleared when the test starts.

Wait until this process finishes. When reading finishes, the result is displayed.

10 **Touch [Cancel].**

The dialog box closes.

11 **Pull out the sampler adapter holder (left), and remove the sampler adapter.**

12 **Remove the sample tube from the sampler adapter.**

13 **Place the sampler adapter in the sampler adapter holder (left).**

14 **Push in the sampler adapter holder (left).**

2.9.5 Sampler operation test (XN-530)

The sampler operation test is used to test the sequence of operation from removing a sample tube from the sampler adapter and mixing the sample to replacing the sample tube in the sample tube holder, and reverse operation.

1 **If the button at the right edge of the control menu is [Manual], press the mode switch.**

Change to sampler analysis mode.

2 **Touch the [Maintenance] icon in the [Menu] screen.**

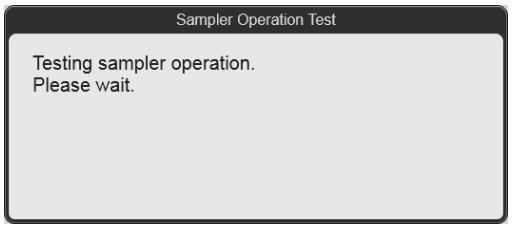
The [Maintenance] menu screen appears.

3 **Touch the [Operation Confirmation] icon.**

The [Operation Confirmation] dialog box appears.

4 **Touch [Sampler Operation Test].**

The operation test starts, and the [Sampler Operation Test] dialog box appears.



[Sampler Operation Test] dialog box

Wait until this process finishes. When the process finishes, the dialog box closes.

If an error occurred during the test, an error message appears.

2.10 Checking the cycle count (counter)

Use to check the analysis count of each analysis mode and the cycle count of each unit.

1 Touch the [Maintenance] icon in the [Menu] screen.

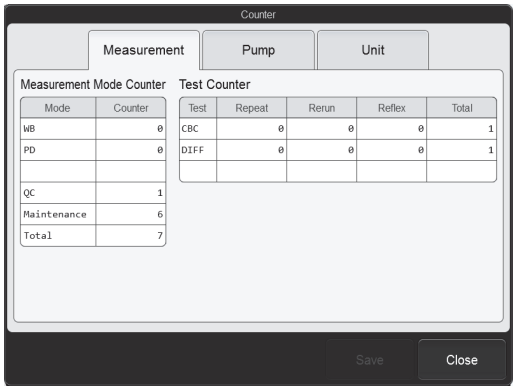
The [Maintenance] menu screen appears.

2 Touch the [Status Confirmation] icon.

The [Status Confirmation] dialog box appears.

3 Touch [Counter].

The [Counter] dialog box appears.



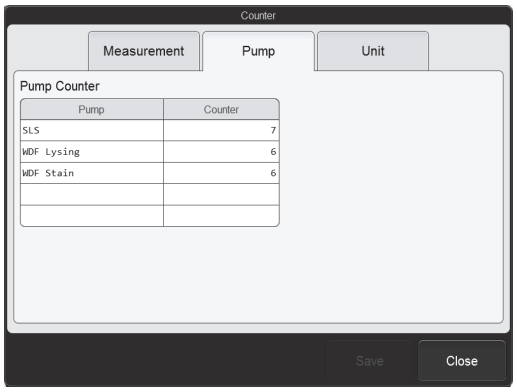
[Counter] dialog box ([Measurement] tab)

Select the tabs to check the analysis count, pump cycle count, and counts of other units.

[Measurement] tab

[Measurement Mode Counter]	Displays the analysis count of each analysis mode. [Maintenance] shows the count of background check.
[Test Counter]	Displays the analysis count of each discrete and test. [Total] sums up the [Repeat], [Rerun], and [Reflex] counts. On models other than the XN-530, there is no function for Repeat analysis, Rerun analysis, or Reflex analysis, and thus this field is blank.

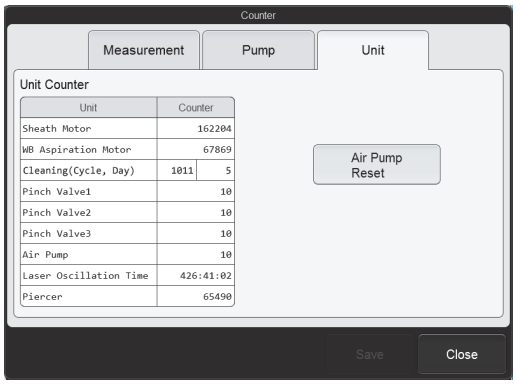
[Pump] tab



[Counter] dialog box ([Pump] tab)

[Pump Counter]	Displays the cycle count of each pump.

[Unit] tab



[Counter] dialog box ([Unit] tab)

[Unit Counter]	Displays the cycle count of each unit. [Cleaning(Cycle, Day)] shows the analysis count and the number of days elapsed since the last time routine cleaning was executed. [Piercer] appears when the instrument is the XN-530 or XN-430.
[Air Pump Reset]	Resets the air pump counter to 0.

4 Touch [Close].

The dialog box closes.

2.11 Checking the instrument status (sensor)

You can verify the temperature, pressure, and sensor status of each unit. The information displayed is updated every 0.5 seconds.
You can also execute analysis with the [Sensor Display] dialog box open and showing the information.

1 Touch the [Maintenance] icon in the [Menu] screen.

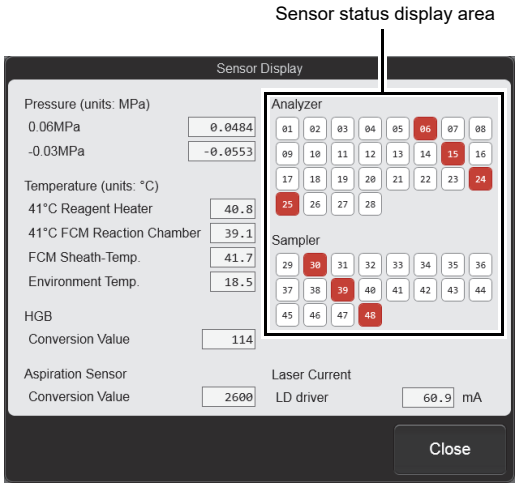
The [Maintenance] menu screen appears.

2 Touch the [Status Confirmation] icon.

The [Status Confirmation] dialog box appears.

3 Touch [Sensor].

The [Sensor Display] dialog box appears.



[Sensor Display] dialog box

[Pressure (units: MPa)]	Displays the pressure of each unit.
[Temperature (units: °C)]	Displays the temperature of each unit in the instrument and the ambient temperature.
[HGB]	Displays the conversion value for hemoglobin. Nothing is displayed during analysis.
[Aspiration Sensor]	Displays the conversion value for the aspiration sensor. Nothing is displayed during analysis.
[Laser Current]	Displays the output current of the laser.
Sensor status display area	Displays the status of each sensor. Red: ON White: OFF The [Sampler] sensor status is only displayed on the XN-530.

4 Touch [Close].

The dialog box closes.

2.12 Replacing the reagent

When the replacement of reagent is required, the error message appears. Promptly replace the indicated reagent.

2.12.1 [Reagent Replacement] dialog box

The [Reagent Replacement] dialog box allows you to check how much reagent remains and replace reagents.

1 Touch the [Maintenance] icon in the [Menu] screen.

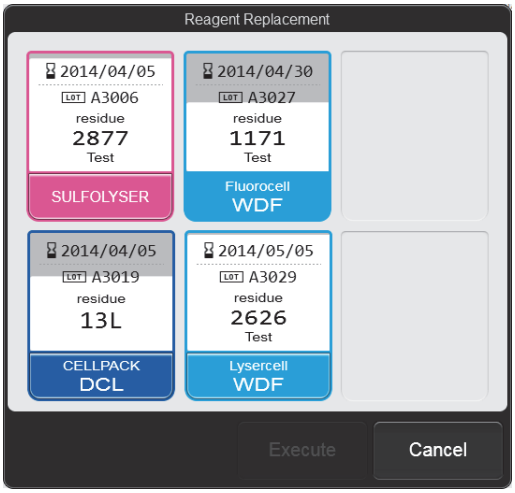
The [Maintenance] menu screen appears.

2 Touch the [Exchange] icon.

The [Exchange] dialog box appears.

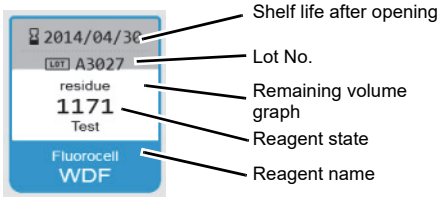
3 Touch [Reagent Replacement].

The [Reagent Replacement] dialog box appears.



[Reagent Replacement] dialog box

The dialog box shows information on each reagent and how much remains.



Shelf life after opening	Displays the shelf life of the reagent after opening. The value is not displayed if the reagent has not been registered. When the shelf life after opening has expired, it appears in white on a red background.
Lot No.	Displays the lot number of the reagent.
Reagent state	Displays the remaining number of tests that can be executed with the reagent. For CELLPACK DCL, the remaining volume appears. The remaining number of tests is an approximate value. The value will vary depending on conditions of use. The value is not displayed if the reagent has not been registered. When the reagent runs low, the background becomes yellow. During diluent or hemolytic agent replacement, progress is indicated as "0 to 100%".
Reagent name	Displays the reagent name.
Remaining volume graph	The remaining volume of the reagent is shown as a graph. This is not displayed if the reagent has not been registered, or if the reagent has run out.

Note:

The [Reagent Replacement] dialog box can also be displayed by touching the remaining reagent display in the control menu.
In addition, touching [Execute] in the [Help] dialog box when a reagent replacement error message appears also displays the [Reagent Replacement] dialog box. In this case, only the reagent for which the error occurred can be replaced.

2.12.2 Replacing the diluent and hemolytic agent

When the replacement of reagent such as CELLPACK DCL, CELLPACK DST, SULFOLYSER, or Lysercell WDF is required, follow the steps below to replace it.

1 Prepare a new reagent.

Make sure the reagent has not expired.

Caution!

- Place the reagent container at a level no more than 1 meter above or below the bottom of the analyzer. Do not place reagents on top of the instrument.
- The new reagent must be allowed to sit for at least 24 hours at room temperature (15 to 35°C)* before use.
- If reagent spills, immediately wipe up the spill using a moistened cloth.

* Use CELLPACK DST at 15 to 30°C.

2 Display the [Reagent Replacement] dialog box.

(➤**P.84** "2.12.1 [Reagent Replacement] dialog box")

3 Input the reagent code (barcode) of the new reagent.

Input by reading the barcode

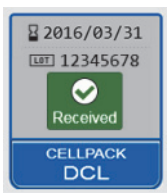
Scan the reagent code (barcode) on the outer box of the new reagent with the hand-held barcode reader. The reagent code is as shown below.

Make sure the barcode scanning surface is flat before scanning.

Note:

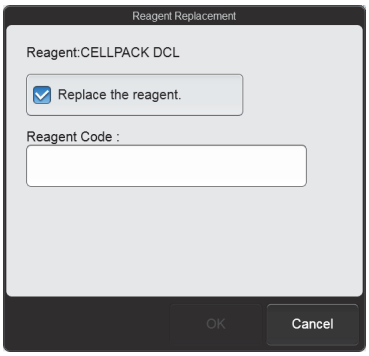
In case the reagent outer box label shows a "XN Reagent Code" or "Reagent Code 2" barcode, please scan this barcode.

When the reagent code is entered, the reagent in the dialog box shows [Received]. The lot number and expiration date show the information of the new reagent.



Note:

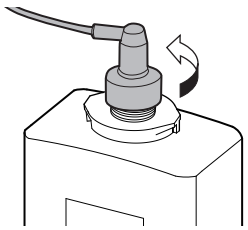
When inputting manually, touch the name of the reagent to be replaced in the [Reagent Replacement] dialog box. The dialog box below appears.



Touch [Replace the reagent.] to select the checkbox, enter the [Reagent Code :], and touch [OK].

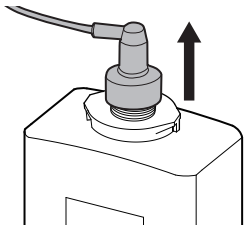
4 Remove the cap from the new reagent container.

5 Remove the cap from the old reagent container.



Example: Lysercell WDF (2 L)

6 Pull the spout set straight up and out.



Caution!

Do not touch the aspiration nozzle on the spout set. Take care that dust does not get on the spout set.

7 **Insert the spout set straight into the new reagent container and close the cap.**

8 **Touch [Execute].**

Reagent replacement starts. Wait until this process finishes. When replacement finishes, the [Reagent Replacement] dialog box closes.

Time guidelines for reagent replacement are shown below.

Reagent name	Time
CELLPACK DCL	Approx. 1 minute
SULFOLYSER	Approx. 2 1/2 minutes
Lysercell WDF	Approx. 3 1/2 minutes

2.12.3 Replacing the dye

When the replacement of reagent such as Fluorocell WDF is required, follow the steps below to replace it.

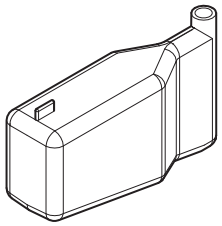
> **⚠ Caution!**
> While performing replacement, always wear adequate personal protective equipment.

1 **Display the [Reagent Replacement] dialog box.**

(➤**P.84** "2.12.1 [Reagent Replacement] dialog box")

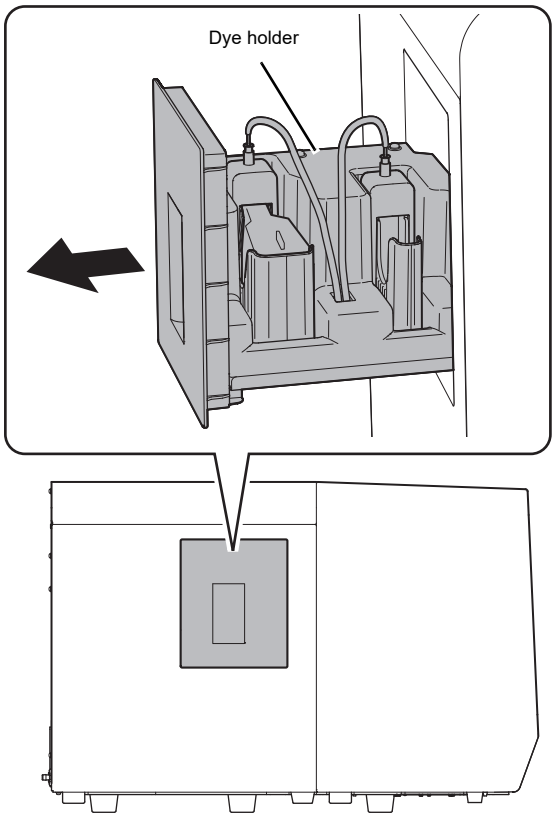
2 **Prepare a new reagent cartridge.**

Make sure the reagent has not expired.



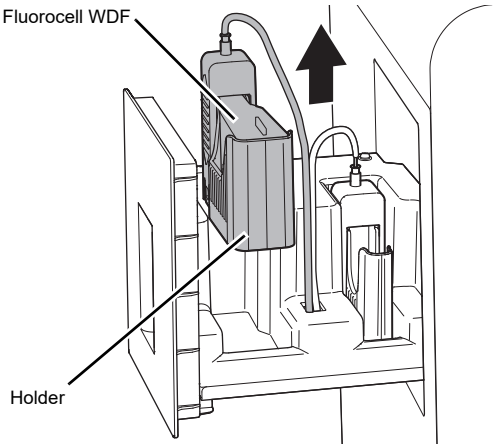
Example: Fluorocell WDF

3 **Pull out the dye holder.**

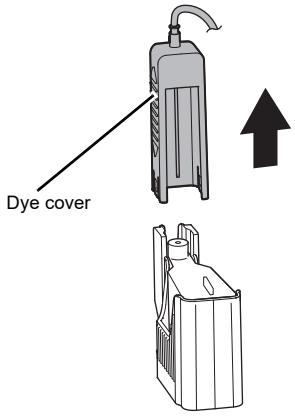


Example: XN-530

4 **Remove the entire dye holder.**



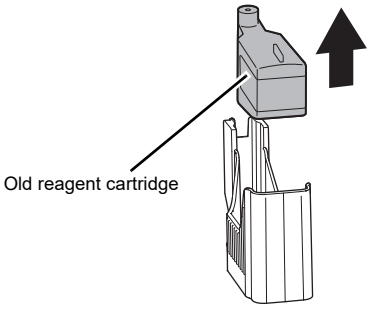
5 **Slowly remove the dye cover, taking care that the dye does not drip.**



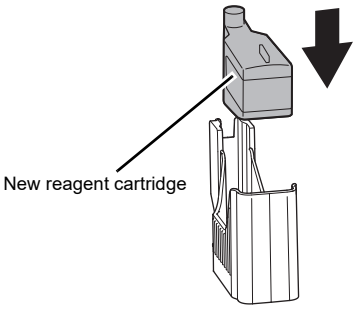
Caution!

Dye may drip from the nozzle on the dye cover.
If dye drips onto the instrument, immediately wipe it off using a moistened cloth. Otherwise, the coated surface of the instrument may become discolored.

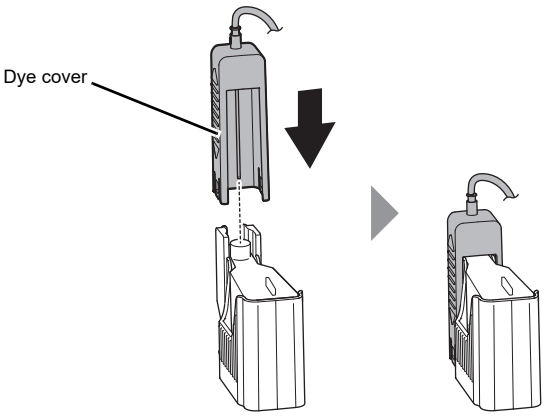
6 **Remove the old reagent cartridge from the holder.**



7 **Insert the new reagent cartridge in the holder.**



8 **Place the dye cover.**



9 **Place the holder in the dye holder.**

10 **Close the dye holder.**

The information on the RFID tag of the cartridge is read, and if normal, a beep sounds. The lot number and expiration date show the information of the new reagent.

Information

Be sure to push the dye holder all the way in.

2.13 Replacing the piercer (XN-530/XN-430)

When the piercer operation count exceeds 120,000, [Piercer replacement is required.] appears in the [Help] dialog box. Contact your local Sysmex representative to request a piercer replacement immediately. A Sysmex technical representative will replace the part.
Continuing to use the old piercer will cause tip wear and may result in problems such as blood aspiration related errors, compromised data integrity, or needle breakage.

2.14 Replacing the air pump

> **Caution, Hot!**
> The surface of the air pump is hot. After turning OFF the main power, make sure that the air pump has cooled sufficiently before replacing it.

Air pump that is used

Part number	Item name
05104711	Air pump set No. 1

The air pump must be replaced once every 30,000 analyses, or once every 2 years. Continuing to use the old air pump may result in breakage or other problems.
When [Replace air pump.] appears, promptly replace the air pump.
A replacement air pump is not included with the instrument. Contact your local Sysmex representative to purchase a replacement air pump.

1 Shut down the instrument.

1 **Make sure the instrument is in the ready state.**
If the instrument status at the bottom left of the screen is not green, wait until it becomes green.

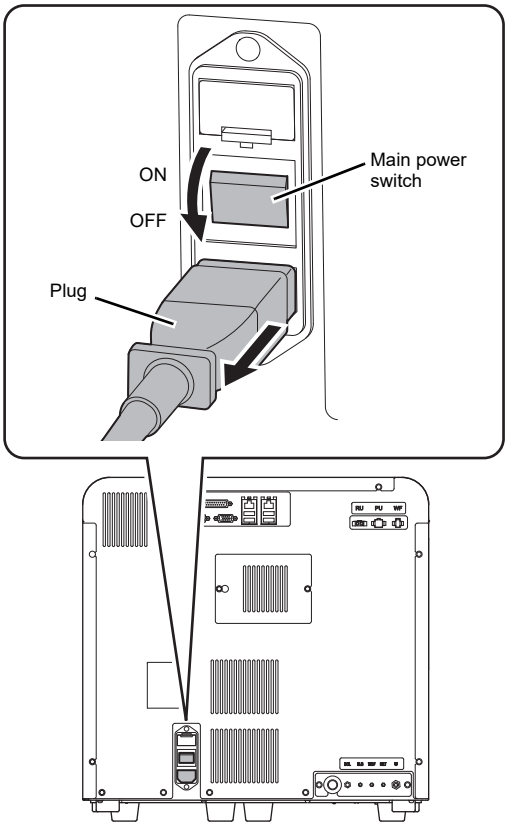
2 **Remove the sample tube from the sample tube holder. (XN-530/XN-430 only)**

3 **Touch the [Menu] button on the toolbar.**
The [Menu] screen appears.

4 **Touch the [Shutdown] icon.**
The [Shutdown] dialog box appears.

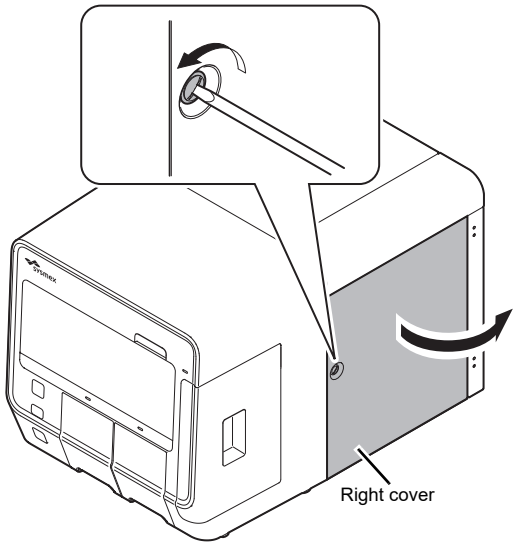
5 **Touch [OK].**
The instrument power automatically turns OFF.

2 Turn OFF the main power switch, and unplug the power cable.



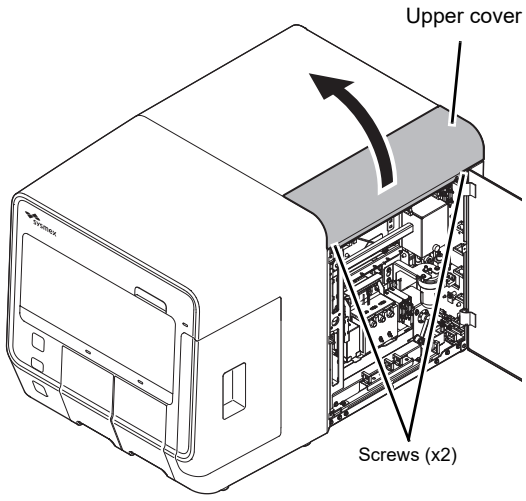
3 Open the right cover.

Release the lock by turning to the left with a flathead screwdriver, and open the right cover.



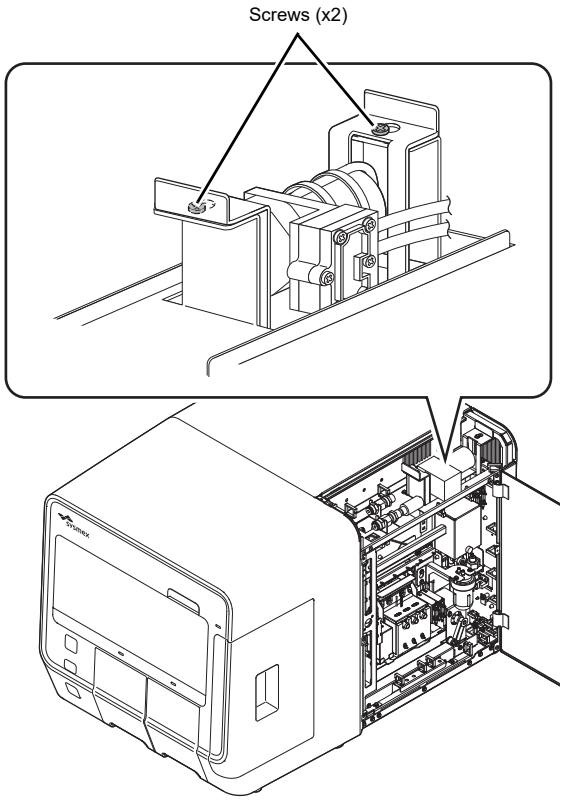
Example: XN-530

4 Remove the screws (x2) with a Phillips head screwdriver, and remove the upper cover.



Example: XN-530

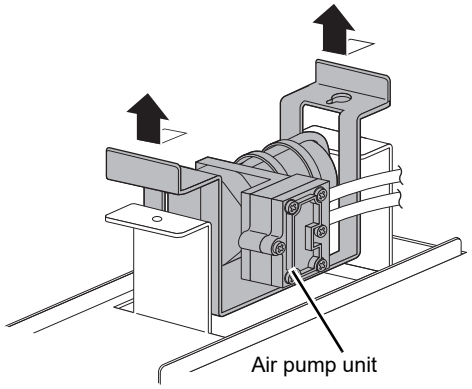
5 Loosen the screws (x2) with a Phillips head screwdriver.



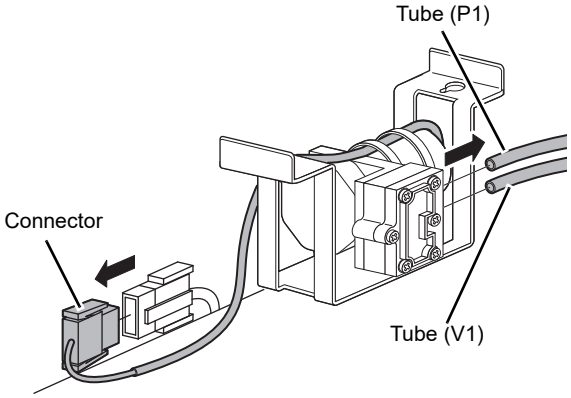
Example: XN-530

> **⚠ Caution!**
> Take care not to drop the screws.
> It may be very difficult to remove a screw that falls into the instrument.

6 Pull up the air pump unit.



7 **Remove the connectors and tubes (x2), and remove the air pump unit.**



8 **Connect the connectors and tubes (x2) to the new air pump.**

See the illustration of step 7.

Information

Connect the tube (P1) to the upper side.

9 **Place the air pump unit in the instrument, and fasten with the screws (x2) with a Phillips head screwdriver.**

10 **Attach the upper cover, and fasten with the screws (x2) with a Phillips head screwdriver.**

11 **Close the right cover and lock.**

Turn the lock to the right with a flathead screwdriver.

12 **Turn ON the main power switch.**

13 **Press the power switch.**

Start the instrument and log on.

14 **Reset the counter of the air pump to "0".**

Display the [Unit] tab of the [Counter] dialog box, and reset the count.

For details on the [Unit] tab and the reset procedure, see the following.

(➤**P.82** "2.10 Checking the cycle count (counter)")

2.15 Replacing the fuse

If a fuse blows, replace the fuse.

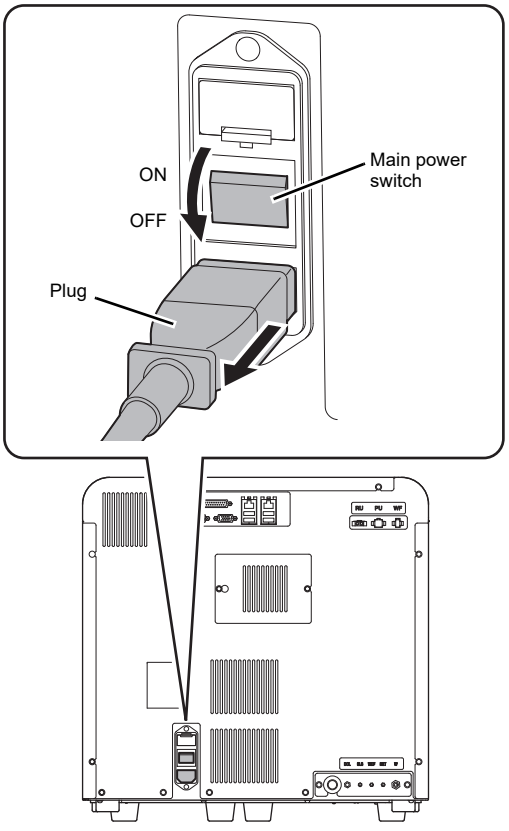
Warning!

- Always unplug the power cable before replacing a fuse.
  An electrical shock could occur.
- Use only a fuse of the specified type and rating.
  Doing so could cause a smoke emission.

Fuse that is used

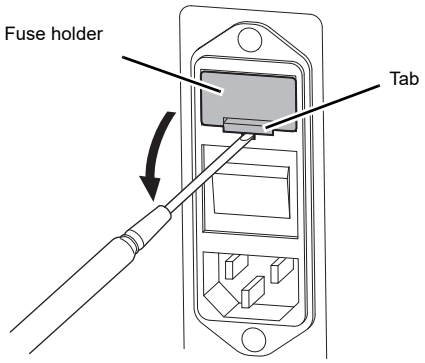
Part number	Item name	Rating	Type	Number of fuse
26677681	Fuse 50T100H	250 V 10 A	Time lag	2

1 Turn OFF the main power switch, and unplug the power cable.

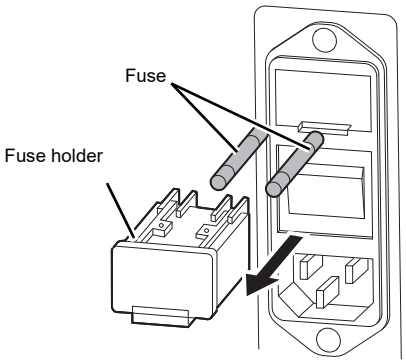


2 Remove the old fuse.

1 **Lift the tab on the fuse holder with a flathead screwdriver and pull out the fuse holder.**



2 **Remove the old fuse from the fuse holder.**



3 Place the new fuse in the fuse holder and insert the fuse holder into the instrument.

4 **Plug in the power cable.**

5 **Turn ON the main power switch.**

6 **Press the power switch.**

2.16 Cleaning the aspiration unit tray (XN-530/XN-430)

If the aspiration unit tray becomes dirty, clean the aspiration unit tray.

Risk of infection

Always wear adequate personal protective equipment, such as protective gloves, a protective mask, protective eyewear, and a lab coat when cleaning the aspiration unit tray. Wash your hands after completing the task.
There is a risk of infection if the tray is contaminated with blood or other material.

1 Shut down the instrument.

1 Make sure the instrument is in the ready state.

If the instrument status at the bottom left of the screen is not green, wait until it becomes green.

2 Remove the sample tube from the sample tube holder.

3 Touch the [Menu] button on the toolbar.

The [Menu] screen appears.

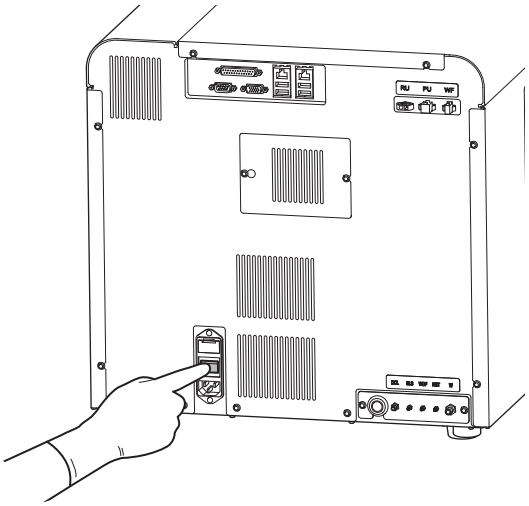
4 Touch the [Shutdown] icon.

The [Shutdown] dialog box appears.

5 Touch [OK].

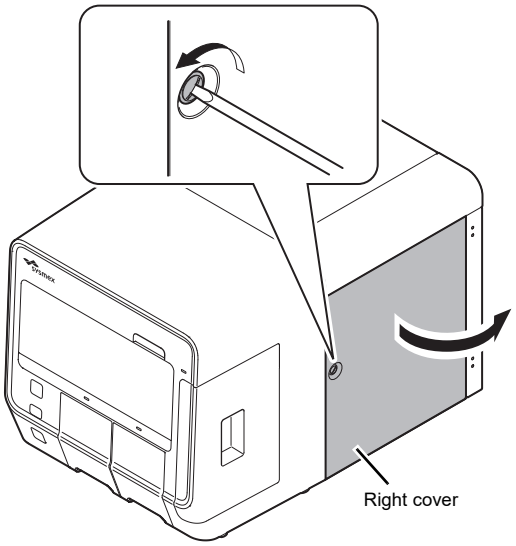
The instrument power automatically turns OFF.

2 Turn OFF the main power switch.



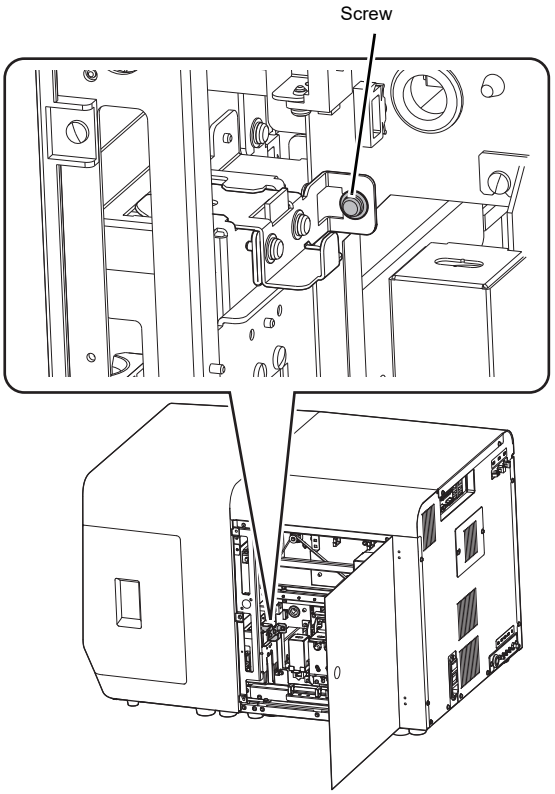
3 Open the right cover.

Release the lock by turning to the left with a flathead screwdriver, and open the right cover.



Example: XN-530

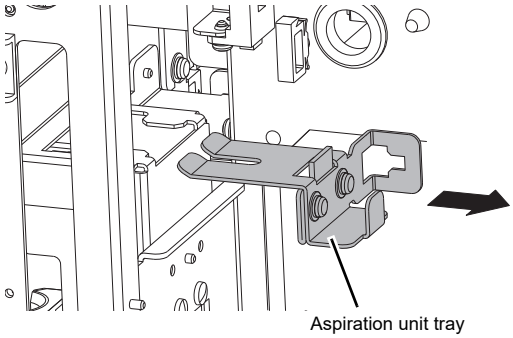
4 Remove the screw (x1) with a Phillips head screwdriver.



Example: XN-530

> **⚠ Caution!**
> Take care not to drop the screws you removed.
> It may be very difficult to remove a screw that falls into the instrument.

5 Remove the aspiration unit tray.



6 Clean the aspiration unit tray using tap water or alcohol.

7 Make sure no dirt remains, and wipe off the water.

8 Install the aspiration unit tray in the instrument, and fasten with the screw (x1) with a Phillips head screwdriver.

See the illustrations of steps 4 and 5.

9 Close the right cover and lock.

Turn the lock to the right with a flathead screwdriver.

10 Turn ON the main power switch.

11 Press the power switch.

Start the instrument and log on.

2.17 Cleaning the aspiration unit tray (XN-330)

If the aspiration unit tray becomes dirty, clean the aspiration unit tray.

> **Risk of infection**
>
> Always wear adequate personal protective equipment, such as protective gloves, a protective mask, protective eyewear, and a lab coat when cleaning the aspiration unit tray. Wash your hands after completing the task.
> There is a risk of infection if the tray is contaminated with blood or other material.

1 Shut down the instrument.

1 Make sure the instrument is in the ready state.

If the instrument status at the bottom left of the screen is not green, wait until it becomes green.

2 Touch the [Menu] button on the toolbar.

The [Menu] screen appears.

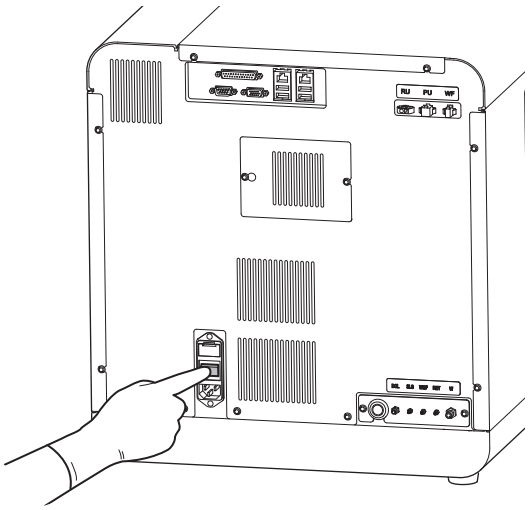
3 Touch the [Shutdown] icon.

The [Shutdown] dialog box appears.

4 Touch [OK].

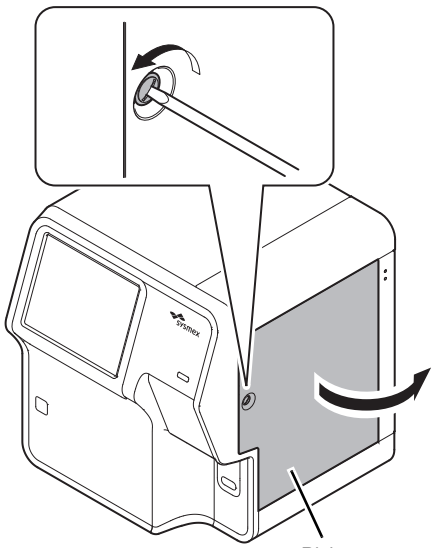
The instrument power automatically turns OFF.

2 Turn OFF the main power switch.

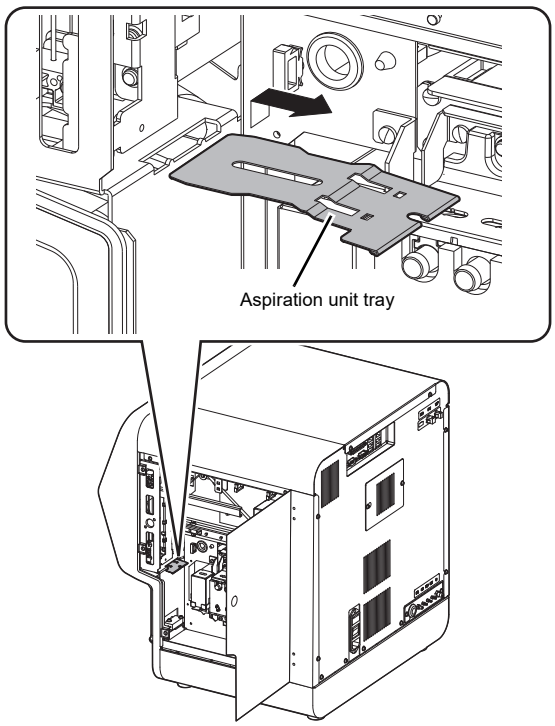


3 Open the right cover.

Release the lock by turning to the left with a flathead screwdriver, and open the right cover.



4 **Remove the aspiration unit tray.**



5 **Clean the aspiration unit tray using tap water or alcohol.**

6 **Make sure no dirt remains, and wipe off the water.**

7 **Install the aspiration unit tray in the instrument.**

See the illustration of step 4.

Information

Install so that the protrusion on the aspiration unit tray is on the right side.

8 **Close the right cover and lock.**

Turn the lock to the right with a flathead screwdriver.

9 **Turn ON the main power switch.**

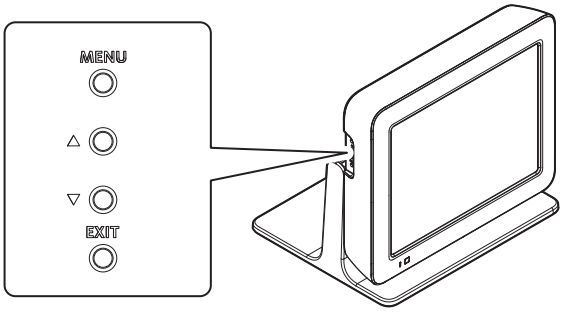
10 **Press the power switch.**

Start the instrument and log on.

2.18 Adjusting the monitor image quality (XN-530)

When you want to change the monitor image (brightness, color, position, etc.), adjust the image with the OSD (on-screen display) buttons.

OSD (on-screen display) buttons



2.18.1 Displaying the OSD screen

1 Press the MENU button.

The OSD screen (page 1) appears on the monitor.

To display page 2 (Option Setting), press the △ or ▽ button to move the cursor (gray background) to [Option] and press the MENU button.

Monitor Setting	
Contrast	55
H Position	125
V Position	127
HTotal(Clock)	128
Phase	112
Contrast Red	50
Contrast Green	50
Contrast Blue	50
Backlight	31
AutoAdjust	
AutoColor	
Default	
Save Data	
Cancel	
Option	

Page 1

To return to page 1, press the △ or ▽ button to move the cursor to [Cancel] and press the MENU button.

Option Setting	
Red Gain	133
Green Gain	133
Blue Gain	133
Red Offset	128
Green Offset	128
Blue Offset	128
Filter	Non
Gamma	1.0
OSD HPosition	128
OSD VPosition	128
OSD Effect	0
OSD Timeout	10
Default	
Save Data	
Cancel	

Page 2

2.18.2 Closing the OSD screen

1 Press the EXIT button.

The OSD screen closes.

Note:

- The OSD screen can be closed by moving the cursor to [Cancel] in the OSD screen (page 1) and pressing the MENU button.
- If the OSD buttons are not used for more than 10 seconds when changing settings, the settings are automatically saved and the OSD screen closes. This time can be set using [OSD Timeout].

2.18.3 Changing the monitor settings

1 Move the cursor to the desired setting item.

Press the △ or ▽ button to move the cursor (gray background).

For a description of each item, see the following.

(➤**P.99** "2.18.4 Setting items and functions in the OSD screen")

2 Press the MENU button.

The item is selected and the cursor background changes to yellow.

When an item that does not have settings ([AutoAdjust], [Save Data], etc.) is selected, the function of the item is executed.

3 Change the setting.

- To increase a value, press the △ button.
- To decrease a value, press the ▽ button.

4 Press the MENU button.

The item is unselected and the cursor background changes to gray.

5 Move the cursor to [Save Data].

6 Press the MENU button.

The settings are saved.

2.18.4 Setting items and functions in the OSD screen

Pages	Setting item/ function	Description	Setting range	Default setting
1	Contrast	Adjustment of contrast of all RGB colors	0 to 255	55
	H Position	Horizontal position adjustment	28 to 228	128
	V Position	Vertical position adjustment	105 to 151*	128
	HTotal (Clock)	Horizontal total count setting	64 to 192	128
	Phase	Phase setting (flickering adjustment)	0 to 63	0
	Contrast Red	Red contrast adjustment (digital setting)	0 to 255	50
	Contrast Green	Green contrast adjustment (digital setting)	0 to 255	50
	Contrast Blue	Blue contrast adjustment (digital setting)	0 to 255	50
	Backlight	Brightness adjustment	0 to 31	31
	AutoAdjust	Auto position adjustment	-	
	AutoColor	Auto color adjustment	-	
	Default	Initial setting	-	
	Save Data	Data save	-	
	Cancel	Cancel or OSD screen closing	-	
	Option	Display of page 2	-	
2	Red Gain	Red ADC gain adjustment (analog setting)	0 to 255	128
	Green Gain	Green ADC gain adjustment (analog setting)	0 to 255	128
	Blue Gain	Blue ADC gain adjustment (analog setting)	0 to 255	128
	Red Offset	Red ADC offset adjustment (analog setting)	0 to 255	128
	Green Offset	Green ADC offset adjustment (analog setting)	0 to 255	128
	Blue Offset	Blue ADC offset adjustment (analog setting)	0 to 255	128
	Filter	Space filter setting	Non	Non
	Gamma	Gamma value setting	0.1 to 3.0	1.0
	OSD HPosition	OSD horizontal position adjustment	3 to 255	128
	OSD VPosition	OSD vertical position adjustment	41 to 211	128
	OSD Effect	OSD transparency effect setting	0 to 7	0
	OSD Timeout	Timeout setting for lights-out of OSD	Non, 5 to 10, 15, 20, 30, 40, 50, 60	10
	Default	Initial setting	-	
	Save Data	Data save	-	
	Cancel	Display of page 1	-	

* Value when SVGA 60 Hz is input. The range varies depending on the input resolution and vertical frequency.

Example:

Daily maintenance tasks

Month Yr.

Maintenance task \ Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Shutdown																															
Signed																															

Weekly maintenance tasks

Maintenance task	M/D Signed	M/D Signed	M/D Signed	M/D Signed	M/D Signed	M/D Signed	M/D Signed	M/D Signed
Routine cleaning								

Maintenance tasks once every 2 years

Maintenance task	M/D Signed	M/D Signed
Replace the air pump		

Maintenance tasks to be performed as needed

Maintenance task	M/D Signed	M/D Signed
Replenish the reagent		
Replace the waste container		
Adjust the monitor image quality		
Clean the aspiration unit tray		

Reagents and supply parts replacement

Maintenance task	M/D Signed	M/D Signed
Replace the reagent (CELLPACK DCL)		
Replace the reagent (CELLPACK DST)		
Replace the reagent (SULFOLYSER)		
Replace the reagent (Lysercell WDF)		
Replace the reagent (Fluorocell WDF)		
Replace the air pump		
Replace the fuse		

* We recommend that our customers prepare a checklist that suits their operating environment.

Chapter 3 Calibration

3.1 Overview of calibration

Calibration is performed to maintain the accuracy of the system. Calibration compensates variances of the air pressure system, fluid system and electrical system, which affect the accuracy of analysis results.

Calibrator calibration

A special calibrator is used to calibrate the instrument.
Manually analyze the same calibrator 11 times, and check the repeatability and accuracy of the analysis parameters.
At the same time, the compensation rate can be updated.

Precision check

Check the instrument's repeatability using a normal sample.

Note:

- Before performing calibration, check the level of the reagent connected to the instrument. If the reagent runs out, calibration will stop.
- The following sample numbers are automatically assigned by the analyzer.
  - Calibrator calibration: CAL-CAL-01 to CAL-CAL-11
  - Precision check: PRE-CHK-01 to PRE-CHK-11

3.1.1 Calibration standards

The initial calibration is done by your Sysmex technical representative, at the time of installation.
Perform calibration when needed; for example, when the QC data fluctuates. However, if the abnormality in the QC analysis data is caused by an error in the analyzer, degradation of the reagent, or degeneration of the control blood, do not perform calibration.

3.1.2 Calibrators and samples to be used

Use the following calibrators and samples for calibrator calibration and precision check.

● Calibrator calibration

XN CAL: use for WBC, RBC, HGB, HCT, and PLT calibration.

● Precision check

For a precision check, use fresh normal blood that meets the following requirements.

- Blood of a healthy person who is not taking any medicine
- Blood with an appropriate amount of anticoagulant added
- Whole blood volume of 2.0 mL or more per sample

Information

Control blood is not suitable for calibrator calibration. Control blood is intended for quality control, not for calibration.

3.1.3 Main calibration functions

The instrument supports the following calibration functions.

Functions	Description	Pages
Print	Calibration results (log) can be output to the printer.	➤P.113
CSV output	Calibration results (log) can be output to a file in CSV format.	➤P.114
Save	Calibration results (log) can be saved. (Backup)	➤P.115
Restore	Calibration results (log) can be restored. (Restore)	➤P.115
Delete	A calibration log can be deleted.	➤P.116

3.2 Performing calibrator calibration

Follow the steps below to perform a calibrator calibration.

1 Make sure the instrument is in the ready state.

If the instrument status at the bottom left of the screen is not green, wait until it becomes green.

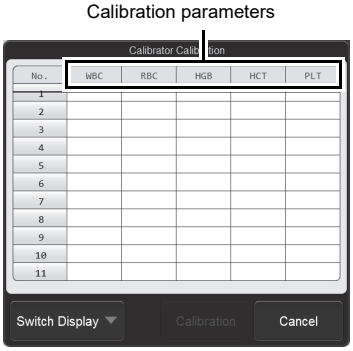
2 Touch the [Calibration] icon in the [Menu] screen.

The [Calibration] menu screen appears.

[Calibration] menu screen

3 Touch the [Calibrator Calibration] icon.

The [Calibrator Calibration] (analysis) dialog box appears.

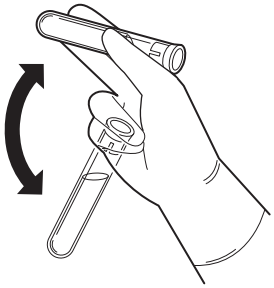


[Calibrator Calibration] (analysis) dialog box

Calibration parameters	The analysis parameters to be calibrated appear. The parameters that appear depend on your system configuration.
[No. 1] to [No. 11]	For each calibration parameter, the analysis results of 11 analysis cycles appear. The results of [No. 1] are shown with a strike-through because they are not included in [Mean Value], [SD], and [CV (%)].
[Mean Value]	For each calibration parameter, the mean value of the analyzed values from [No. 2] to [No. 11] appears.
[SD]	For each calibration parameter, the standard deviation for the analyzed values from [No. 2] to [No. 11] appears.
[CV (%)]	The coefficient of variation of the analysis results of each calibration parameter appears. After the 11th analysis is completed, if the coefficient of variation is greater than the [Limit (%)], it appears in white characters on a red background.
[Limit (%)]	The standard value (allowable value) for the coefficient of variation of each calibration parameter appears.
[Switch Display]	Touch to display the details. Touch again to close the details.
[Calibration]	Touch to display the [Calibrator Calibration] (confirmation) dialog box.

4 Mix the vial containing the calibrator as shown.

For details on the mixing method, see the package insert for the calibrator.



5 Execute manual analysis.

Note:

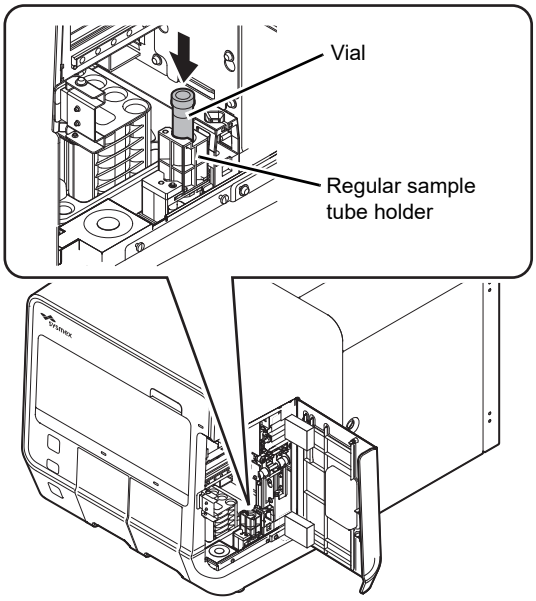
- Calibrator calibration is performed using manual analysis.
- The discrete parameters to be analyzed are set to CBC+DIFF, and cannot be changed.

XN-530:

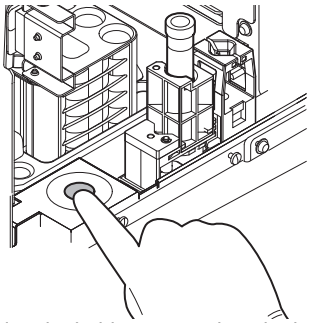
1 Open the sampler cover (manual unit).

2 Place the vial in the sample tube holder.

Place in the regular sample tube holder.



3 Press the start switch.



The sample tube holder retracts into the instrument and manual analysis starts.

When aspiration finishes, the sample tube holder is ejected.

4 Repeat mixing and analysis (total of 11 times).

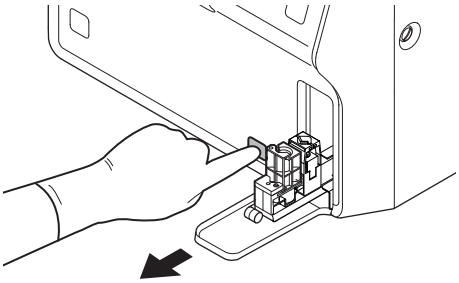
Information

If an error occurs during analysis, stop calibrator calibration. After clearing the error, repeat the procedure from the beginning.

XN-430:

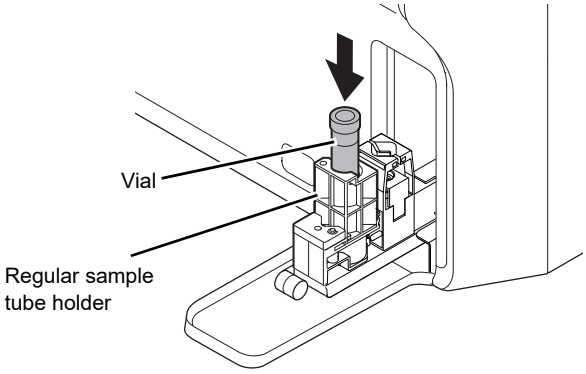
1 If the sample tube holder is not ejected, press the sample tube holder open/close switch.

The sample tube holder is ejected.

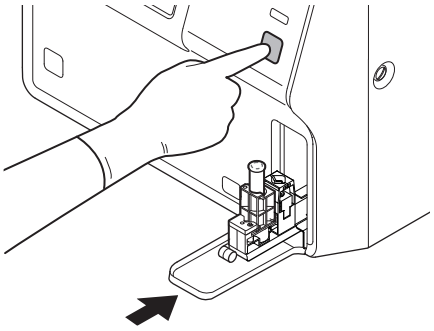


2 Place the vial in the sample tube holder.

Place in the regular sample tube holder.



3 Press the start switch.



The sample tube holder retracts into the instrument and manual analysis starts.

When aspiration finishes, the sample tube holder is ejected.

4 Repeat mixing and analysis (total of 11 times).

Information

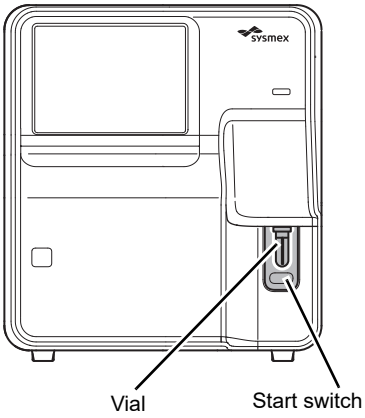
If an error occurs during analysis, stop calibrator calibration. After clearing the error, repeat the procedure from the beginning.

XN-330:

1 Open the vial cap.

When removing the cap, take care that the calibrator does not spill.

2 Insert the pipette all the way to the bottom of the vial, and press the start switch.



When analysis finishes, the result is shown in [No. 1] in the [Calibrator Calibration] (analysis) dialog box.

3 Repeat mixing and analysis (total of 11 times).

Information

If an error occurs during analysis, stop calibrator calibration. After clearing the error, repeat the procedure from the beginning.

6 If you need to repeat analysis, select the analysis number and repeat the manual analysis.

The results from the analysis in step 5 appear in the [Calibrator Calibration] (analysis) dialog box.

If the analysis results do not meet the following requirements, the analysis must be repeated.

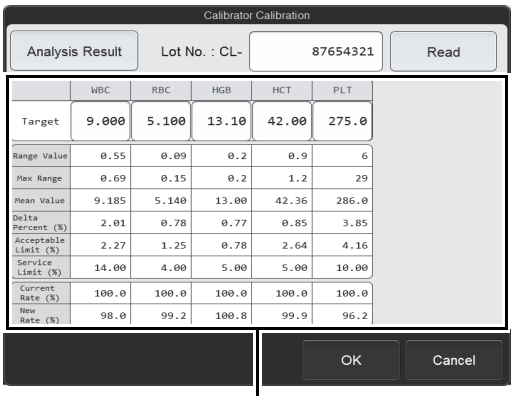
- All analysis results are normal.
- All calibration parameters are below the [Limit (%)] value.

When the analysis results meet the requirements, [Calibration] in the [Calibrator Calibration] (analysis) dialog box can be touched. Proceed to the next step.

7 Remove the vial. (XN-530/XN-430 only)

8 Touch [Calibration].

The [Calibrator Calibration] (confirmation) dialog box appears.



Data display area

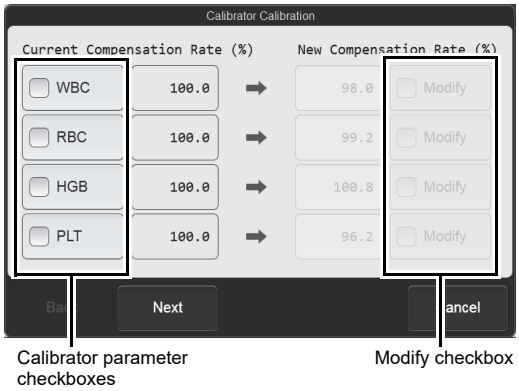
[Calibrator Calibration] (confirmation) dialog box

[Analysis Result]	Touch to display the [Calibrator Calibration] (analysis) dialog box.
[Lot No.]	The lot number can be entered. Up to 8 characters can be entered. Double-byte characters cannot be entered.
[Read]	This is used if the target values of calibration parameters are imported from a server or a memory medium with a saved display value file. Touch after entering the [Lot No.] to read in the target values.
Data display area	
[Target]	Referring to the target sheet supplied with the XN CAL, manually enter the target value of each calibration parameter. • You can also use [Lot No.] and [Read] to read in the values from a server or a memory medium with a saved display value file.
[Range Value]	Displays the difference between the maximum and the minimum values for each calibration parameter. If the difference is greater than the maximum range value, it is displayed in white characters on a red background.
[Max Range]	When the target value is entered, a value that is equal to "Target value x Fixed ratio for each calibration parameter" is displayed.
[Mean Value]	Displays the average value of the analysis data.
[Delta Percent (%)]	When the target value is entered, a value that is equal to "|Target value - Mean Value|/Mean Value x 100 (%)" is displayed. If this value is greater than the Acceptable Limit and less than the Service Limit, the background is displayed in yellow. If the value is greater than the Service Limit, the value is displayed in white characters on a red background.
[Acceptable Limit (%)]	Displays a numeric value for determining whether calibration is necessary. If the Delta Percent is less than this value, no calibration is necessary.
[Service Limit (%)]	Displays the maximum value of the Delta Percent when performing calibrator calibration. If the Delta Percent is greater than this value, calibration cannot be performed for that parameter.
[Current Rate (%)]	Displays the compensation rate for each calibration parameter before calibrator calibration.
[New Rate (%)]	Displays the new compensation rate, which is calculated from "Target value x Current Rate/Mean Value". The rate appears when [Target] and [Mean Value] are entered.

9 Touch [OK].

The [Calibrator Calibration] (execute) dialog box appears.

The parameters that appear depend on your system configuration.



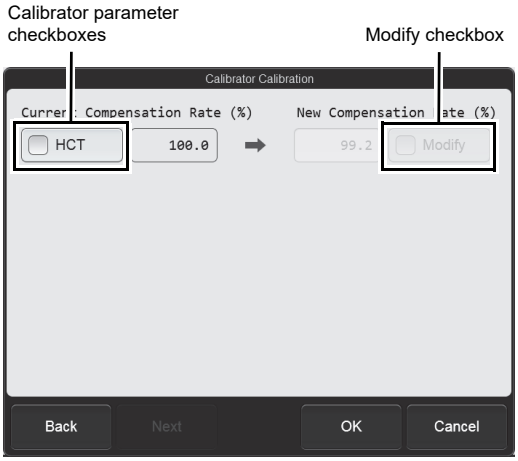
[Calibrator Calibration] (execute) dialog box

Calibrator parameter checkboxes	Select a checkbox to include that calibration parameter in the calibrator calibration. Clear a checkbox to exclude that parameter from calibrator calibration. If a calibration parameter meets all of the conditions below, the checkbox for that parameter is automatically selected when the screen appears. In addition, you can select or clear checkboxes manually. 1) 80% ≤ New Compensation Rate ≤ 120% 2) New Compensation Rate - Current Compensation Rate ≤ ±5% 3) Range Value ≤ Max Range 4) Acceptable Limit ≤ Delta Percent ≤ Service Limit If a calibration parameter meets all of conditions 1) to 3) and the Delta Percent is less than the Acceptable Limit, the parameter is excluded from calibration, as there is no need for calibration. If a calibration parameter does not meet any of conditions 1) to 3) and the Delta Percent is greater than the Acceptable Limit, calibration cannot be performed. Calibration is performed with this calibration parameter excluded.
[Current Compensation Rate (%)]	Displays the compensation rate for each calibration parameter before calibrator calibration.
[New Compensation Rate (%)]	Displays the new compensation rate calculated by the system.
Modify checkbox	You can select a checkbox to manually enter a value in [New Compensation Rate (%)]. A value within the range 80 to 120% can be entered. However, a checkbox cannot be selected for a calibration parameter with "Delta Percent > Acceptable Limit". Calibration parameters with manually entered values will be displayed with an asterisk [*] next to its value in the calibrator calibration log. When a checkmark is removed, a value cannot be entered in [New Compensation Rate (%)]. If a value was manually entered prior to removing the checkmark, the value will revert to the system-calculated value.
[Back]	Touch to display the previous screen.
[Next]	Touch to display the next screen.

10 Touch [Next].

The following dialog box appears.

The parameters that appear depend on your system configuration.



[Calibrator Calibration] (execute) dialog box

11 Touch [OK].

The compensation rate is updated.

3.3 Performing precision check

Follow the steps below to perform a precision check.

1 Make sure the instrument is in the ready state.

If the instrument status at the bottom left of the screen is not green, wait until it becomes green.

2 Touch the [Calibration] icon in the [Menu] screen.

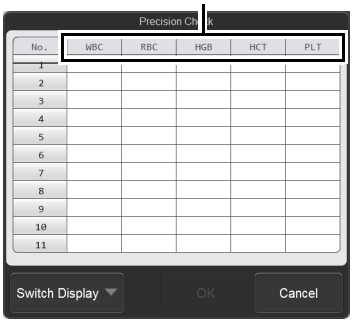
The [Calibration] menu screen appears.

[Calibration] menu screen

3 Touch the [Precision Check] icon.

The [Precision Check] (analysis) dialog box appears.

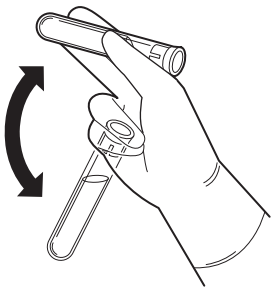
Precision check parameters



[Precision Check] (analysis) dialog box

Precision check parameters	The analysis parameters to be analyzed in the precision check appear. The parameters that appear depend on your system configuration.
[No. 1] to [No. 11]	For each precision check parameter, the analysis results of 11 analysis cycles appear. The results of [No. 1] are shown with a strike-through because they are not included in [Mean Value], [SD], and [CV (%)].
[Mean Value]	For each precision check parameter, the mean value of the analyzed values from [No. 2] to [No. 11] appears.
[SD]	For each precision check parameter, the standard deviation for the analyzed values from [No. 2] to [No. 11] appears.
[CV (%)]	The coefficient of variation of the analysis results of each precision check parameter appears. After the 11th analysis is completed, if the coefficient of variation is greater than the [Limit (%)], it appears in white characters on a red background.
[Limit (%)]	The standard value (allowable value) for the coefficient of variation of each precision check parameter appears.
[Switch Display]	Touch to display the details. Touch again to close the details.

4 Mix the vial containing the sample as shown.



5 Execute manual analysis.

Note:

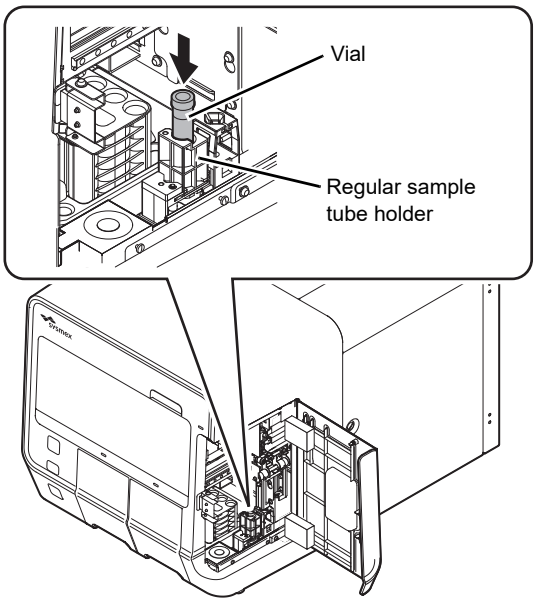
- The precision check is performed using manual analysis.
- The discrete parameters to be analyzed are set to CBC+DIFF, and cannot be changed.

XN-530:

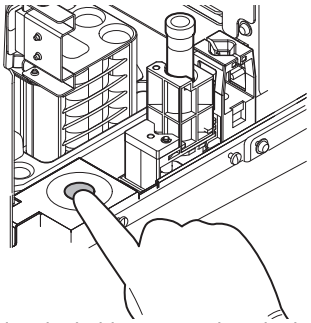
1 Open the sampler cover (manual unit).

2 Place the vial in the sample tube holder.

Place in the regular sample tube holder.



3 Press the start switch.



The sample tube holder retracts into the instrument and manual analysis starts.

When analysis finishes, the sample tube holder is ejected.

4 Repeat mixing and analysis (total of 11 times).

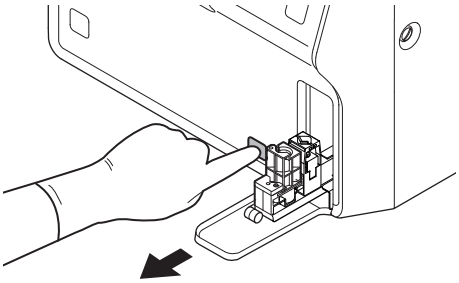
Information

If an error occurs during analysis, stop precision check. After clearing the error, repeat the procedure from the beginning.

XN-430:

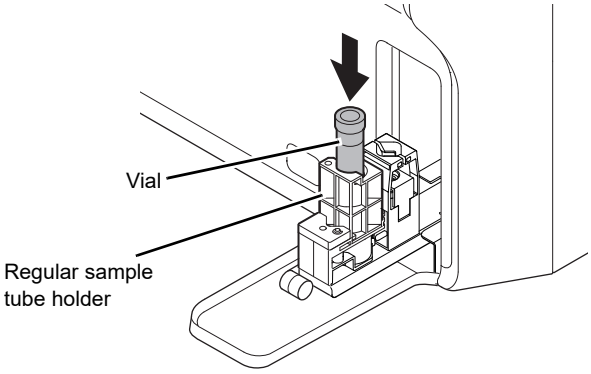
1 If the sample tube holder is not ejected, press the sample tube holder open/close switch.

The sample tube holder is ejected.

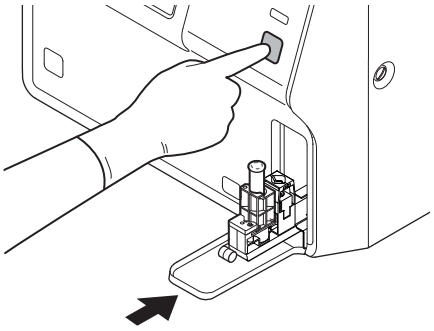


2 Place the vial in the sample tube holder.

Place in the regular sample tube holder.



3 Press the start switch.



The sample tube holder retracts into the instrument and manual analysis starts.

When analysis finishes, the sample tube holder is ejected.

4 Repeat mixing and analysis (total of 11 times).

Information

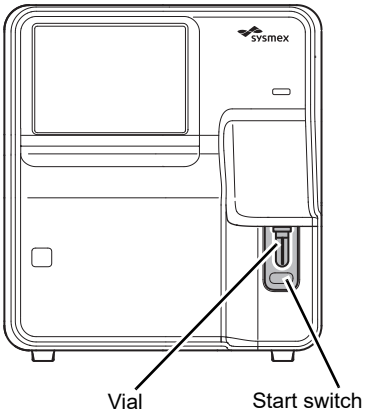
If an error occurs during analysis, stop precision check. After clearing the error, repeat the procedure from the beginning.

XN-330:

1 Open the vial cap.

When removing the cap, take care that the sample does not spill.

2 Insert the pipette all the way to the bottom of the vial, and press the start switch.



When analysis finishes, the result is shown in [No. 1] in the [Precision Check] (analysis) dialog box.

3 Repeat mixing and analysis (total of 11 times).

Information

If an error occurs during analysis, stop precision check. After clearing the error, repeat the procedure from the beginning.

6 If you need to repeat analysis, select the analysis number and repeat the manual analysis.

The results from the analysis in step 5 appear in the [Precision Check] (analysis) dialog box.

If the analysis results do not meet the following requirements, the analysis must be repeated.

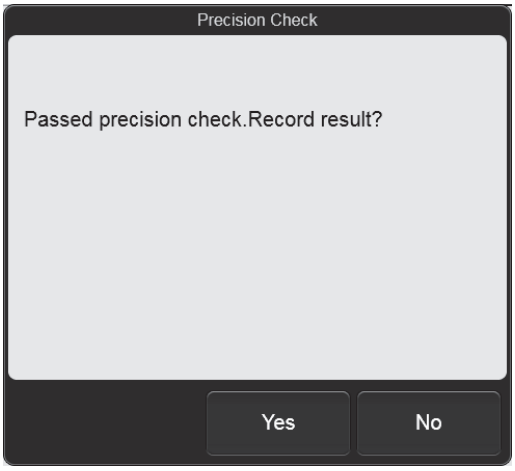
- All analysis results are normal.
- All calibration parameters are below the [Limit (%)] value.

When the analysis results meet the requirements, [OK] in the [Precision Check] (analysis) dialog box can be touched. Proceed to the next step.

7 Remove the vial. (XN-530/XN-430 only)

8 **Touch [OK].**

The following dialog box appears.



9 **Touch [Yes].**

The result of the precision check is recorded.

3.4 Checking the calibration log/precision check log

You can view the logs of the saved calibrator calibration and precision check.

Note:

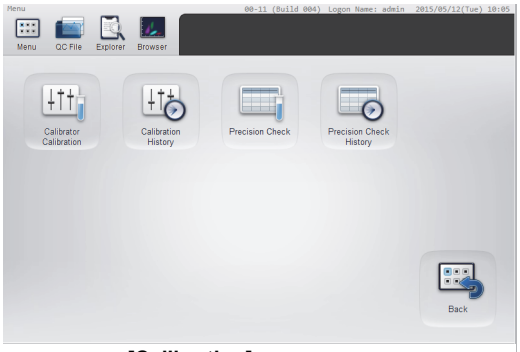
Up to 20 logs of each type are saved. Once 20 logs are saved, each new log automatically deletes the oldest log.

3.4.1 Checking the calibration log/ precision check log

Follow the steps below to check a log.

1 Touch the [Calibration] icon in the [Menu] screen.

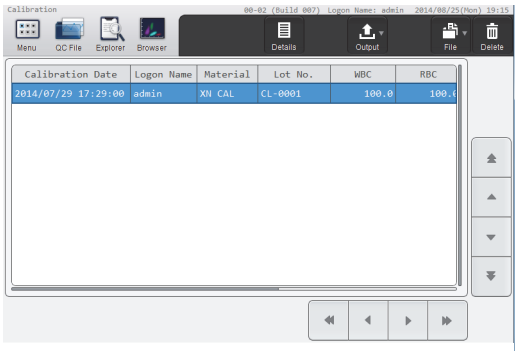
The [Calibration] menu screen appears.



[Calibration] menu screen

2 Touch the [Calibration History]/ [Precision Check History] icon.

The [Calibration History]/[Precision Check History] screen appears.



Example: [Calibration History] screen

3 Check the log.

For details, see the following.

(➤**P.117** "3.5 [Calibration History] screen")

(➤**P.119** "3.6 [Precision Check History] screen")

3.4.2 Printing the calibration log/ precision check log on a printer

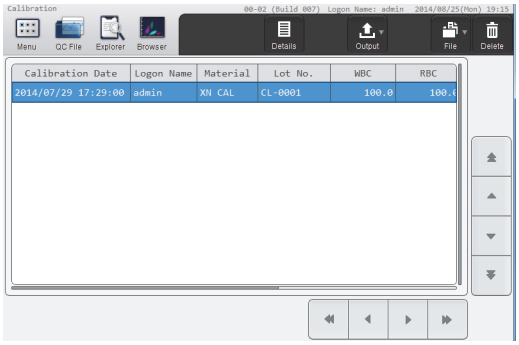
You can print a log on the printer.

Follow the steps below to print a log.

1 Display the log screen you want to print.

(➤**P.113** "3.4.1 Checking the calibration log/ precision check log")

2 Select the log you want to print.



Example: [Calibration History] screen

3 Touch the [Output] button - [Ledger (LP)] on the toolbar.

The log is output to the printer.

3.4.3 Saving the calibration log/ precision check log in CSV format

You can save a log to a USB memory stick as a file in CSV format.
Follow the steps below to save a log in CSV format.

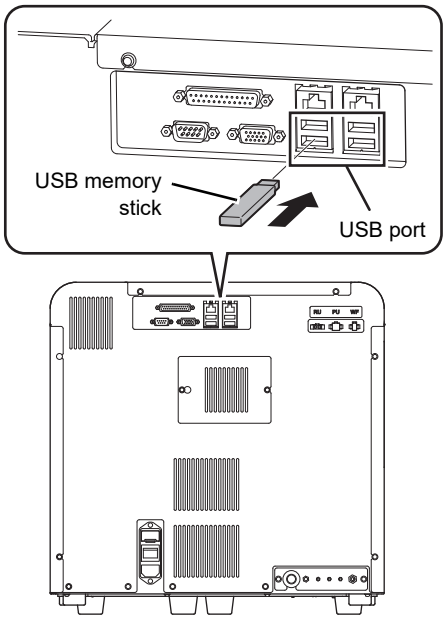
1 Display the desired log screen.

(➤**P.113** "3.4.1 Checking the calibration log/ precision check log")

2 Insert the USB memory stick.

Insert the USB memory stick into a free USB port on the back of the instrument.

A USB memory stick with a password lock function cannot be used.



3 Select the log you want to save.

4 Touch the [File] button - [Output in CSV Format] on the toolbar.

The data save starts and the [Waiting to complete execution] dialog box appears.

The [Waiting to complete execution] dialog box closes when the data save is complete.

5 Remove the USB memory stick.

Save directory and file name

When you save a log, the log is saved using the file name below in a folder* that has the instrument ID as the folder name.

Calibrator calibration log:

Instrument ID_Software version_CALIBRATOR_CAL_ Execution date_Execution time.csv

Precision check log:

Instrument ID_Software version_PRECISION_CHECK_ Execution date_Execution time.csv

Example: XN-XXX_00-01_PRECISION_CHECK_ 20140505_080808.csv

* If a folder with the instrument ID as the folder name does not exist in the USB memory stick, the folder is automatically created.

3.4.4 Saving the calibration log/ precision check log (backup)

Calibration log data can be backed up to a USB memory stick.

Follow the steps below to save a log.

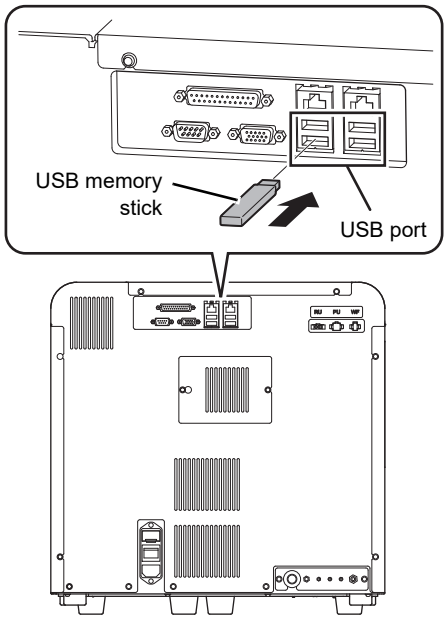
1 Display the desired log screen.

(➤**P.113** "3.4.1 Checking the calibration log/ precision check log")

2 Insert the USB memory stick.

Insert the USB memory stick into a free USB port on the back of the instrument.

A USB memory stick with a password lock function cannot be used.



3 Select the log you want to save.

Select by touching the cursor move buttons to move the cursor.

4 Touch the [File] button - [Backup] on the toolbar.

The backup starts and the [Waiting to complete execution] dialog box appears.

The [Waiting to complete execution] dialog box closes when the backup is complete.

5 Remove the USB memory stick.

Backup directory and file name

When you back up a log, the log is saved using the file name below in a folder* that has the instrument ID as the folder name.

Calibrator calibration log:

[Instrument ID][Software version][Execution date_ Execution time].cad

Precision check log:

[Instrument ID][Software version][Execution date_ Execution time].pre

Example: [XN-XXX][00-01][20140505_080808].pre

* If a folder with the instrument ID as the folder name does not exist in the USB memory stick, the folder is automatically created.

3.4.5 Restoring a saved calibration log/precision check log (restore)

You can restore saved log data.

Note:

If the number of logs exceeds 20 during restoring, the oldest log is automatically deleted.

Follow the steps below to restore a log.

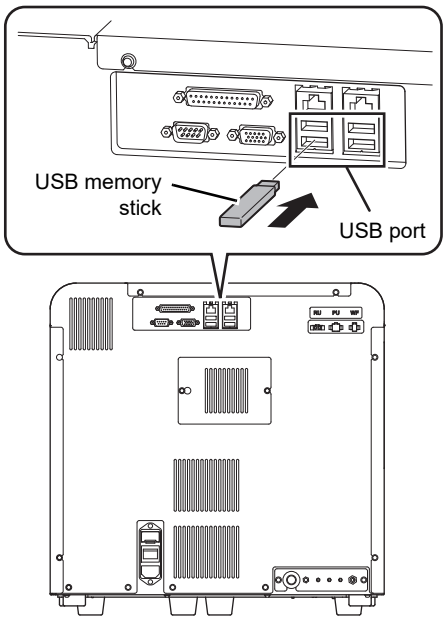
1 Display the desired log screen.

(➤**P.113** "3.4.1 Checking the calibration log/ precision check log")

2 Insert the USB memory stick that contains the backup log file.

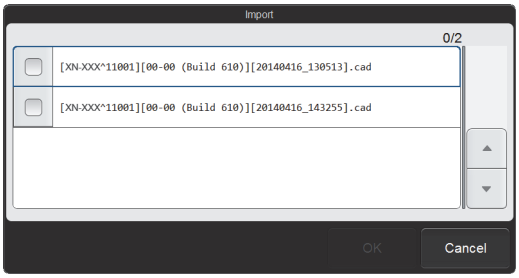
Insert the USB memory stick into a free USB port on the back of the instrument.

A USB memory stick with a password lock function cannot be used.



3 Touch the [File] button - [Restore] on the toolbar.

The [Import] dialog box appears.



[Import] dialog box

4 Select the checkbox of the file you want to restore.

Files with checkmarks will be restored.

Each time you touch the checkbox, the checkbox is selected or unselected.

5 Touch [OK].

The restore starts and the [Waiting to complete execution] dialog box appears.

The [Waiting to complete execution] dialog box closes when the restore is complete.

6 Remove the USB memory stick.

3.4.6 Deleting a calibration log/ precision check log

Follow the steps below to delete a log.

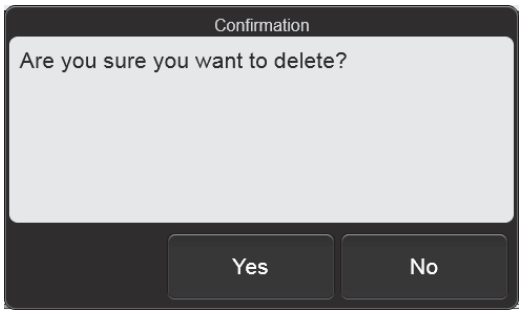
1 Display the desired log screen.

(➤**P.113** "3.4.1 Checking the calibration log/ precision check log")

2 Select the log you want to delete.

3 Touch the [Delete] button on the toolbar.

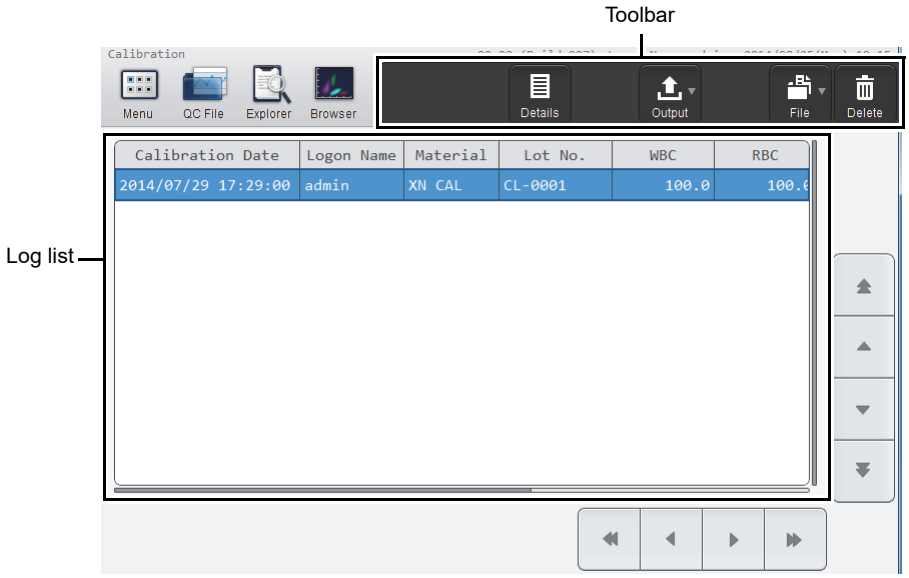
The following dialog box appears.



4 Touch [Yes].

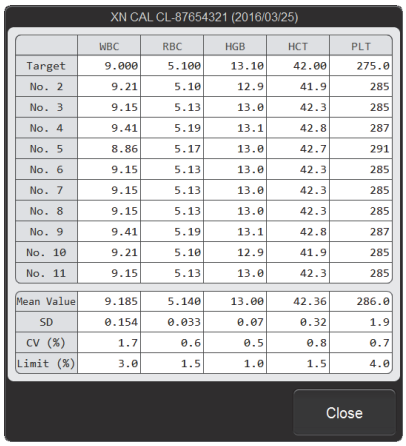
The dialog box closes, and the log is deleted.

3.5 [Calibration History] screen



[Calibration History] screen

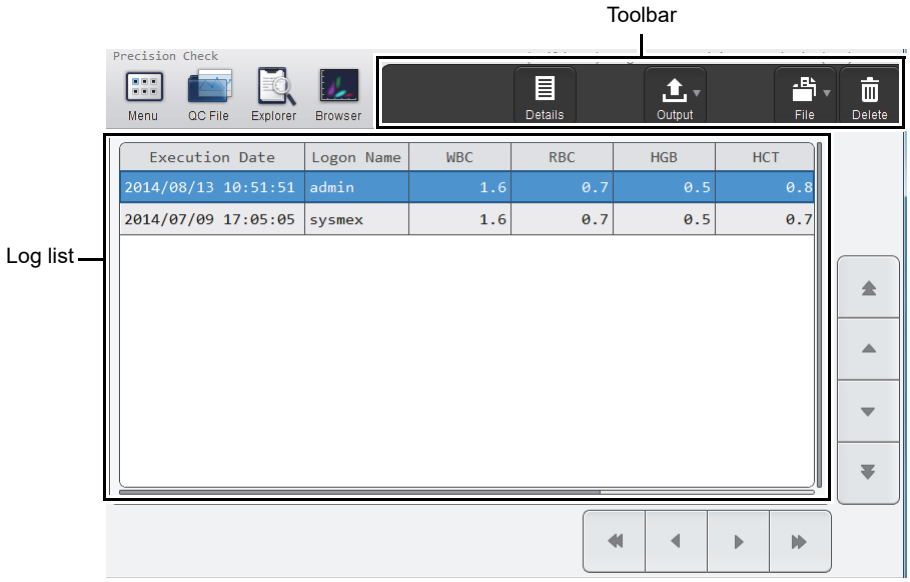
Toolbar	Displays the function buttons.
[Details]	Touch to show the analysis results of the selected calibration log in a dialog box.



[Output]	Touch to open a submenu that allows you to output the selected log. (➤**P.113** "3.4.2 Printing the calibration log/precision check log on a printer")

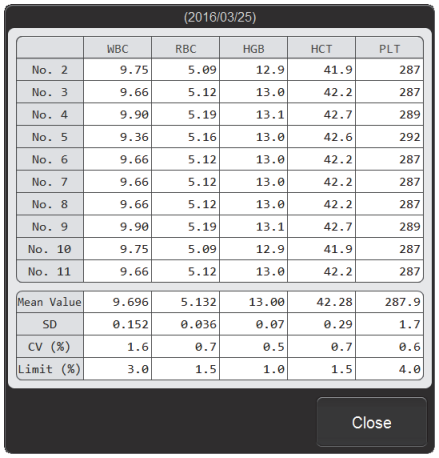
[File]	Touch to open a submenu that allows you to save and restore the log selected in the list. [Output in CSV Format]: Use to save a log in CSV format. (➤**P.114** "3.4.3 Saving the calibration log/precision check log in CSV format") [Backup]: Use to back up a log. (➤**P.115** "3.4.4 Saving the calibration log/precision check log (backup)") [Restore]: Use to restore the backed up data. (➤**P.115** "3.4.5 Restoring a saved calibration log/ precision check log (restore)")
[Delete]	Use to delete the log selected in the list. (➤**P.116** "3.4.6 Deleting a calibration log/precision check log")
Log list	Displays the calibration logs in the list.
[Calibration Date]	Displays the date and time when the calibration was performed.
[Logon Name]	Displays the name of the user who was logged on when the calibration was performed.
[Material]	Displays the name of the calibrator.
[Lot No.]	Displays the lot number of the calibrator.
Compensation rate	Displays the compensation rate of each analysis parameter. When a new compensation rate has been manually input for a parameter, [*] appears in front of the compensation rate.

3.6 [Precision Check History] screen



[Precision Check History] screen

Toolbar	Displays the function buttons.
[Details]	Touch to show the analysis results of the selected precision check log in a dialog box.



[Output]	Touch to open a submenu that allows you to output the selected log. (➤**P.113** "3.4.2 Printing the calibration log/precision check log on a printer")

	[File]	Touch to open a submenu that allows you to save and restore the log selected in the list. [Output in CSV Format]: Use to save a log in CSV format. (➤**P.114** "3.4.3 Saving the calibration log/precision check log in CSV format") [Backup]: Use to back up a log. (➤**P.115** "3.4.4 Saving the calibration log/precision check log (backup)") [Restore]: Use to restore the backed up data. (➤**P.115** "3.4.5 Restoring a saved calibration log/ precision check log (restore)")
	[Delete]	Use to delete the log selected in the list. (➤**P.116** "3.4.6 Deleting a calibration log/precision check log")
Log list		Displays the precision check logs.
	[Execution Date]	Displays the date and time when the precision check was performed.
	[Logon Name]	Displays the name of the user who was logged on at the time of the precision check.
	Analysis results	Displays the CV (%) of each precision check parameter.

Chapter 4 Checking Logs

4.1 Logs

You can check the following logs that are saved on the instrument.

- [Audit Log]: Instrument operation log
- [Error Log]: Errors that occurred, and information on when the errors occurred and when they were cleared
- [Maintenance Log]: Maintenance tasks executed, and information at the time of execution
- [Reagent Replacement Log]: Reagents replaced, and information entered at the time of replacement

Note:

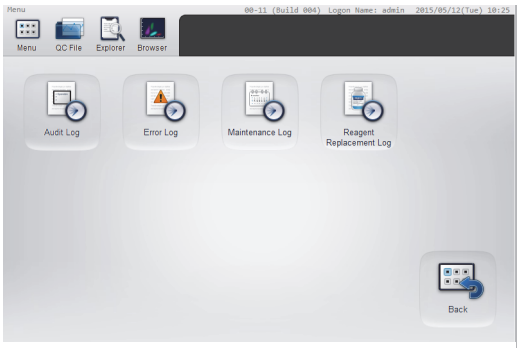
- Up to 5,000 logs of each type are saved. Once 5,000 logs are saved, each new log automatically deletes the oldest log.
- The calibration logs (calibrator calibration and precision check) cannot be viewed from the [History] menu screen. For details on calibration logs, see Chapter 3.
(➤**P.113** "Chapter 3: 3.4 Checking the calibration log/precision check log")

4.1.1 Checking a log

Follow the steps below to check a log.

1 Touch the [History] icon in the [Menu] screen.

The [History] menu screen appears.



[History] menu screen

2 Touch the button of the log you want to view.

The selected log screen appears.

3 Check the log.

For details, see the following.

(➤**P.124** "4.2 Log screen")

4.1.2 Adding a comment to a log

You can add a comment to a log.

Information

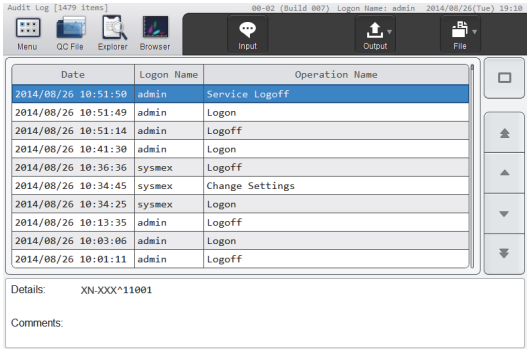
Once a comment is entered, it cannot be edited or deleted. If a comment is entered when a comment already exists, the new comment is added after the previous comment.

Follow the steps below to enter a comment.

1 Display the screen of the log you want to add a comment to.

(➤**P.121** "4.1.1 Checking a log")

2 **Select the log you want to add a comment to.**



Example: [Audit Log] screen

3 **Touch the [Input] button on the toolbar.**

The software keyboard appears.

4 **Enter a comment.**

You can enter up to 50 characters.

5 **Touch [OK].**

The comment is added.

4.1.3 Printing a log on a printer

A log list can be output to a printer.
Follow the steps below to print a log.

1 **Display the log screen you want to print.**

(➤**P.121** "4.1.1 Checking a log")

2 **Touch the [Output] button - [Ledger (LP)] on the toolbar.**

The log is output to the printer.

4.1.4 Saving a log in CSV format

A log list can be saved to a USB memory stick as a file in CSV format.
Follow the steps below to save a log in CSV format.

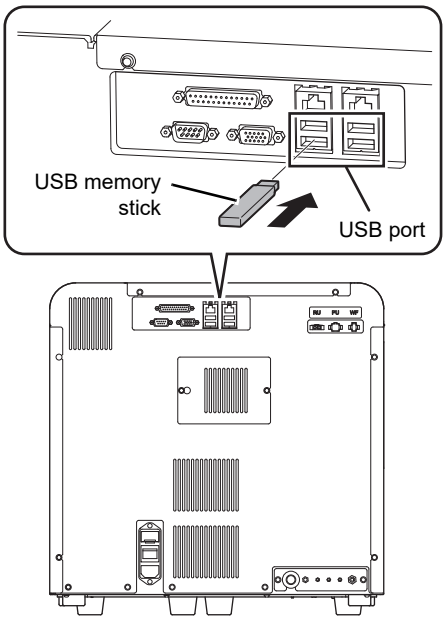
1 **Display the desired log screen.**

(➤**P.121** "4.1.1 Checking a log")

2 **Insert the USB memory stick.**

Insert the USB memory stick into a free USB port on the back of the instrument.

A USB memory stick with a password lock function cannot be used.



3 **Touch the [File] button - [Output in CSV Format] on the toolbar.**

The data save starts and the [Waiting to complete execution] dialog box appears.

The [Waiting to complete execution] dialog box closes when the data save is complete.

4 Remove the USB memory stick.

Save directory and file name

When you save a log, the log is saved using the file name below in a folder* that has the instrument ID as the folder name.

Audit log:
Instrument ID_Software version_AUDITLOG.csv

Error log:
Instrument ID_Software version_ERRORLOG.csv

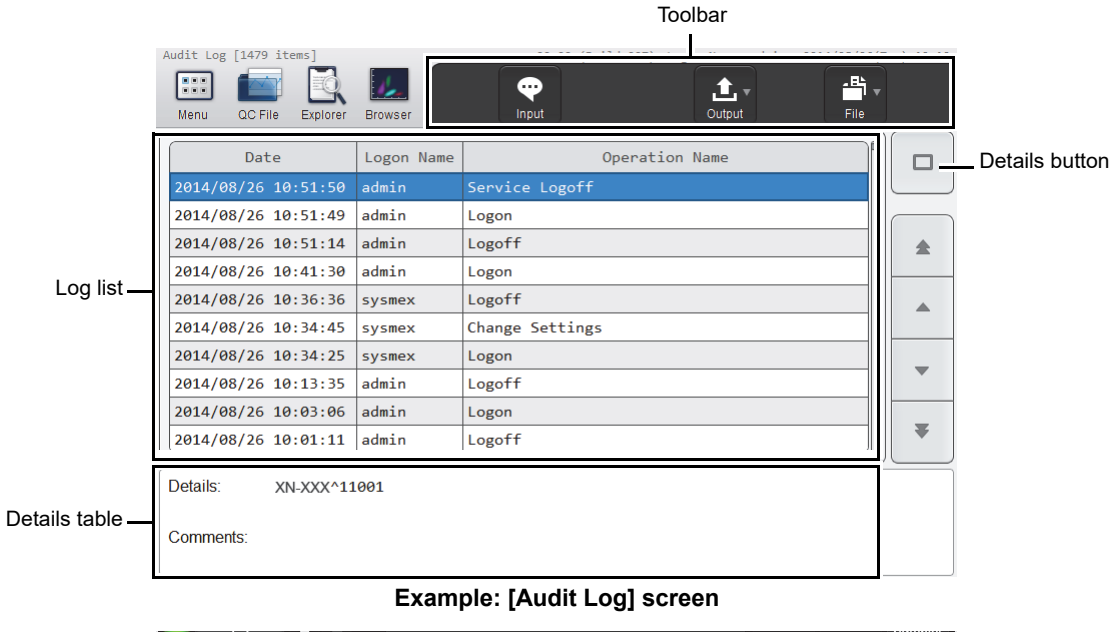
Maintenance log:
Instrument ID_Software version_MAINTENANCELOG.csv

Reagent replacement log:
Instrument ID_Software version_REAGENTLOG.csv

Example: XN-XXX_00-01_REAGENTLOG.csv

* If a folder with the instrument ID as the folder name does not exist in the USB memory stick, the folder is automatically created.

4.2 Log screen



Example: [Audit Log] screen

Toolbar	Displays the function buttons.
[Input]	Touch to display a software keyboard that allows you to enter a comment. (➤**P.121** "4.1.2 Adding a comment to a log")
[Output]	Touch to open a submenu that allows you to output the log list. (➤**P.122** "4.1.3 Printing a log on a printer")
[File]	Touch to open a submenu that allows you to save the log list. (➤**P.122** "4.1.4 Saving a log in CSV format")
Log list	Displays a list of the logs.
Details button	Touch to display the details of the log selected in the log list below the log list. Touch again to close the details.

4.2.1 Contents of the log list and details

● [Audit Log] screen

[Date]	Displays the date and time the log was registered.
[Logon Name]	Displays the name of the user that was logged on when the log was registered.
[Operation Name]	Displays the name of the operation that was performed.
[Details]*	Displays the details of the operation that was performed.
[Comments]*	Displays the entered comments.

* When the Details button is touched, the details appear below the log list.

Operation names and display conditions are shown below.

Operation names	Display conditions
[Logon]	When a user logs on.
[Logoff]	When a user logs off.
[Service Logon]	When a service technician logs on.
[Service Logoff]	When a service technician logs off.
[Modify Sample No.]	When the sample number of analysis data is modified.
[Modify Pos. -> Neg.]	When the judgment of analysis data is changed from Positive to Negative.
[Modify Neg. -> Pos.]	When the judgment of analysis data is changed from Negative to Positive.
[Modify Sample Inf.]	When the attributes of sample number of analysis data is modified.
[Modify Patient ID]	When the patient ID of analysis data is modified.
[Delete Analysis Data]	When analysis data is deleted*1.
[Register QC File]	When a QC file is registered.
[Modify QC Lot]	When QC lot attributes (expiration date and lot number) are changed.
[Modify QC Target/Limit]	When a QC target is changed.
[Delete QC File]	When a QC file is deleted.
[Delete QC Plot]	When a QC plot is deleted.
[Delete Analysis Registration]	When an analysis order is deleted*1.
[Execute Calibration]	When a compensation rate is changed.
[Change Settings]	When settings are changed.
[Restore Settings]	When saved settings are restored.
[Initialize Settings]	When settings are initialized.
[Register Rule]	When a rule is registered in the rule screen.
[Modify Rule]	When a rule is modified in the rule screen.
[Delete Rule]	When a rule is deleted in the rule screen.
[Restore Rule]	When a saved rule is restored in the rule screen*2.
[Initialize Rule]	When a rule is initialized in the rule screen.
[Enable Rule Settings]	When a setting for a rule is enabled.
[Disable Rule Settings]	When a setting for a rule is disabled.

*1 A deletion is not recorded when an entry is automatically deleted because the maximum number of registered entries was exceeded.

*2 A log is displayed for each rule type.

● [Error Log] screen

[Date]	Displays the date and time the log was registered.
[Logon Name]	Displays the name of the user that was logged on when the log was registered.
[Status]	Displays the status of an error that occurred. [Occurred]: Error [Clear]: Error cleared
[Error]	Displays the message for the error that occurred.
[Error Code]*	Displays the error code of the error that occurred.
[Parameter 1]*/ **[Parameter 2]***	Displays parameter 1 and parameter 2 of the error that occurred. Depending on the type of error, this field may be blank.
[Comments]*	Displays the entered comments.

* When the Details button is touched, the details appear below the log list.

● [Maintenance Log] screen

[Date]	Displays the date and time the log was registered.
[Logon Name]	Displays the name of the user that was logged on when the log was registered.
[Maintenance]	Displays the name of the executed maintenance task.
[Maintenance Property]*	Displays the properties of the executed maintenance task.
[Comments]*	Displays the entered comments.

* When the Details button is touched, the details appear below the log list.

A maintenance log is registered when one of the maintenance tasks below is performed.
The maintenance tasks and properties that are displayed are shown below.

Maintenance tasks	Maintenance properties
[Auto Rinse]	[As needed]
[Routine Cleaning] (Including routine cleaning at shutdown)	[Daily]
[Drain Waste Fluid Chamber]	[As needed]
[Rinse Waste Fluid Chamber]	[As needed]
[Remove Flowcell Air Bubbles]	[As needed]
[Rinse Flowcell]	[As needed]
[Drain Reaction Chamber]	[As needed]
[Drain RBC Isolation Chamber]	[As needed]
[Remove RBC Detector Clog]	[As needed]
[Reagent Replenishment]	[As needed]
[Reset Air Pump Count]	[Part Replacement]

● [Reagent Replacement Log] screen

[Date]	Displays the date and time the log was registered.
[Logon Name]	Displays the name of the user that was logged on when the log was registered.
[Reagent]	Displays the name of the replaced reagent.
[Lot No.]	Displays the lot number of the replaced reagent.
[Exp. Date]	Displays the expiration date of the replaced reagent.
[Serial No.]*	Displays the serial number within the lot of the replaced reagent.
[Exp. date after opening]*	Displays the shelf life of the replaced reagent after it has been opened.
[Amounts]*	If a diluent or a hemolytic agent was replaced, the amount of the replaced reagent is displayed. If a dye was replaced, the number of tests for the replaced reagent is displayed.
[Entry Type]*	Displays the method of input used for the replaced reagent. [Manual]: Manual [Barcode]: Barcode reader [RFID]: ID reader of the dye
[ProductCode]*	Displays the entered product code.
[Manufacturer]*	Displays the entered manufacturer.
[Address]*	Displays the entered manufacturer address.
[Comments]*	Displays the entered comments.

* When the Details button is touched, the details appear below the log list.

Chapter 5 IP Messages

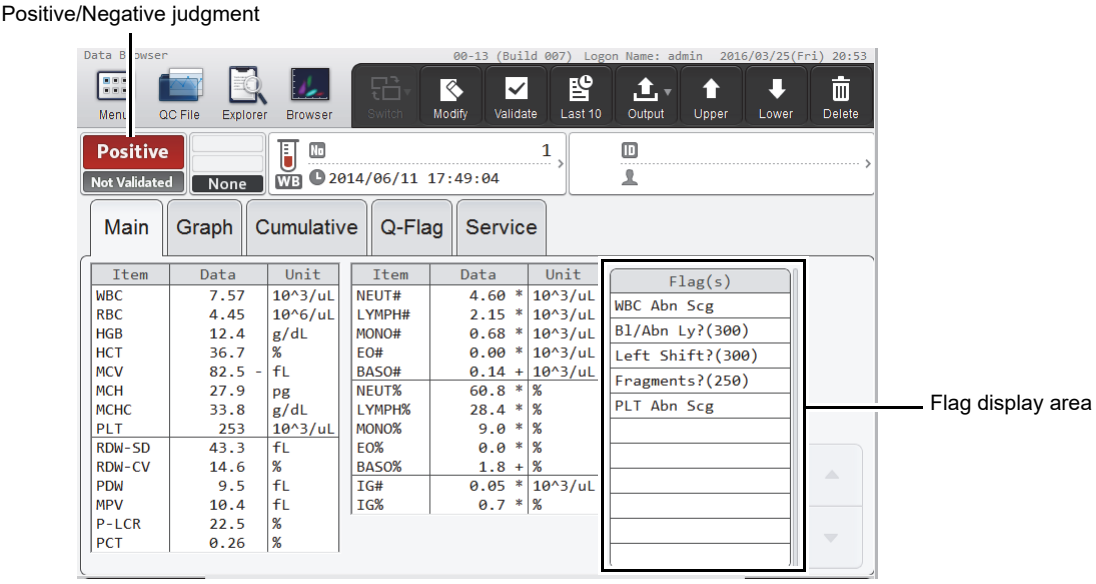
5.1 Overview of IP messages

When analysis data is analyzed, information that supplements the Positive/Negative sample judgment appears in the [Data Browser] screen.
Results without an analysis error are classified as Positive or Negative based on preset criteria. The system judges flags for analysis data based on comprehensive surveys of numerical data, distributions and scattergrams, and provides easily-to-understand messages indicating the results. These messages are referred to as "IP (Interpretive Program) messages".
IP messages appear in the flag display area in the following screen.

- Sample information tab in the [Sample Explorer] screen
- [Main] tab in the [Data Browser] screen
- [Graph] tab in the [Data Browser] screen

Caution!

- A Positive or Error judgment indicates the possibility of an abnormality. It is not a diagnosis of the patient. If a Positive or Error judgment occurs, check the data and repeat the analysis, or examine carefully in accordance with the protocol of your laboratory.
- IP messages are only intended for use in the clinical laboratory and are not for patient diagnosis. IP messages provide notification of the possibility of a specific sample abnormality based on examination of the analysis data.



[Main] tab in the [Data Browser] screen

● Message types

There are 2 types of IP messages that may be displayed for WBC, RBC, and PLT: abnormal messages and suspect messages.

Abnormal messages	Indicates that the sample is clearly abnormal. With some exceptions, the criteria for abnormal message judgment can be preset.
Suspect messages	Indicates a possibility that the sample is abnormal.

● Positive/Negative judgment

[Positive]	Indicates that a blood cell analysis value or cell morphology exceeds the preset criteria for the IP message (abnormal sample). Displayed on a red background. A Positive judgment is classified into the 3 types shown below. Touch [Positive] to display a dialog box. [Diff. Abnormal]: Indicates an abnormal blood cell differentiation value. [Morph. Abnormal]: Indicates an abnormal cell morphology. [Count Abnormal]: Indicates an abnormal blood cell count.
[Negative]	Indicates that there were no analysis errors or abnormalities, and that there is no IP message (normal sample). Displayed on a green background.

Note:

Only Positive judgment is performed for analysis in [Pre-Dilution] mode. Negative judgment is not performed.

With respect to the following IP messages, when a sample judgment is Positive, the analysis results are regarded as having low reliability due to the abnormality, and " * " is displayed to the right of the data or "- - - -" which is a data mask indicating non-analyzable is displayed.

WBC IP messages

		WBC	NEUT# NEUT%	LYMPH# LYMPH%	MONO# MONO%	EO# EO%	BASO# BASO%	IG# IG%
WBC Abn Scattergram								
	Lymph, Mono			*	*			
	Neut, Eo		*			*		*
	Lymph, Neut		*	*				*
	Neut, Mono		*		*			*
	Lymph, Baso						*	
	Mono, Eo				*	*		
	Mono, Baso				*		*	
	Neut, Baso						*	
	Debris, Neut	*	*	*	*	*	*	*
	Debris, Baso	*	*	*	*	*	*	*
	Debris, Lymph	*	*	*	*	*	*	*
	5 DIFF data calculation impossible		- - - -	- - - -	- - - -	- - - -	- - - -	- - - -
	Abnormal IG clustering							*
Left Shift?			*			*		*
Blasts/Abn Lympho?			*	*	*			*
Atypical Lympho?			*	*	*			*
NRBC?		*	*	*	*	*	*	*

RBC IP messages

	RBC HCT MCV MCH MCHC	HGB MCH MCHC	RDW-SD	RDW-CV
RBC Abn Distribution				
MP-Flag	*		- - - -	- - - -
Abnormal RDW-SD	*		- - - -	*
Other abnormal distributions	*		*	*
Dimorphic Population			- - - -	- - - -
RBC Agglutination?	*			
Turbidity/HGB Interf?		*		
Iron Deficiency?				
HGB Defect?				
Fragment?				
iRBC?*				

* Only appears when the iRBC flag license is registered.

PLT IP messages

	PLT	PDW MPV P-LCR PCT
PLT Abn Distribution		
Abnormal PDW		- - - -
Other abnormal distributions		*
PLT Clumps?	*	*

5.2 List of IP messages

Judgment value settings for IP messages can be changed. For details, see "Basic Operation".
(➤Basic Operation, "Chapter 7: 7.6 Data analysis settings")

● WBC IP messages

Messages	Meaning	Judgment method/equation
Abnormal messages		
WBC Abn Scattergram	Abnormal WBC scattergram	Judged from clustering in the WDF scattergram.
Neutropenia	Low neutrophil count	NEUT# < 1.00 x 10^3/μL or NEUT% < 0.0%
Neutrophilia	High neutrophil count	NEUT# > 11.00 x 10^3/μL or NEUT% > 100.0%
Lymphopenia	Low lymphocyte count	LYMPH# < 0.80 x 10^3/μL or LYMPH% < 0.0%
Lymphocytosis	High lymphocyte count	LYMPH# > 4.00 x 10^3/μL or LYMPH% > 100.0%
Monocytosis	High monocyte count	MONO# > 1.00 x 10^3/μL or MONO% > 100.0%
Eosinophilia	High eosinophil count	EO# > 0.70 x 10^3/μL or EO% > 100.0%
Basophilia	High basophil count	BASO# > 0.20 x 10^3/μL or BASO% > 100.0%
Leukocytopenia	Low leukocyte count	WBC < 2.50 x 10^3/μL
Leukocytosis	High leukocyte count	WBC > 18.00 x 10^3/μL
IG Present	Increased immature granulocyte	IG# > 0.10 x 10^3/μL or IG% > 100.0%
Suspect messages		
Left Shift?	Possibility of left shift	Judged from the distribution of the upper right area of NEUT in the WDF scattergram.
Blasts/Abn Lympho?	Possibility that blasts are present/Possibility of abnormal lymphocytes	Judged from the presence of Blasts/Abn Lympho on the WDF scattergram.
Atypical Lympho?	Possibility of atypical lymphocytes	Judged from the distribution of the upper area of LYMPH in the WDF scattergram.
NRBC?	Possibility of nucleated red blood cells	Judged from the presence of NRBC in the WDF scattergram.

● RBC IP messages

Messages	Meaning	Judgment method/equation
Abnormal messages		
RBC Abn Distribution	Abnormal RBC distribution	Judged from the red blood cell distribution.
Dimorphic Population	Double-peak RBC distribution	Judged from the shape of the distribution peak and the gap between the high and low points.
Anisocytosis	Anisocytosis	RDW-SD > 65.0 fL or RDW-CV > 20.0%
Microcytosis	Microcytosis	MCV < 70.0 fL
Macrocytosis	Macrocytosis	MCV > 110.0 fL
Hypochromia	Hypochromia	MCHC < 29.0 g/dL
Anemia	Anemia	HGB < 10.0 g/dL
Erythrocytosis	Erythrocytosis	RBC > 6.50 x 10^6/µL
Suspect messages		
RBC Agglutination?	Possibility of RBC agglutination	Judged from the red blood cell distribution and hemoglobin related parameters.
Turbidity/HGB Interf?	Possibility of effect on HGB by chylemia	Judged from the red blood cell distribution and hemoglobin related parameters.
Iron Deficiency?	Possibility of iron deficiency	Judged from the red blood cell distribution and hemoglobin related parameters.
HGB Defect?	Possibility of HGB abnormality	Judged from the red blood cell distribution related parameters.
Fragments?	Possibility of fragmented red blood cells	Judged from the red blood cell distribution and platelet distribution.
iRBC?*	Possibility of erythrocyte inclusions	Judged from various analysis data and scattergrams.

* Only appears when the iRBC flag license is registered.

● PLT IP messages

Messages	Meaning	Judgment method/equation
Abnormal messages		
PLT Abn Distribution	Abnormal PLT distribution	Judged from the platelet distribution.
Thrombocytopenia	Thrombocytopenia	PLT# < 60 x 10^3/µL
Thrombocytosis	Thrombocytosis	PLT# > 600 x 10^3/µL
Suspect messages		
PLT Clumps?	Possibility of PLT clumps	Judged from the presence of PLT clumps in the WDF scattergram.

5.3 IP message judgment conditions and judgment methods

In the following cases, IP message judgment is not performed.
- QC analysis data
- Calibration analysis data
- Blank data
- Background check data
- Insufficient blood volume
- Adjustment

Blank data

Blank data is data that meets all of the following conditions:
- WBC < 1.00 x 10^3/µL
- RBC < 0.30 x 10^6/µL
- HGB < 1.0 g/dL
- PLT < 20 x 10^3/µL

● Judgment methods

WBC < 0.50 x 10^3/µL	Judgment for a WBC suspect message ([Left Shift?]) is not performed. (In [Pre-Dilution] mode, when WBC < 0.20 x 10^3/µL.)
RBC < 0.50 x 10^6/µL	IP message judgment for RBC other than [RBC Abn Distribution] is not performed. This is displayed as [RBC Abn Distribution], even if analysis of RBC was not specified.

- If an error or other condition prevents an analysis parameter necessary for judgment from being calculated ("- - - -" or "+ + + +" is displayed), judgments including that parameter will not be performed.
- Parameters for which the user has not specified that analysis be performed (blank " ") are not used for judgment.

● Analysis in [Pre-Dilution] mode

For IP messages judged in analysis in [Pre-Dilution] mode, see the following.
(➤**P.136** "● Table of IP message judgments")
Only Positive judgment is performed; Negative judgment is not performed.

● Table of IP message judgments

	Messages	Flag No.*1	Positive/Negative judgment flag category	Detection channel	WB [Whole Blood]		PD [Pre-Dilution]	
					CBC	CBC+DIFF	CBC	CBC+DIFF
WBC	Abnormal messages	1	Morph	WDF	✓	✓	✓	✓
		2	Diff	WDF	-	✓	-	✓
		3	Diff	WDF	-	✓	-	✓
		4	Diff	WDF	-	✓	-	✓
		5	Diff	WDF	-	✓	-	✓
		6	Diff	WDF	-	✓	-	✓
		7	Diff	WDF	-	✓	-	✓
		8	Diff	WDF	-	✓	-	✓
		9	Count	WDF	✓	✓	✓	✓
		A	Count	WDF	✓	✓	✓	✓
		F	Morph+Count	WDF	-	✓	-	✓
	Suspect messages	3	Morph	WDF	-	✓	-	✓
		7	Morph	WDF	-	✓	-	✓
		4	Morph	WDF	-	✓	-	✓
		5	Morph	WDF	-	✓	-	✓
RBC	Abnormal messages	1	Morph	RBC	✓	✓	-	-
		2	Morph	RBC	✓	✓	-	-
		3	Morph	RBC	✓	✓	✓	✓
		4	Morph	RBC	✓	✓	✓	✓
		5	Morph	RBC	✓	✓	✓	✓
		6	Morph	RBC+HGB	✓	✓	✓	✓
		7	Count	HGB	✓	✓	✓	✓
		8	Count	RBC	✓	✓	✓	✓
	Suspect messages	1	Count	RBC+HGB	✓	✓	-	-
		2	Count	RBC+HGB	✓	✓	-	-
		3	Morph	RBC+HGB	✓	✓	-	-
		4	Morph	RBC	✓	✓	-	-
		5	Morph	RBC, PLT	✓	✓	-	-
		6	Morph	WDF, PLT	✓*3	✓*3	✓*3	✓*3
PLT	Abnormal messages	1	Morph	PLT	✓	✓	-	-
		2	Count	PLT	✓	✓	✓	✓
		3	Count	PLT	✓	✓	✓	✓
	Suspect messages	1	Count	WDF	✓	✓	-	-

*1 In the [Sample Explorer] screen, IP messages are shown by flag number.

*2 Only appears when the iRBC flag license is registered.

*3 Judgements are dependent on the utilized channels.

Index

P

R

S

X