Reagent Unit

RU-20

Instructions for Use

Sysmex Corporation

KOBE, JAPAN

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Chapter 1 Introduction

Thank you for purchasing the RU-20 Reagent Unit. Please read this manual carefully to ensure proper use of the product.
After reading this manual, store it in a safe place for future reference.
The RU-20 reagent unit prepares (dilutes) concentrated reagent (CELLPACK DST) using RO (Reverse Osmosis : R/O) water and feeds it to connected hematology analyzer and automated hematology slide preparation unit (hereinafter analyzer).
For the details on RO (Reverse Osmosis : R/O) water, see below.
(➤**P.8-1** "Chapter 8: 8.1 Performance/specifications")

Contact Address

Manufacturer

SYSMEX CORPORATION
1-5-1 Wakinohama-Kaigandori, Chuo-ku, Kobe 651-0073, Japan

Authorized Representative

European Representative
SYSMEX EUROPE GmbH
Bornbarch 1, 22848 Norderstedt, Germany
Phone: +49 40 5 27 26-0 / Fax: +49 40 5 27 26-100

Americas

SYSMEX AMERICA, Inc.
577 Aptakisic Road, Lincolnshire, IL 60069, U.S.A.
Phone: +1-224-543-9500 / Fax: +1-224-543-9505

Asia-Pacific

SYSMEX ASIA PACIFIC PTE LTD.
9 Tampines Grande #06-18 Singapore 528735
Phone: +65-6221-3629 / Fax: +65-6221-3687

Ordering Supplies and Replacement Parts

If you need to order supplies or replacement parts, please contact your local Sysmex representative.

Service and Maintenance

Please contact the Service Department of your local Sysmex representative.

Training Course

For information on training, please contact the Service Department of your local Sysmex representative.

CE-mark

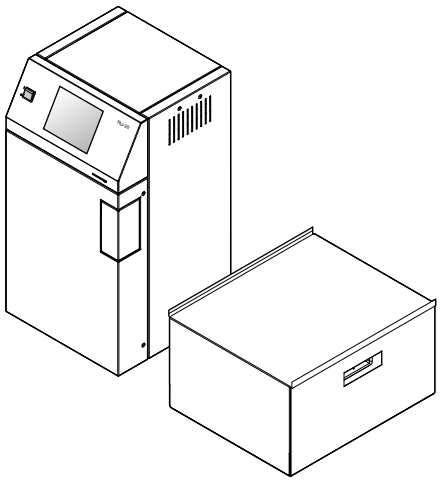
The IVD-system described in this manual is marked with a CE-mark which confirms the observance of the essential requirements of the following European directive: 98/79/EC IVD Directive

1.1 Intended use

The RU-20 reagent unit prepares (dilutes) concentrated reagent (CELLPACK DST) using RO (Reverse Osmosis : R/O) water and feeds it to connected analyzers.
Any other use is regarded as non-specified.
If the instrument fails to function properly as a result of either the user's operation not specified in the manual or the user's utilization of a program not specified by Sysmex, the product warranty would not apply.

1.2 Overview of the instrument

This instrument is installed as a peripheral device for hematology analyzers. The instrument dilutes concentrated reagent (CELLPACK DST) with RO water to the required concentration and can supply the reagent to multiple analyzers (XN series, XE-series).



* Pneumatic unit is omitted in this figure.

External view of RU-20

1.3 About the manuals

1.3.1 Structure of this manual

This manual consists of the following chapters.

Chapter	Description
Chapter 1: Introduction	Explains an overview of this manual and of the instrument.
Chapter 2: Safety Information	Explains precautions to be observed for safe use of the instrument, and also explains the meaning of the safety symbols that appear on the instrument.
Chapter 3: Part Names and Functions	Explains external views, names and functions of each of the devices connected to the instrument.
Chapter 4: Basic Operation	Explains how to perform basic operations, such as starting up and shutting down the instrument.
Chapter 5: Using the Functions	Explains the instrument settings and how to check reagent information.
Chapter 6: Performing maintenance of instrument and replacing supply parts	Explains an overview of the maintenance tasks for the instrument and explains how to perform those tasks, including the replacement of reagents and supply parts.
Chapter 7: Troubleshooting	Explains the errors that may occur in the instrument and how to troubleshoot them.
Chapter 8: Technical Information	Explains technical information such as specifications and principles.

1.3.2 Points to note about this manual

- Unauthorized reproduction of part or all of this manual is prohibited.
- Images and certain details related to product are for illustration purposes only and may not exactly match with what is indicated within this manuals.

1.4 Symbols used in this manual

Warnings, Cautions, Information, and Notes provide important safety and operational information.
Failure to comply with this information may compromise safety. Be sure to follow all indicated instructions.

Warning!
High risk. Failure to observe this warning may result in injury to the operator.

Caution!
Medium risk. Failure to observe this warning may result in property damage. Intended to prevent damage and incorrect measurement results.

Information
Low risk. Rules which should be observed when operating this instrument.

Note:
Background information and practical tips.

1.5 Trademarks

- Sysmex® is a registered trademark of SYSMEX CORPORATION, Japan.
- Other company names and product names in this manual are the trademarks or registered trademarks of their respective owners.
- The fact that a trademark is not explicitly indicated in this manual does not authorize its use.

Chapter 2 Safety Information

This chapter explains precautions for safe use of this instrument.

2.1 General information

Warning!

- This instrument must only be used as described in this manual.
- Your dealer or local Sysmex representative will unpack and install the instrument, and check initial operation.
- If you notice a strange odor, smoke, or other abnormal condition, immediately turn off the power, remove the plug from the power outlet, and please contact the Service Department of your local Sysmex representative.
  Continuing to use the instrument may result in fire, electrical shock, or injury.
- Do not spill blood samples or reagents on the instrument. Do not insert or drop staples, clips, or other metal objects into the instrument. This may cause short-circuiting and smoke. If you notice an abnormal condition, immediately turn off the power, remove the plug from the power outlet, and please contact the Service Department of your local Sysmex representative.
- The operator should never touch the electrical circuitry inside the cover. Danger of electrical shock, especially if the hand is wet.
- The instrument must never be connected to a power outlet of the wrong voltage. The instrument must always be grounded. Otherwise fire or electrical shock may result.
- Do not damage the power cable. Do not place any heavy objects on the power cable or forcibly pull on the power cable. Risk of fire and electrical shock due to short-circuiting or wire breakage.
- Switch off the power before connecting any peripheral devices. Otherwise electrical shock and failure may result.

2.2 Installation

Caution!

- Install in a location where water will not splash on the instrument.
- Install in a dry, dust-free location that is not exposed to direct sunlight and is not subject to large temperature variations.
- Do not subject the instrument to shock or vibration.
- Install in a location with good ventilation.
- Do not install in a location where there is signal noise caused by radios, centrifuges, or other equipment.
- Do not install in a location where chemicals are stored or there are gases.
- Do not use near electro-conductive or flammable gases, including oxygen, hydrogen and anesthetics.
- This instrument is designed for indoor use.
- Install on a level, vibration-free surface.
- If the instrument is not used for an extended time, evaporation may cause reagent components to solidify on the inside the instrument, rendering it unusable.
  If you will not use the instrument for an extended time, please contact the Service Department of your local Sysmex representative.

2.3 Electromagnetic compatibility (EMC)

This instrument complies with the following IEC (EN) standards:

- IEC61326-2-6:2005 (EN61326-2-6:2006)
- Complies with EMI (Electromagnetic Interference) Class A requirements
- EMS (Electromagnetic Susceptibility)
  Fulfills the minimum requirements for susceptibility.
- This instrument has been designed and tested for compliance with CISPR11 Class A. In a domestic environment, it may cause radio interference. In this event, measures must be taken to mitigate the interference. Do not use the instrument near a strong source of electromagnetic radiation (such as an unprotected intentional radio source), as this may interfere with the basic operation of the instrument.

2.4 Safety

This instrument complies with the following IEC (EN) standards:

- IEC61010-1:2001 (EN61010-1:2001)Complies with Class 1, Pollution Level 2.

2.5 Reagents

This device will use concentrated reagent (CELLPACK DST).
The reagent is stored at 2 to 35°C (Do not freeze).
Before opening, the reagent can be used until the expiration date stated on the reagent container.
After opening, keep at a temperature from 15 to 30°C or below, and use within 2 months.

⚠ Warning!

- As with the contents of this manual, note carefully the information stated on the reagent package.
- Avoid direct contact with reagents. Reagents can cause irritation of the eyes, skin and mucous membranes.
- Should you inadvertently come in contact with a reagent, rinse your skin immediately with copious amounts of water.
- If a reagent comes in contact with your eye, rinse at once with copious amounts of water and seek medical advice immediately.
- Follow the instructions in the Material Safety Data Sheet.
- If you inadvertently swallow a reagent, immediately vomit, or drink a sufficient amount of warm salty water to induce vomiting, and seek medical attention immediately.
- CELLPACK DST is a good electrical conductor. There is a risk of electric shock if diluent is spilled near electrical cables or appliances. Switch off the instrument power, disconnect the plug from the outlet, and remove the liquid.

⚠ Caution!

- Follow all instructions on the reagent container.
- After opening, take care to prevent contamination by dirt, dust, and bacteria.
- Do not use a reagent beyond the expiration date.
- Handle reagents gently to avoid foaming. Do not shake! Do not use immediately after a reagent has been transported.
- Take care not to spill a reagent. If a reagent is spilled, wipe up immediately using a wet cloth.

2.6 Maintenance

Warning!

Always wear gloves when performing service and maintenance work. After completing work, wash your hands with a disinfectant. Failure to do so may result in irritation of the skin.

Information

- When performing maintenance, use only the tools expressly provided for such work.
- The maintenance procedures described in this manual enable the instrument to achieve full performance. When replacing supply parts and maintenance parts, use only genuine parts that meet the specifications of the instrument.

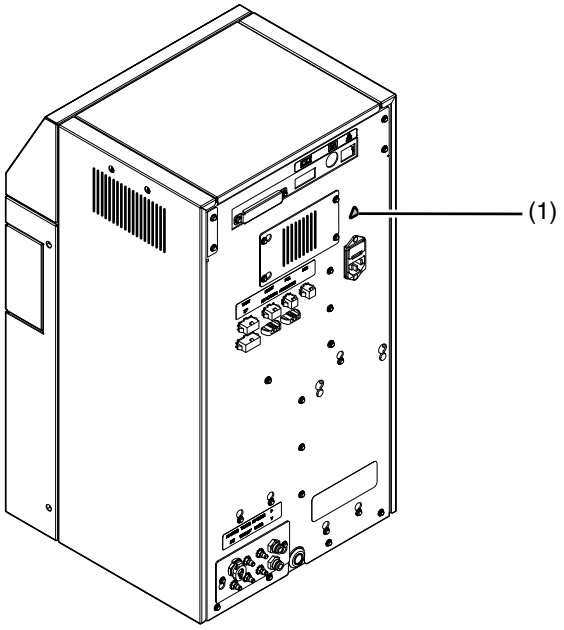
2.7 Disposal of waste fluid, waste materials, and the instrument

Warning!

- When disposing of waste fluid, consumable supplies, or the instrument, follow local regulations for the disposal of medical waste, contaminated waste, and industrial waste.
- The RU-20 includes batteries that are used for data storage. Remove the batteries before disposing of the instrument. The batteries may explode if they are put into a fire.

2.8 Markings on the instrument

Main Unit



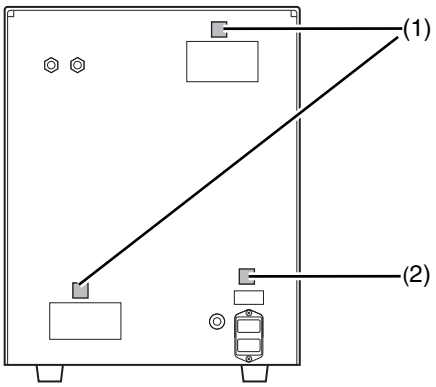
Rear View

(1)

Caution!

- Always unplug the power cord before performing inspection. Inspection with the power cord plugged in is dangerous.
- When replacing a fuse, use only a fuse of the specified type and rating.

Pneumatic Unit



Rear View

(1)

Caution!

Do not block the exhaust port on the back of the pneumatic unit.

(2)

Caution!

- Always unplug the power cord before performing inspection. Inspection with the power cord plugged in is dangerous.
- When replacing a fuse, use only a fuse of the specified type and rating.

2.9 Operators

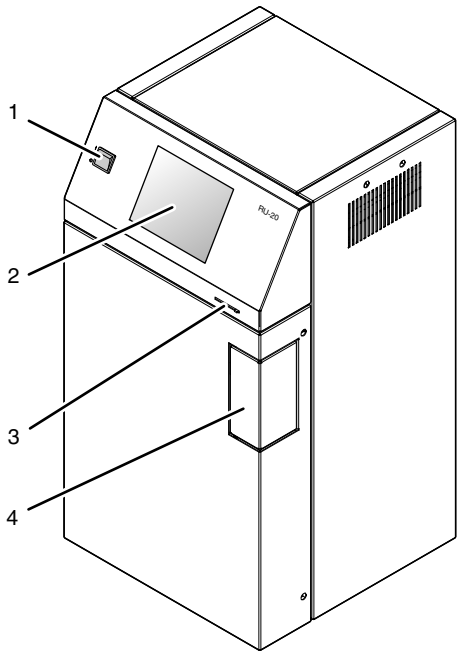
Caution!

- Do not operate this device without proper training and direction.
- In the event of device failure, follow the troubleshooting action(s) and direction provided within this manual and by your Sysmex representative.
- At time of delivery, your Sysmex representative will unpack and install the instrument and check initial operation.

Chapter 3 Part Names and Functions

This chapter explains external views, names and functions of each of the devices connected to the instrument.

Main Unit



Front View

1 Main switch

Turns the main power of the instrument on and off.

2 LCD display (touch panel)

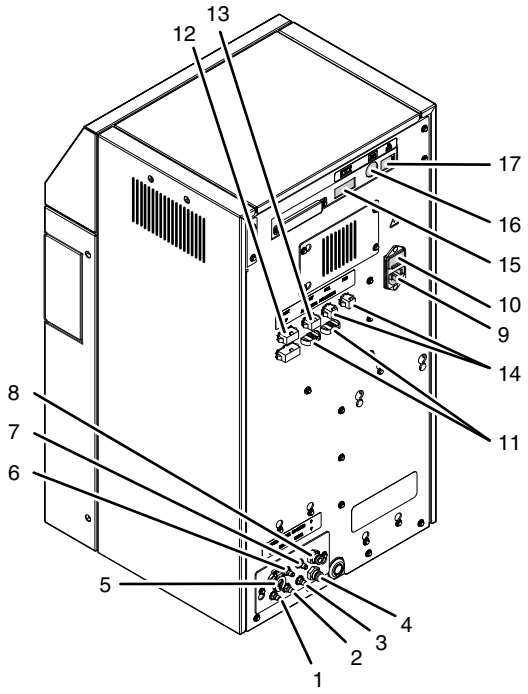
Shows the status of the instrument. The touch panel is used to operate the instrument.

3 Contrast adjustment lever

Adjusts the contrast of the LCD display.

4 Door for pneumatic pressure adjustment

Open the door and adjust the 0.07 MPa pressure.



Rear View

1 CELLPACK DST supply nipple

CELLPACK DST is supplied via this nipple.
Connects to a container of CELLPACK DST.

2 Supply tank aspiration nipple

Aspirates adjusted CELLPACK DST from the supply tank.

3 Waste outlet nipple

Waste fluid is discharged via this nipple.
Connects to a drain or waste container.

4 Vacuum supply nipple

Connects to the vacuum output nipple of the pneumatic unit.

5 RO water supply port

Supplies RO water.
The inner diameter of the RO water supply connection tube is 1/4 inch (6.4 mm).

6 Supply tank supply nipple

Supplies CELLPACK DST.

7 RO water discharge nipple

Discharges RO water.
Connect the RO water drain tube (6.4 mm) and set the end of the tube in the waste drain.

8 Pressure supply nipple

Connects to the pressure output nipple of the pneumatic unit.

9 AC power supply

Supplies power through the provided power cable.

10 Fuse holder

250 V, 3.15 A (time lag) fuse.

Insert only the specified type of fuse.

11 Analyzer connector

Connector for communication with analyzers.

Up to 3 analyzers can be connected.

12 Supply tank connector

Connector for communication with the supply tank.

13 Indicator light connector

Connects to the indicator light (optional).

14 Pneumatic unit control output connector

Output connector for control of pneumatic unit on/off.

Connects to the connector on the back of the pneumatic unit.

Up to 3 main units can be connected.

15 RS-232C

Not used.

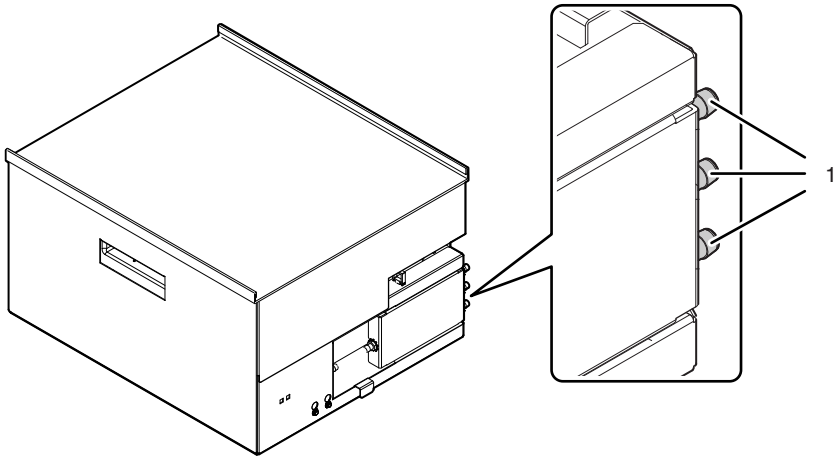
16 Hand-held barcode reader connector

For connection of the hand-held barcode reader (optional).

17 Ethernet connector

Connects to a host computer.

Supply Tank



Rear View

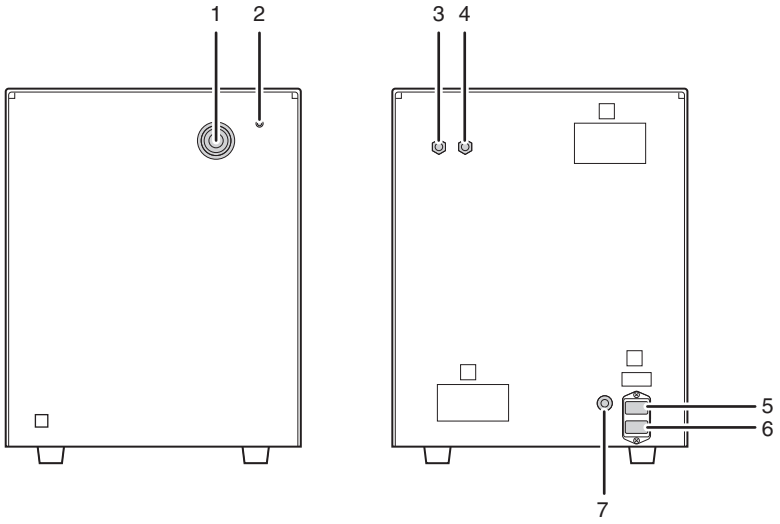
1 Analyzer supply nipple

Supplies prepared reagent stored in the supply tank to the analyzer.

Information

Do not tilt the supply tank or place upside down. This may cause failure.

Pneumatic Unit



Front View **Rear View**

1 0.25 MPa Regulator

Regulates the 0.25 MPa pressure that is supplied to the main unit.

2 Pilot lamp

Illuminates when the pneumatic unit power is on.

3 Pressure output nipple

Supplies pressure to the main unit.

Connects to the pressure supply nipple on the main unit.

4 Vacuum output nipple

Supplies vacuum pressure to the main unit.

Connects to the vacuum supply nipple on the main unit.

5 Fuse

250 V, 4 A (time lag) fuse.

Insert only the specified type of fuse.

6 Power connector

Supplies power through the provided power cord.

7 Pneumatic unit control input connector

Input connector for control of pneumatic unit on/off.

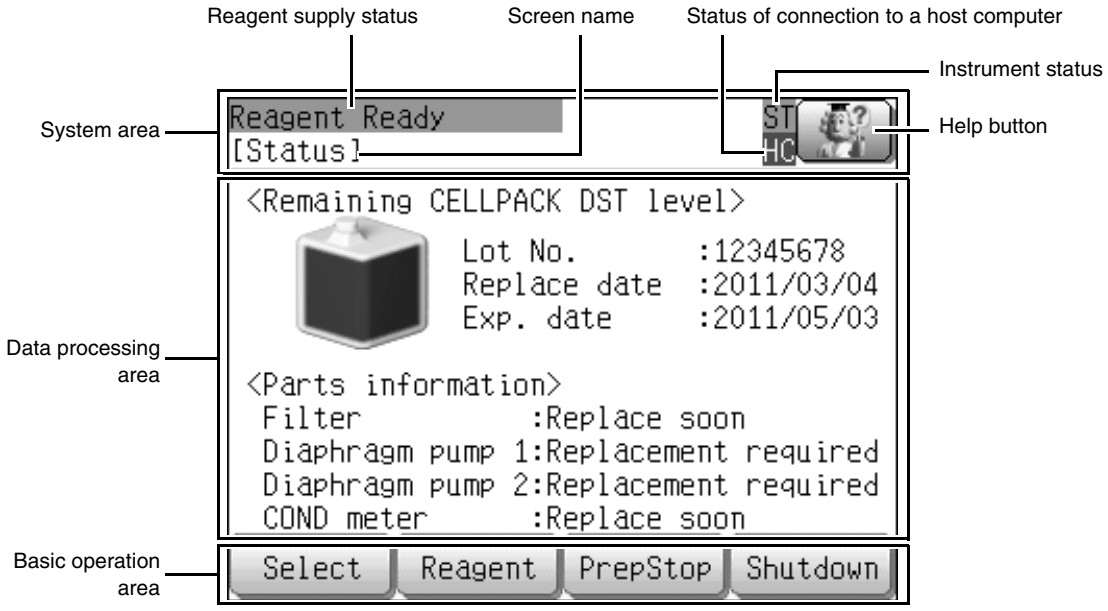
Connects to the pneumatic unit control output connector on the main unit.

Chapter 4 Basic Operation

This chapter explains the basic procedures for operating the instrument.

4.1 Screen configuration

The following status screen appears when the system is started.



[Status] screen

● **System area**

Shows the operation status of the instrument and the status of reagent supply.

Reagent supply status	[Reagent Ready]:	There is prepared reagent in the supply tank and it is ready to be supplied to the analyzer(s).
	[Reagent Not Ready]:	Cannot supply reagent to the analyzer(s) because there is no prepared reagent in the supply tank.
Screen name	Displays the name of the screen that currently appears in the data processing area.	
Instrument status	ST (Green):	Ready
	ST (Flashing green):	Starting up / Maintenance in progress / Reagent preparation in progress / Automatic operation (draining / RO water refilling) / Shutting down
	ST (Orange):	Warning
	ST (Red):	Error
Status of connection to a host computer	Displays the status of connection with the host computer.	
	HC (green):	Connected
	HC (red):	Not connected
Help button	Touch to open the [Error List] screen.	

● Data processing area

The content varies depending on the function that is selected.

When the [Status] screen is selected

[Remaining CELLPACK DST level]	Displays how much CELLPACK DST remains in 5 levels.  100% (blue) 50% (blue) 20% (yellow) 10% (red) 0%
[Lot No.]	Displays the lot number of the reagent.
[Replace date]	Displays the date when the reagent was last replaced.
[Exp. date]	Displays the expiration date of the reagent. Appears in red when the expiration date has passed. * The expiration date will not appear if [No Exp. Msg] is set for the reagent expiration date in the [Reagent registration] screen.
[Parts information]	Displays messages notifying you when parts used in the instrument must be replaced or calibrated. [Filter] / [Diaphragm pump 1] / [Diaphragm pump 2] Notifies you when the filter, diaphragm pump 1, and diaphragm pump 2 must be replaced.

Message	Status
[Replace soon]	Starts appearing 10 days before the expiration date
[Replacement required]	Expiration date has passed
[-]	Okay to continue normal use

[COND meter]
Displays messages to notify you when the electric conductance meter must be calibrated.

Message	Status
[Calibrate soon]	Starts appearing 10 days before the expiration date
[Calibration required]	Expiration date has passed
[-]	Okay to continue normal use

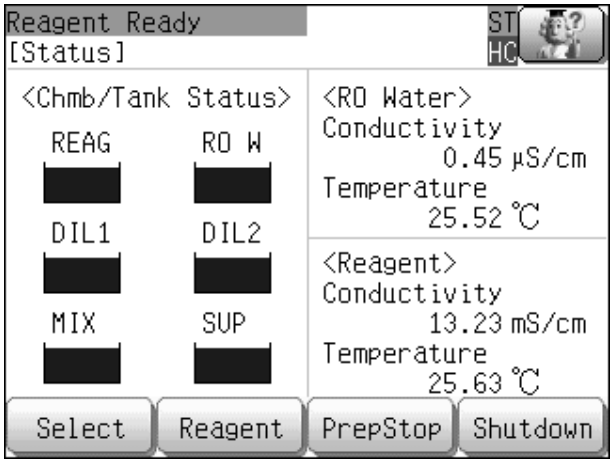
● Basic operation area

This shows the operation buttons.

[Select]	This can be touched to configure various instrument settings, and perform maintenance and other processes. (➤**P.5-1**"Chapter 5: Using the Functions")
[Reagent]	This can be touched to register reagent information and management information, and to drain prepared fluid from the instrument.
[PrepStop]	During reagent preparation, [PrepStop] appears. This can be touched to stop preparation. If reagent preparation is stopped, [PrepResm] appears. This can be touched to resume preparation.
[Shutdown]	Touch to execute shutdown processing. For shutdown procedure, see below. (➤**P.4-7** "4.4 Shutdown")

● Status Details screen

Execute [Select] - [Data View] in the [Status] screen to display the [Status Details] screen.



[Status Details] screen

[Chmb/Tank Status]

Display visually how much reagent or other fluid is remaining in each chamber/tank. The display is updated when there is a change in the level. The display method varies by chamber/tank, with the level shown in 2 to 4 steps.

- 2-level display A : [DIL1], [DIL2], [MIX]

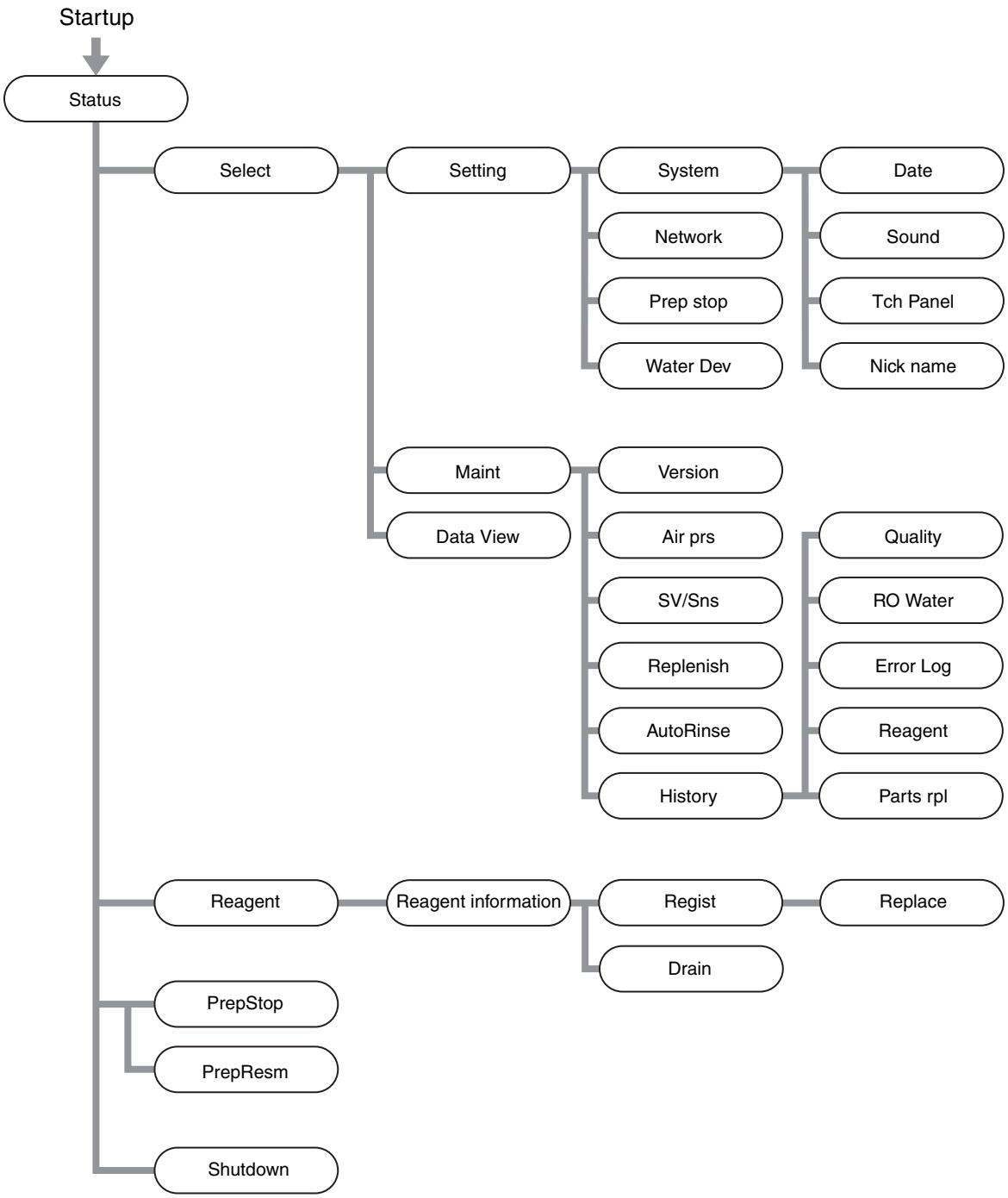
Indicates that the chamber/tank is empty.

Indicates that the chamber/tank is full.

	• 3-level display: [RO W]  Indicates that the chamber/tank is empty.  Indicates that the chamber/tank is about 2/3 full.  Indicates that the chamber/tank is full.  Indicates that the float switch has failed.
	• 4-level display: [SUP], [REAG]  Indicates that the chamber/tank is empty.  Indicates that the chamber/tank is about 1/3 full.  Indicates that the chamber/tank is about 2/3 full.  Indicates that the chamber/tank is full.  Indicates that the float switch has failed.
[RO Water]	• Displays the electrical conductivity of the RO water.
[Conductivity]	• The display is updated once every 3 seconds.
xx.xx µS/cm	• 0.00 to 99.99 [µS/cm]
[RO Water]	• Displays the temperature of the RO water.
[Temperature]	• The display is updated once every 3 seconds.
xx.xx°C	• 0.00 to 99.99[°C]
[Reagent]	• Displays the electrical conductivity of the reagent.
[Conductivity]	• This is the result of the latest measurement of reagent electrical conductivity. • If analysis has not been performed since the power was turned on, "0" appears.
xx.xx mS/cm	• 0.00 to 99.99 [mS/cm]
[Reagent]	• Displays the temperature of the reagent.
[Temperature]	• This is the result of the latest measurement of reagent electrical conductivity. • If analysis has not been performed since the power was turned on, "0" appears.
xx.xx°C	• 0.00 to 99.99[°C]

4.2 List of menu items

The hierarchy of screens that appear for each function is shown below.

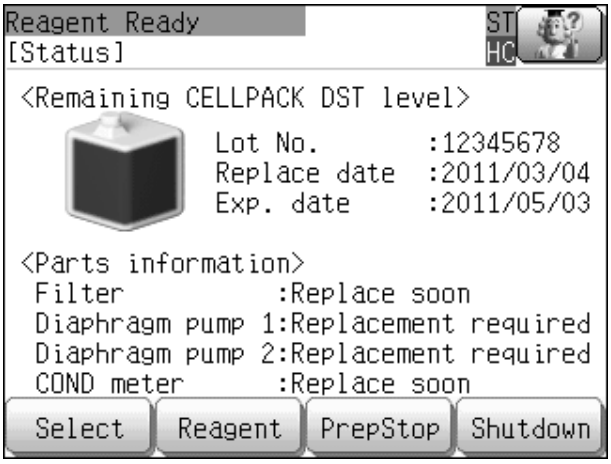


4.3 Start up

Follow the steps below to turn on the power of the instrument.

1 Press the power switch on the main unit.

The screen at right appears in the LCD display.



[Status] screen

2 Turn on the power of the analyzer(s) connected to the instrument

After startup is executed, the reagent preparation sequence is automatically executed. When the reagent supply tank fills with prepared reagent, the reagent status display shows [Reagent Ready] and the prepared fluid can be supplied to the instrument.

Information

- If the analyzer is started before this instrument is started, notification of the diluted reagent level cannot take place and an error may occur on the analyzer.
- If you need to turn off and then turn on the instrument power, wait at least 5 seconds after turning off the power before turning the power on again.

4.4 Shutdown

Shutdown is not routinely performed. Perform it when shutdown is needed, for example, when an error occurs. For details, see below.

(➤**P.6-1** "Chapter 6: 6.2.1 Shutdown")

Follow the steps below to turn off the power of the instrument.

1 Turn off the power of the analyzer(s) connected to the instrument.

2 Touch [Shutdown].

The screen at right appears.

3 Touch [OK].

The shutdown completion screen appears.

4 Press the power switch off the main unit.

Note:

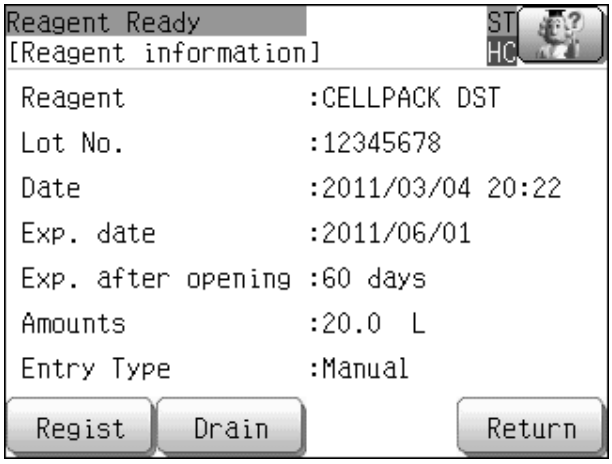
- The system cannot be shutdown when the instrument is in the [Not ready] state. If the reagent adjustment operation is not finished, shutdown will take place without starting the next adjustment operation when the adjustment operation currently being executed is completed.
- If an error occurs during shutdown, the [Error] dialog will appear. Touch [OK] to close the dialog, clear the error, and then re-execute shutdown.

Chapter 5 Using the Functions

This chapter explains the instrument settings and how to check reagent information.

5.1 Checking reagent information

Check information on the currently used reagent.
Touch [Reagent], and the screen at right appears.



[Reagent]	Displays the reagent type (CELLPACK DST).
[Lot No.]	Displays the lot number of the reagent.
[Date]	Displays the date when the reagent was last replaced.
[Exp. date]	Displays the expiration date of the reagent.
[Exp. after opening]	Displays how long the reagent can be used after it is opened.
[Amounts]	Displays the amount of reagent.
[Entry Type]	Displays the reagent registration method. Displays [Manual] if the reagent information was entered manually, or [Barcode] if entered by barcode. If information is entered manually after entry by barcode, [Manual] appears.
[Regist]	Touch to open the [Reagent registration] screen. For reagent registration procedure, see below. (➤**P.6-5** "Chapter 6: 6.3 Replacing the reagent")
[Drain]	Touch to open the [Supply chmb drain] screen. For drain procedure, see below. (➤**P.6-5** "Chapter 6: 6.3 Replacing the reagent")

5.2 Configuring settings

The instrument stops operating while settings are being configured.

5.2.1 Setting the date and time

Follow the steps below to set the date and time.

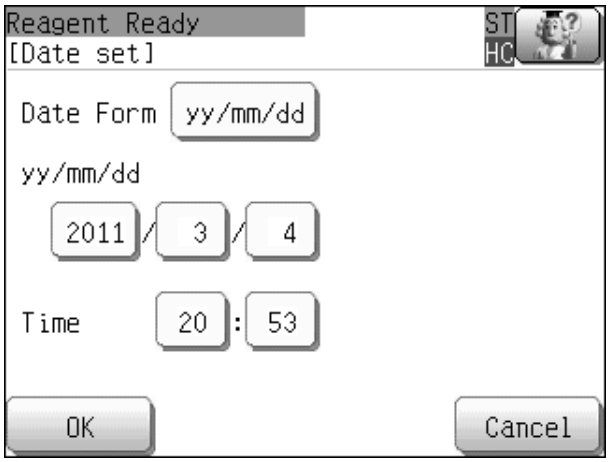
1 Touch [Select].

2 Touch [Setting].

3 Touch [System].

4 Touch [Date].

The screen at right appears.



5 Set the displayed item.

When you touch an input box, a numeric keypad opens. Enter a number and touch [Entr].

[Date Form]	Touch this button to select date form type on LCD display from 3 types.		
	Options	:	[yy/mm/dd], [mm/dd/yy], [dd/mm/yy]
[yy/mm/dd]	Input range	yy :	2008 to 2037
		mm:	1 to 12
		dd :	1 to 31
[Time]	Input range	Hour:	00 to 23
		Minute:	00 to 59

6 Touch [OK].

5.2.2 Configuring sound settings

Follow the steps below to configure sound settings.

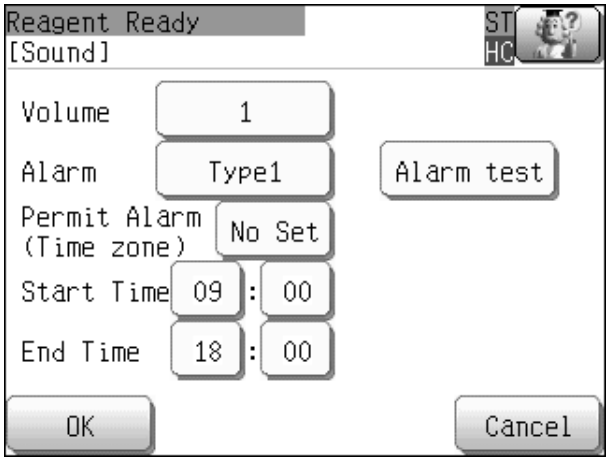
1 Touch [Select].

2 Touch [Setting].

3 Touch [System].

4 Touch [Sound].

The screen at right appears.



5 Set the displayed item.

Configures the alarm volume, types, etc. which sound when an error occurs.

[Volume]	Touch this button to adjust the volume in 3 levels. Options : [1] to [3] ([3] is the maximum volume)
[Alarm]	Touch this button to select the alarm type from 6 types. Options : [Type 1] to [Type 6] [Alarm test] can be touched to check the selected alarm sound. The display will change to [AlarmReset]. To stop the alarm sound, touch [AlarmReset].

[Permit Alarm]	Touch this button to select whether alarm activation will be restricted to a certain time frame. Options : [Set Up], [No Set] When [Set Up] is selected, you can set the time frame in which the alarm will activate. A numeric keypad will appear when the [Start Time] and [End Time] input boxes are touched. Enter each time and touch [Entr]. The alarm will activate from the time set in [Start Time] until the time set in [End Time].

6 **Touch [OK].**

5.2.3 Calibrating the touch panel

Follow the steps below to correct misalignment between the touch panel and the LCD.

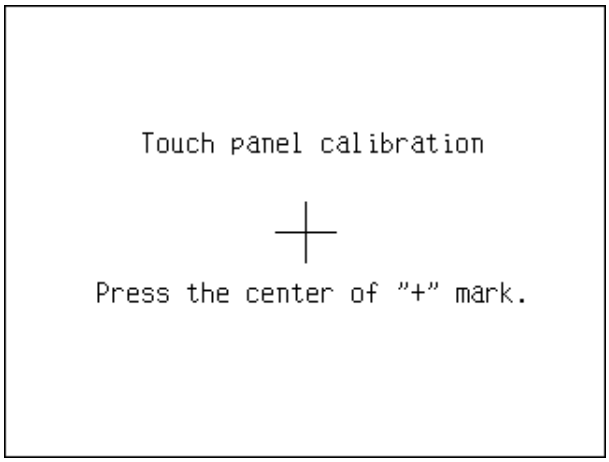
1 **Touch [Select].**

2 **Touch [Setting].**

3 **Touch [System].**

4 **Touch [Tch Panel].**

The screen at right appears.



5 Touch the center of the [+] mark.

Perform the above operation a total of 5 times. When you have finished calibration, an update confirmation message will appear.

6 Touch [OK].

The touch panel calibration is completed.

5.2.4 Setting the instrument nickname

A nickname can be set to enable the host to identify the instrument when multiple instruments are connected. Follow the steps below to set a nickname for the instrument.

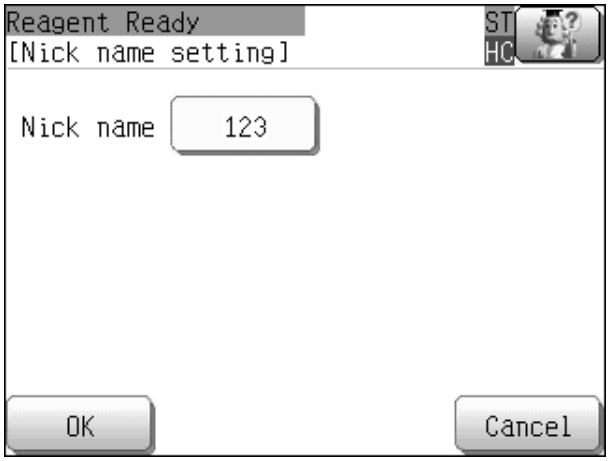
1 Touch [Select].

2 Touch [Setting].

3 Touch [System].

4 Touch [Nick name].

The screen at right appears.



5 Set the displayed item.

When you touch an input box, a numeric keypad opens. Enter a number and touch [Entr].
The [Nick name] can be 5 digits long.

6 Touch [OK].

5.2.5 Configuring network settings

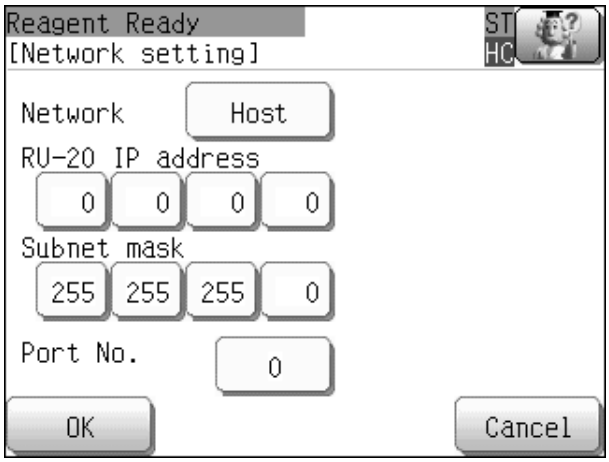
Follow the steps below to configure network settings.

1 Touch [Select].

2 Touch [Setting].

3 Touch [Network].

The screen at right appears.



4 Set the displayed item.

● **Select the connection destination**

[Network]	Touch this button to select the network connection destination. Options : [IPU], [Host], [Non]

● **Set the address and port**

When you touch an input box, a numeric keypad opens. Enter a number and touch [Entr].

[RU-20 IP address]	Input range: 0 to 255
[Subnet mask]	Input range: 0 to 255
[Port No.]	Input range: 0 to 99999

5 **Touch [OK].**

5.2.6 Setting the action when the reagent has expired

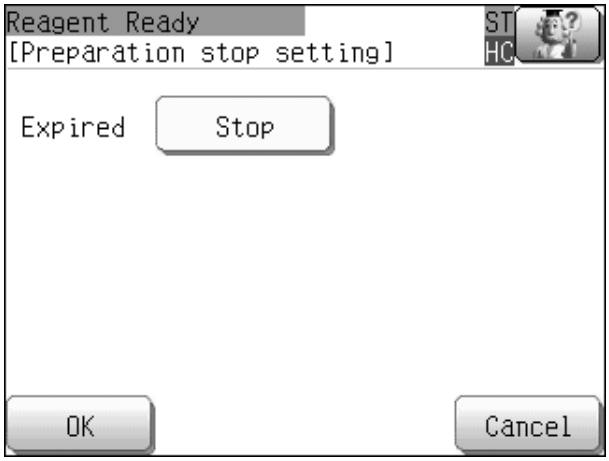
You can set whether or not reagent preparation stops when the reagent has expired.
Follow the steps below to set the action when the reagent has expired.

1 **Touch [Select].**

2 **Touch [Setting].**

3 **Touch [PrepStop].**

The screen at right appears.



[Preparation stop setting] screen

4 **Set the displayed item.**

Touch the button to select the action that takes place when the reagent has expired.

[Stop]	When the expiration date of the reagent passes, reagent preparation stops.
[Not stop]	Even if the expiration date of the reagent has passed, reagent preparation will not stop.

5 **Touch [OK].**

5.2.7 Configuring the water device setting

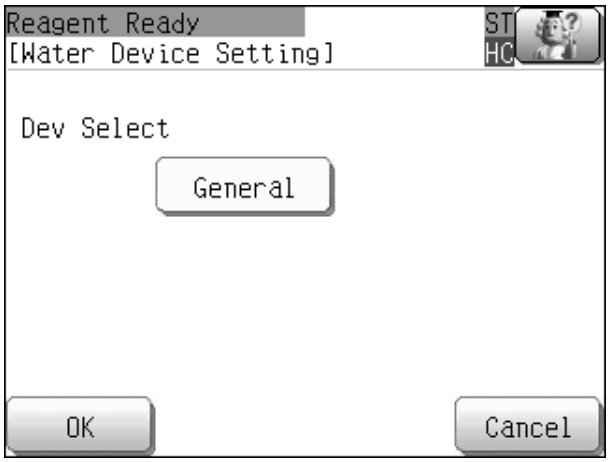
Follow the steps below to set the type of water device that is used.

1 Touch [Select].

2 Touch [Setting].

3 Touch [Water Dev].

The screen at right appears.



4 Set the displayed item.

Touch this button to select the type of water purifier that is used.
Options: [General], [ELIX5 WU]

5 Touch [OK].

The selected water purifier information is saved.

5.3 Maintenance screen

5.3.1 Checking version information

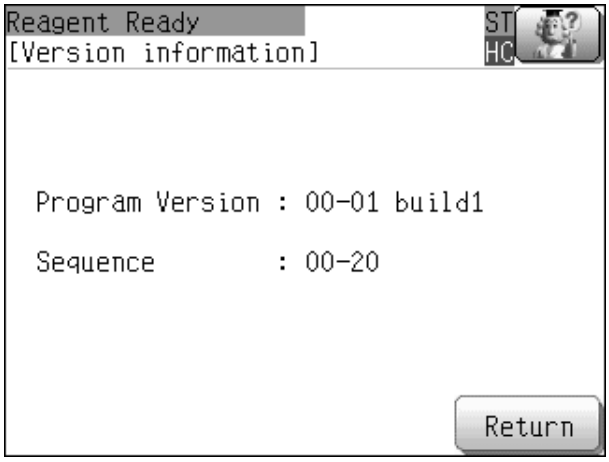
Follow the steps below to check the instrument's version information.

1 Touch [Select].

2 Touch [Maint].

3 Touch [Version].

The screen at right appears.



[Program Version]	Displays the version of the main program.
[Sequence]	Displays the version of the sequence program.

5.3.2 Checking the air pressure

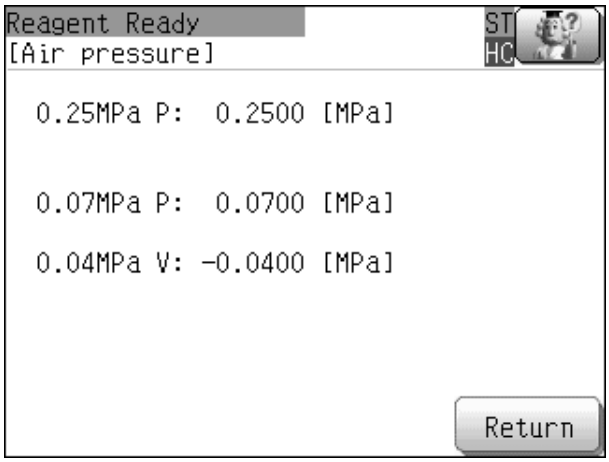
Follow the steps below to check the air pressure.

1 Touch [Select].

2 Touch [Maint].

3 Touch [Air prs].

The screen at right appears.



[Air pressure] screen

[0.25MPa P]	Displays the source pressure of the pneumatic unit.
[0.07MPa P]	Displays the pressure value inside the instrument.
[0.04MPa V]	Displays the vacuum value inside the instrument.

Note:

For the procedure for adjusting the air pressure, refer to Chapter 6.
(➤**P.6-2** "Chapter 6: 6.2.2 Adjusting the air pressure")

5.3.3 Checking the status of the solenoid valve and sensor

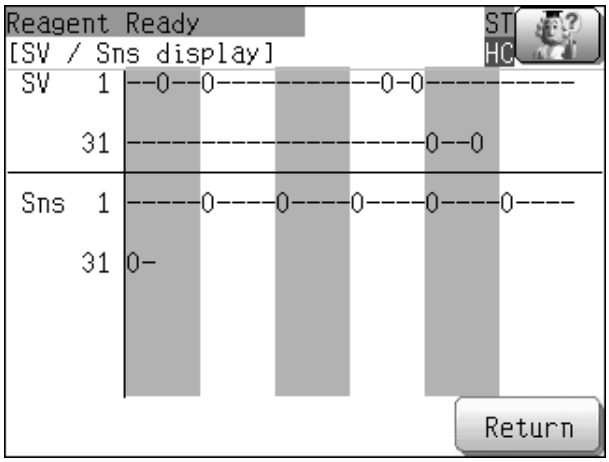
Follow the steps below to check the status of the solenoid valve and sensor.

1 Touch [Select].

2 Touch [Maint].

3 Touch [SV/Sns].

The screen at right appears.



[O]	The solenoid valve and sensor are on.
[-]	The solenoid valve and sensor are off.

5.3.4 Replenishing the reagent

In the event that the concentrated reagent in the instrument has expired or otherwise become unusable, the concentrated reagent in the instrument and the prepared reagent in the supply tank must be drained and replenished with new reagent.
Follow the steps below to replenish the reagent.

1 Touch [Select].

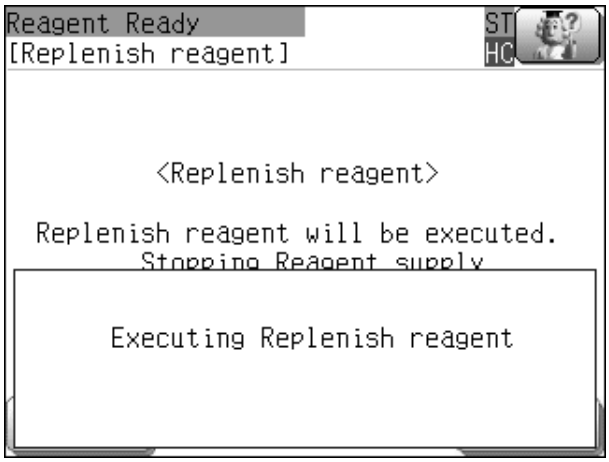
2 Touch [Maint].

3 Touch [Replenish].

The screen at right appears.
Reagent replenishment takes about 4 to 6 hours.

4 Touch [OK].

The screen at right appears.



5.3.5 Performing auto rinse

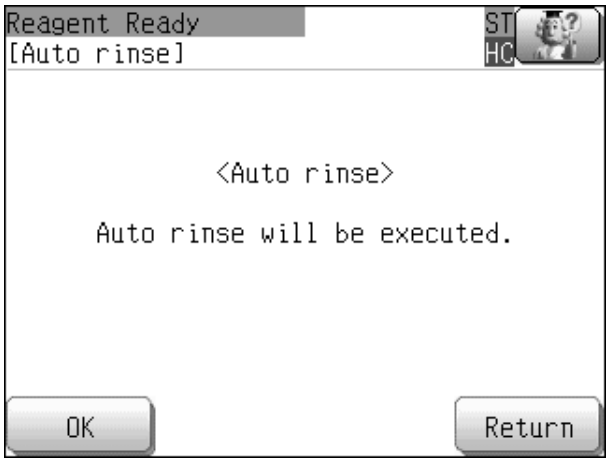
In the event that a reagent adjustment failure occurs, the partially adjusted reagent can be drained and the interior of the instrument automatically rinsed. When automatic rinsing is performed, the adjusted reagent in the supply tank is not drained.
Follow the steps below to perform auto rinse.

1 Touch [Select].

2 Touch [Maint].

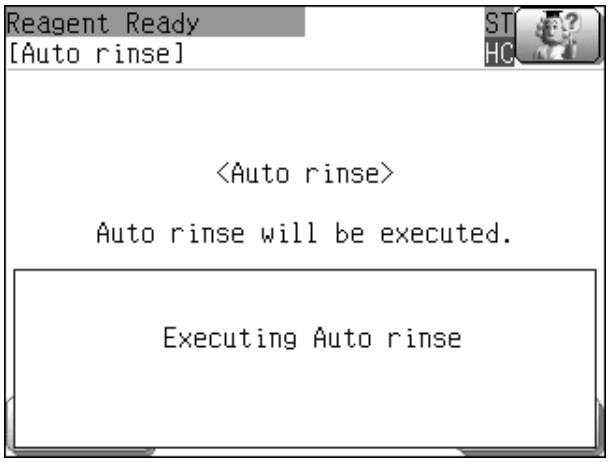
3 Touch [AutoRinse].

The screen at right appears.



4 Touch [OK].

The screen at right appears.



5.3.6 Display the quality log

Follow the steps below to check the reagent preparation quality log.

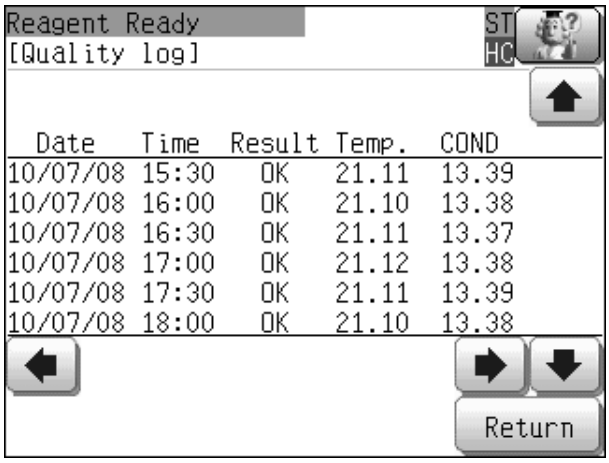
1 Touch [Select].

2 Touch [Maint].

3 Touch [History].

4 Touch [Quality].

The screen at right appears.
Touch [↑] or [↓] to move to older or newer entries in the log.
To show items that do not currently appear, touch [←] or [→].



[Date]	Displays the date on which reagent preparation was completed.
[Time]	Displays the time when reagent preparation was completed.
[Result]	Displays the result of reagent preparation.
[Temp.]	Displays the temperature when reagent preparation was completed. Units are [°C].
[COND]	Displays the conductance when reagent preparation was completed. Units are [mS/cm].
[Ref Val]	Displays the AD value of the reference voltage when reagent preparation was completed.
[Elec val]	Displays the AD value of the electrode voltage when reagent preparation was completed.
[QTM val]	Displays the AD value of the thermistor voltage when reagent preparation was completed.

Note:

The quality log can hold a maximum of 1,000 entries. Once 1,000 entries have been recorded, each new entry deletes the oldest entry.

5.3.7 Display the RO (Reverse Osmosis) Water log

Follow the steps below to check the RO water measurement log.

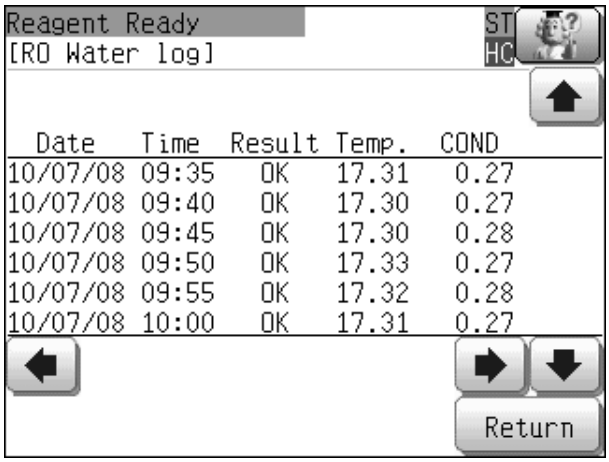
1 Touch [Select].

2 Touch [Maint].

3 Touch [History].

4 Touch [RO Water].

The screen at right appears.
Touch [↑] or [↓] to move to older or newer entries in the log.
To show items that do not currently appear, touch [←] or [→].



[Date]	Displays the date on which RO water was measured.
[Time]	Displays the time when RO water was measured.
[Result]	Displays the RO water measurement result.
[Temp.]	Displays the temperature when RO water was measured. Units are [°C].
[COND]	Displays the conductance when RO water was measured. Units are [µS/cm].
[Ref Val]	Displays the AD value of the reference voltage when RO water was measured.

[Elec val]	Displays the AD value of the electrode voltage when RO water was measured.
[QTM val]	Displays the AD value of the thermistor voltage when RO water was measured.
[Type]	Displays the type of timing at which RO water was measured.
[START]	Indicates the first conductance when supply to the RO chamber was started (the valve was switched).
[STOP]	Shows the last conductance when supply to the RO chamber was ended (the valve was switched).
[CYCLE]	Indicates the conductance measured every 5 minutes if the time from the start to the end of supply exceeded 5 minutes.
[OVER]	Indicates the first conductance that was outside the two types of monitor level (abnormal range and warning range) during supply.
[RECOVER]	Indicates the first conductance that returned to the two types of monitor level (abnormal range and warning range) during supply.
[Direction]	The supply direction when RO water was registered in the history.
[Chamber]	The measurement value when RO water was supplied to the RO water chamber.
[Drain]	The measurement value when RO water was discharged from the RO water chamber.

Note:

The RO Water log can hold a maximum of 1,000 entries. Once 1,000 entries have been recorded, each new entry deletes the oldest entry.

5.3.8 Display the error log

Follow the steps below to view the error occurrence and resolution history.

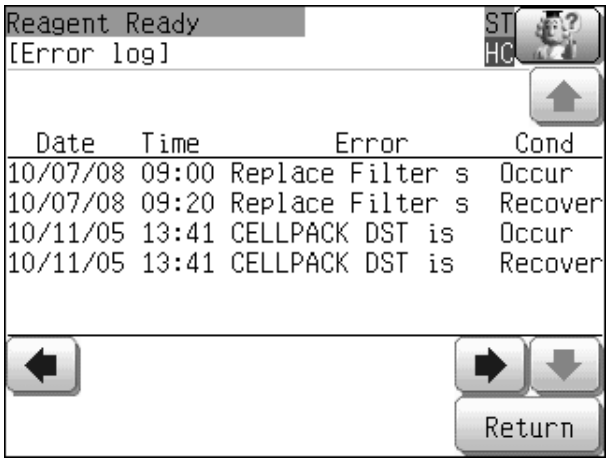
1 Touch [Select].

2 Touch [Maint].

3 Touch [History].

4 Touch [Error log].

The screen at right appears.
Touch [↑] or [↓] to move to older or newer entries in the log.
To show items that do not currently appear, touch [←] or [→].



[Date]		Displays the date on which the error occurred or recovery took place.
[Time]		Displays the time when the error occurred or recovery took place.
[Error]		Displays what error occurred.
[Cond]		Displays the status of the error.
	[Occur]	Indicates that the error has occurred.
	[Recover]	Indicates that recovery from the error has taken place.

Note:
The error log can hold a maximum of 1,000 entries. Once 1,000 entries have been recorded, each new entry deletes the oldest entry.

5.3.9 Display the reagent replacement log

Follow the steps below to check the Reagent Replacement log.

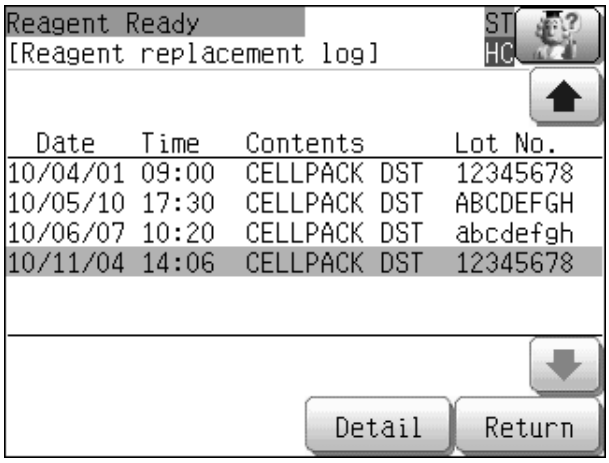
1 Touch [Select].

2 Touch [Maint].

3 Touch [History].

4 Touch [Reagent].

The screen at right appears.
Touch [↑] or [↓] to move to older or newer entries in the log.



[Date]	Displays the date on which the reagent was replaced.
[Time]	Displays the time when the reagent was replaced.
[Contents]	Displays the details of reagent replacement.
[Lot No.]	Displays the lot number of the reagent.
[Detail]	This can be touched after the Reagent Replacement log is selected to display a detailed Reagent Replacement log.

Note:
The reagent replacement log can hold a maximum of 100 entries. Once 100 entries have been recorded, each new entry deletes the oldest entry.

5.3.10 Display the parts replacement log

Follow the steps below to check the Parts replacement log.

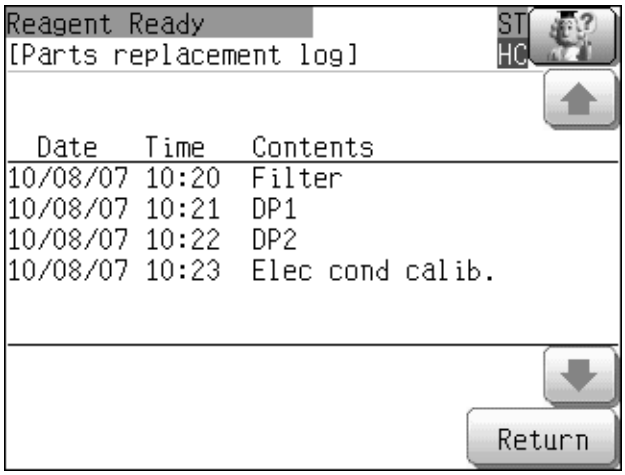
1 Touch [Select].

2 Touch [Maint].

3 Touch [History].

4 Touch [Parts log].

The screen at right appears.
Touch [↑] or [↓] to move to older or newer entries in the log.



[Date]	Displays the date on which the parts were replaced.
[Time]	Displays the time when the parts were replaced.
[Contents]	Displays the details of parts replacement.

Note:

The parts replacement log can hold a maximum of 100 entries. Once 100 entries have been recorded, each new entry deletes the oldest entry. The calibration history (dates) of the reagent electrical conductivity meter used for service and maintenance is also displayed.

Chapter 6 Performing maintenance of instrument and replacing supply parts

This chapter explains an overview of the maintenance tasks for the instrument and explains how to perform those tasks, including the replacement of reagents and supply parts.

6.1 Introduction

Regular maintenance of the analyzers is necessary to keep the instrument in the most optimal condition. Please perform the appropriate maintenance tasks according to this chapter.

6.1.1 List of maintenance items

Below is a list of maintenance tasks.

Maintenance tasks performed as needed

Replacing supply parts

6.2 Maintenance tasks performed as needed

If an error occurs that requires maintenance, the [error] dialog box appears in the screen. To view details on the error that has occurred, touch the [Help] button. For the procedure for clearing an error, refer to Chapter 7.
(➤**P.7-1** "Chapter 7: 7.1.1 Clearing an error")

6.2.1 Shutdown

To turn off the power to perform instrument maintenance, the shutdown sequence must be executed. For the procedure for shutdown, refer to Chapter 4.
(➤**P.4-7** "Chapter 4: 4.4 Shutdown")

6.2.2 Adjusting the air pressure

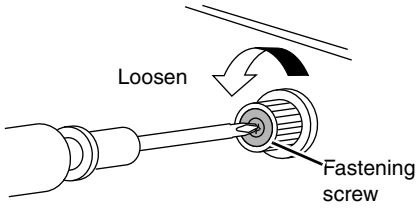
If a [0.25MPa Pressure error] or [0.07MPa Pressure error] occurs, follow the procedure below to adjust the air pressure (positive pressure).

[0.25MPa Pressure error]

1 Display the [Air pressure] screen.

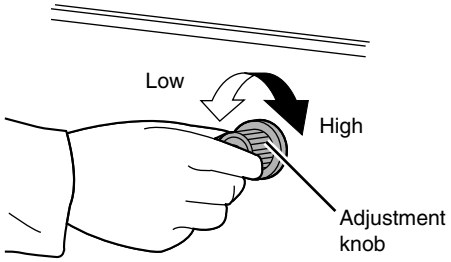
(➤**P.5-10** "Chapter 5: 5.3.2 Checking the air pressure")

2 Loosen the fastening screw for the 0.25 MPa regulator on the front of the pneumatic unit.



3 Adjust the pressure by turning the knob on the 0.25 MPa regulator.

While viewing the [Air pressure] screen, adjust the pressure to the specified pressure (0.25 ± 0.01 MPa).
To increase the pressure, turn the knob clockwise.



Information

If the pressure is higher than the specified pressure, reduce it below the specified pressure and then adjust to the specified pressure.

4 Tighten the fastening screw of the 0.25 MPa regulator, without turning the adjustment knob.

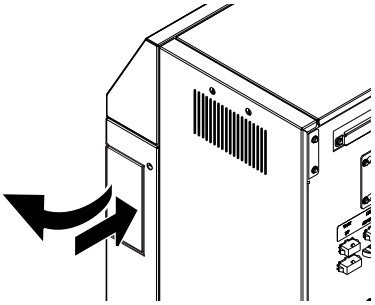
[0.07MPa Pressure error]

1 Display the [Air pressure] screen.

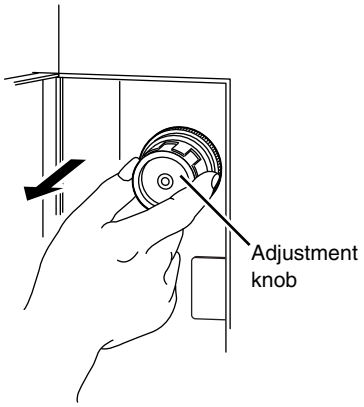
(➤**P.5-10** "Chapter 5: 5.3.2 Checking the air pressure")

2 Open the door for pneumatic pressure adjustment.

Push the cover located on the right side of the Door for pneumatic pressure adjustment once, so that it pops up. Then open the door.

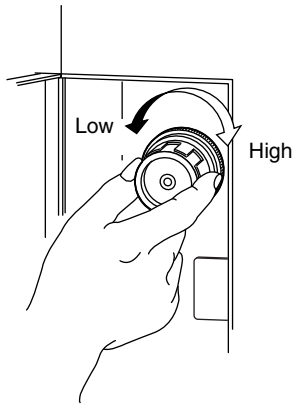


3 Pull out the adjustment knob on the 0.07 MPa regulator to unlock it.



4 Adjust the pressure by turning the knob on the 0.07 MPa regulator.

While viewing the [Air pressure] screen, adjust the pressure to the specified pressure (0.07 ± 0.005 MPa).
To increase the pressure, turn the knob clockwise.



5 Push the adjustment knob on the 0.07 MPa regulator to lock it.

Note:

0.04 MPa vacuum cannot be adjusted.
If a [Vacuum Error] occurs, check if a tube between the main unit and the pneumatic unit has become disconnected. If disconnected, firmly reconnect the tube.
If the tube is properly connected but an error still occurs, please contact the Service Department of your local Sysmex representative.

6.3 Replacing the reagent

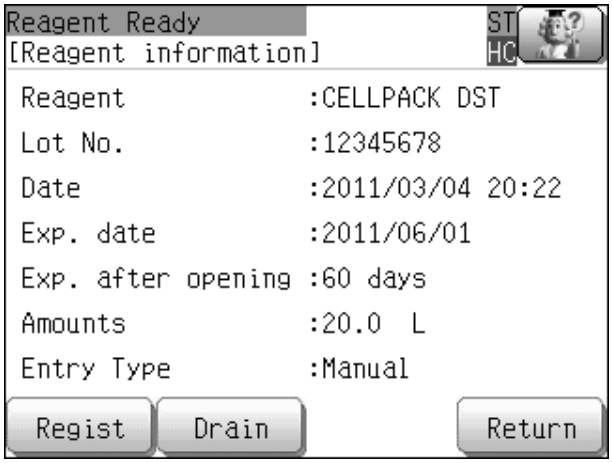
When the reagent has run out or expired, it must be replaced.
Follow the steps below to replace the reagent.

Caution!

- Leave the reagent at room temperature (15 to 30°C) for at least 24 hours before use.
- Do not use a reagent that may have frozen. Follow the precautions given on the package.
- When replacing the reagent container, make sure there is no dust or other contaminants on the spout kit.
- After opening, take care to prevent contamination by dirt, dust, and bacteria.
- Take care not to touch the tube that goes into the reagent and make sure there is no dust or other contaminants on the tube. If you have touched the tube or there is dust on the tube, wash the tube with reagent before attaching it.
- Take care not to spill the reagent. If the reagent is spilled, wipe up immediately using a wet cloth.

1 Display the [Reagent information] screen.

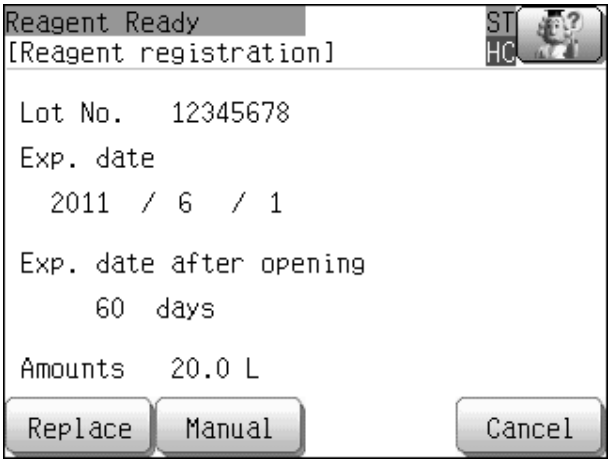
When [Reagent] is touched in the [Status] screen, the screen at right appears.
(➤**P.4-6** "Chapter 4: 4.3 Start up")



[Drain]	Touch to replenish the reagent in the instrument. Draining will take about 1 hour.

2 Touch [Regist].

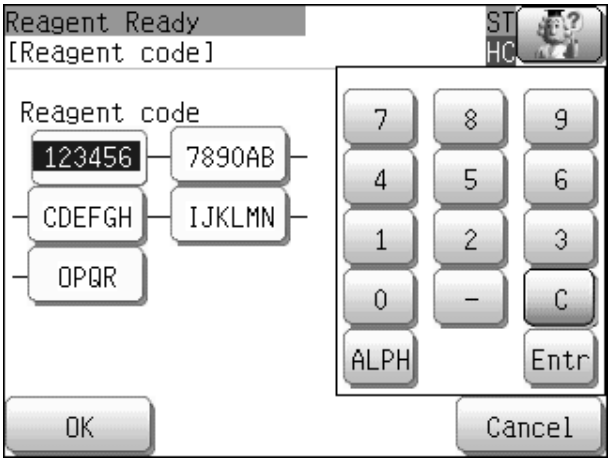
The screen at right appears.



[Reagent registration] screen

3 Set the displayed items.

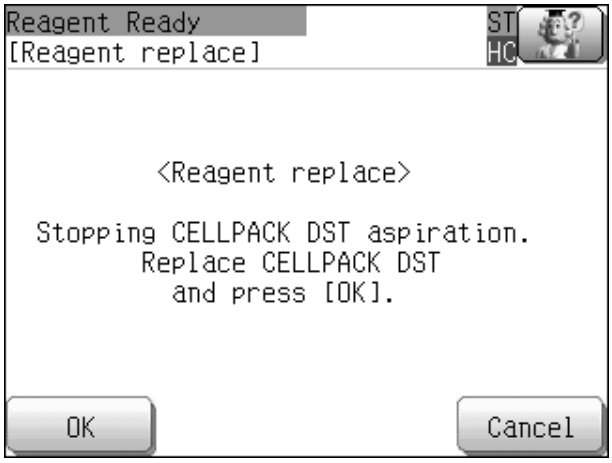
[Lot No.]*	Displays the reagent lot number.
[Exp. date]*	Displays the expiration date of the reagent.
[Exp. After opening]*	Displays how long the reagent can be used after it is opened.
[Amounts]*	Displays the amount of reagent.
[Replace]	Touch to open the [Reagent replace] screen. The button will be grayed out and cannot be touched until the reagent code is entered by barcode input or manually.
[Manual]	Enter the reagent code. When the [Reagent code] button (input box) is touched, a numeric keypad dialog appears on the right side of the screen. After pressing the code, touch [Entr] to enter the code and close the numeric keypad dialog.



* The information can be input by scanning the barcode on the reagent box with the hand-held barcode reader (option), or by pressing the [Manual Input] button and entering the reagent code and other information manually. When the [Reagent code] is entered and the [OK] button is pressed, the [Lot No.], [Exp. date], [Exp. After opening] , and [Amounts] are displayed if the [Reagent code] is valid.

4 Touch [Replace].

The screen at right appears.

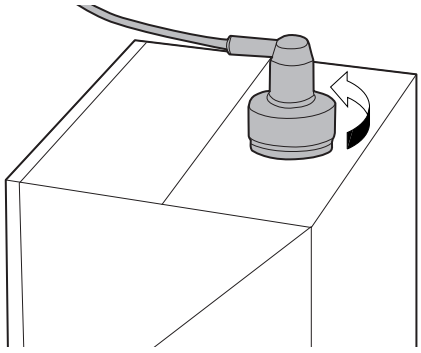


[Reagent replace] screen

5 Remove the cap from the new reagent container.

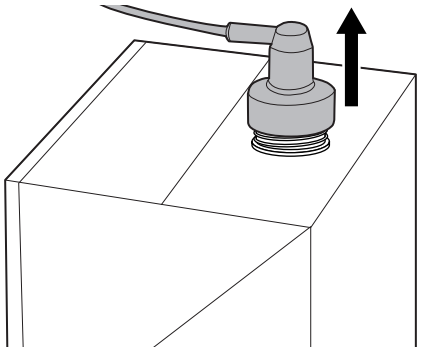
Check that the reagent has not expired.

6 Remove the cap from the old reagent container.



e.g.) CELLPACK DST (4L)

7 **Pull out the dispensing set straight up.**



8 **Insert the dispensing set straight into the new reagent container.**

9 **Close the cap.**

10 **Touch [OK].**

6.4 Replacing supply parts

6.4.1 Replacing a fuse

Over-current protection fuses are used in the main unit and pneumatic unit. If a fuse is blown, it must be replaced.
Follow the steps below to replace the fuse.

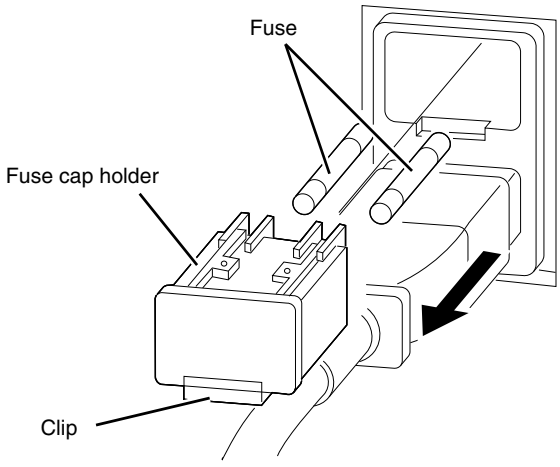
Warning!
Be sure to disconnect the power cord before replacing a fuse.
Risk of electrical shock.

1 Turn off the power of the main unit and the pneumatic unit.

2 Disconnect the power cord of the unit with the fuse to be replaced.

3 Remove the fuse cap holder.

To remove the fuse cap holder, use a flathead screwdriver or similar tool to press up on the clip.



4 Replace the fuse.

Warning!
Use a fuse of the specified type and rating.
Risk of smoke emission.

Fuse used in main unit

Specification	Part No.	Name	Type
100-240 VAC	AX880901	250V 3.15A 50T032H Fuse	Time lag

Fuse used in pneumatic unit

Specification	Part No.	Name	Type
100-117 VAC	266-5011-3	250V 4A ST4-4A-N1 Fuse	Time lag

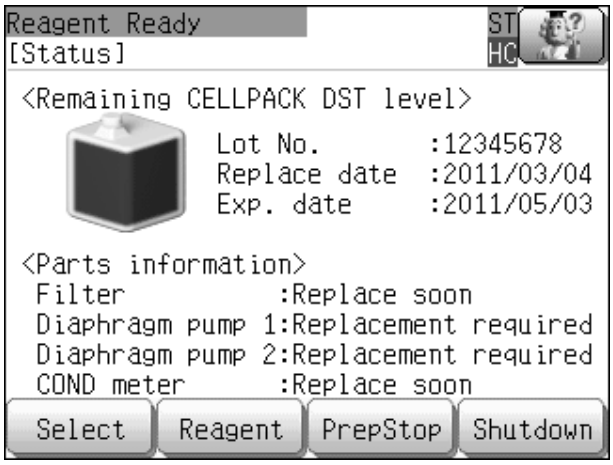
5 Replace the fuse cap holder.

6 Connect the power cord of the unit with the fuse that was replaced.

7 Turn on the power of the main unit and the pneumatic unit.

6.4.2 Replacing a maintenance part

If [Replacement required] or [Calibration required] appears in parts information, stop using the instrument and please contact the Service Department of your local Sysmex representative for replacement and/or inspection.



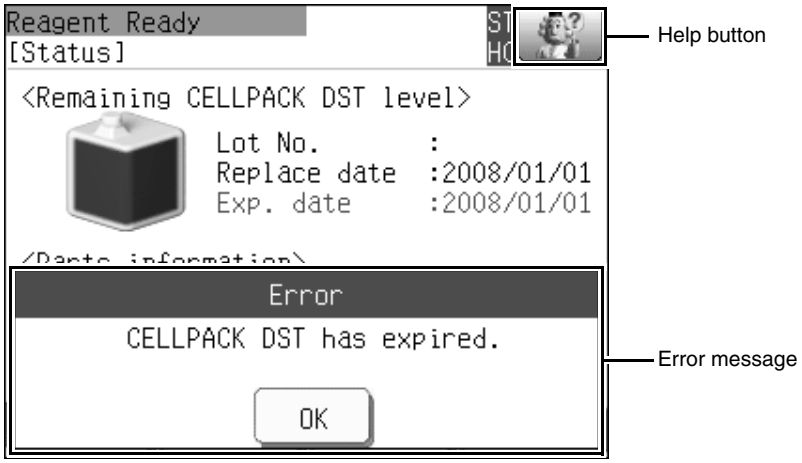
Maintenance parts	Description	Approximate replacement/calibration time
[Filter]	Replacement	Preparation of 72,000 L of reagent or 2 years
[Diaphragm pump 1] [Diaphragm pump 2]	Replacement	3 million cycles or 2 years
[COND meter]	Calibration	1 year

Chapter 7 Troubleshooting

This chapter explains the errors that may occur in the instrument and how to troubleshoot them.

7.1 Overview of instrument errors

If an error occurs in the instrument, an error message will appear.
An error that has occurred can be cleared from the error list, which is opened by touching the help button.
The errors that appear in the error list are listed in order of priority.

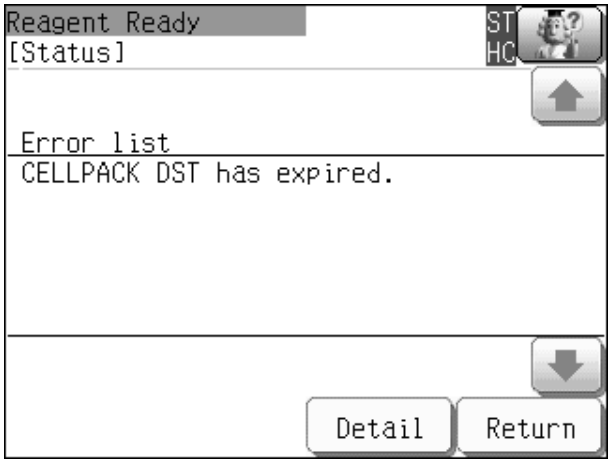


7.1.1 Clearing an error

Follow the steps below to clear an error.

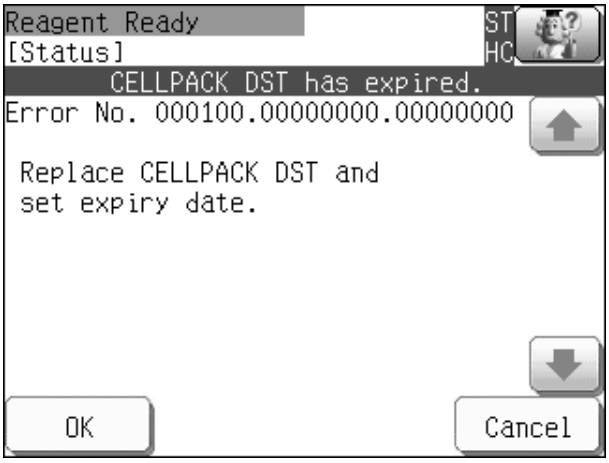
1 Touch the help button.

The screen at right appears.



2 Touch [Detail].

An error screen for the highest priority error appears.



3 Follow the instructions in the error message screen to clear the error.

4 Touch [OK].

The error is cleared.

Note:

The Error Log can hold a maximum of 1,000 errors. Once 1,000 errors have been recorded, each new error deletes the oldest error.

7.1.2 Error alarm sounds

The instrument makes a different alarm sound for each error level.
For details, see below.

Error level	Alarm sound
Errors that require turning the power off	Continuous sound
Recoverable errors	Intermittent sound
Errors where operation can continue without the need for recovery	Intermittent sound

7.2 Error message list

7.2.1 Error message list in alphabetic order

7.2.2 Error messages listed by function

System-related errors

Transfer-related errors

Water purification errors

Water leakage errors

Pressure-related errors

Temperature-related errors

Electrical conductance errors

Maintenance-related errors

Communication errors

Other errors

7.3 Causes of errors and remedial action

System-related errors

Error message	RAM error
Alarm	Continuous sound
Probable cause	Error in the working memory (SDRAM).
Action	Turn the main power switch on the instrument off and then on to restart the instrument. If the error still occurs, turn off the main power switch on the instrument and please contact the Service Department of your local Sysmex representative.
Error recovery condition	-

Error message	ROM error
Alarm	Continuous sound
Probable cause	Error in the flash ROM.
Action	Turn the main power switch on the instrument off and then on to restart the instrument. If the error still occurs, turn off the main power switch on the instrument and please contact the Service Department of your local Sysmex representative.
Error recovery condition	-

Error message	Quality log file error
Alarm	Intermittent sound
Probable cause	Error in the quality log file.
Action	Turn the main power switch on the instrument off and then on to restart the instrument. If the error still occurs, turn off the main power switch on the instrument and please contact the Service Department of your local Sysmex representative.
Error recovery condition	Touch [OK] in the error dialog.

Error message	Error log file error
Alarm	Intermittent sound
Probable cause	Error in the error log file.
Action	Turn the main power switch on the instrument off and then on to restart the instrument. If the error still occurs, turn off the main power switch on the instrument and please contact the Service Department of your local Sysmex representative.
Error recovery condition	Touch [OK] in the error dialog.

Error message	Parts replacement log file error
Alarm	Intermittent sound
Probable cause	Error in the replacement log file.
Action	Turn the main power switch on the instrument off and then on to restart the instrument. If the error still occurs, turn off the main power switch on the instrument and please contact the Service Department of your local Sysmex representative.
Error recovery condition	Touch [OK] in the error dialog.

Error message	Reagent replacement log file error
Alarm	Intermittent sound
Probable cause	Error in the reagent replacement log file.
Action	Turn the main power switch on the instrument off and then on to restart the instrument. If the error still occurs, turn off the main power switch on the instrument and please contact the Service Department of your local Sysmex representative.
Error recovery condition	Touch [OK] in the error dialog.

Error message	RO Water log file error
Alarm	Intermittent sound
Probable cause	Error in the reagent replacement log file.
Action	Turn the main power switch on the instrument off and then on to restart the instrument. If the error still occurs, turn off the main power switch on the instrument and please contact the Service Department of your local Sysmex representative.
Error recovery condition	Touch [OK] in the error dialog.

Error message	BBURAM error
Alarm	Continuous sound
Probable cause	Error in the settings file (user settings, service settings, operation information).
Action	Turn the main power switch on the instrument off and then on to restart the instrument. If the error still occurs, turn off the main power switch on the instrument and please contact the Service Department of your local Sysmex representative.
Error recovery condition	-

Transfer-related errors

Error message	Reagent transfer error
Alarm	Intermittent sound
Probable cause	1) Transfer from the mix chamber to the supply chamber not completed. 2) Transfer from dilution chamber 1 to the mix chamber not completed. 3) Transfer from dilution chamber 2 to the mix chamber not completed. 4) Diluent of reagent and RO water was prepared, but dilution chamber 1 was not filled. 5) Diluent of reagent and RO water was prepared, but dilution chamber 2 was not filled. 6) Dilution chamber 1 was not filled with RO water. 7) Dilution chamber 2 was not filled with RO water.
Action	Drain the reagent.
Error recovery condition	Touch [OK] in the error dialog.

Error message	RO water chamber supply error
Alarm	Intermittent sound
Probable cause	The chamber was not filled with RO water.
Action	Check RO water supply conditions.
Error recovery condition	Touch [OK] in the error dialog.

Error message	Supply tank drain error
Alarm	Intermittent sound
Probable cause	Drainage from the supply tank into the mix chamber was not completed.
Action	Check the drain tube.
Error recovery condition	Touch [OK] in the error dialog.

Error message	Mix chamber drain error
Alarm	Intermittent sound
Probable cause	Draining of the mix chamber was not completed.
Action	Check the drain tube.
Error recovery condition	Touch [OK] in the error dialog.

Error message	RO water drain error
Alarm	Intermittent sound
Probable cause	Draining of the RO water chamber was not completed.
Action	Check the drain tube.
Error recovery condition	Touch [OK] in the error dialog.

Water purification errors

Error message	Water Device error
Alarm	Intermittent sound
Probable cause	A water purifier warning or error was detected.
Action	Check the water purifier.
Error recovery condition	Touch [OK] in the error dialog.

Water leakage errors

Error message	Water leak detected
Alarm	Continuous sound
Probable cause	Water is leaking from the instrument.
Action	Stop RO water supply, turn off the power, and please contact the Service Department of your local Sysmex representative.
Error recovery condition	-

Error message	Water leak sns error
Alarm	Continuous sound
Probable cause	The water leak sensor has failed.
Action	Stop RO water supply, turn off the power, and please contact the Service Department of your local Sysmex representative.
Error recovery condition	-

Error message	External Water leak detected
Alarm	Continuous sound
Probable cause	Water is leaking from the supply tank.
Action	Stop RO water supply, turn off the power, and please contact the Service Department of your local Sysmex representative.
Error recovery condition	-

Error message	External Water leak sns error
Alarm	Continuous sound
Probable cause	The external water leak sensor has failed.
Action	Stop RO water supply, turn off the power, and please contact the Service Department of your local Sysmex representative.
Error recovery condition	-

Pressure-related errors

Error message	0.07MPa Pressure error
Alarm	Intermittent sound
Probable cause	An air pressure value outside the stipulated range was detected.
Action	Adjust the 0.07 MPa regulator.
Error recovery condition	Adjust the 0.07 MPa regulator, touch [OK] in the error dialog.

Error message	Vacuum error
Alarm	Intermittent sound
Probable cause	An air pressure value outside the stipulated range was detected.
Action	Stop supply of RO water, turn off the power, and contact your local Sysmex representative.
Error recovery condition	-

Error message	0.25MPa Pressure error
Alarm	Intermittent sound
Probable cause	An air pressure value outside the stipulated range was detected.
Action	Adjust the 0.25 MPa regulator.
Error recovery condition	Adjust the 0.25 MPa regulator, Touch [OK] in the error dialog.

Temperature-related errors

Error message	Reagent Thermistor error
Alarm	Continuous sound
Probable cause	The thermistor used for calculation of electric conductance is malfunctioning or there is a broken connection.
Action	Turn off the instrument power and please contact the Service Department of your local Sysmex representative.
Error recovery condition	-

Error message	Reagent Temperature error (high)
Alarm	Intermittent sound
Probable cause	The temperature of the prepared reagent is higher than the stipulated value.
Action	Check the ambient temperature.
Error recovery condition	Touch [OK] in the error dialog.

Error message	Reagent Temperature error (low)
Alarm	Intermittent sound
Probable cause	The temperature of the prepared reagent is lower than the stipulated value.
Action	Check the ambient temperature.
Error recovery condition	Touch [OK] in the error dialog.

Error message	RO water Thermistor error
Alarm	Continuous sound
Probable cause	The thermistor used for calculation of electric conductance is malfunctioning or there is a broken connection.
Action	Turn off the instrument power and please contact the Service Department of your local Sysmex representative.
Error recovery condition	-

Error message	RO water Temperature error (high)
Alarm	Intermittent sound
Probable cause	The temperature of the RO water is higher than the stipulated value.
Action	Check the temperature of the supplied RO water.
Error recovery condition	Touch [OK] in the error dialog.

Error message	RO water Temperature error (low)
Alarm	Intermittent sound
Probable cause	The temperature of the RO water is lower than the stipulated value.
Action	Check the temperature of the supplied RO water.
Error recovery condition	Touch [OK] in the error dialog.

Electrical conductance errors

Error message	Reagent electric conductivity error
Alarm	Intermittent sound
Probable cause	A reagent other than CELLPACK DST is being used.
Action	Drain the reagent that is being prepared.
Error recovery condition	Touch [OK] in the error dialog.

Error message	Calibrate Reagent EC meter
Alarm	Intermittent sound
Probable cause	The electrical conductivity meter (reagent) requires calibration.
Action	Please contact the Service Department of your local Sysmex representative.
Error recovery condition	Touch [OK] in the error dialog.

Error message	Warning : RO water quality
Alarm	Intermittent sound
Probable cause	The detected value of the electrical conductance of the RO water is at the warning level.
Action	Check if the RO water being supplied meets the specifications. (➤**P.8-2** "Chapter 8: RO (Reverse Osmosis) water required specification for RO water")
Error recovery condition	Touch [OK] in the error dialog.

Error message	Error : RO water quality
Alarm	Intermittent sound
Probable cause	The detected value of the electrical conductance of the RO water is at an error level.
Action	Check if the RO water being supplied meets the specifications. (➤**P.8-2** "Chapter 8: RO (Reverse Osmosis) water required specification for RO water")
Error recovery condition	Touch [OK] in the error dialog.

Maintenance-related errors

Error message	Replace DP1 soon
Alarm	Intermittent sound
Probable cause	The DP1 replacement time has almost been reached.
Action	If you need to order supplies or replacement parts, please contact your local Sysmex representative.
Error recovery condition	Touch [OK] in the error dialog.

Error message	Replace DP2 soon
Alarm	Intermittent sound
Probable cause	The DP2 replacement time has almost been reached.
Action	If you need to order supplies or replacement parts, please contact your local Sysmex representative.
Error recovery condition	Touch [OK] in the error dialog.

Error message	Replace Filter soon
Alarm	Intermittent sound
Probable cause	The filter replacement time has almost been reached.
Action	If you need to order supplies or replacement parts, please contact your local Sysmex representative.
Error recovery condition	Touch [OK] in the error dialog.

Error message	Replace DP1 now
Alarm	Intermittent sound
Probable cause	The DP1 replacement time has been exceeded.
Action	If you need to order supplies or replacement parts, please contact your local Sysmex representative.
Error recovery condition	Touch [OK] in the error dialog.

Error message	Replace DP2 now
Alarm	Intermittent sound
Probable cause	The DP2 replacement time has been exceeded.
Action	If you need to order supplies or replacement parts, please contact your local Sysmex representative.
Error recovery condition	Touch [OK] in the error dialog.

Error message	Replace Filter now
Alarm	Intermittent sound
Probable cause	The filter replacement time has been exceeded.
Action	If you need to order supplies or replacement parts, please contact your local Sysmex representative.
Error recovery condition	Touch [OK] in the error dialog.

Error message	Replace CELLPACK DST
Alarm	Intermittent sound
Probable cause	1) Insufficient reagent. 2) Inflow path problem.
Action	1) Replace the reagent. Replace the CELLPACK DST. 2) Check the inflow path. Check for bends, looseness, breaks or other problems in the tube for the reagent, and reconnect or replace as needed.
Error recovery condition	1) Touch [OK] in the error dialog. 2) Touch [OK] in the error dialog.

Error message	Replace CELLPACK DST (Chamber empty)
Alarm	Intermittent sound
Probable cause	1) Insufficient reagent. 2) Inflow path problem. 3) Reagent aspiration stopped.
Action	1) Replace the reagent. Replace the CELLPACK DST. 2) Check the inflow path. Check for bends, looseness, breaks, or other problems in the tube for the reagent, and reconnect or replace as needed. 3) Restart reagent aspiration. Reagent aspiration stops while the [Reagent Replacement] screen appears. If the screen is left open, the reagent chamber will empty and reagent preparation will stop. Touch [Cancel] to close the [Reagent Information] screen.
Error recovery condition	1) Touch [OK] in the error dialog. 2) Touch [OK] in the error dialog. 3) Touch [OK] in the error dialog.

Error message	CELLPACK DST has expired.
Alarm	Intermittent sound
Probable cause	The CELLPACK DST has expired.
Action	Replace the CELLPACK DST.
Error recovery condition	Touch [OK] in the error dialog.

Error message	CELLPACK DST has expired.
Alarm	Intermittent sound
Probable cause	The instrument stopped because the CELLPACK DST has expired. If the preparation stop setting of 5.2.6 is [Stop], the main unit stops.
Action	Replace the CELLPACK DST.
Error recovery condition	Touch [OK] in the error dialog.

Communication errors

Error message	HC message format error
Alarm	Intermittent sound
Probable cause	The format of the command received from the host computer was invalid.
Action	Clear the error from the Error List screen.
Error recovery condition	Touch [OK] in the error dialog.

Error message	IPU message format error
Alarm	Intermittent sound
Probable cause	The format of the command received from the IPU was invalid.
Action	Clear the error from the Error List screen.
Error recovery condition	Touch [OK] in the error dialog.

Error message	IPU communication error
Alarm	Intermittent sound
Probable cause	An error was detected in communication with the IPU.
Action	Clear the error from the Error List screen.
Error recovery condition	Touch [OK] in the error dialog.

Other errors

Error message	Shutdown was not executed correctly
Alarm	Intermittent sound
Probable cause	The power was turned off without executing shutdown. Auto rinse starts.
Action	Clear the error from the Error List screen.
Error recovery condition	Touch [OK] in the error dialog.

Error message	Water solenoid valve error
Alarm	Continuous sound
Probable cause	The solenoid valve of the RO water supply unit has failed.
Action	Turn off the instrument power and please contact the Service Department of your local Sysmex representative.
Error recovery condition	-

Error message	Supply tank float switch fail
Alarm	Continuous sound
Probable cause	The supply tank float switch has failed.
Action	Turn off the instrument power and please contact the Service Department of your local Sysmex representative.
Error recovery condition	-

Error message	RO water chamber float switch fail
Alarm	Continuous sound
Probable cause	The RO water chamber float switch has failed.
Action	Turn off the instrument power and please contact the Service Department of your local Sysmex representative.
Error recovery condition	-

Chapter 8 Technical Information

This chapter explains technical information such as specifications and principles.

8.1 Performance/specifications

Specifications of the reagent unit

Power supply	100 - 240 V AC (50/60 Hz)
Protection type	Class I Equipment
Power consumption	Main unit: 120 VA or less Pneumatic unit: 280 VA or less
Ambient temperature	15 to 30°C
Relative humidity	30 to 85%
Ambient air pressure	70 to 106 KPa
Weight	Main unit: Approx. 23 kg Pneumatic unit: Approx. 17 kg
Dimensions	Main unit Width: 300 mm Height: 570 mm Depth: 300 mm Pneumatic unit Width: 280 mm Height: 400 mm Depth: 355 mm

RO (Reverse Osmosis) water required specification for RO water

Electric conductance	1.0 µS/cm or less
Supply pressure	0.2 to 0.4 MPa
Supply volume	10 to 50 L/h
Water temperature	10 to 30°C
TOC	500 ppb or less

Note:

- The pure water which meets the specification above is indicated as RO water in this manual. It does not need to be the water passed through the reverse osmosis membrane.
- "Supply volume" is 4 to 10 L/h only when the optional "ELIX5 WU" water purifier is used. This purifier is available through some of the Sysmex distributors.

Connection specifications

Connectable analyzers	XN-10, XN-20, XE-5000, XE-2100 series, SP-10, SP-1000*i*
Number of analyzers	Up to 3 analyzers: XN-10, XN-20, SP-10 (up to 2 units of SP in case of connecting only SP-10) Up to 2 analyzers: XE-5000, XE-2100 series, SP-10, SP-1000*i*
Maximum length of tubing	15 m (from supply tank to analyzer)

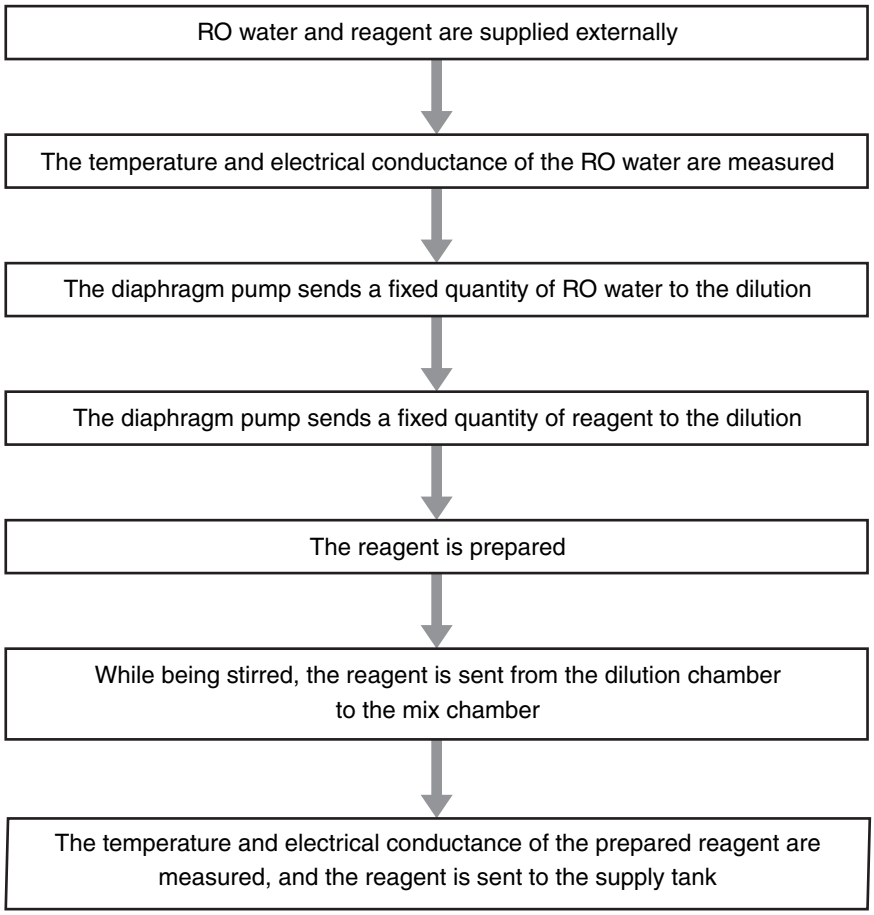
Supply tank specifications

Capacity	Approx. 9 L
Weight	6 kg
Dimensions	Width: 324 mm Height: 215 mm Depth: 387 mm

8.2 Principle

8.2.1 Processing flowchart

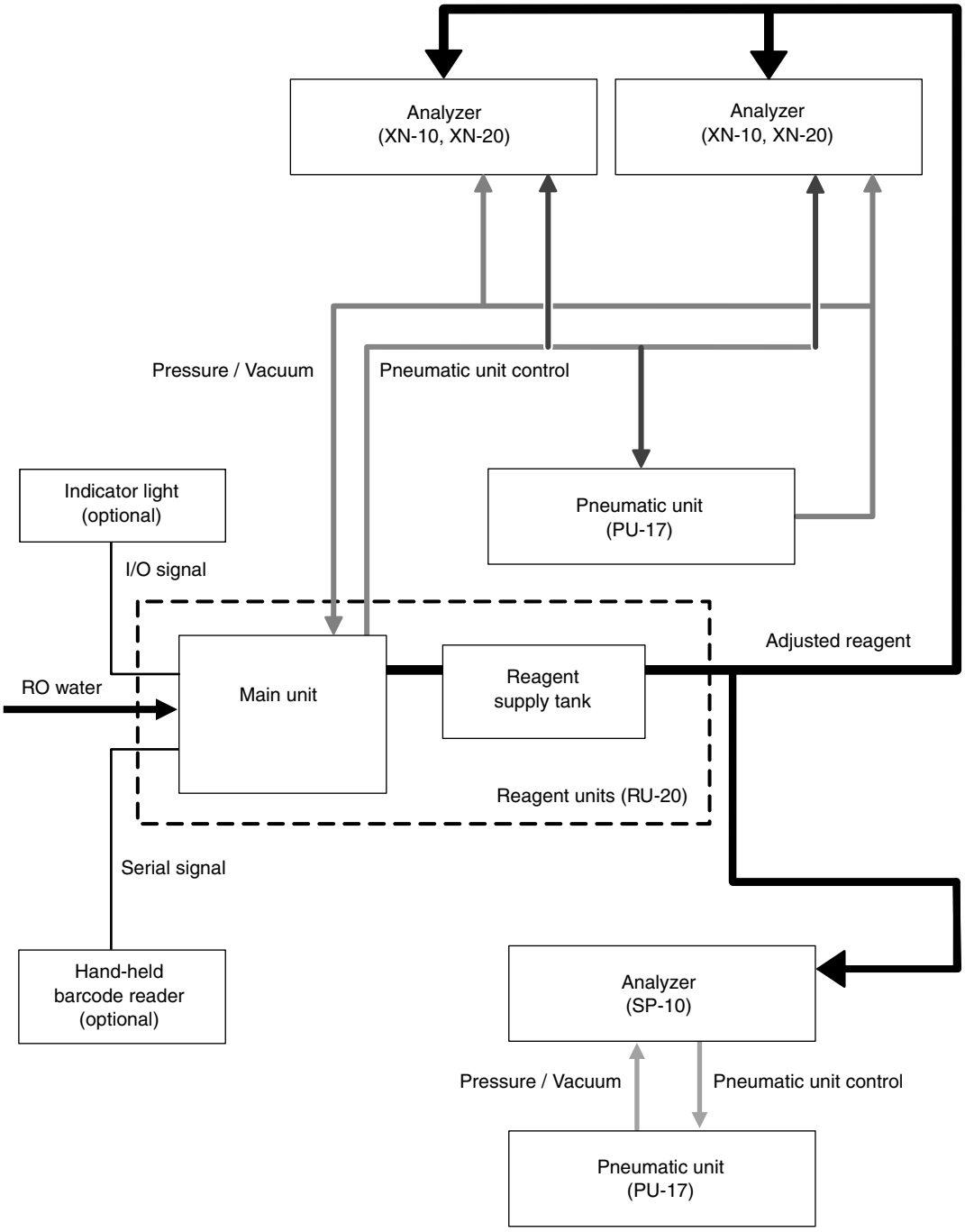
The flowchart below shows the general sequence of processing by the instrument.



8.2.2 Unit connection diagram

The reagent unit consists of the main unit and the pneumatic unit, and can be connected to and used with up to 3 analyzers*. One pneumatic unit can supply pressure to up to three main units*.

* Up to 2 analyzers/main units in case of connecting XE-5000, XE-2100 series, SP-10 and SP-1000*i*



e.g. When connected to XN-10/20 and SP-10

8.3 Unpacking checklist

RU-20 Packages

Part Number	Names	Quantity	
		100 - 120 V*1	220 - 240 V*2
AJ689367	Main Unit Complete RU-20	1	1
AG372479	RU-20 IFU (EN)	1	1
AR297635	Fluid controller_Assy No. 42	1	1
BM144323/ AY820252	Wiring cord_Assy No. 6717 (1.5 m)/ Wiring cord_Assy No. 8361 (1.5 m)	1	1
AU559735	Connecting cord No. 10	1	1
BM080457	Connecting cord No. 11	1	1
CG634748	Connecting cord No. 18	2	2
BF572845	Connecting cord No. 9	2	2
923-8092-8	Power Cord No.15	1	-
265-7153-5	Power Cord TA-6P(A)+TA-5(A) H05VV-F	-	1
BM278135	LAN Cable NSEDT-PC-S-MP4N-5SB568B/AB	1	1
BC214282	PMCD220412 Coupling	2	2
CG902973	Intake Tube_Assy No. 21	1	1
AY247703	Intake Tube_Assy No. 23	1	1
AX880901	Fuse 50T32H	2	2
442-4002-3	Nipple No.122	3	3
442-3431-0	T-Joint No. 21	2	2
442-3429-1	T-Joint No.19	2	2
442-5340-5	Tube Polyurethane 6 mmID x 9 mmOD 70mm	3	3
442-5340-5	Tube Polyurethane 6 mmID x 9 mmOD 13m	3	3
442-5338-7	Tube Polyurethane 4 mmID x 6 mmOD 10m	2	2
442-5338-7	Tube Polyurethane 4 mmID x 6 mmOD 3m	5	5
442-5338-7	Tube Polyurethane 6 mmID x 4 mmOD 30mm	2	2
BK603598	Tube Silicone 3 x 6.5_#9E55 500mm	1	1
266-4461-8	Tie Wrap CV-100	10	10
266-4462-1	Tie Wrap CV-250	5	5

*1 for North America

*2 for Europe

Pneumatic Unit (PU-17)

Part Number	Names	Quantity	
		100 - 117 V*1	220 - 240 V*2
013-3015-4	PU-17 Main Complete (100 - 117 V) (White)	1	-
013-3016-8	PU-17 Main Complete (220 - 240 V) (White)	-	1
923-8092-8	Power Cord No. 15	1	-
265-7153-5	Power Cord TA-6P(A)+TA-5(A) H05VV-F	-	1
266-5011-3	Fuse ST4-4A-N1 (250V4A, Time Lag)	2	-
266-5293-0	Fuse No. 19195 (250V3.15A, Time Lag)	-	2

*1 for North America
*2 for Europe

8.4 Before installation

Your Sysmex representative will install the instrument and peripheral devices, and check initial operation.
If relocation becomes necessary after installation, please contact the Service Department of your local Sysmex representative. Problems resulting from the relocation of the instrument by anyone other than a service representative are not covered by the warranty even if within the warranty period.

8.4.1 Grounding

The instrument must be grounded at the time of installation. If your power outlet is grounded, the power plug can simply be inserted into the power outlet to ground the instrument. If your power outlet is not grounded, use an adapter plug and ground the ground wire. In this case, be sure to verify that the ground wire on the adapter plug and the metal parts of the outlet are grounded.
Proper grounding is extremely important for safe use of the instrument. If you have any questions, please contact the Service Department of your local Sysmex representative.

Warning!
Be sure to ground the instrument.
If improperly grounded, electrical shock may result.

8.4.2 Installation environment

- When moving the instrument, do not subject it to vibration.
- If the ambient temperature or humidity is not suitable, control by air conditioning.
- Use the instrument within a temperature range of 15 to 30°C.
- Water supplied to the instrument must be RO water that meets the specifications.
  (➤**P.8-2** "RO (Reverse Osmosis) water required specification for RO water")

Warning!
Do not use the instrument in an environment other than the specified environment.
This may affect the measurement data.

8.4.3 Installation space

To obtain full performance from the instrument, it is important to install the instrument in a suitable location.

- Select a location near a power source and a suitable drain.
- Allow a clearance of at least 50 cm between the wall and the sides, back, and top panel of the instrument to enable maintenance and servicing, and for heat dissipation.
- Install the pneumatic unit and reagent in a location that is convenient for work.
  The reagent supply tube to the analyzer must not be longer than 15 m.
- Allow a clearance of at least 50 cm from the left side and top of the instrument to the wall and any other obstacles to enable immediate disconnection of the power cord in an emergency.
- If installing on an XN series special cart, contact your local Sysmex representative.

8.5 GNU General Public License

Instrument software

Part of the software used with this product is subject to the GNU General Public License.
If you wish to obtain the source code for or detailed information concerning the part of the software that is subject to the GNU General Public License, please contact the Service Department of your local Sysmex representative.
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Version 2, June 1991

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