Measurement Unit for Automated Dry Chemistry System

SPOTCHEM D-02

SD-4810 | Operating Manual

arkray,inc.

1 Premise

Thank you for purchasing our measurement unit for automated dry chemistry system, the SPOTCHEM D-02 SD-4810.

This manual contains important information on the functions of the SPOTCHEM D-02 SD-4810.

This manual is issued by ARKRAY, Inc.
Read carefully prior to starting up the unit.
It is recommended to retain this operating manual for future use.

The SPOTCHEM D-02 (SD-4810) instrument is intended for the quantitative and automated measurement of several physiological markers in whole blood, serum, and plasma when controlled by the SD-9810 or SD-9811 control units. This instrument is intended for use with SPOTCHEM D reagent strips/plates. Sample types vary depending on reagent. For information about the analyte, the function and the target disease/condition as well as the intended use population, please refer to the reagent instructions for use. For *in vitro* diagnostic use and professional use only.

This product conforms to the EMC Standard IEC61326-2-6:2012(EN61326-2-6:2013).
Class of emission: CISPR 11 Class A
This instrument is an IVD medical instrument.

This product conforms to Regulation (EU) 2017/746.

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

The electromagnetic environment should be evaluated prior to operation of the device. Do not use this device in close proximity to sources of strong electromagnetic radiation, as these may interfere with the proper operation.

2 Introduction

Read this operating manual thoroughly before using the instrument. This operating manual gives an outline of the instrument and the proper procedures for operation and maintenance.
Follow the instructions in this operating manual in order not to defeat the purpose of protective features of the instrument.

If you have had or could have had any serious incident related to the device, please report it directly to the manufacturer or through the authorised representative and to your local regulatory authority.

If you want to obtain information included in this operating manual in a language other than English, contact your distributor.

- **BE CAREFUL WHEN HANDLING BLOOD. This system uses blood as sample. Blood may be contaminated by pathogenic microbes that can cause infectious diseases. Improper handling of blood may cause infection to the user or other individuals by pathogenic microbes.**
- **This instrument is to be operated by qualified persons only. A qualified person is one having adequate knowledge of clinical testing and the disposal of infectious waste. Thoroughly read this operating manual before use.**
- **Never touch the tip case, disposal case, reagent table or other parts where sample may adhere with unprotected hands. During cleaning or maintenance of these parts, wear protective gloves to prevent exposure to pathogenic microbes.**
- **Discard used samples, tips, reagents, cuvettes, units and instruments in accordance with local regulations for biohazardous waste.**
- **For a description of the performance characteristics, reference intervals, warnings and limitations specific to the reagent, refer to the reagent product insert.**

NOTE: This instrument is precision equipment. Be careful when handling it and do not subject it to strong shocks or vibration.

3 Symbols

The following symbols are used in this operating manual and labels on this instrument to call your attention to specific items.
For the meaning of symbols indicated on the labels (including the shipping box) not described below, refer to the leaflet included in the package.

■ For your safety

Follow the instructions given here to prevent exposure to pathogenic microbes.

Follow the instructions given here to prevent injury and property damage.

■ For optimal performance

IMPORTANT: Follow the instructions given here to obtain accurate measurement results.

NOTE: Information useful for preventing damage to the instrument or parts and other important information you should keep in mind.

REFERENCE: Additional explanations that help you make the best use of the instrument and information on related functions.

4 About the Operating Manuals

The following operating manuals are provided with each SPOTCHEM D-Concept instrument.
Read this manual after first reading the “SPOTCHEM D-00 Operating Manual”.

● SPOTCHEM D-00 (operation unit) Operating Manual

First read the “SPOTCHEM D-00 Operating Manual”.

The SPOTCHEM D-00 is an operation unit that can be connected to a measurement unit or existing model for operating and making settings of the connected unit(s). This operating manual describes the necessary operations for and how to make the various settings for taking measurements.

* There is also a 2D code type operation unit, SPOTCHEM D-00 QR. However, both units are described as “D-00” in this manual.

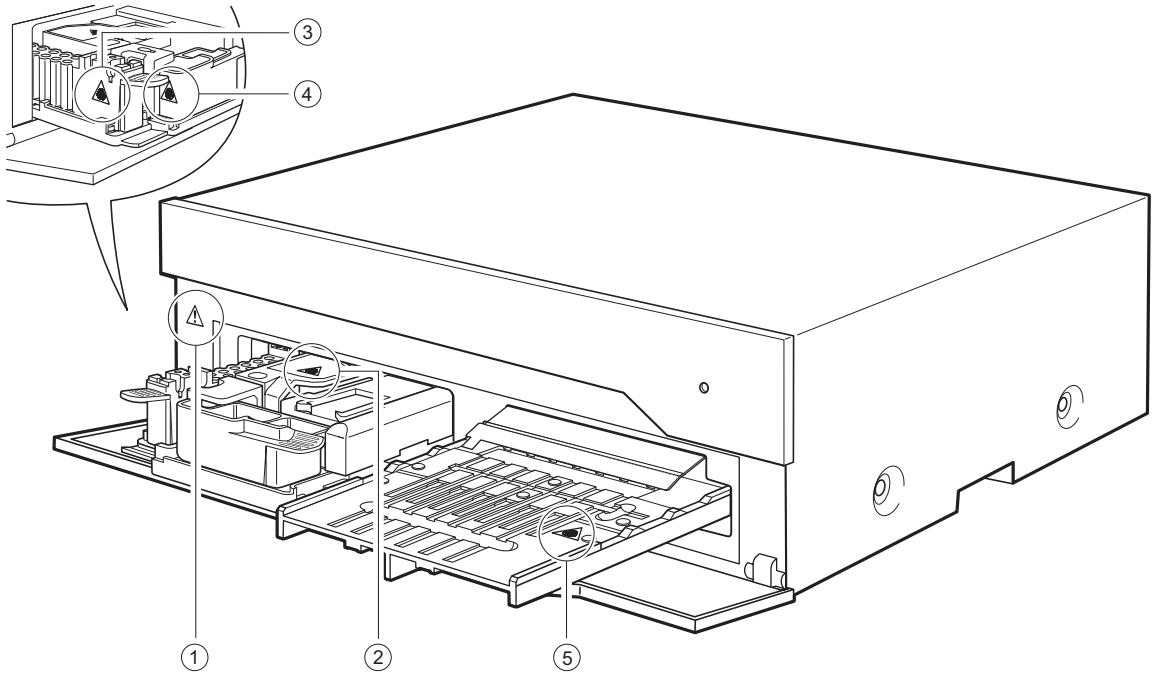
● SPOTCHEM D-02 (measurement unit) Operating Manual (this manual)

The SPOTCHEM D-02 is a measurement unit that uses the SPOTCHEM D single reagent, multiple reagent and electrolyte plate to take various measurements. This operating manual describes the method of measurements and maintenance.

5 Warning and Caution Labels

This instrument has several warning and caution labels on the areas that have potential dangers. Please learn potential dangers warned by each label and observe the precautions described below.

■ Front side



① Inside of the unit

Do not touch the inside of the unit or insert foreign bodies into the inside of the unit. This may damage the unit and result in personal injury. When maintaining the unit, be sure to turn off the power and follow the maintenance procedure.

② Plate table

Do not touch the plate table with unprotected hands. When cleaning or maintaining the unit, or setting the electrolyte plate, wear protective gloves to prevent exposure to pathogenic microbes.

③ Tip case

Do not touch the tip case with unprotected hands. When cleaning or maintaining the unit, or setting a sample or tip, wear protective gloves to prevent exposure to pathogenic microbes.

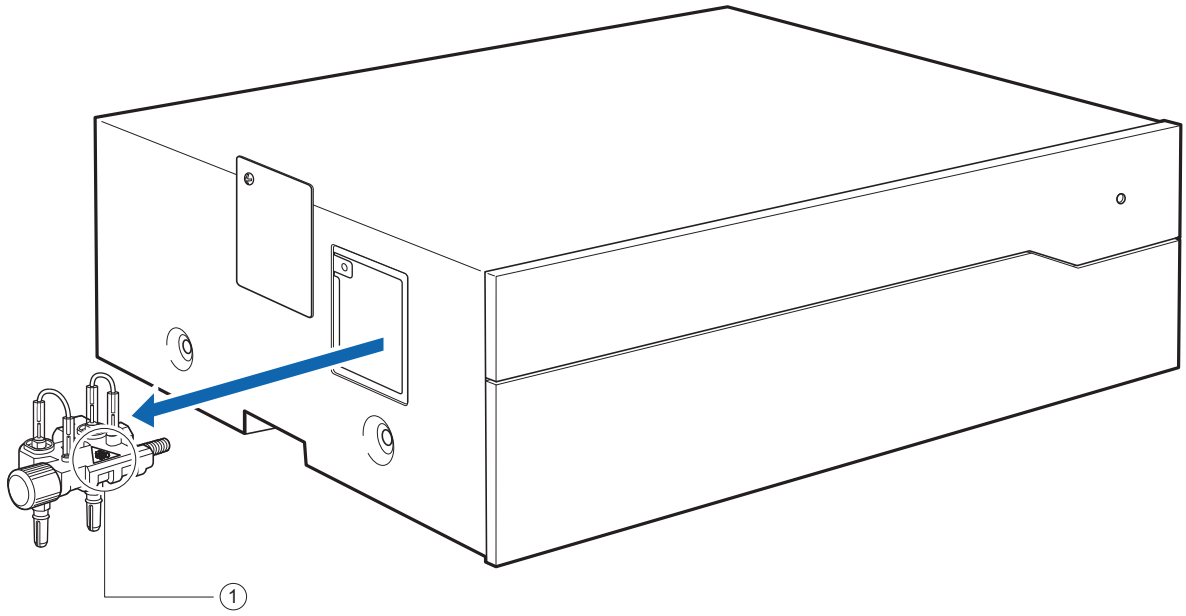
④ Disposal case

The disposal case contains tips and/or electrolyte plates with sample adhering. When disposing of the tips or electrolyte plates, or cleaning the disposal case, wear protective gloves to prevent exposure to pathogenic microbes.

⑤ Reagent table

Do not touch the reagent table with unprotected hands. During cleaning or maintenance of the reagent table, wear protective gloves to prevent exposure to pathogenic microbes.

■ Inside of the unit



① Nozzle maintenance holder

Do not touch the nozzle maintenance holder with unprotected hands. During cleaning or maintenance of the nozzle maintenance holder, wear protective gloves to prevent exposure to pathogenic microbes.

Table of Contents

Chapter 1 Before Use

This chapter describes basic information about taking measurements and the operation of the instrument components.

SPOTCHEM D-Concept

1-1 Overview

1-1-1 Features

● Unit designing

The operation unit and measurement units are provided as separate units, thereby enabling you to combine the required measurement units for an optimal system configuration.

● Automatic sample application

Samples are automatically deposited and dispensed by the unit. User pipetting operations are not required and samples can be dispensed without fluctuations, thereby yielding stable measurement results.

● Lot calibration

Calibrations can be performed reading the 2D code (Reagent Info.) printed on the product box of a reagent. Simply scan the 2D code with the 2D code reader that comes with the operation unit and the reagent lot-to-lot difference and variation per day are automatically calibrated.

1-1-2 Specifications

SPOTCHEM D-02 (SD-4810)

Item	Specifications
Configuration	Instrument, accessories
Measurement objects	Single/multiple reagent: Serum, Plasma Electrolyte plate: Serum, Plasma, Whole blood
Reagent	SPOTCHEM D single reagent SPOTCHEM D multiple reagent SPOTCHEM D electrolyte plate
Measurement parameter	Listed in package insert of reagent
Measurement range	Listed in package insert of reagent
Measurement principle	Single/multiple reagent: Endpoint method and reaction rate method using dual wavelength reflectance photometry Electrolyte plate: Potentiometric method using ion-selective electrode (ISE)
Measurement wavelength	405 nm, 550 nm, 575 nm, 610 nm, 820 nm
Number of reagents measurable at once	6 single reagents 1 multiple reagent 1 electrolyte plate
Measurement time	Approximately 18 minutes to measure 1 multiple reagent and 6 single reagents Approximately 4 minutes to measure an electrolyte plate
Sample consumption	Biochemical measurement: Approximately 6 µL per item Electrolyte measurement: Approximately 22 µL
Required sample volume	30 µL + sample consumption volume per measurement
Sample container	SPOTCHEM D cuvette (for D-Concept only)
Number of measurable samples	1 sample
Startup time	Approximately 8 minutes (at a room temperature of 25°C)
Measurement environment	Temperature: 10 to 30°C Humidity: 20 to 80% RH (no condensation)
Storage environment	Temperature: 1 to 30°C Humidity: 20 to 80% RH (no condensation)
Environment during transport	Temperature: -10 to 60°C Humidity: 20 to 80% RH (no condensation)
Dimensions	408 (W) × 330 (D) × 132 (H) mm
Weight	Approximately 10 kg
Supply voltage (Instrument)	DC 24 V, 2 A (supplied from operation unit)
Sound pressure level	80 dB
Location of use	Indoor use only
Altitude	2,000 m
Pollution degree	2
Over voltage category	II
Expected life	5 years (according to company data)*1

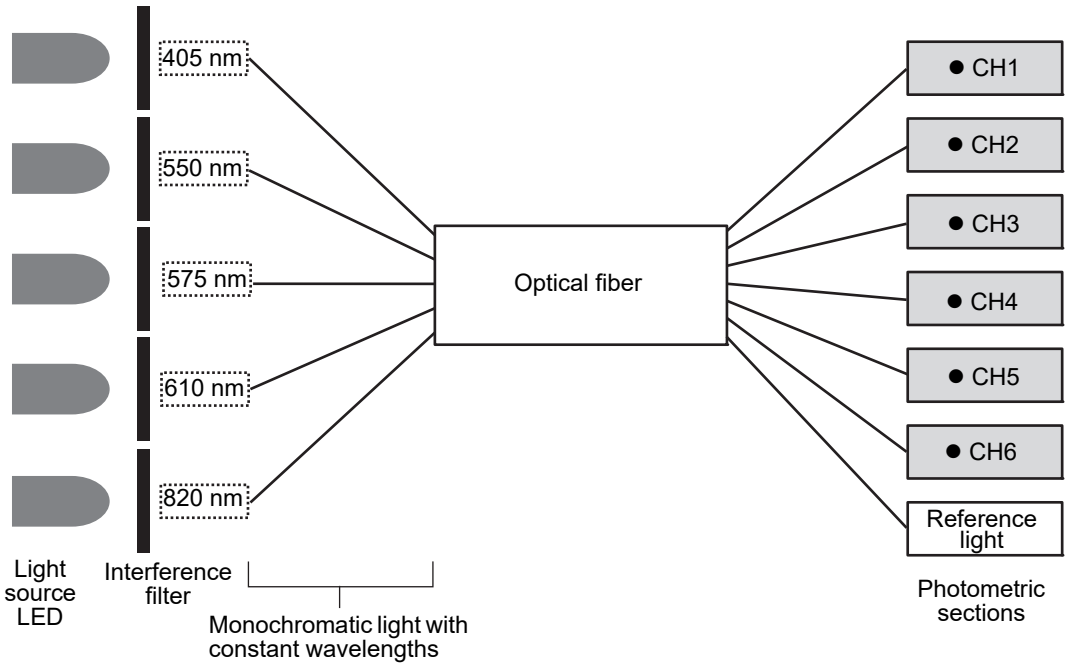
*1: The manufacturing date is included in the serial number as shown below.

- 2nd and 3rd digits of the serial number: The last 2 digits of the manufacturing year
- 4th and 5th digits of the serial number: The manufacturing month

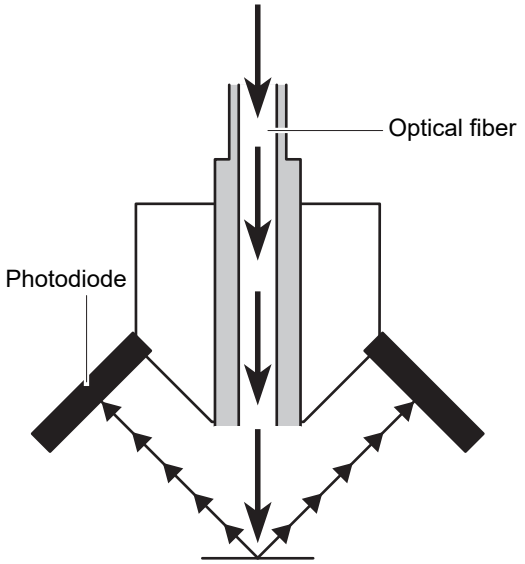
1-1-3 Measurement Principle

■ Single/multiple reagent

Light from the light source LED passes through the interference filter and becomes monochromatic light with constant wavelengths. There are five wavelengths in total and the optimal wavelength is chosen based on the measurement parameter. Monochromatic light is separated into seven wavelengths by optical fiber, with one wavelength transmitted to the photometric section of the reference light and the other six wavelengths transmitted to the photometric section of each measurement CH.



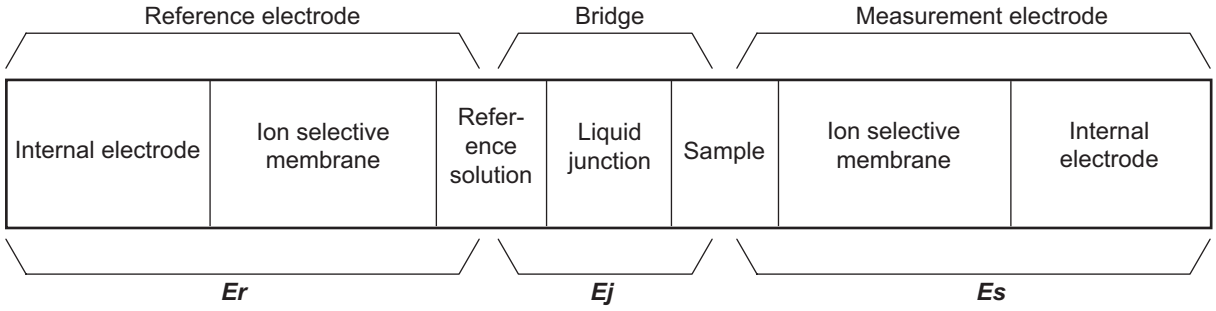
At the photometric sections of each measurement CH, the monochromatic light output from the optical fiber shines on the reagent pad to which a sample is dispensed and reacted and the reflected light is read by two photodiodes. The read reflected light is numerically converted by the A/D converter and used for computations.



■ Electrolyte plate

Electrolyte measurement enables measurement of various types of ion concentrations in the sample with the potentiometric method using ion-selective electrodes (ISEs) as the basic principle.

The ISEs used for electrolyte measurement have the following configuration.



The reference electrode and measurement electrode use an ISE with exactly the same structure.

The reference solution is measured with the reference electrode and the reference electrode potential ***Er*** can be obtained. Meanwhile, the target ion in the sample is measured with the measurement electrode and the measurement electrode potential ***Es*** can be obtained.

A liquid junction is provided between the reference solution and sample, thereby the measurement electrode ***E*** between the reference electrode and measurement electrode can be obtained.

The Nernst's equation can be expressed between the potential generated by the ISE and the ionic activity (ion concentration) and the ion concentration can be obtained by measuring the potential difference ***E***.

$$E = Es - Er + Ej$$

$$E = \frac{2.303 \cdot RT}{zF} (\log(a_S) - \log(a_r)) + Ej$$

$$E = \frac{2.303 \cdot RT}{zF} \cdot \log(a_S) + Eo$$

Where ***Es***: Potential generated by ionic activity in the sample

Er: Potential generated by ionic activity in the reference solution (constant)

Ej: Liquid junction potential (constant)

Eo: $Ej - \frac{2.303 \cdot RT}{zF} \cdot \log(a_r)$ (constant)

a_S: Ionic activity in the sample

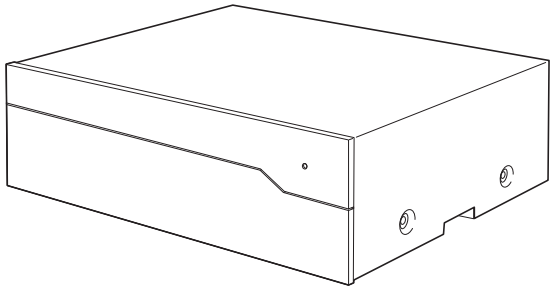
a_r: Ionic activity in the reference solution (constant)

1-2 Unpacking

The following items are included with this instrument. Check that all of these items are included. If any items are missing or defective, please contact your distributor.

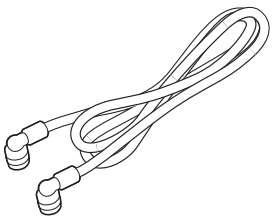
> **NOTE:** The following items are not included with the instrument:
> cuvettes (including cuvettes with gray caps and cuvettes with green caps), single reagents, multi reagents, electrolyte plates, control, magnetic card for calibration, 2D code for calibration, distilled water, soft cloth, 70% isopropyl alcohol, protective gloves, and gauze
>
> Note that the items not included in the package are underlined in this manual.

1-2-1 Instrument

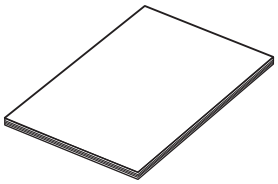


Items included	Description	Quantity
Instrument	SPOTCHEM D-02	1

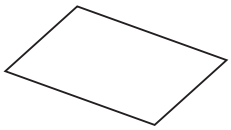
1-2-2 Accessories



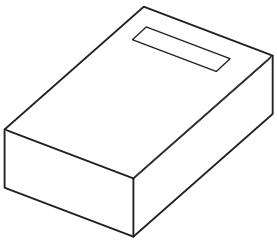
① Connecting cable



② Operating manual



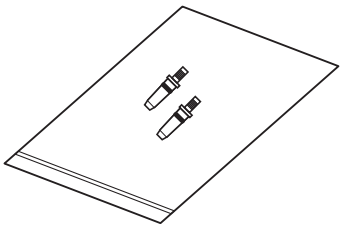
③ List of errors/troubles



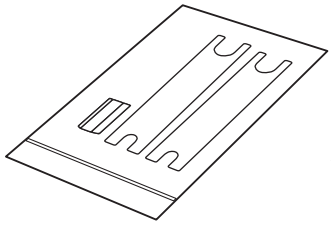
④ Accessories packing box

Item No.	Items included	Description	Quantity
①	Connecting cable		1
②	Operating manual		1
③	List of errors/troubles		1
④	Accessories packing box		1

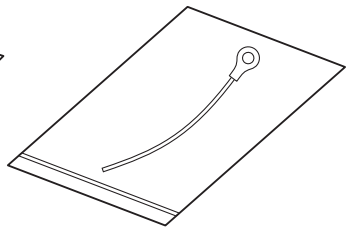
1-2-3 Accessories Packing Box



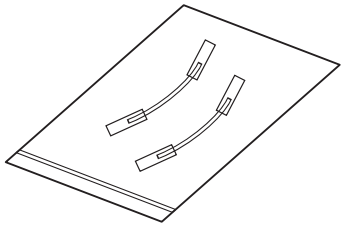
① Nozzle set



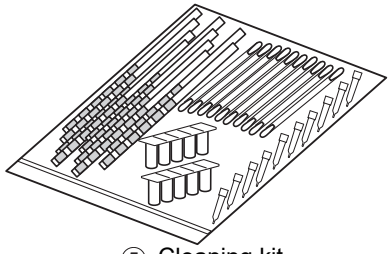
② Wrench set for replacing nozzle



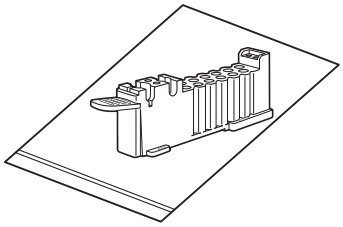
③ Cleaning wire



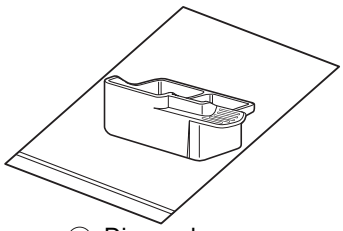
④ Nozzle tube



⑤ Cleaning kit



⑥ Tip case

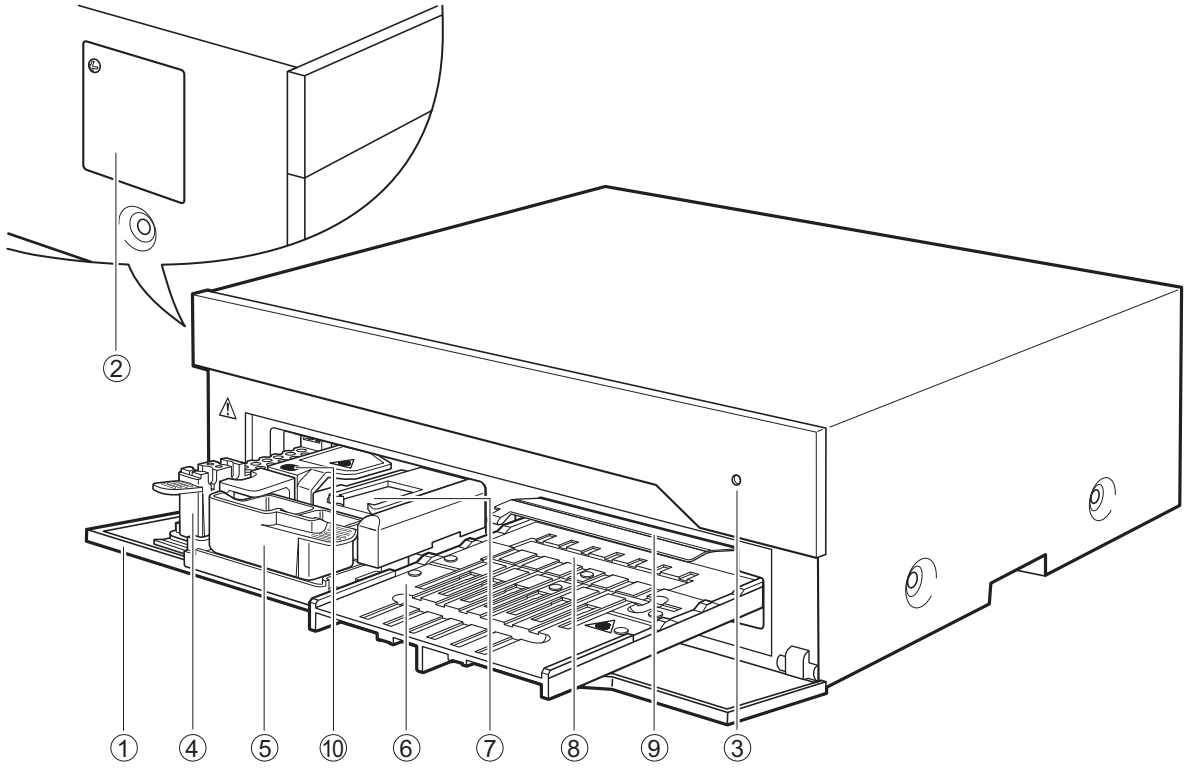


⑦ Disposal case

Item No.	Items included	Description	Quantity
①	Nozzle set	2 nozzles with O-rings	1
②	Wrench set for replacing nozzle	2 wrenches, 1 adapter	1
③	Cleaning wire	For cleaning nozzle	1
④	Nozzle tube	2 replacement nozzle tubes	1
⑤	Cleaning kit	10 cotton swabs, 2 sets of 5 containers, 10 pieces of cleaning paper, 10 tips	1
⑥	Tip case		1
⑦	Disposal case		1

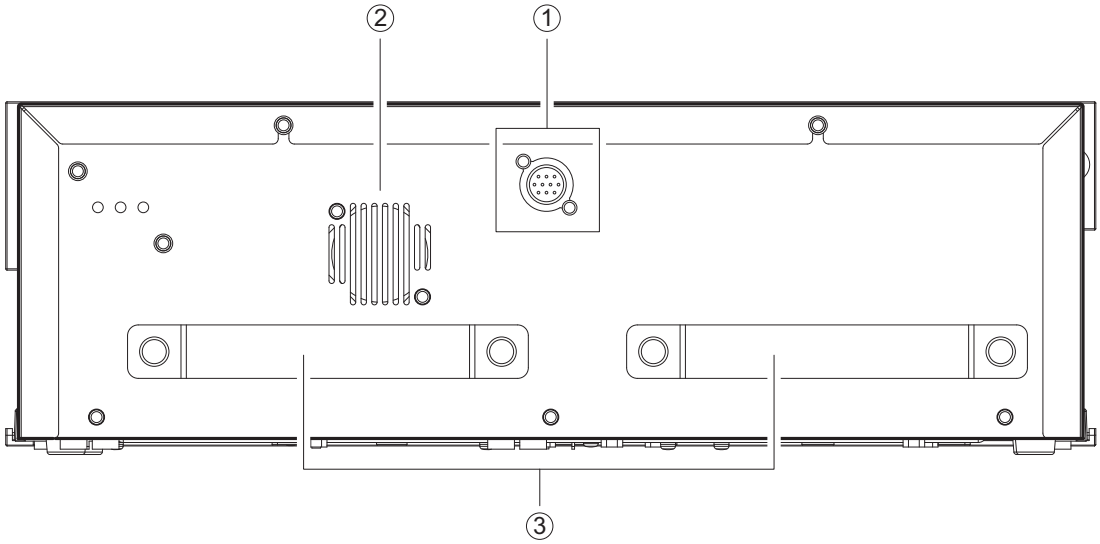
1-3 Part Names and Functions

1-3-1 Front Side of Instrument



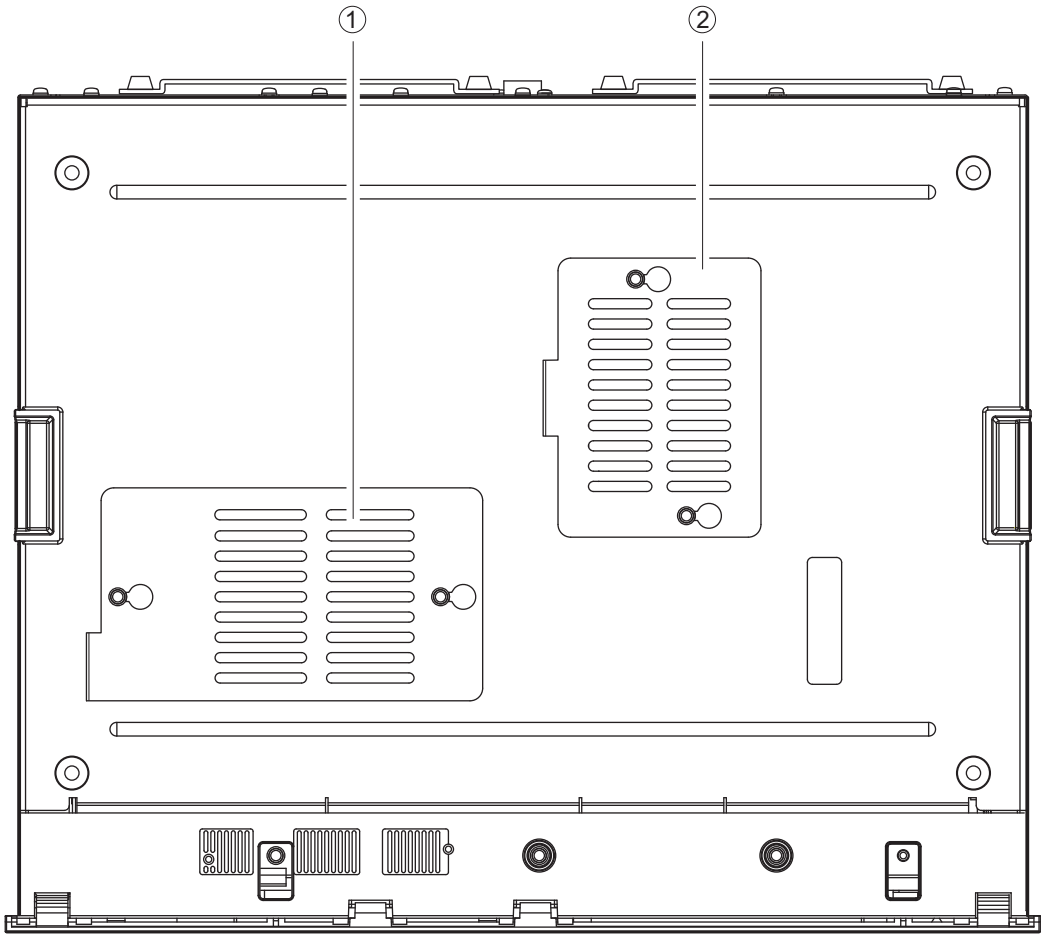
Item No.	Name	Function
①	Front cover	Prevents incoming ambient light. Opens when the reagent table and plate table extend toward you.
②	Maintenance cover	Can be opened to clean or replace the nozzle.
③	Status indication LED	Indicates the operation status of the instrument. White steady light: Startup process Blue steady light: Standby status Blue blinking light: Measuring Blue blinking light (fast): Front cover opening up Red blinking light: Error status
④	Tip case	Used to set the measurement tips and cuvette and the reference solution.
⑤	Disposal case	Used tips and electrolyte plates are put.
⑥	Reagent table	Used to set a single/multiple reagent.
⑦	Plate table	Used to set the electrolyte plate.
⑧	White/black plate	Reflectance plate used as the baseline for reflectance measurement. Used to measure a single/multiple reagent.
⑨	White/black plate cover	Protects the white/black plate.
⑩	Rubber plate	Used for pressure test of the nozzle piping. Also cleans the nozzle tip.

1-3-2 Rear Side of Instrument



Item No.	Name	Function
①	Operation unit connecting terminal	Connects the operation unit using a connecting cable.
②	Cooling fan	Expels warm air from inside the unit to prevent overheating.
③	Fixing brackets	Used to fix this unit to another unit.

1-3-3 Bottom of Instrument

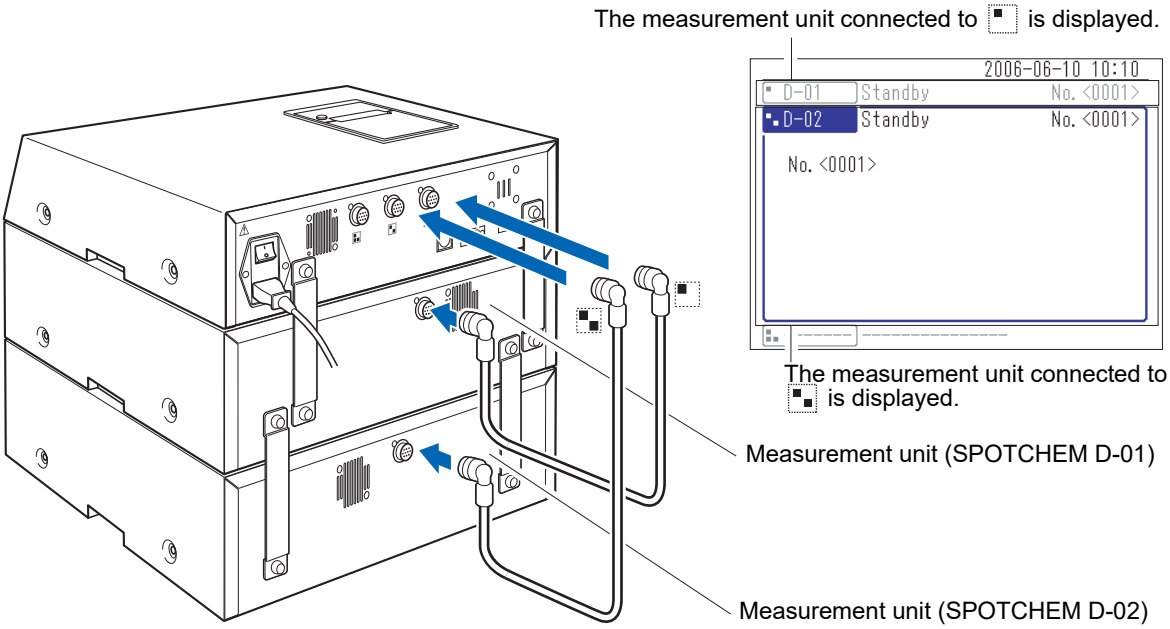


Item No.	Name	Function
①	Photometric section cover	Open this cover for cleaning the photometric window or removing the fixtures during installation.
②	Electrolyte measurement section cover	Open this cover for removing the fixtures during installation.

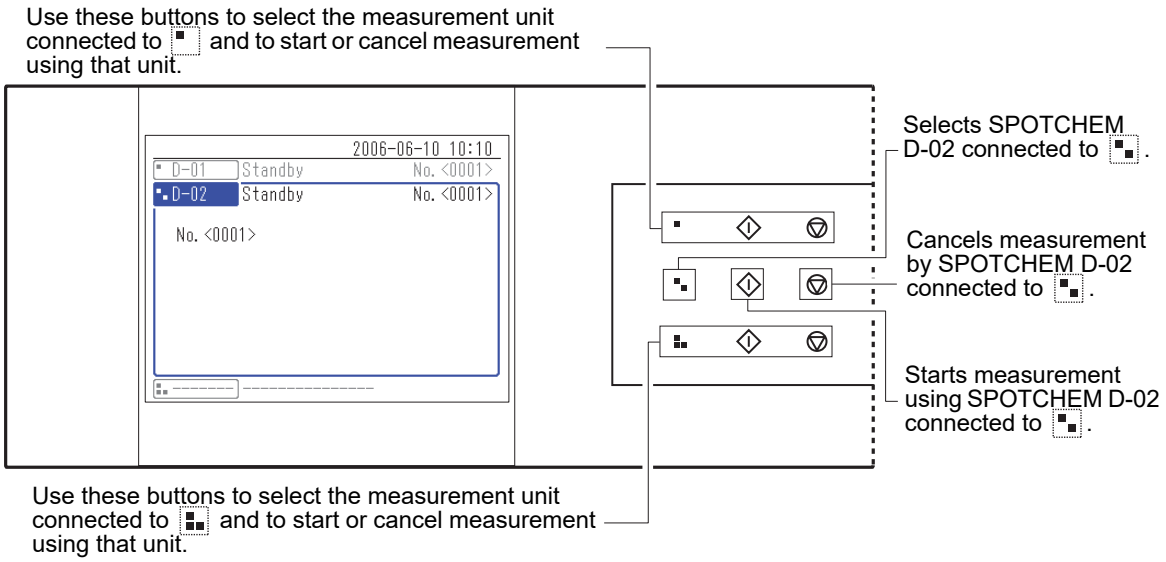
1-4 Measurement Unit Connection and Display

The connecting terminals ( ) on the rear side of the operation unit connected to a measurement unit (or existing model) correspond to the buttons on the operator panel. The on-screen position of the measurement unit connected to the operation unit is determined by the connected terminals.

The following shows an example of SPOTCHEM D-01 connected to and SPOTCHEM D-02 connected to on the operation unit. The relationship between the connected terminals and the on-screen positions of the measurement units is as follows:



To operate a connected measurement unit (or existing model), press the buttons on the operator panel corresponding to that unit.
The following is an example of using the button.



1-5 Installation

1-5-1 Precautions for Installation

Before installing the instrument, read the following items and always take proper safety precautions.

Install the instrument under the supervision of a serviceperson.

- Determine a location for the instrument and assemble it in that location.
  Do not move the instrument with the operation unit or other measurement unit connected. Separate the operation unit and other measurement units from the instrument before moving it. For safety reasons, always transport the instrument with both hands holding handles.
- During installation, be careful not to get your hands trapped under the instrument.
- Install the rear side of the instrument at least 20 cm away from walls. Inadequate clearance between the instrument and wall may cause overheating of the instrument or undesirable load on cable connections, thus resulting in fire or incorrect measurement results.
- Install the left side of the instrument (as seen from the front of the instrument) at least 20 cm away from walls. Inadequate clearance between the instrument and walls may prevent cleaning of the nozzle and other maintenance.
- Use the fixing brackets on this instrument to fix the instrument to the operation unit and other measurement units. Failure to do so may cause the instrument to fall due to strong external forces or vibrations resulting in damage to the instrument and personal injury.
- Install the instrument where temperature and humidity can be maintained in the following ranges.
  Temperature: 10 to 30°C
  Humidity: 20 to 80%
  Installation in the measurement environment outside these ranges may result in incorrect measurement results.
- Install the instrument on a level, vibration-free sturdy platform. Operation of the instrument in an unstable place may cause trouble or malfunction of the instrument resulting in personal injury. **Do not** install the instrument where it may fall or topple over.
- **Do not** install the instrument near places that store chemicals, near equipment that generates corrosive gas or electrical noise, or near areas that may affect the temperature or humidity of the instrument, as this may cause malfunction of or damage to the instrument and consequently lead to personal injury, or may otherwise cause incorrect measurement results.
- Install the instrument in a place to avoid direct sunlight, condensation or wind. These factors may cause incorrect measurement results, as well as deformation of or damage to the instrument.
- Use only the connecting cable supplied with the instrument to avoid electric shock and fire when connecting the instrument to the operation unit.
- **Do not** disassemble the instrument unless required for installation. **Do not** modify the instrument. Disassembly and modification of the instrument may result in exposure to pathogenic microbes or cause fire or damage to the instrument and consequently lead to personal injury.
- If you need to disassemble the instrument after use, wear protective gloves to prevent exposure to pathogenic microbes.
- The front cover of the instrument opens during startup and measurement. **Do not** place anything within 15 cm of the front cover, as this may damage the instrument.

1-5-2 Precautions for Moving the Instrument

When moving the instrument, read the following items and always take proper safety precautions.

- Be sure that the operation unit and other measurement units are not connected to the instrument.
- Move the instrument with the front cover closed. Moving the instrument with the front cover open may result in exposure to pathogenic microbes or cause damage to the instrument.
- Be sure that no reagent, tip or sample is left in the instrument before moving it. Moving the instrument with reagent, tip or sample left in it may result in diffusion of pathogenic microbes in the instrument.
- Hold the handles with both hands and be careful not to apply any shock or vibration to the instrument while moving it. Failing to do so may damage the instrument.
- To transport the instrument, pack it in the same conditions as when it is delivered, with fixing tapes and fixtures in place.

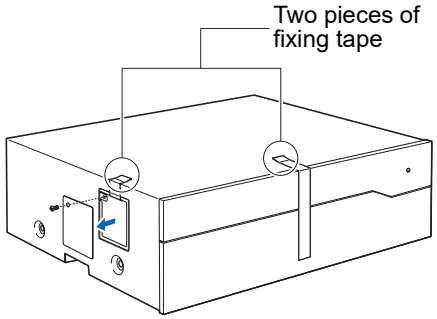
1-5-3 Before Installing the Instrument

Before installing the instrument, remove any fixing tape or fixtures on the parts of the instrument.

① Remove the maintenance cover using the Phillips screwdriver supplied with the operation unit.

② Remove the two pieces of fixing tape shown in the diagram on the right.

③ Attach the maintenance cover.

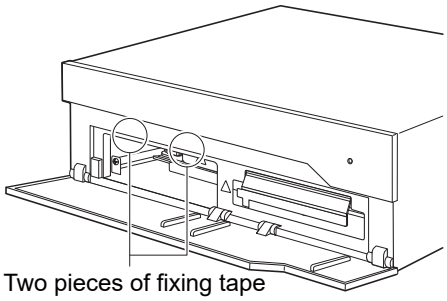


④ Open the front cover by hand.

⑤ Remove the two pieces of fixing tape inside the unit.

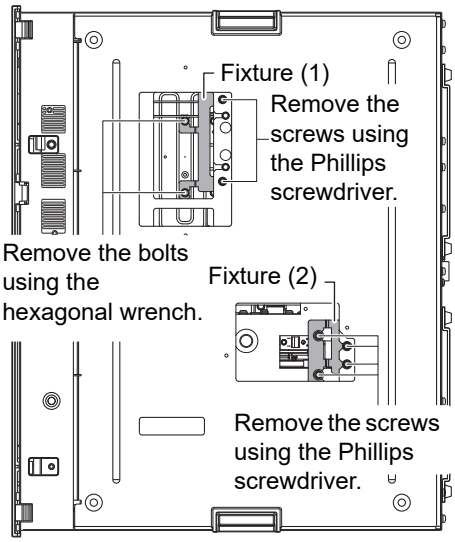
⑥ Facing the instrument, lift the right side of the instrument and remove the photometric section cover and electrolyte measurement section cover using the Phillips screwdriver.

⑦ Remove fixtures (1) and (2) using the Phillips screwdriver and hexagonal wrench.



NOTE: Be careful not to drop the screws inside the instrument when removing.

⑧ Attach the photometric section cover and electrolyte measurement section cover.



1-5-4 Fixing the Instrument

① Use the fixing brackets on this instrument to fix this instrument to the operation unit and other measurement units.

REFERENCE: For details, see “1-6-3 Fixing the Instrument” in the “SPOTCHEM D-00 Operating Manual”.

1-5-5 Connecting the Instrument

① Check that the main switch of the operation unit is in the OFF position.

② Use the connecting cable to connect the operation unit connecting terminal on this instrument to the measurement unit connecting terminal on the operation unit.

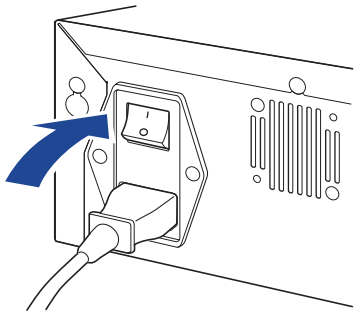
REFERENCE: For details, see “1-6-4 Connecting the Instrument” in the “SPOTCHEM D-00 Operating Manual”.

1-5-6 Starting the Instrument

Press the ⏻ button on the operation unit to start the instrument.

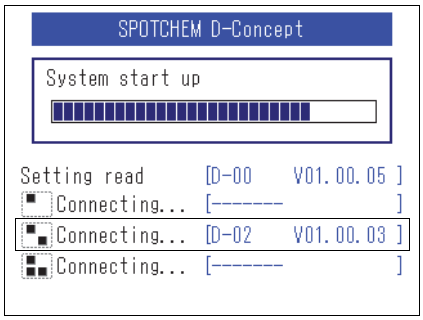
NOTE:
- Before pressing the ⏻ button, check that maintenance cover is attached. If the maintenance cover is not attached, a W-2001 warning occurs.
- Before pressing the ⏻ button, check that the area in front of the front cover is clear. The front cover of the instrument may open during the startup process and any objects placed in front of the front cover may interfere with operations.

① Set the main switch on the operation unit to the ON position.



② Press the ⏻ button. The status indication LED on the operation unit lights blue.

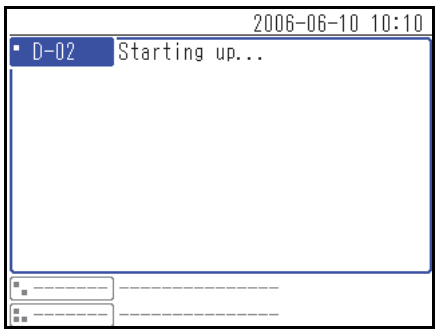
③ The message “System start up” and the connection status of the measurement units are displayed on the screen.



REFERENCE: Check that “D-02” is displayed on the [System start up] screen.

The status indication screen is displayed.

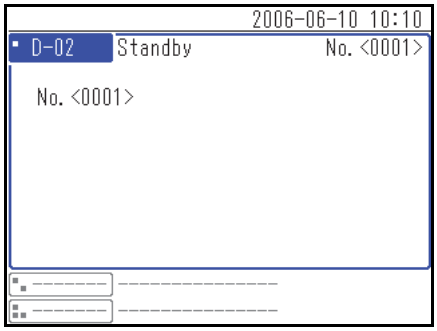
During the startup process, the status indication LED lights white.



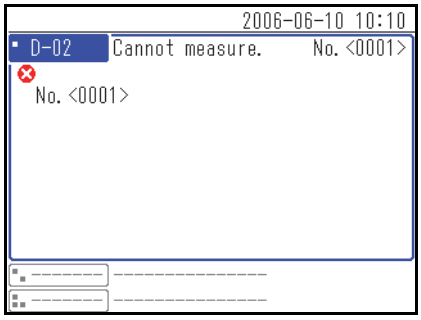
REFERENCE: You cannot operate the instrument menus while the instrument is starting up. (The menu is grayed out.) Wait until the instrument reaches standby. The startup process takes approximately 8 minutes.

Check that the instrument is in standby.

The status indication LED changes from white to blue.



NOTE: If a warning or error occurs during the startup process, the message “Cannot measure.” may be displayed. This indicates that the instrument cannot perform measurement operations. See “Chapter 4 Troubleshooting” (page 4-1) for possible solutions.



1-5-7 Shutting Down the Instrument

① Check that the instrument is in standby and then press and hold the ⏻ button for at least 3 seconds. The power turns off.

REFERENCE: If you will not perform measurement operations for a long period of time, turn off the main switch of the operation unit.

1-6 Measurement Precautions

This section describes the measurement precautions. Before using this instrument for the first time, be sure to read all the precautions listed here.

1-6-1 Precautions for Operation

- **This instrument is to be operated by qualified persons only. A qualified person is one having adequate knowledge of clinical testing and the disposal of infectious waste. Thoroughly read this operating manual before use. Anyone who operates the instrument for the first time must be assisted by a trained person.**
- **Never touch the nozzle, tubing or other parts where sample may adhere with unprotected hands. During cleaning or maintenance of these parts, wear protective gloves to prevent exposure to pathogenic microbes.**
- **Discard used samples, tips, reagents, cuvettes and units in accordance with local regulations for biohazardous waste.**

- **Read "1-5-1 Precautions for Installation" (page 1-13) and ensure that the instrument is installed in a proper environment before turning on the power.**
- **Do not place a collection cup or any other vessel containing a sample or other liquid on the unit. The sample or other liquid can get inside the instrument and damage the instrument.**
- **Any vibration during measurement may cause a malfunction and prevent accurate measurement.**
- **Do not place anything in front of the front cover as this may prevent the cover from opening and damage the instrument.**
- **Be sure to clean and wash the specified components of the instrument to maintain measurement quality. For more details, see "3-3 Maintenance" (page 3-5).**
- **If you detect an abnormal odor or noise, immediately turn OFF the power and unplug the power cord. Continuing operation in such conditions may result in fire or damage to the instrument and consequently lead to personal injury.**
- **If the instrument malfunctions, contact your local distributor for repair. Unauthorized servicing or modification can damage the instrument and consequently lead to personal injury.**

1-6-2 Precautions for Handling Samples

- **BE CAREFUL WHEN HANDLING BLOOD. This system uses blood as sample. Blood may be contaminated by pathogenic microbes that can cause infectious diseases. Improper handling of blood may cause infection to the user or other individuals by pathogenic microbes.**
- **Discard used samples, tips, reagents, cuvettes and parts in accordance with local regulations for biohazardous waste.**

● See the package insert.

The handling of samples differs for each reagent used for measurement. Be sure to follow the package insert supplied with the reagent.

1-6-3 Precautions for Handling Reagents

● Use the reagent designed for this instrument.

Use a SPOTCHEM D single/multiple reagent or electrolyte plate. Read the package insert supplied with the reagent.

● Allow the reagent to return to room temperature before measurement.

Before measurement, remove the reagent from the refrigerator and allow it to reach the environmental temperature for measurement (10 to 30°C). Measurement of the reagent without allowing the reagent to return to the environmental temperature for measurement may lead to incorrect measurement results.

● Check the reagent before measurement.

Do not use expired reagents and reference solutions. Also, do not use reagents whose reagent pads are discolored even before the expiration date because this may lead to incorrect measurement results.

● Do not touch the reagent pad.

Do not touch the reagent pad of the single/multiple reagent. Touching the reagent pad with unprotected hands may leave sebum on the reagent pad and consequently lead to incorrect measurement results.

● Do not reuse a reagent or reference solution.

Do not reuse a single/multiple reagent, electrolyte plate, or reference solution as this may lead to incorrect measurement results.

1-6-4 Precautions for Handling Tips

● Do not touch the tip end with unprotected hands.

Do not touch the tip end with unprotected hands. The tip end may become dirty and consequently lead to incorrect measurement results.

● Do not reuse the tip.

Tip is for single-use only. The tip has a water repellent finish that may come off when washed and consequently lead to incorrect measurement results.

Chapter 2 Measurement

This chapter describes the methods for normal measurement and calibration.

2-1 Before Measurement

This section explains what you need to know before you begin measurements with this instrument.

2-1-1 Lot calibration

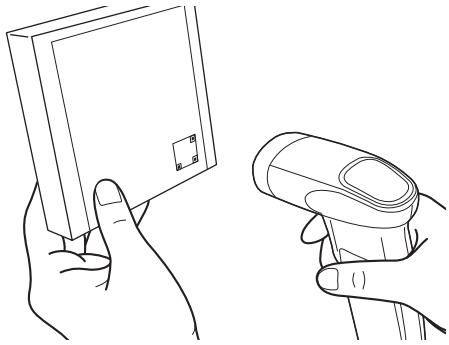
2D code (Reagent Info.) is printed on the product box of a reagent. When you use a reagent of a new lot, scan the Reagent Info. with the 2D code reader connected to the operation unit to input the reagent lot information and automatically calibrate the lot-to-lot difference and variation per day.

IMPORTANT: When using a reagent of a new lot, read the Reagent Info. before measurements.

① Check that the instrument is in standby.

② Scan the Reagent Info. with the 2D code reader.

③ After the Reagent Info. has been read, the input information is temporarily displayed. Then, the status indication screen is displayed.



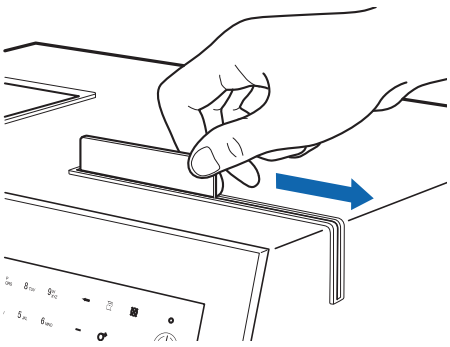
When using the SD-9810 operation unit, follow the instructions described below.

Each reagent comes with a magnetic card called a “lot card”. When you use a reagent of a new lot, swipe the lot card through the magnetic card reader to input the reagent lot information and automatically calibrate the lot-to-lot difference and variation per day.

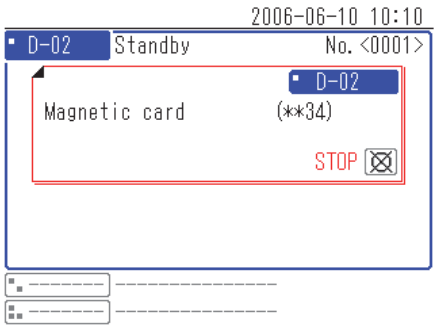
IMPORTANT: When using a reagent of a new lot, swipe the lot card supplied with the reagent through the magnetic card reader on the operation unit before measurements.

① Check that the instrument is in standby.

② Insert the lot card into the magnetic card reader with the magnetic stripe down and slide the lot card to the right.



REFERENCE: You can swipe the magnetic stripes in any order. You can start with any stripe.
If a stripe has already been read, an asterisk [*] is displayed on the screen.



③ After all magnetic stripes of the lot card have been read, magnetic card calibration has been completed. Then, the status indication screen is displayed.

2-1-2 Measurement Types

There are two types of measurement: normal measurement and calibration measurement.

However, due to the discontinuation of the calibrator kit, calibration measurement is no longer available. Please do not use the related menu operations.

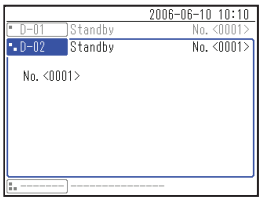
2-1-3 Measurement Procedures

The measurement procedures are shown in the following flowchart.
Use similar procedures when measuring quality control samples.
For details on quality control samples, contact your local distributor.

Instrument startup

Set the main switch on the operation unit to the ON position and press the button.

Status indication screen



Pre-measurement checks

Perform as necessary before measurement.
- Enter the measurement number and sample ID.
- Set the sample type and patient type.
- Check that the printer has printing paper.
- Check that the date and time are correct.
- Read the Reagent Info.

Press the button.

Measurement preparations

① Remove the tip case and place the tips in the tip port.
② Place a cuvette in the sample port and place a reference solution in the reference solution port.
③ Attach the tip case.
④ Place a single/multiple reagent on the reagent table.
⑤ Place an electrolyte plate on the plate table.

Start measurement

Press the button.

Check the measurement results

① The measurement results are displayed on the screen.
② The measurement results are printed.

To continue measurement

End measurement

① Detach the disposal case and dispose of the used tips and electrolyte plates.
② Attach the disposal case.
③ Detach the tip case and dispose of the used cuvette and reference solution.
④ Attach the tip case.
⑤ Dispose of the used reagent.

Press the button.

Status indication screen

To end measurement

Maintenance

Daily cleaning

2-2 Measurement Preparations

This section explains the preparations required prior to measurement.
Please note that the underlined parts are not included in the package. Prepare them separately.

2-2-1 Instrument Checks

This explains the items to be checked after the instrument has started.

■ Check the printing paper

Check that there is sufficient printing paper in the printer on the operation unit. If both ends of the paper have a red line, replace the printing paper referring to “5-2 Setting the Printing Paper” in the “SPOTCHEM D-00 Operating Manual”.

■ Check the date and time

Check that the date and time displayed at the top right of the screen are correct. If the date and time settings are incorrect, correct measurement results may not be obtained.
Adjust the date and time referring to “4-5-1 Clock Adjustment” in the “SPOTCHEM D-00 Operating Manual”.

2-2-2 Preparing the Sample

Place the sample into the cuvette (sample container) for measurement. Use the correct cuvette for the sample to be tested. Please note that the measurement items are subject to additions or changes in the future. Please read the package insert supplied with each reagent for information on handling the sample.

Wear protective gloves to prevent exposure to pathogenic microbes. Do not hold the cap of a cuvette containing a sample. The cuvette may fall and the sample inside may leak out. Always carry sample in a cuvette by the body.

IMPORTANT: Remove any bubbles or film from the liquid surface of the sample. Otherwise, inaccurate results may be obtained.

Reagent type	Cuvette to use	Sample Type Mode	Required sample volume
Single reagent Multiple reagent	Cuvette with gray cap	Serum or plasma	6 µL × number of measurement items + 30 µL
	Cuvette with green cap (centrifuge sample with an external centrifuge)	plasma	530 µL
Electrolyte plate	Cuvette with gray cap	Serum or plasma	52 µL
	Cuvette with green cap	Whole blood	530 µL

NOTE: The required sample volume when simultaneously measuring a single/multiple reagent and an electrolyte plate is 6 µL × number of measurement items + 22 µL + 30 µL.
6 µL × number of measurement items: Sample consumption for single/multiple reagent
22 µL: Sample consumption for electrolyte plate
30 µL: Minimum sample volume required

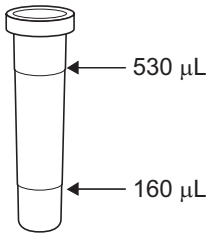
NOTE: If a measurement is performed using sample below minimum volume, an error may occur or the measurement results may be inaccurate.

NOTE: Be sure to use a SPOTCHEM D cuvette (for D-Concept only) for measurement.

NOTE: The cuvette is not to be stored. It should be used as soon as possible after placing the sample inside.

NOTE:
- Correct results can not be obtained for electrolyte measurements when using plasma that has been centrifuged from whole blood in the cuvette with green cap (containing heparin). When measuring electrolytes and biochemistry analytes simultaneously, either add whole blood sampled in collection tubes containing an anticoagulant to the cuvette with gray cap and centrifuge to obtain plasma, or add plasma or serum to the cuvette with gray cap after centrifuging separately.
- Do not use the cuvette with green cap to measure whole blood sampled in collection tubes containing an anticoagulant.

REFERENCE: The cuvette has two gauge lines, at 160 µL and 530 µL, as shown below.



■ Measurement of a serum or plasma

① Place the sample into a cuvette with a gray cap.

② Place the cap on the cuvette to prevent contamination or evaporation if you are not measuring the sample right away.

■ Measurement of a whole blood sample

① Place the whole blood sample into a cuvette with a green cap.

② Place the cap on the cuvette and gently invert it several times to mix.

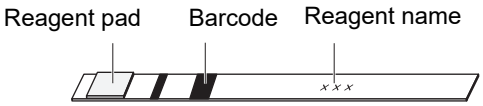
NOTE: The sample may appear staying still even when the cuvette is inverted. In this condition, lithium heparin is mixed with the sample. So do not forcefully shake the cuvette, but gently invert it several times.

2-2-3 Preparing the Reagent

This instrument uses SPOTCHEM D reagents sold separately. This instrument uses three types of SPOTCHEM D reagents. Use the type of reagent that best matches your measurement needs.

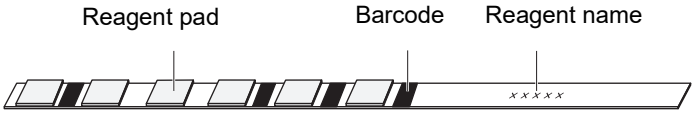
■ Single reagent

You can measure one item per reagent.



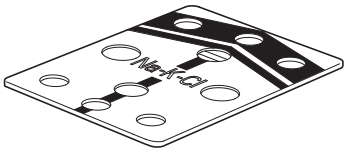
■ Multiple reagent

You can measure several items per reagent according to your measurement needs.



■ Electrolyte plate

You can measure three items per electrolyte plate.



2-3 Measurement

You can measure a maximum of 15 items at a time for each sample using a SPOTCHEM D single/multiple reagent or electrolyte plate.

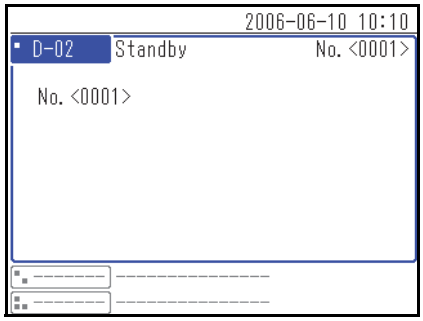
- **Wear protective gloves to prevent exposure to pathogenic microbes.**
- **For disinfection of the device, lightly wipe the disinfecting area with a cotton swab or gauze moistened with a disinfectant, then wipe the disinfectant with a cotton swab or gauze moistened with water, and then wipe it dry. Use 70% isopropanol as the disinfectant. Contact your distributor if you use another disinfectant. If the sample is not removed from the instrument, the user or other individuals may become infected by pathogenic microbes.**
- **Discard used samples, tips, reagents, cuvettes and parts in accordance with local regulations for biohazardous waste.**

Carefully remove the cap from the cuvette to prevent the sample from spilling.

70% isopropyl alcohol is sometimes used to clean the instrument. 70% isopropyl alcohol is readily combustible, therefore handle it carefully and keep away from flames, electrical sparks and sources of heat. Also, ventilate the room sufficiently during use.

1 Check the status of the instrument

Check that the instrument is in standby.



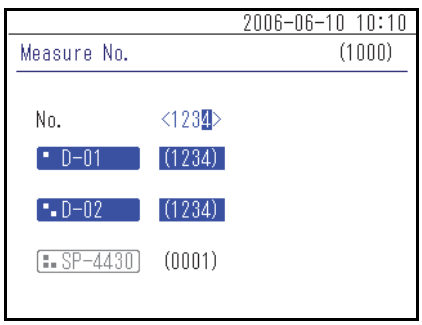
2 Enter the measurement number and sample ID

Enter the measurement number and sample ID.

■Measurement number

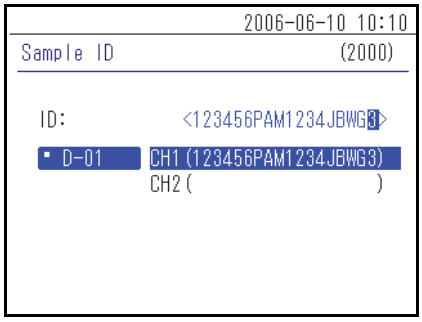
The measurement number is a four-digit number. When a number is entered, the instrument counts from that numeric value and automatically adds a number for each measurement.

For details on entering the measurement number, see “4-2 Entering the Measurement Number” in the “SPOTCHEM D-00 Operating Manual”.



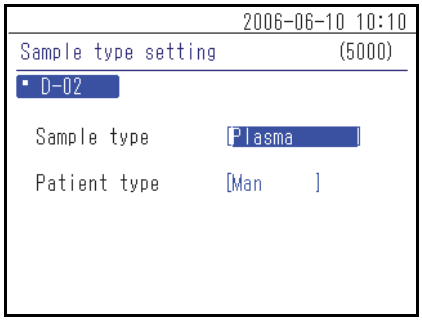
■Sample ID

To add a unique ID to the sample that is separated from the measurement number, enter a sample ID. For details on entering the sample ID, see “4-3 Entering the Sample ID” in the “SPOTCHEM D-00 Operating Manual”.



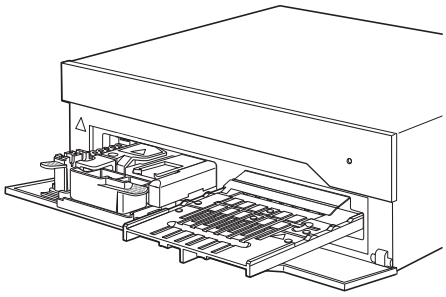
3 Select the sample type and patient type

For details on selecting the sample type and patient type, see “3-2 Sample Type Setting” (page 3-4).



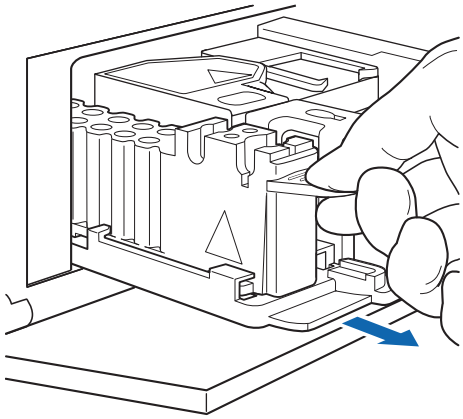
4 Place the tips and samples in the instrument

① Press the ◇ button. The front cover opens and the reagent table and plate table extend toward you.



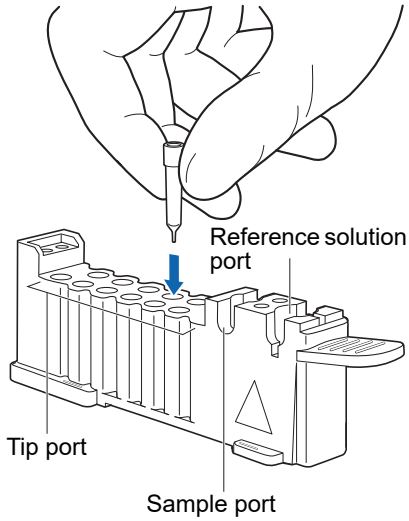
REFERENCE: The operations of the ◇ and ▽ buttons differ depending on the terminals ( ) to which this instrument is connected. For details, see “1-4 Measurement Unit Connection and Display” (page 1-12).

② Remove the tip case.



REFERENCE: When measuring for the first time after installing the instrument, set the tip case and disposal case in the accessories packing box in the instrument before measurement.

③ Place the tips in the tip port.

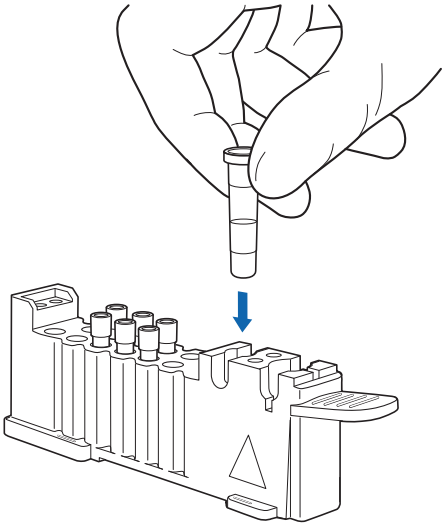


NOTE: Do not touch the end of the tips with unprotected hands. Contamination on the tip end may lead to inaccurate results.

NOTE: The number of tips required for measurement varies depending on the combination of reagents being measured at the same time.

Single reagent: 1 tip
Multiple reagent: 1 tip
Electrolyte plate: 2 tips
Single reagent + multiple reagent: 2 tips
Single reagent + electrolyte plate: 3 tips
Multiple reagent + electrolyte plate: 3 tips
Single reagent + multiple reagent + electrolyte plate: 4 tips

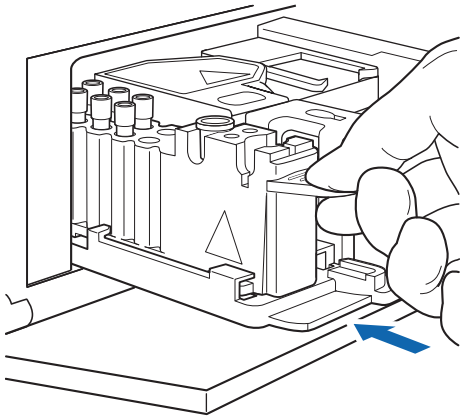
④ Remove the cap from the cuvette with the sample and place the cuvette in the sample port on the tip case.



IMPORTANT: Remove any bubbles or film from sample. Otherwise, inaccurate results may be obtained.

NOTE: Placing the cuvette in the sample port without first removing the cap will cause the nozzle to break. Be sure to remove the cap before placing the cuvette in the sample port.

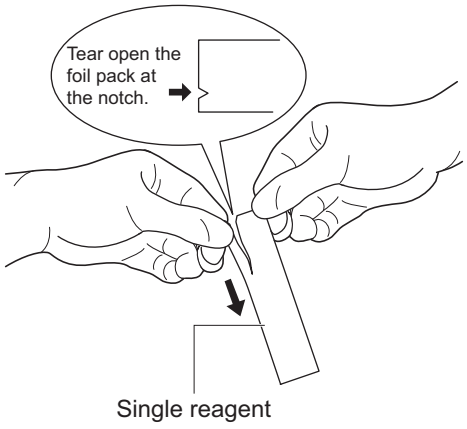
⑤ Return the tip case to its original position.

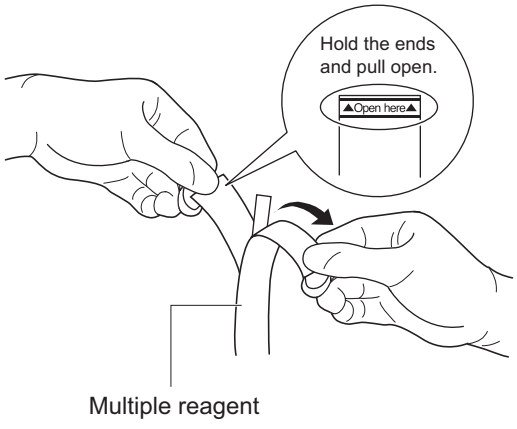


NOTE: Insert the tip case fully to the back of the instrument.

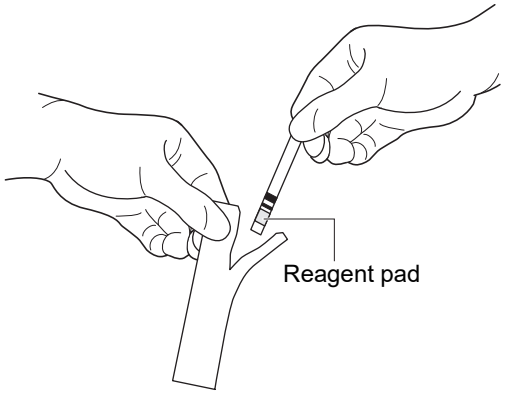
5 Place the single/multiple reagent in the instrument

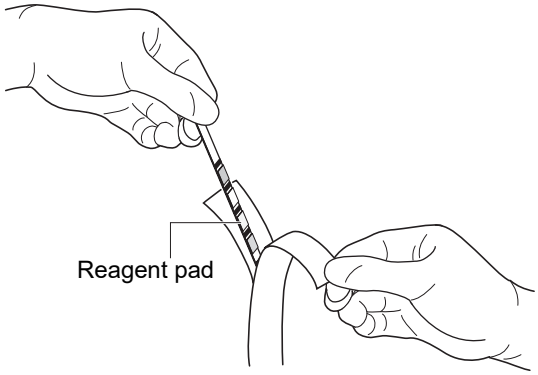
① Open the foil pack of the single/multiple reagent as shown below.





② Remove the single/multiple reagent without touching the reagent pad.

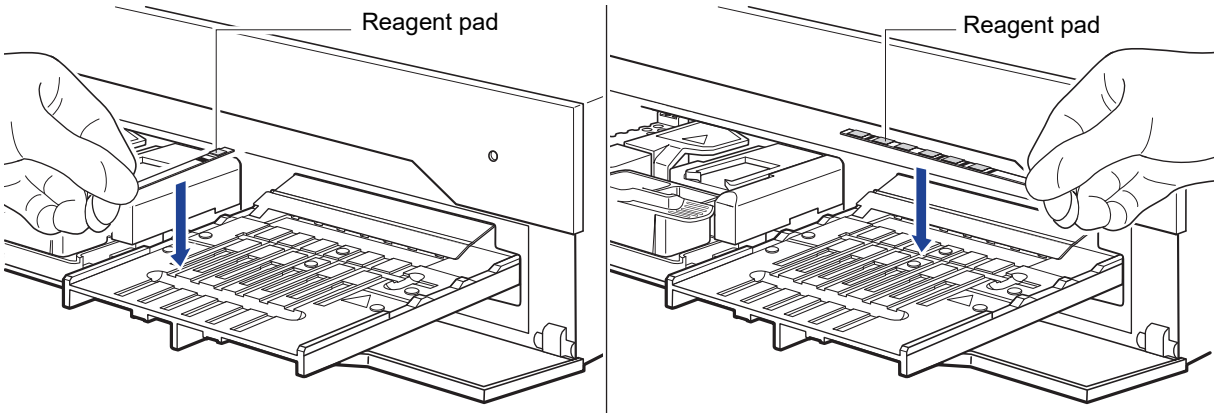




IMPORTANT: Be careful not to fold or bend the single/multiple reagent when taking it out from the foil pack. Test by using a folded or bent single/multiple reagent may lead to inaccurate results.

③ Place the single/multiple reagent on the reagent table as shown below.

IMPORTANT: Insert the end of a single/multiple reagent strip into the opening at the end of the groove on the reagent table and then fit the entire strip in the groove. If the single/multiple reagent strip is warped and/or not fitting on the groove, it may become jammed inside the instrument or lead to inaccurate results.



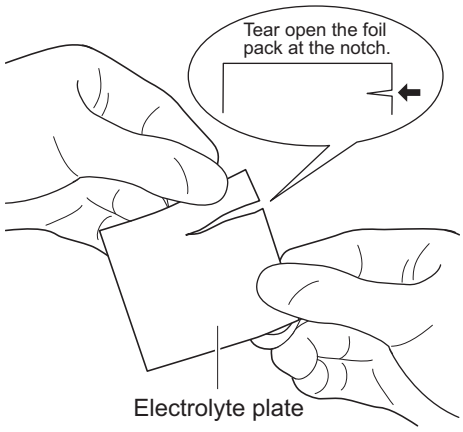
Single reagent

Multiple reagent

6 Place the electrolyte plate and reference solution in the instrument

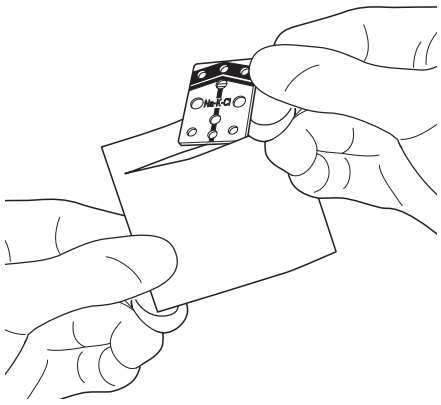
① Open the foil pack of the electrolyte plate.

NOTE: Be careful not to put excessive pressure on the electrolyte plate.



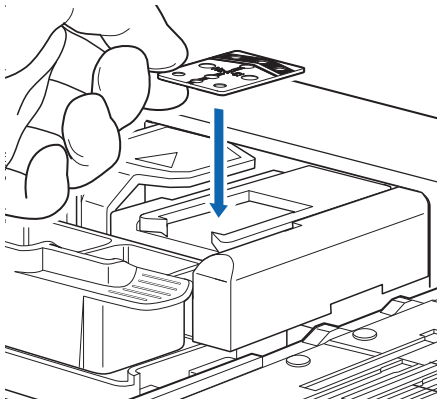
② Take out the electrolyte plate.

NOTE: Be careful not to touch the holes on the electrolyte plate when removing it from the foil pack.

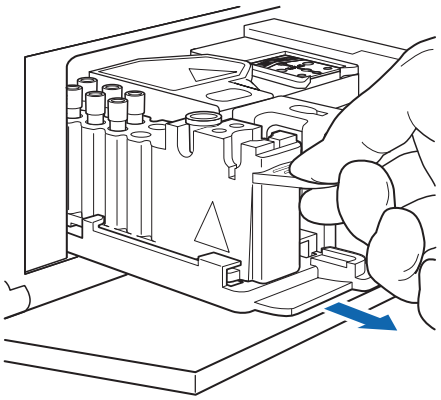


③ Place the electrolyte plate on the plate table.

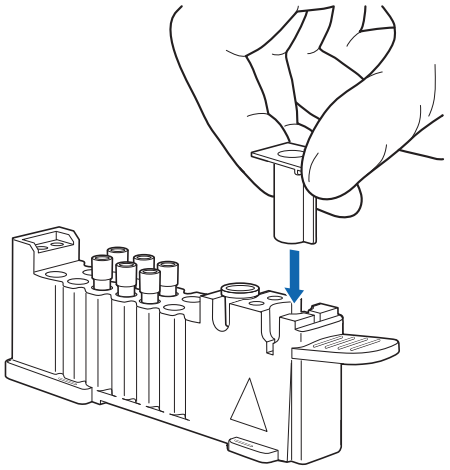
NOTE: Be sure to correctly position the electrolyte plate on the plate table. If the electrolyte plate is not correctly positioned on the plate table, the instrument may become damaged.



④ Remove the tip case.

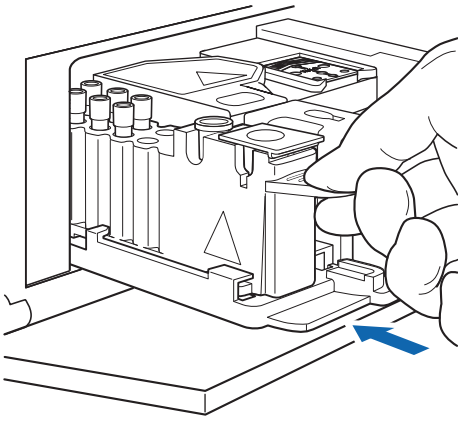


⑤ Remove the foil seal from the reference solution and place the reference solution into the reference solution port.



NOTE: Measuring without removing the foil seal from the reference solution will cause the nozzle to break. Be sure to remove the foil seal from the reference solution before placing it in the reference solution port.

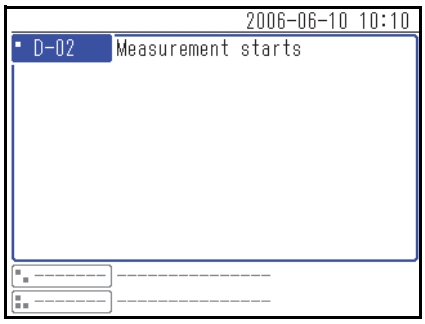
⑥ Return the tip case to its original position.



NOTE: Insert the tip case fully to the back of the instrument.

7 Start measurement

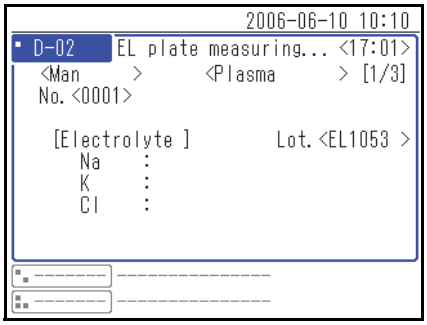
① Press the ◇| button. The plate table and reagent table retract, and the front cover closes and measurement starts.



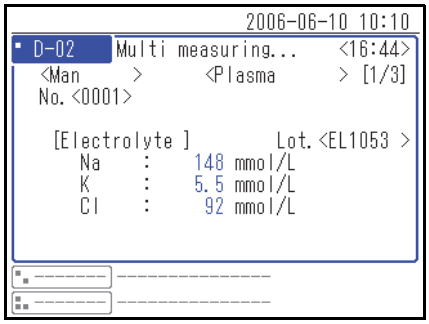
NOTE: Do not open the maintenance cover or front cover during measurement. If the front cover is opened during measurement, a W-2001 warning occurs.

REFERENCE: To cancel measurement, press the ▽ button.

② After measurement of the reagent is completed, the measurement result is displayed in order on the screen.



Example of measurement result display 1



Example of measurement result display 2

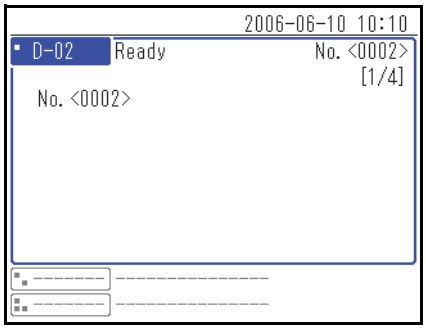
③ When measurement is completed, the message “Ready” is displayed on the screen.

The measurement result is printed.

For more details about the measurement result, see “2-5-1 Measurement Result” (page 2-19).

■View the measurement result

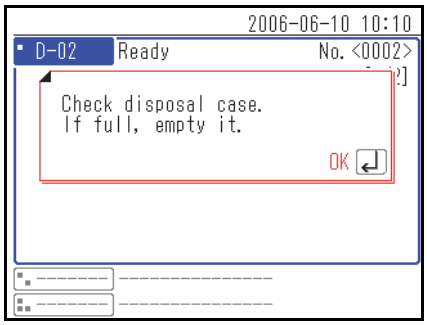
To see the measurement result, press the ≡▲ ≡▼ button. The measurement result is displayed on the screen.



REFERENCE: To print the measurement result again, press the button.

8 Dispose of the used tips, samples and reagents

NOTE: Each time after using 24 tips, the message on the right is displayed after measurement is completed. Be sure to dispose of the used tips in the disposal case. Continuing operation of the instrument without disposing of the used tips may cause the instrument to malfunction.



① Remove the disposal case and dispose of all used tips and electrolyte plates.

② Return the disposal case to its original position.

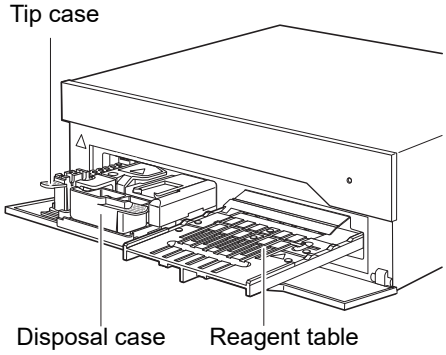
③ Remove the tip case and dispose of all used cuvettes and reference solution.

④ Return the tip case to its original position.

⑤ Dispose of the used single/multiple reagents on the reagent table.

⑥ If you do not continue operations, press the ▽ button. The reagent table and plate table retract and then the front cover closes.

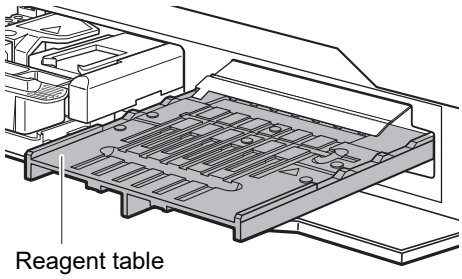
Tip case



9 Inspect the reagent table

Read the chapter “Daily cleaning” (page 3-8) and inspect the reagent table for any areas that require cleaning. Clean the reagent table as necessary.

NOTE: When measurement for the day is completed, be sure to dispose of all used tips and electrolyte plates in the disposal case.



2-4 Calibration

2-4-1 Overview

- **Lot calibration (See “2-1-1 Lot calibration” (page 2-2).)**

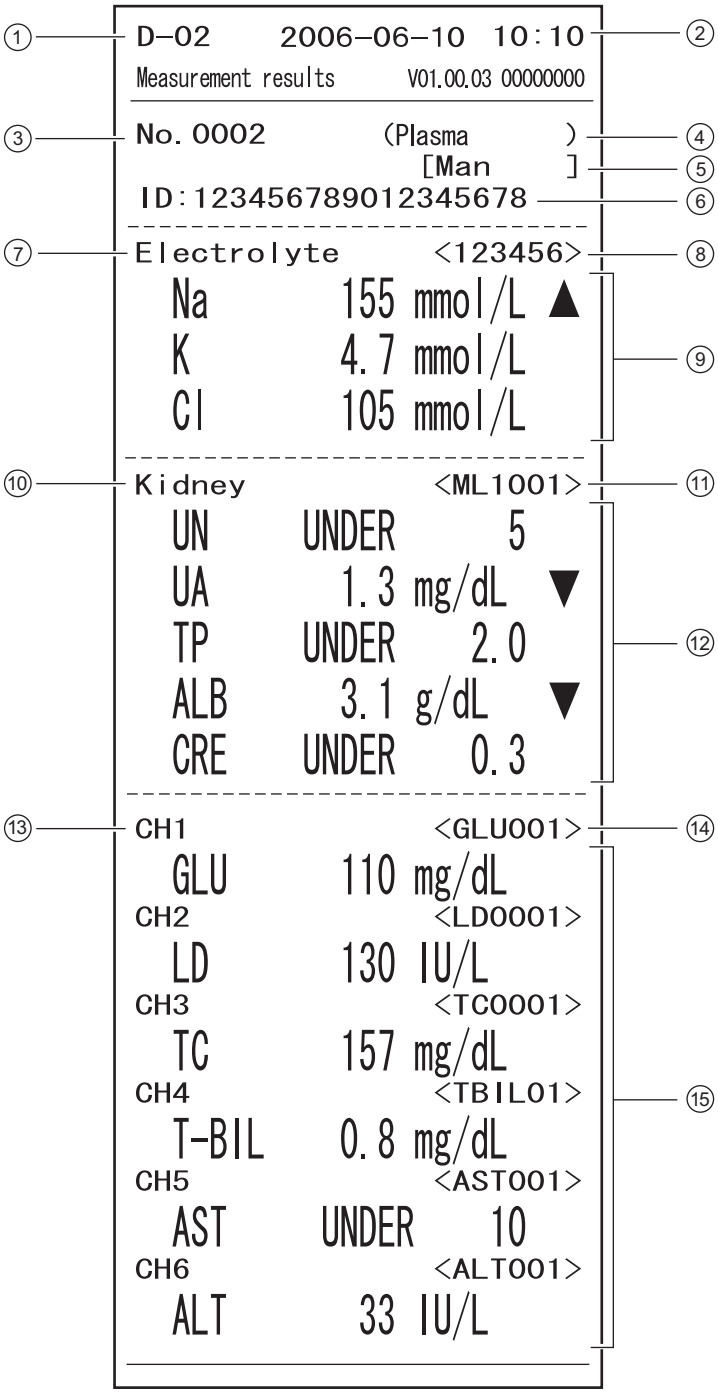
  Calibration made by scanning the Reagent Info. printed on the product box of the reagent with the 2D code reader.

2-5 Viewing the Measurement Result

You can print out and check the measurement result.

2-5-1 Measurement Result

This section explains how to read the printed measurement result.

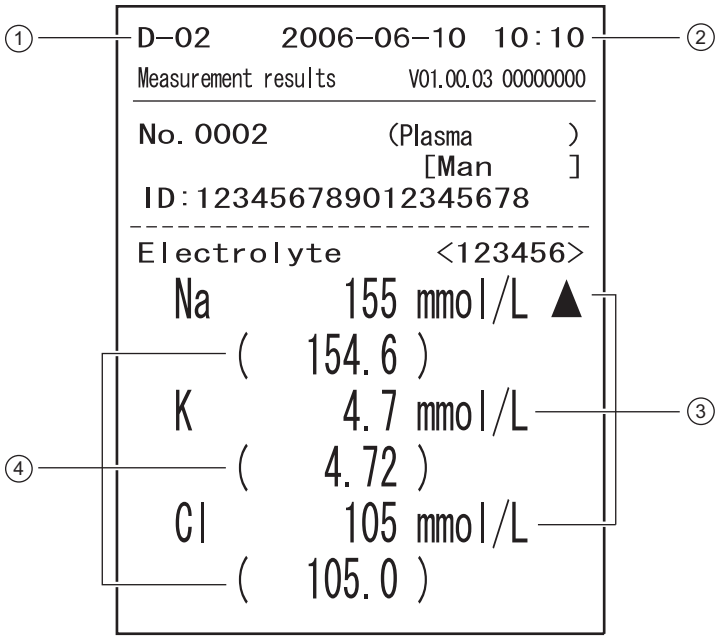


No.	Item	Description
①	Unit name	
②	Measurement date and time	
③	Measurement number	
④	Sample type	
⑤	Patient type	Printing is available only when the patient type is entered.
⑥	Sample ID	Printing is available only when the ID is entered.
⑦	Electrolyte plate reagent name	Printed only when this reagent is used.
⑧	Electrolyte plate lot number	Printed only when this reagent is used.
⑨	Electrolyte plate item name and measurement result	Printed only when this reagent is used. The following are printed depending on the measurement value. ▲ : The value is higher than the normal range ▼ : The value is lower than the normal range OVER: The value is higher than the measurable range UNDER: The value is lower than the measurable range The upper or lower limit of the measurement range is printed after "OVER" or "UNDER". ???: Stability error or the sample type setting is incorrect ***: Liquid junction error ------: Measurement is impossible
⑩	Multiple reagent name	Printed only when this reagent is used.
⑪	Multiple reagent lot number	Printed only when this reagent is used.
⑫	Multiple reagent item name and measurement result	Printed only when this reagent is used. The following are printed depending on the measurement value. ▲ : The value is higher than the normal range ▼ : The value is lower than the normal range OVER: The value is higher than the measurable range UNDER: The value is lower than the measurable range The upper or lower limit of the measurement range is printed after "OVER" or "UNDER". ???: Application failure or very low concentration (including distilled water) ------: Measurement is impossible
⑬	Channel number	Printed only when this channel is used.
⑭	Single reagent lot number	Printed only when this reagent is used.

No.	Item	Description
⑮	Single reagent item name and measurement result	Printed only when this reagent is used. The following are printed depending on the measurement value. ▲ : The value is higher than the normal range ▼ : The value is lower than the normal range OVER: The value is higher than the measurable range UNDER: The value is lower than the measurable range The upper or lower limit of the measurement range is printed after "OVER" or "UNDER". ???: Application failure or very low concentration (including distilled water) ------: Measurement is impossible

2-5-2 Survey Mode Measurement Result

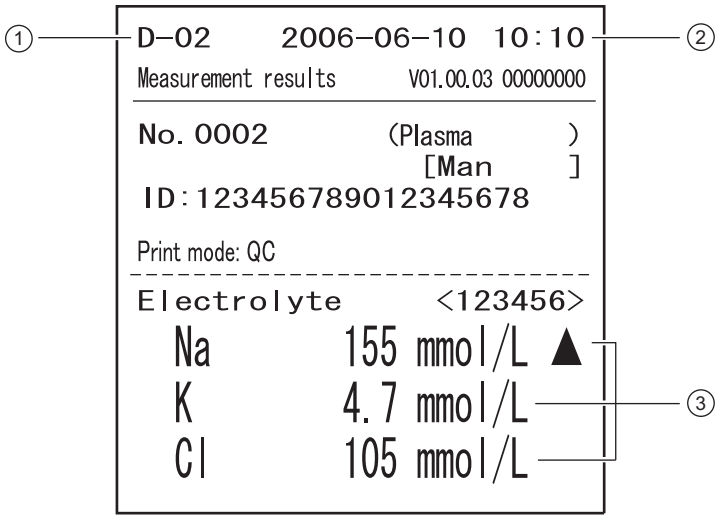
This section explains how to read the printed survey mode measurement result.



No.	Item	Description
①	Unit name	
②	Measurement date and time	
③	Measurement result	Item name and measurement value
④	Survey mode measurement result	Measurement value for which unit conversion and correlation correction are not performed

2-5-3 QC Mode Measurement Result

This section explains how to read the printed QC mode measurement result.



No.	Item	Description
①	Unit name	
②	Measurement date and time	
③	QC mode measurement result	Item name and measurement value for which unit conversion and correlation correction are not performed

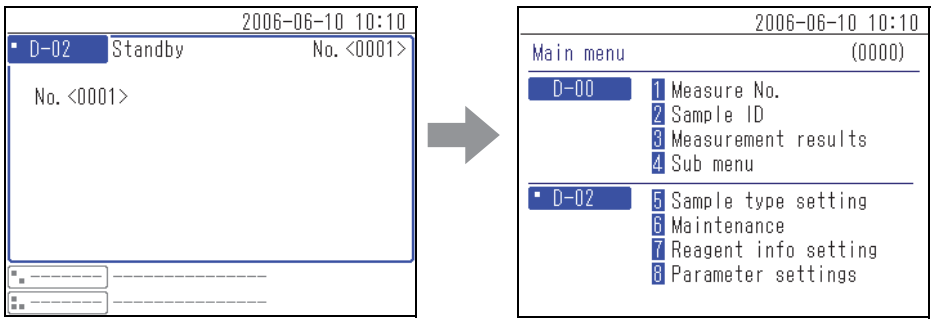
Chapter 3 Menu Operations

This chapter describes the sample type setting, maintenance, reagent information setting and various parameter settings on the [Main menu] screen.

For details on setting the measurement number, sample ID, measurement result and submenu, see “Chapter 4 Menu Operations” in the “SPOTCHEM D-00 Operating Manual”.

3-1 Menu Screen Overview

On the status indication screen, press [0] to display the [Main menu] screen.



Press [0]. The [Main menu] screen is displayed.

REFERENCE: For details on operating menus [1] to [4], see “Chapter 4 Menu Operations” in the “SPOTCHEM D-00 Operating Manual”.

3-1-1 Screen Flow Chart

The screen flowchart, which shows the flow of the menu screen in a list, is available. If you need it, please contact your local distributor.

3-1-2 Settings Available on the Menu Screen

■ Sample type setting

Item	Description	See page
Sample type	Sets the type of sample to be measured.	3-4
Patient type	Sets the type of patient.	3-4

■ Maintenance

Item	Description	See page
Maintenance information	Displays the date and time of last maintenance and the number of measurements performed since then.	3-5
Maintenance item	Selects the various maintenance items to be performed.	3-6

■ Reagent information setting

Item	Description	See page
Single reagent information	• Sets the correlation correction factor of the parameters for each instrument. • After setting correlation correction factors, perform verification measurements to confirm that they are set correctly. • Sets the temperature of the enzyme item for each item. • Sets the normal range for items and patient type. • Returns the setting to the default value. • Prints item information.	3-21
Multiple reagent information	Prints item information.	3-26
Electrolyte item information	• Sets the correlation correction factor of the parameters for each instrument. • After setting correlation correction factors, perform verification measurements to confirm that they are set correctly. • Sets the compensation temperature for each item. • Sets the normal range for each item and patient type. • Returns the setting to the default value. • Prints item information.	3-28
Electrolyte plate information	Prints item information.	3-32
Lot information	Selects the calibration method.	3-34

■ Various parameter settings

Item	Description	See page
Unit information setting	• Sets the unit name, speaker volume and warning sound pattern. • Returns the setting to the default value.	3-36
Mode setting	Selects between printing mode and measurement mode.	3-38

3-2 Sample Type Setting

This section explains how to set the sample type and patient type.

■ Available settings

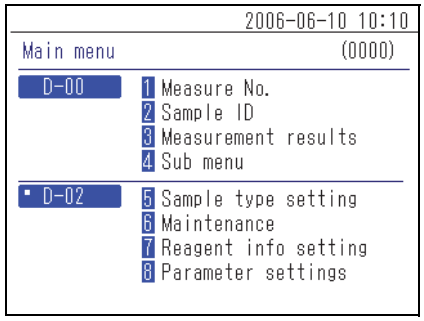
Item	Description
Sample type	Sets the type of sample to be measured.
Patient type	Selects the patient type previously registered with the operation unit.

REFERENCE: If the patient type is not registered, the patient type item is not displayed. For details on registering the patient type, see “4-5-2 Option Settings” in the “SPOTCHEM D-00 Operating Manual”.

1 Display the <Sample type setting> screen

① Press [5] on the [Main menu] screen.

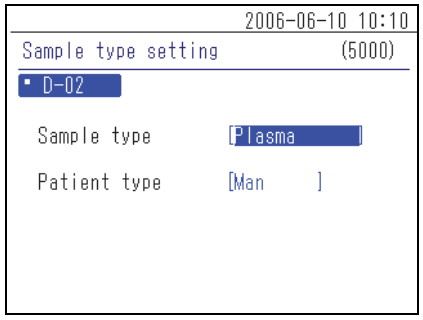
REFERENCE: You can also press [5] on the status indication screen to display the <Sample type setting> screen.



2 Set the sample type

① Press the [—] button on the <Sample type setting> screen, select the sample type and press the ↵ button.

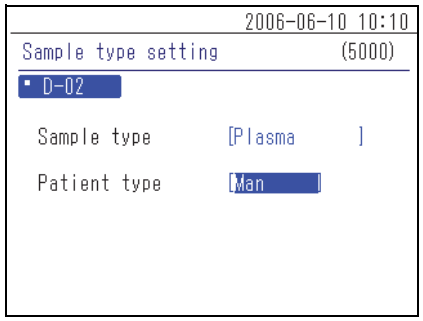
NOTE:
- Depending on the reagent, some sample types cannot be measured.
- For details on the sample types that can be measured, see the package insert supplied with the reagent.



3 Set the patient type

① Press the [—] button, select the patient type and press the ↵ button.

REFERENCE: If the patient type is not registered, the patient type item is not displayed. For details on registering the patient type, see “4-5-2 Option Settings” in the “SPOTCHEM D-00 Operating Manual”.

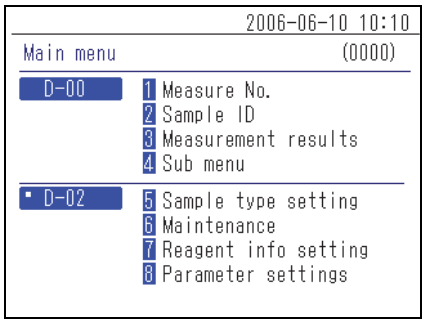


3-3 Maintenance

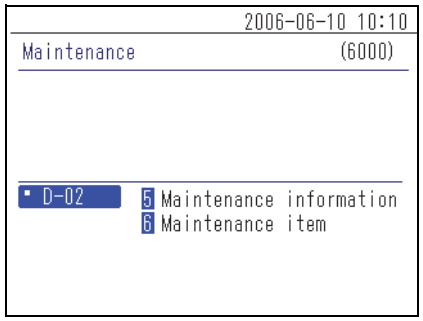
3-3-1 Maintenance Information

The date and time of last maintenance and the number of measurements performed since then are displayed.

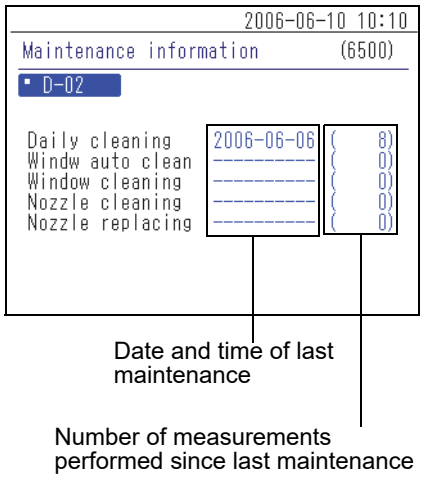
① Press [6] on the [Main menu] screen.



② Press [5] on the [Maintenance] screen.



The <Maintenance information> screen is displayed.



3-3-2 Maintenance Items

This section explains the maintenance items.

Wear protective gloves to prevent exposure to pathogenic microbes.

70% isopropyl alcohol is sometimes used to clean the instrument. 70% isopropyl alcohol is readily combustible, therefore handle it carefully and keep away from flames, electrical sparks and sources of heat. Also, ventilate the room sufficiently during use.

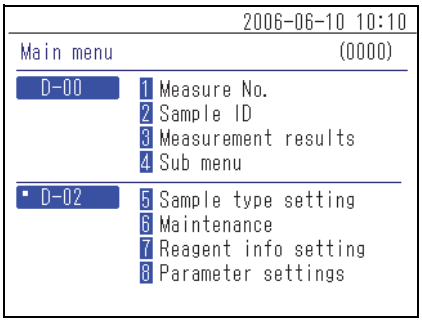
■ Description of maintenance

The table below shows the type of maintenance required for this instrument and the maintenance schedule. To ensure accurate measurement results, it is recommended that you perform regular maintenance.

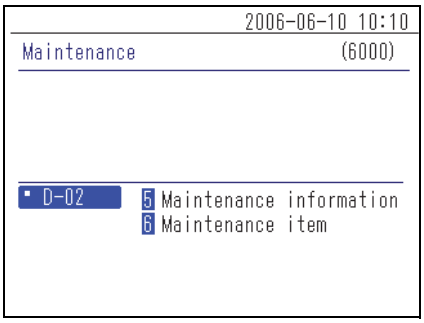
Item	Description	Maintenance timing
Daily cleaning	Performing measurements over time may cause samples and soil to adhere to the rubber plate, reagent table, white plate/ black plate and disposal case. Be sure to clean these parts when measurement for the day is completed.	Daily
Automatic cleaning of photometric window	Performing measurements over time may cause the photometric window to become dirty. Because the photometric window is inside of the unit and difficult to reach, use “automatic cleaning of the photometric window”.	After every approx. 300 measurements
Manual cleaning of photometric window	If the photometric window becomes very dirty, you may not be able to fully clean it using “automatic cleaning of the photometric window”. In this case, manually clean the photometric window.	When automatic cleaning of the photometric window is not sufficient
Nozzle cleaning Nozzle tube replacing	Samples and reagents adhering to the nozzle tip may cause clogging of the nozzle and nozzle tube. Clean the nozzle when a warning, error or malfunction is displayed, or after the set number of measurements is performed. Replace the nozzle tube when it becomes clogged.	After every approx. 1,000 measurements or when a related warning, error or malfunction occurs
Nozzle replacing	The O-ring attached to the nozzle deteriorates over time. With deteriorated O-ring, suction and discharge of the sample and reagent become less accurate. Replace the nozzle when a warning, error or malfunction is displayed, or after the set number of measurements is performed.	After every approx. 3,000 measurements or when a related warning, error or malfunction occurs

■ <Maintenance item> screen display

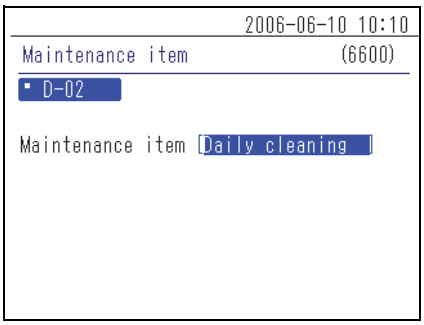
① Press [6] on the [Main menu] screen.



② Press [6] on the [Maintenance] screen.



The <Maintenance item> screen is displayed.

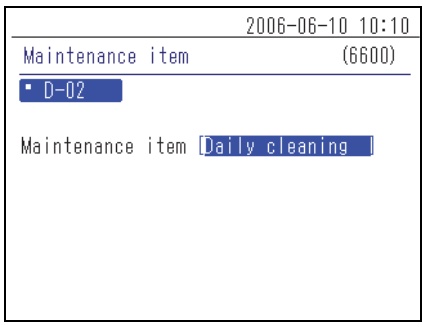


■ Daily cleaning

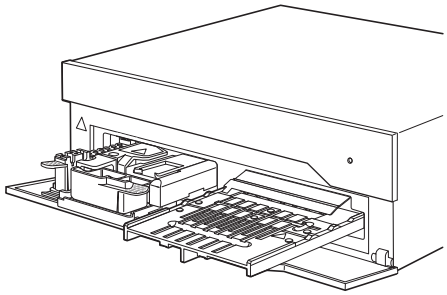
Prepare: Cotton swab, distilled water, soft cloth, blower brush, 70% isopropyl alcohol and protective gloves

1 Select a maintenance item

① Press the [—] button on the <Maintenance item> screen and select [Daily cleaning].



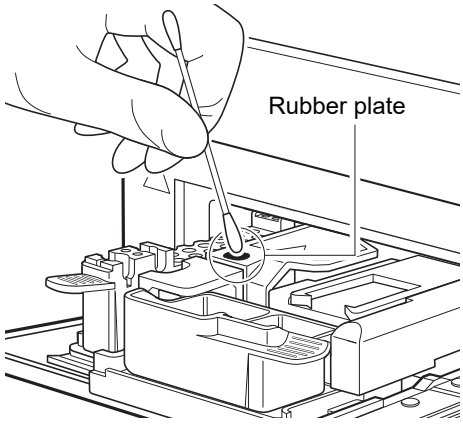
② Press the ↵ button to open the front cover and turn off the instrument.



2 Clean the rubber plate

① Use a cotton swab moistened with distilled water to remove any stains on the rubber plate.

② Use a dry cotton swab to remove any moisture remaining on the rubber plate.



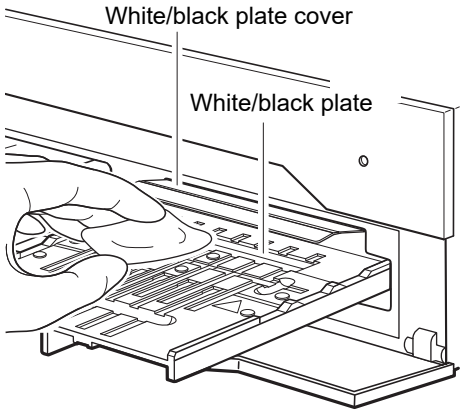
3 Clean the white/black plate

① Lift the white/black plate cover.

② Use a soft cloth moistened with distilled water to remove any stains on the white/black plate.

③ Dry the white/black plate with a soft and dry cloth.

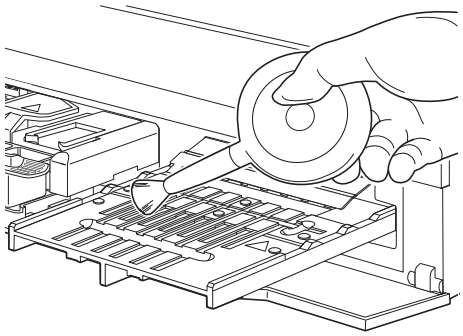
IMPORTANT: Be careful not to touch the white/black plate with unprotected hands (which may leave sebum on the surface), apply pressure, or scratch the surface. Otherwise, inaccurate results may be obtained.



4 Clean the reagent table

① Use the blower brush supplied with the operation unit to blow away any debris.

② Use a soft cloth to remove any stains.



5 Clean the disposal case

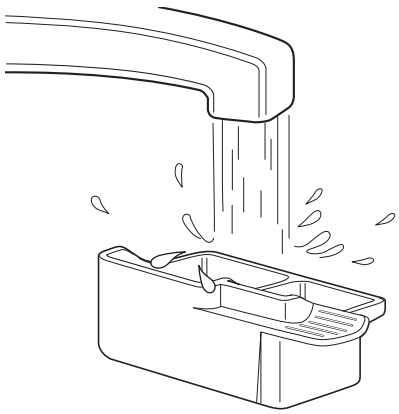
If the disposal case is very dirty, wash the disposal case.

① Remove the disposal case.

② Disinfect the disposal case with 70% isopropyl alcohol and then rinse the case to remove any stains.

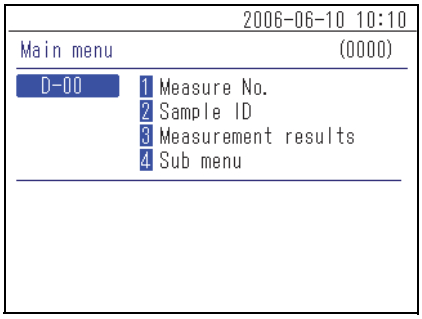
③ Use a cloth to dry the disposal case.

④ Attach the disposal case.

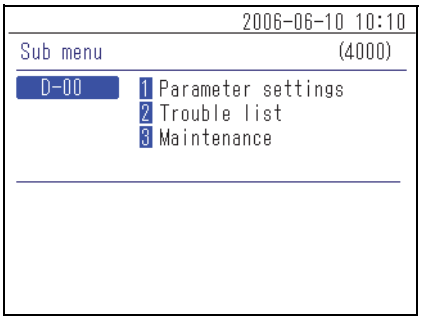


6 Turn on the instrument

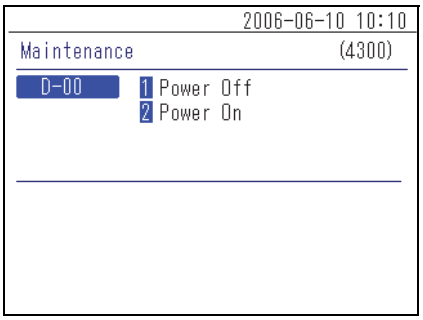
① Press [4] on the [Main menu] screen.



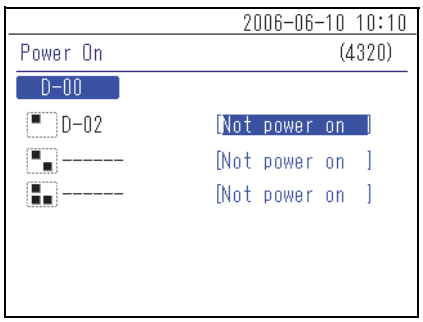
② Press [3] on the [Submenu] screen.



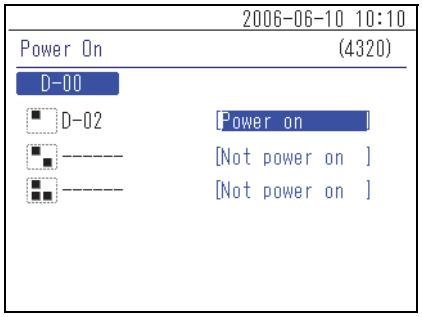
③ Press [2] on the [Maintenance] screen.



④ Press the ↵ button on the <Power On> screen and then move the cursor to the position of this instrument.

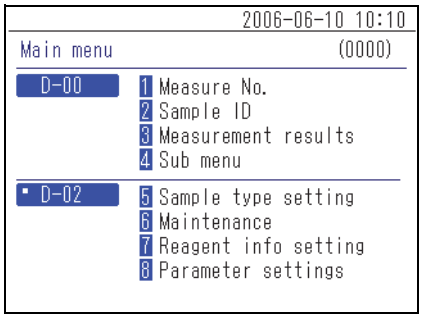


⑤ Press the [—] button, select [Power on] and press the ↵ button.



REFERENCE: The instrument turns on and the message “Connecting…” is displayed on the screen.

The [Main menu] screen is displayed.



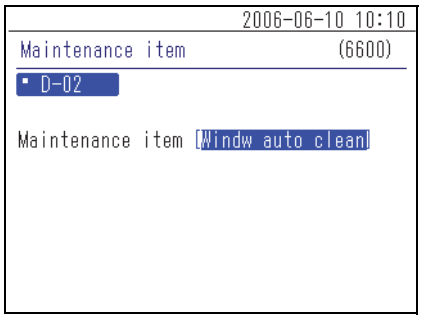
REFERENCE: You cannot operate the instrument menus during starting up. (The menu is grayed out.) Wait until the instrument reaches standby. The startup process takes approximately 8 minutes.

■ Automatic cleaning of the photometric window (Windw auto clean)

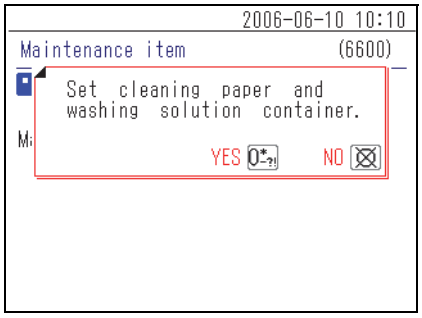
Prepare: Cleaning paper, container (for D-Concept only), distilled water, tips and protective gloves

1 Place the container and cleaning paper in the instrument

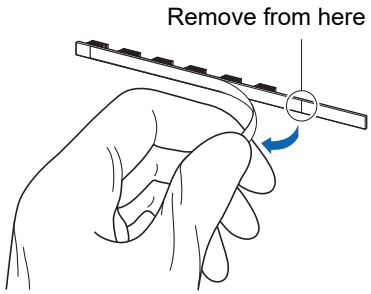
① Press the [—] button on the <Maintenance item> screen and select [Windw auto clean].



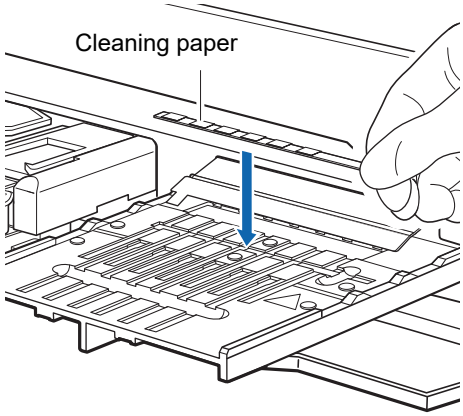
② Press the ↵ button. The front cover opens and a message is displayed on the screen.



③ Remove the double-sided tape from the back of the cleaning paper.



④ Place the cleaning paper on the reagent table.

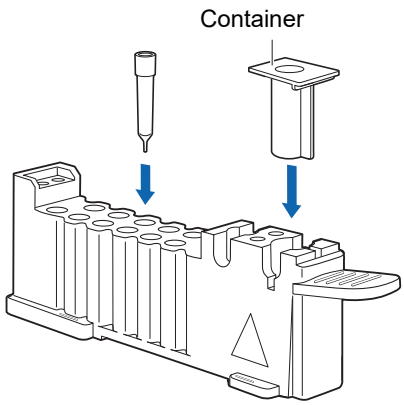


NOTE: Be sure to securely place the cleaning paper on the reagent table without any warping or lifting of the cleaning paper.

⑤ Add approximately 200 µL (about halfway) of distilled water to the container.

⑥ Remove the tip case.

⑦ Place a tip and the container with distilled water into the tip port and the reference solution port respectively.



⑧ Return the tip case to its original position.

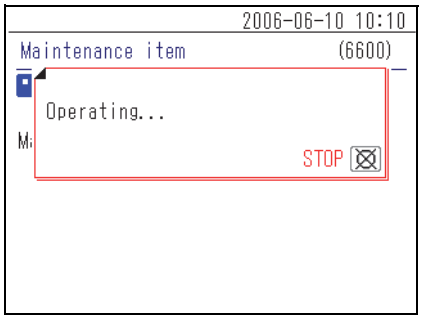
NOTE: Insert the tip case fully to the back of the instrument.

2 Begin automatic cleaning

① Press the ↵ button. The front cover closes and automatic cleaning of the photometric window begins.

If the photometric window is not cleaned enough, an E-2131 error occurs.

In this case, follow the instructions for “Manual cleaning of the photometric window (Window cleaning)” (page 3-13).



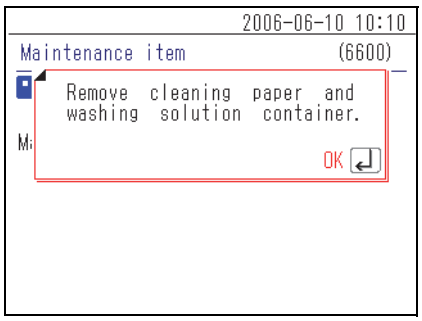
REFERENCE: “Automatic cleaning of the photometric window” may take approximately from 6 to 13 minutes depending on the amount of dirt on the photometric window.

3 Remove the container and cleaning paper

① When the photometric window is completely cleaned, the front cover opens and a message is displayed on the screen.

② Remove the cleaning paper and the container with distilled water.

③ Press the ↵ button. The front cover closes and automatic cleaning of the photometric window ends.

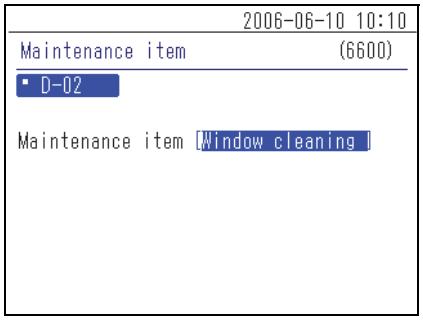


■ Manual cleaning of the photometric window (Window cleaning)

Prepare: Cotton swab, distilled water, protective gloves and Phillips screwdriver

1 Select a maintenance item

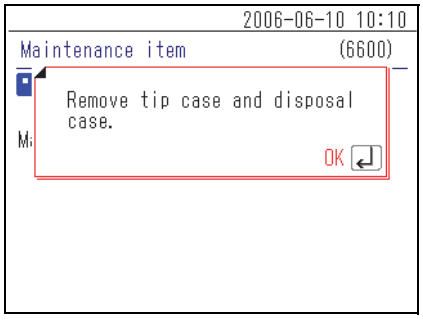
① Press the [—] button on the <Maintenance item> screen and select [Window cleaning].



② Press the ↵ button. The front cover opens and a message is displayed on the screen.

③ Remove the tip case and disposal case.

④ Press the ↵ button. The power turns off.

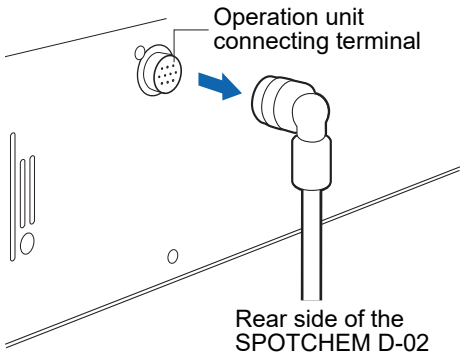


2 Disconnect the instrument from the operation unit and clean the photometric window

① Disconnect the connecting cable at the rear side of the instrument from the operation unit connecting terminal.

② Remove the fixing bracket.

③ Move the instrument to a location where you can perform cleaning.



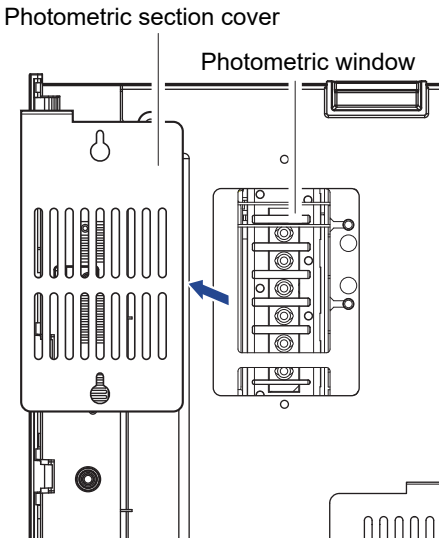
NOTE: Remove the tip case and disposal case before moving the instrument.

④ Facing the instrument, lift the right side of the instrument and carefully stand it with the right side up.

⑤ Remove the photometric section cover on the bottom of the instrument using the Phillips screwdriver supplied with the operation unit.

⑥ Use a cotton swab moistened with distilled water to remove any stains on the photometric window.

⑦ Dry the photometric window with a dry cotton swab.



3 Return the instrument to its original position

① Attach the photometric section cover to the bottom of the instrument.

② Attach the fixing bracket.

③ Place the instrument in its original position and reconnect the connecting cable to the operation unit connecting terminal at the rear side of the instrument.

4 Turn on the instrument

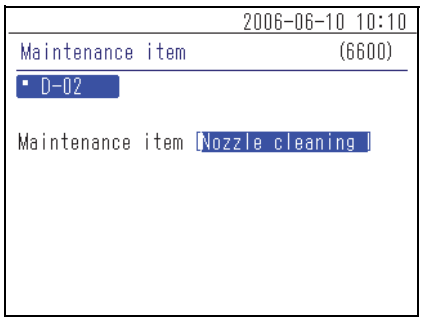
See “6 Turn on the instrument” (page 3-10) in the section “Daily cleaning”.

■ Cleaning the nozzle (Nozzle cleaning)

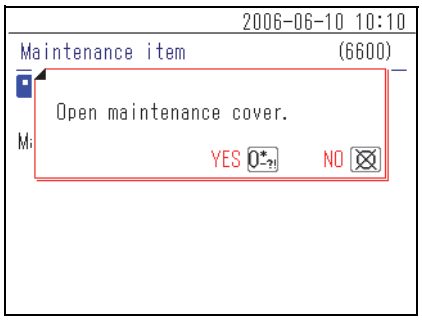
Prepare: Cleaning wire, nozzle tube, protective gloves, Phillips screwdriver and tweezers

1 Move the nozzle to the maintenance position and turn off the instrument.

① Press the [—] button on the <Maintenance item> screen and select [Nozzle cleaning].

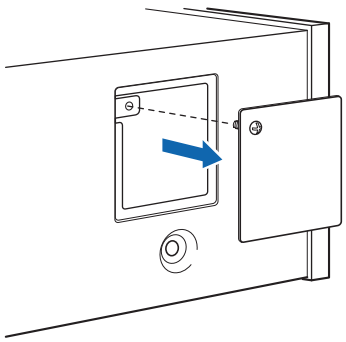


② Press the ↵ button. A message is displayed on the screen.

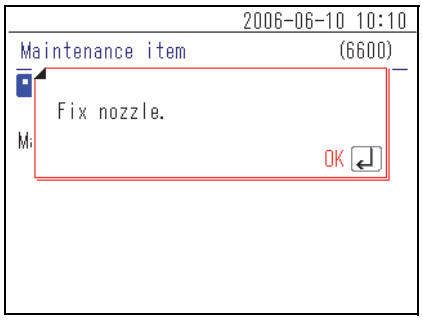


REFERENCE:
- To start maintenance, press [0].
- To cancel maintenance, press the ⊗ button.

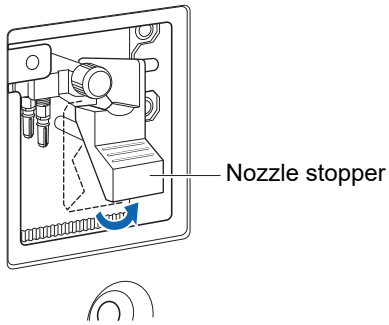
③ Remove the maintenance cover using the Phillips screwdriver supplied with the operation unit.



④ Press [0]. The nozzle moves to the maintenance position and a message is displayed on the screen.

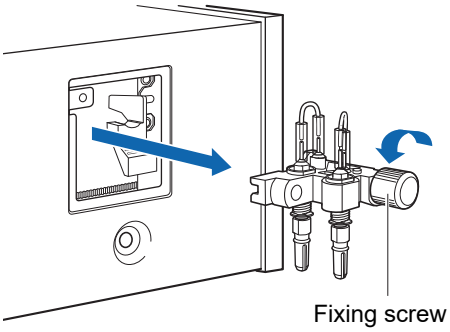


⑤ Fix the nozzle with the nozzle stopper.



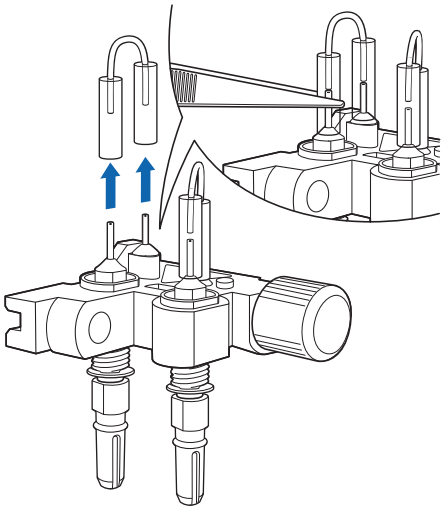
⑥ Press the ↵ button. The power turns off.

⑦ Manually rotate the fixing screw of the nozzle maintenance holder and remove it, as shown in the diagram.

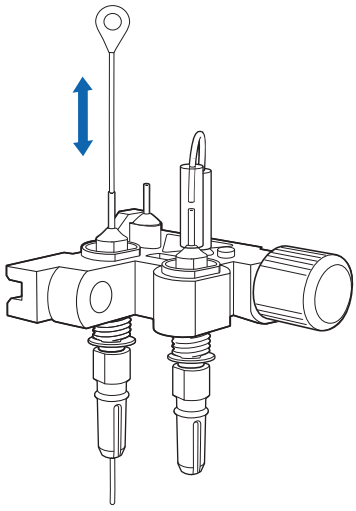


2 Clean the nozzle

① Remove the nozzle tube using the tweezers.



② Insert the cleaning wire into the nozzle and move it up and down two or three times to clean the inside of the nozzle.



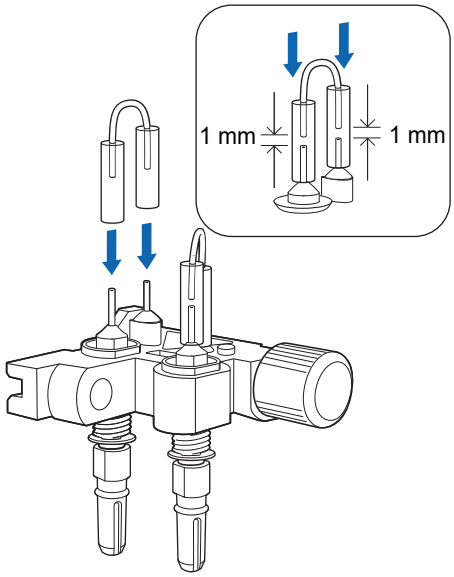
③ Use a piece of tissue paper to remove any debris from the tip of the nozzle.

3 Attach the nozzle tube

① If the nozzle tube is clogged or stained, replace it with a new nozzle tube.

If the nozzle tube is not clogged or stained, attach the removed nozzle tube.

NOTE: When attaching the nozzle tube, be careful not to insert it too far over the nozzle.



4 Attach the nozzle maintenance holder to the instrument

① Attach the nozzle maintenance holder.

NOTE: Securely attach the nozzle maintenance holder.

② Remove the nozzle stopper and gently press in the nozzle by hand.

③ Attach the maintenance cover and fix it with the screws.

5 Turn on the instrument

See “6 Turn on the instrument” (page 3-10) in the section “Daily cleaning”.

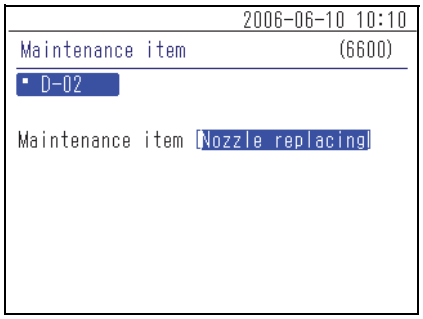
■ Replacing the nozzle (Nozzle replacing)

Prepare: Nozzle, wrench set for replacing nozzle, protective gloves and Phillips screwdriver

1 Move the nozzle to the maintenance position and turn off the instrument

① Press the [—] button on the <Maintenance item> screen and select [Nozzle replacing].

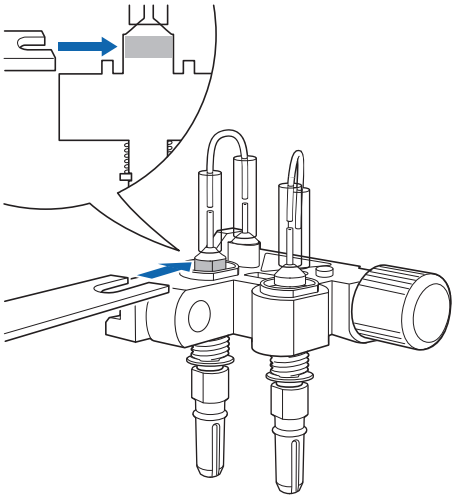
See steps ② to ⑦ under "1 Move the nozzle to the maintenance position and turn off the instrument." (page 3-15) in the section "Cleaning the nozzle".



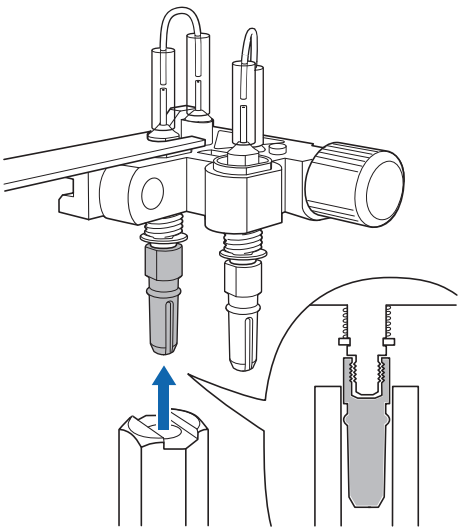
2 Replace the nozzle

① Fix the top part of the nozzle using the smaller end of the wrench.

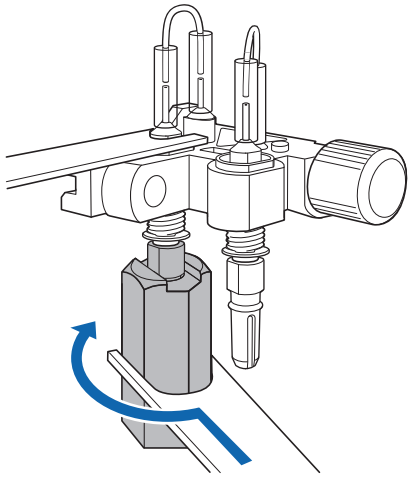
NOTE: Be sure to fix the top part of the nozzle with the wrench before removing or attaching the nozzle. Otherwise, the nozzle may be damaged.



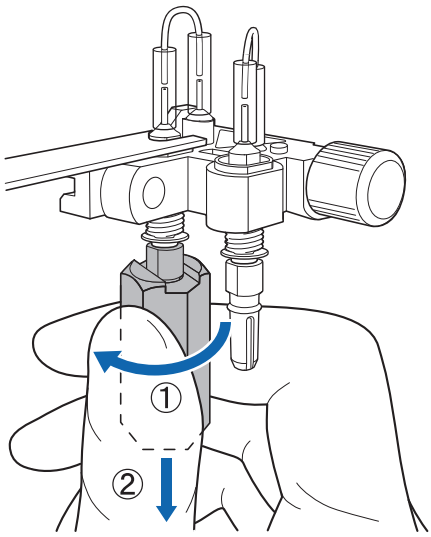
② Attach the adapter to the bottom of the nozzle.



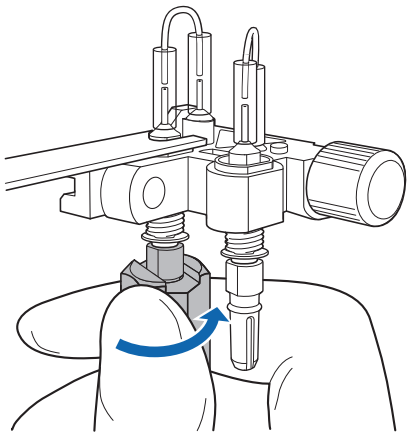
③ Use the larger end of the wrench to rotate the adapter and loosen the nozzle attachment.



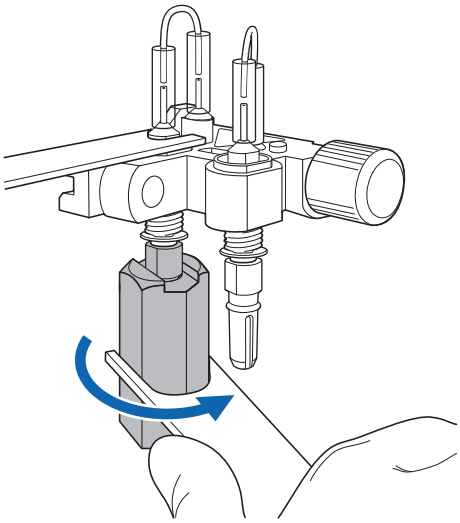
④ Manually rotate the adapter in the direction of the arrow and remove the nozzle.



⑤ Place the new nozzle on the adapter. Attach the adapter to the nozzle maintenance holder and gently tighten by hand.



⑥ Use the smaller end of the wrench to fix the top part of the nozzle and use the larger end of the wrench to rotate and further tighten the adapter (at least 90°).



3 Attach the nozzle maintenance holder to the instrument

① Attach the nozzle maintenance holder.

NOTE: Securely attach the nozzle maintenance holder.

② Remove the nozzle stopper and gently press in the nozzle by hand.

③ Attach the maintenance cover and fix it with the screws.

4 Turn on the instrument

See “6 Turn on the instrument” (page 3-10) in the section “Daily cleaning”.

3-4 Reagent Information Setting

This section explains how to enter and initialize the reagent information. The available setting parameters are shown in the following table.

Item	Description	See page
Single reagent information	• Sets the correlation correction factor of the parameters for each instrument. • Sets the temperature of the enzyme item for each item. • Sets the normal range for items and patient type. • Returns the setting to the default value. • Prints item information.	3-21
Multiple reagent information	Prints item information.	3-26
Electrolyte item information	• Sets the correlation correction factor of the parameters for each instrument. • Sets the compensation temperature for each item. • Sets the normal range for items and patient type. • Returns the setting to the default value. • Prints item information.	3-28
Electrolyte plate information	Prints item information.	3-32
Lot information	Selects the calibration method.	3-34

3-4-1 Single Reagent Information (Single info)

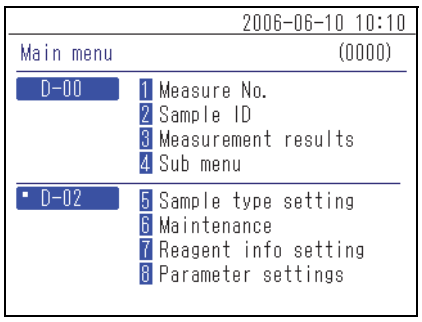
You can set the correlation correction factor, temperature setting and normal range for single reagent information. You can print out and check these settings. The available settings are shown in the following table.

Item	Description	Setting range	Default setting
Correlation correction factor	Enables setting of A and B in the coefficient Y=AX+B for calibration of the output result.	-99.999 to 99.999	A: 1.000 B: 0.000
Temperature setting	Enables setting of temperature conditions for measurement temperature conversion for enzyme items.	25, 30, 37	37
Normal range setting	Enables setting of the lower (L) and upper (H) limits of the normal range for each patient type.	0.00 to 9999.99	L: Lower limit of measurement range H: Upper limit of measurement range

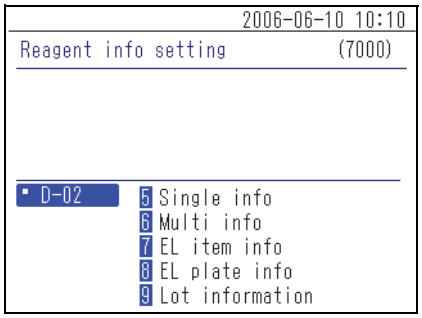
■ Setting the single reagent information

1 Display the <Single info setting> screen

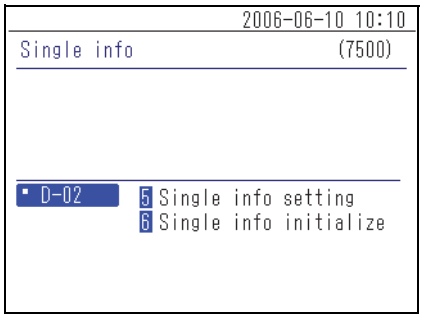
① Press [7] on the [Main menu] screen.



② Press [5] on the [Reagent info setting] screen.

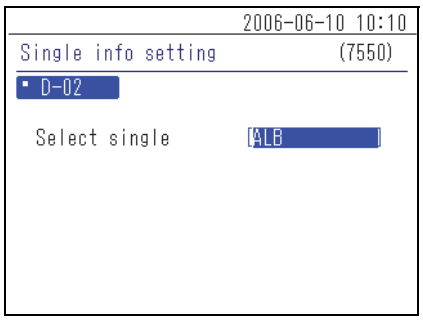


③ Press [5] on the [Single info] screen.



2 Set the single reagent information

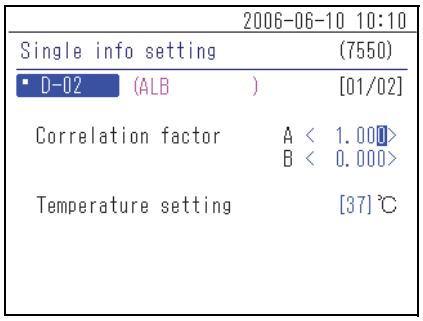
① Press the [—] button on the <Single info setting> screen and select the single reagent to be set.



REFERENCE: To print the single reagent information for one item, select the item and press the button. To print all single reagent information, select [ALL] and press the button.

② Press the ↵ button.

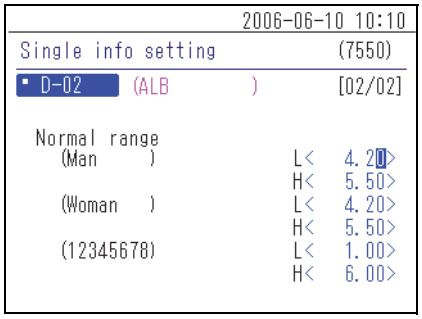
③ Enter the correlation correction factor and temperature setting. Enter the numeric values for A and B and press the ↵ button. Select the temperature and press the ↵ button.



REFERENCE: For details on entering numeric values, see “2-3-4 Entering Numbers” in the “SPOTCHEM D-00 Operating Manual”.

NOTE: After setting correlation correction factors, perform verification measurements to confirm that they are set correctly.

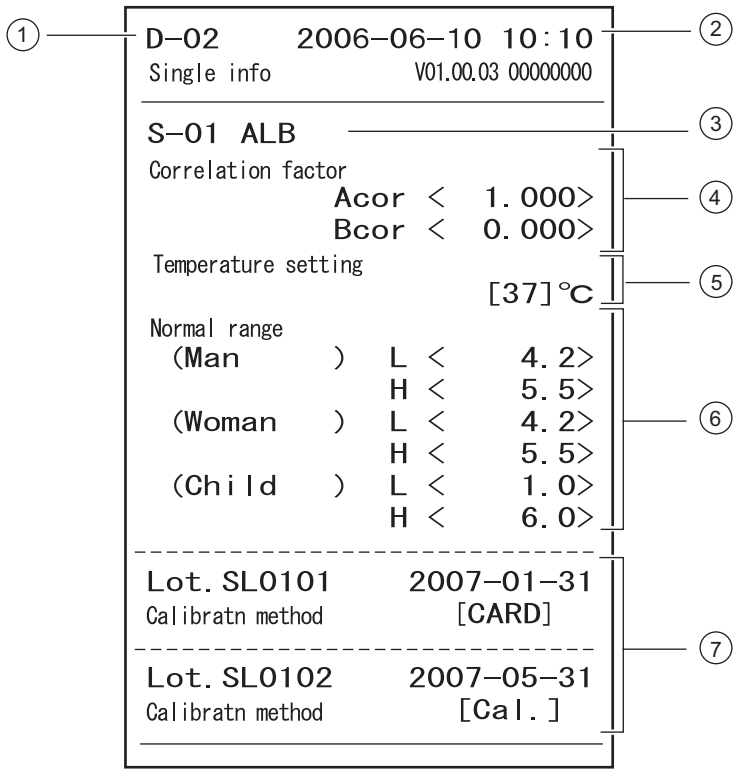
④ Set the normal range. Enter the normal range for each patient type and press the ↵ button.



REFERENCE: If the patient type is not registered, the patient type item is not displayed. For details on registering the patient type, see “4-5-2 Option Settings” in the “SPOTCHEM D-00 Operating Manual”.

■ Printing result of the single reagent information

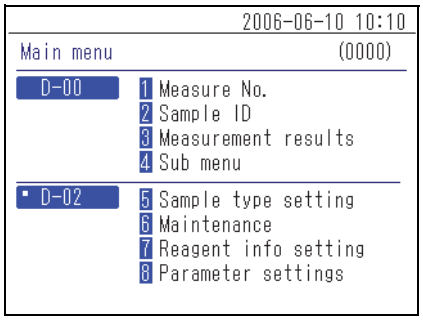
This section explains how to read the printed result.



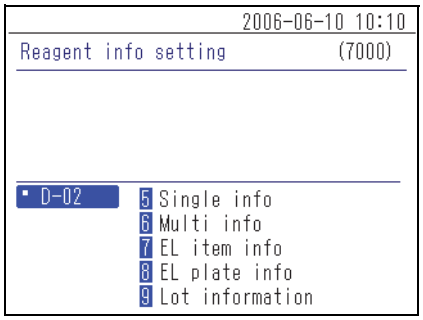
No.	Item	Description
①	Unit name	
②	Printed date and time	
③	Single reagent name	The reagent number and single reagent name are printed.
④	Correlation correction factor	The correlation correction factors are printed.
⑤	Temperature conversion information	The temperature conversion information is printed.
⑥	Normal range	The upper and lower limits of normal range are printed. When the patient types are registered, this information is printed for each patient type.
⑦	Calibration information	The calibration information is printed.

■ Initialization of the single reagent information

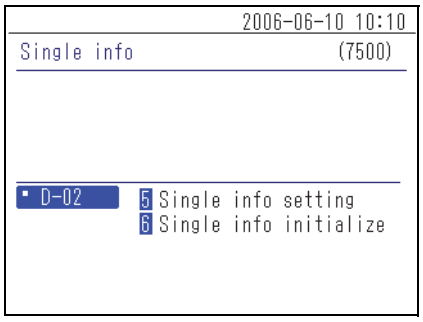
① Press [7] on the [Main menu] screen.



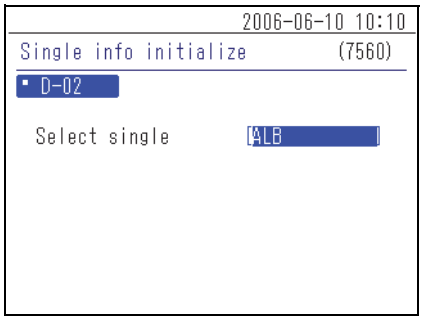
② Press [5] on the [Reagent info setting] screen.



③ Press [6] on the [Single info] screen.



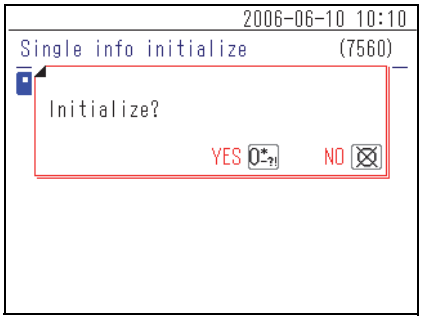
④ Press the [—] button on the <Single info initialize> screen and select the single reagent to be initialized.



REFERENCE: To initialize all single reagent information, select [ALL].

⑤ Press the ↵ button.

⑥ A message appears prompting you to confirm or cancel initialization of the information.



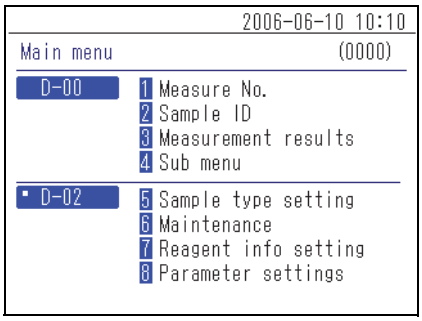
REFERENCE:
- To start initialization, press [0].
- To cancel initialization, press the ⊠ button.

3-4-2 Multiple Reagent Information (Multi info)

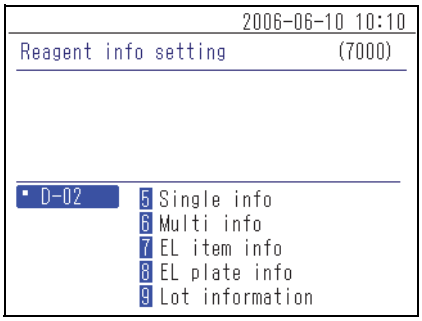
■ Printing the multiple reagent information

1 Display the <Multi info setting> screen

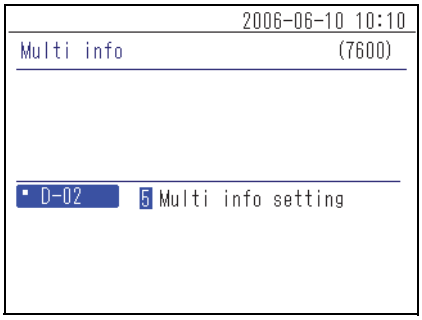
① Press [7] on the [Main menu] screen.



② Press [6] on the [Reagent info setting] screen.

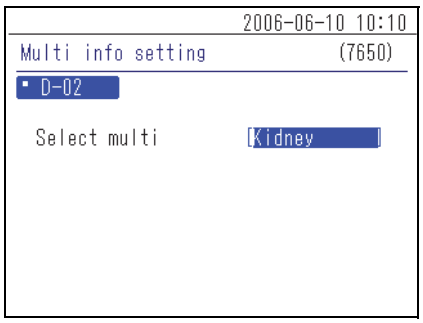


③ Press [5] on the [Multi info] screen.



2 **Print the multiple reagent information**

① Press the [—] button on the <Multi info setting> screen and select the multiple reagent information to be printed.

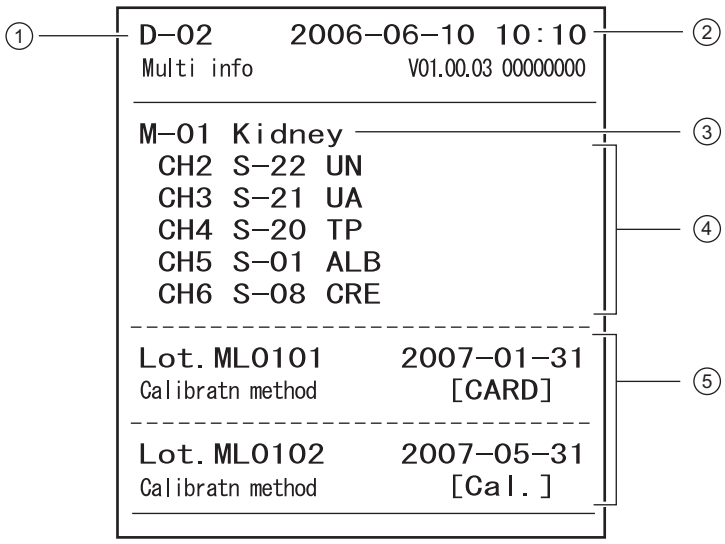


NOTE: You cannot set or initialize the correlation correction factor, compensation temperature, or normal range for a multiple reagent.

REFERENCE: To print the multiple reagent information for one item, select the item and press the button. To print all multiple reagent information, select [ALL] and press the button.

■ Printing result of the multiple reagent information

This section explains how to read the printed result.



No.	Item	Description
①	Unit name	
②	Printed date and time	
③	Multiple reagent name	The reagent number and multiple reagent name are printed.
④	Item information	The channel number, item number and item name are printed.
⑤	Calibration information	The calibration information is printed.

3-4-3 Electrolyte Item Information (EL item info)

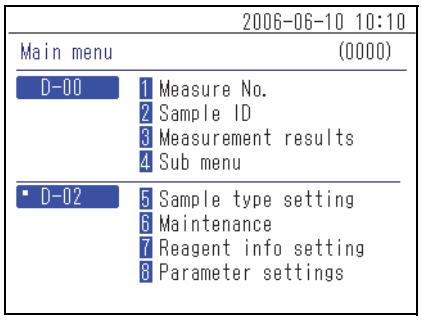
You can set the correlation correction factor, temperature setting and normal range for the electrolyte item information. You can print out and check these settings. The available settings are shown in the following table.

Item	Description	Setting range	Default setting
Correlation correction factor	Enables setting of A and B in the coefficient Y=AX+B for calibration of the output result.	-99.999 to 99.999	A: 1.000 B: 0.000
Temperature setting	Enables setting of temperature conditions for measurement temperature conversion.	25, 30, 37	37
Normal range setting (blood)	Enables setting of the lower (L) and upper (H) limits of the normal range for each patient type.	0.00 to 9999.99	L: Lower limit of measurement range H: Upper limit of measurement range

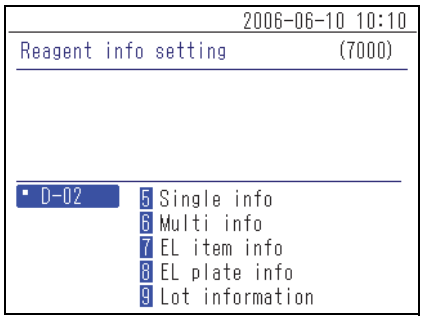
■ Setting the electrolyte item information

1 Display the <EL item info setting> screen

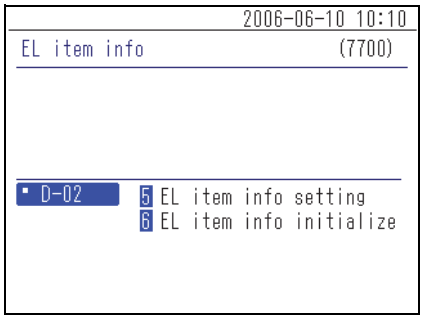
① Press [7] on the [Main menu] screen.



② Press [7] on the [Reagent info setting] screen.

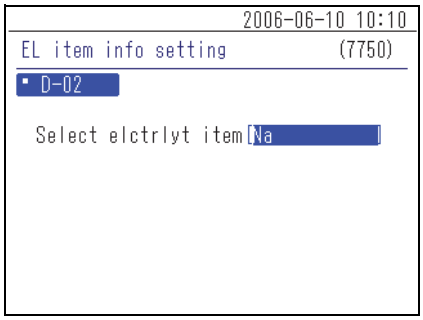


③ Press [5] on the [EL item info] screen.



2 Set the electrolyte item information

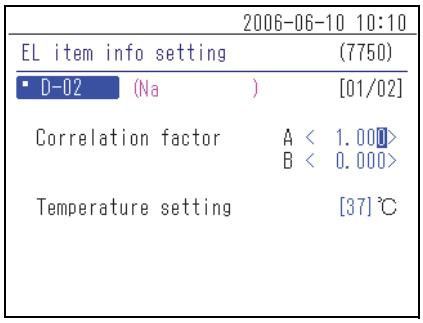
① Press the [—] button on the <EL info setting> screen and select the electrolyte plate to be set.



REFERENCE: To print the electrolyte item information for one item, select the item and press the button. To print all electrolyte item information, select [ALL] and press the button.

② Press the ↵ button.

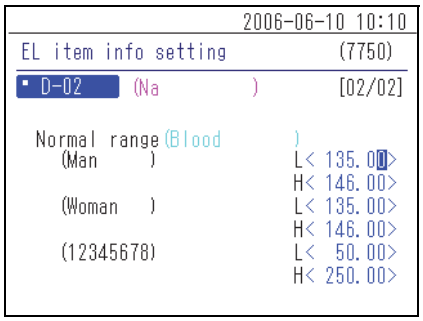
③ Enter the correlation correction factor and temperature setting. Enter the temperature and numeric values for A and B and press the ↵ button.



REFERENCE: For details on entering numeric values, see “2-3-4 Entering Numbers” in the “SPOTCHEM D-00 Operating Manual”.

NOTE: After setting correlation correction factors, perform verification measurements to confirm that they are set correctly.

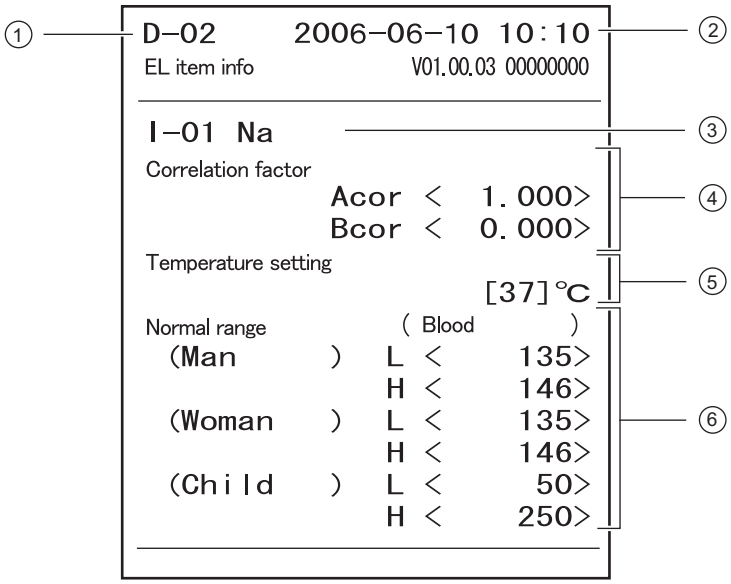
④ Set the normal range. Enter the normal range for each sample and patient type and press the ↵ button.



REFERENCE: If the patient type is not registered, the patient type item is not displayed. For details on registering the patient type, see “4-5-2 Option Settings” in the “SPOTCHEM D-00 Operating Manual”.

■ Printing results of the electrolyte item information

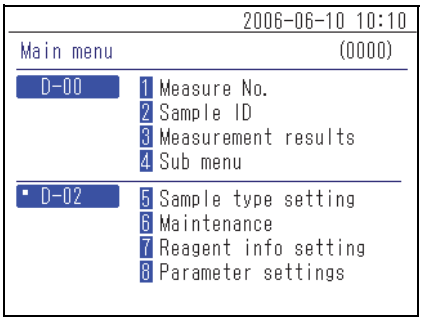
This section explains how to read the printed results.



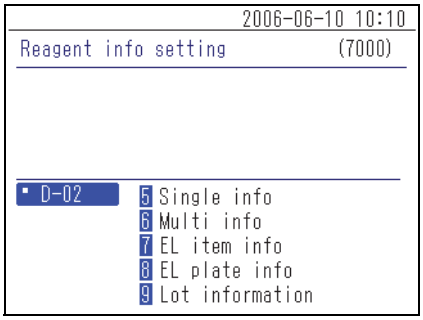
No.	Item	Description
①	Unit name	
②	Printed date and time	
③	Electrolyte item name	The item number and item name are printed.
④	Correlation correction factor	The correlation correction factor is printed.
⑤	Temperature conversion information	The temperature conversion information is printed.
⑥	Normal range setting (blood)	The upper and lower limits are printed. This is printed for each patient type when the patient type is set.

■ Initialization of the electrolyte item information

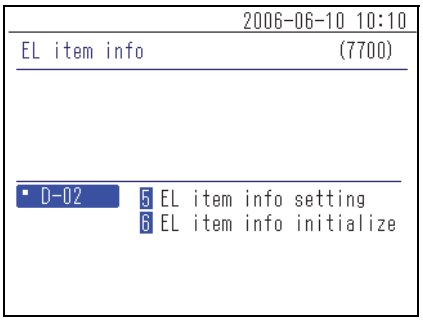
① Press [7] on the [Main menu] screen.



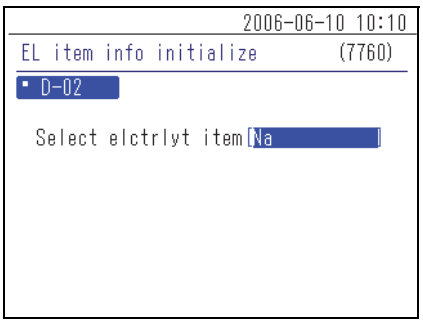
② Press [7] on the [Reagent info setting] screen.



③ Press [6] on the [EL item info] screen.



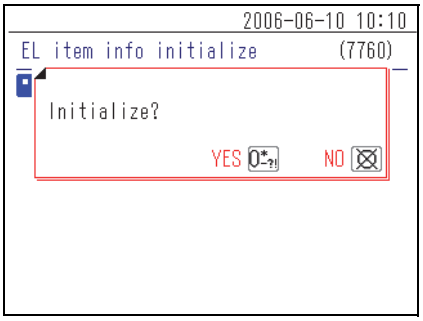
④ Press the [—] button on the [EL item info initialize] screen and select the electrolyte plate to be initialized.



REFERENCE: To initialize all electrolyte item information, select [ALL].

⑤ Press the ↵ button.

⑥ A message appears prompting you to confirm or cancel initialization of the information.



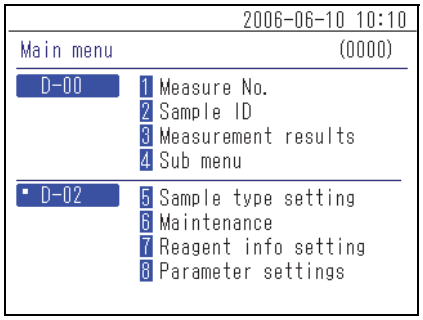
REFERENCE:
- To start initialization, press [0].
- To cancel initialization, press the ⊠ button.

3-4-4 Electrolyte Plate Information (EL plate info)

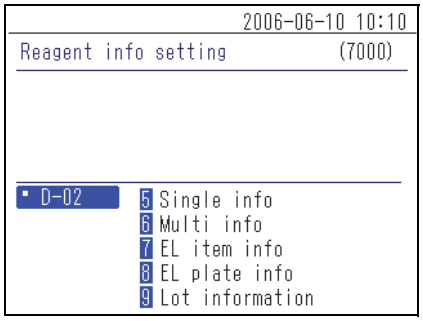
■ Printing the electrolyte plate information

1 Display the <EL plate info setting> screen

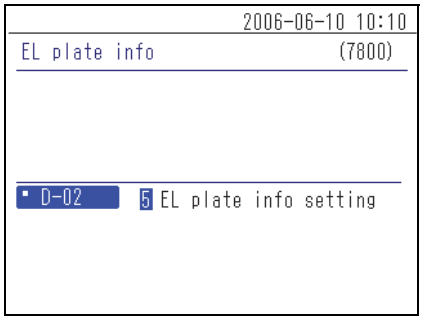
① Press [7] on the [Main menu] screen.



② Press [8] on the [Reagent info setting] screen.

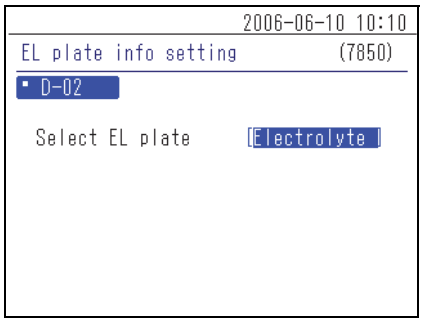


③ Press [5] on the [EL plate info] screen.



2 Print the electrolyte plate information

① Press the [—] button on the [EL plate info setting] screen and select the electrolyte plate information to be printed.

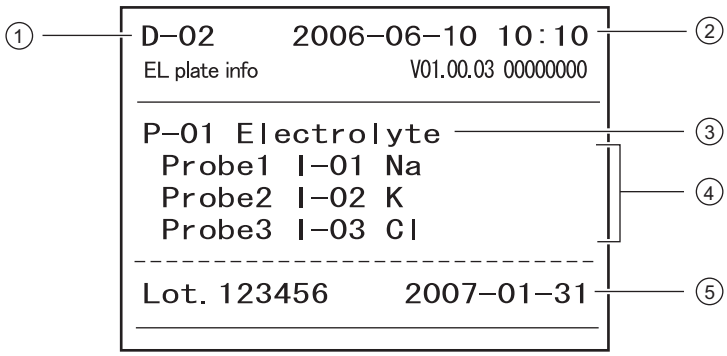


NOTE: You cannot set or initialize the correlation correction factor, temperature setting, or normal range for an electrolyte plate.

REFERENCE: To print the electrolyte plate information for one item, select the item and press the button. To print all electrolyte plate information, select [ALL] and press the button.

■ Printing result of the electrolyte plate information

This section explains how to read the printed result.



No.	Item	Description
①	Unit name	
②	Printed date and time	
③	Electrolyte plate name	The electrolyte plate name is printed.
④	Item information	The probe number, item number and item name are printed.
⑤	Calibration information	The calibration information is printed.

3-4-5 Lot Information

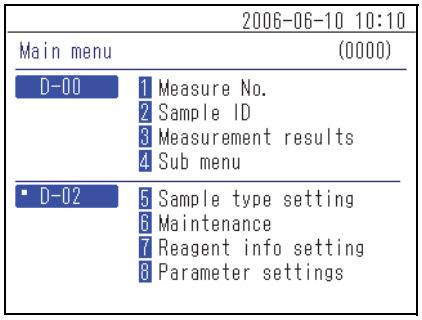
This section explains how to set the calibration method for each lot.

Item	Description	Setting range	Default setting
Calibration method	Although [QR] and [Cal.] can be selected, do not change the setting from [QR].	QR, Cal.	QR

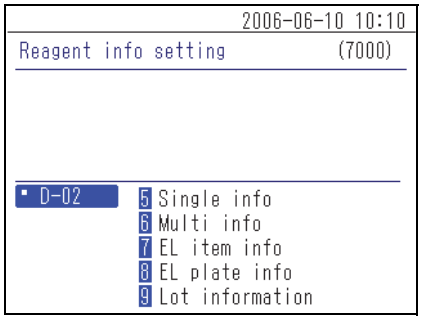
■ Setting the lot information

1 Display the <Single lot info setting> or <Multi lot info setting> screen

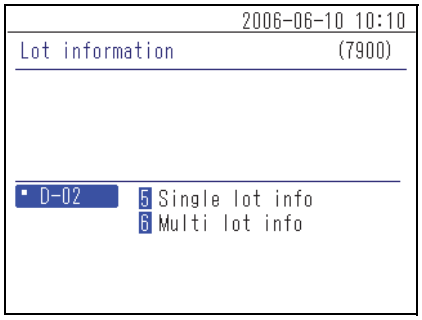
① Press [7] on the [Main menu] screen.



② Press [9] on the [Reagent info setting] screen.

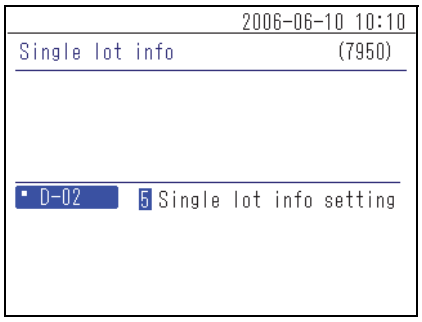


③ On the [Lot information] screen, press [5] for a single reagent or [6] for a multiple reagent.



The operations below are described using the [Single lot info] screen as an example. Press [5].

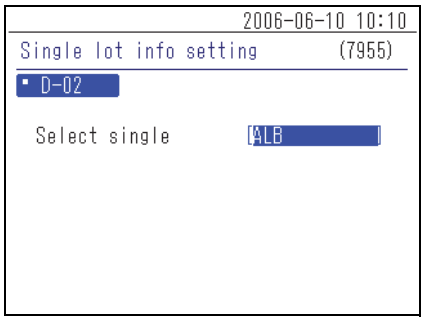
④ Press [5] on the [Single lot info] screen.



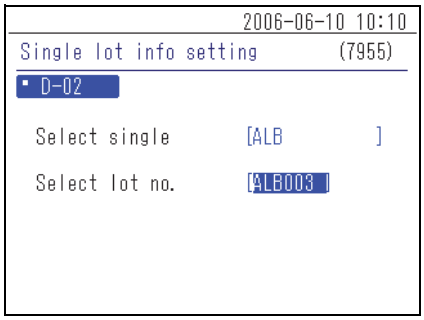
2 Set the lot information

① Press the [—] button on the <Single lot info setting> screen and select the reagent to be set.

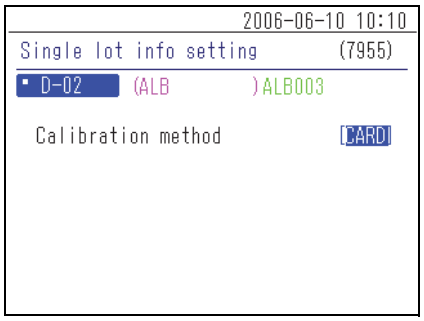
② Press the ↵ button.



③ Select the lot number and press the ↵ button.



④ Select the calibration method and press the ↵ button.



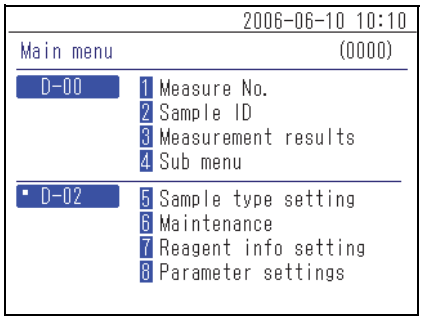
3-5 Parameter Settings

3-5-1 Unit Information Setting (Unit info setting)

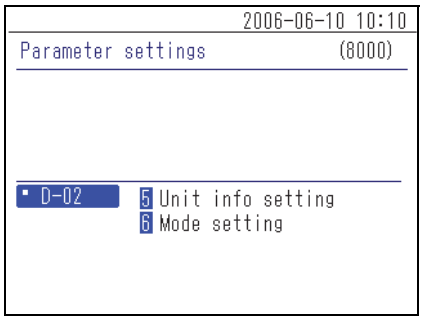
You can set the unit name displayed on the screen, the speaker volume and the warning sound pattern. The available settings are shown in the following table.

Item	Description
Unit name	You can specify the unit name displayed on the screen with a maximum of seven characters. The default unit name is “D-02”.
Speaker volume	You can adjust the speaker volume for warning sounds emitted when an error occurs. Select from [0] (mute) to [4] (maximum volume). The default setting is [2].
Warning sound pattern	You can select the pattern of warning sound ([A] to [E]) emitted when the front cover is opened. The default setting is [A].

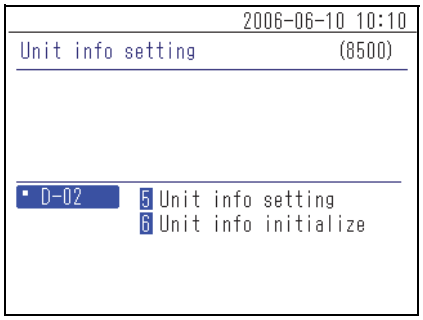
① Press [8] on the [Main menu] screen.



② Press [5] on the [Parameter settings] screen.

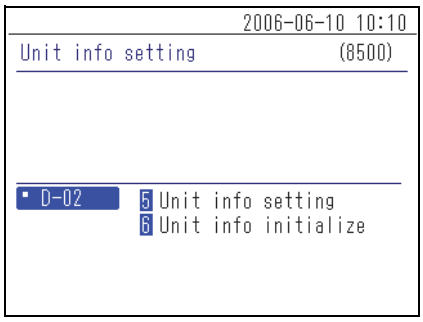


The [Unit info setting] screen is displayed.



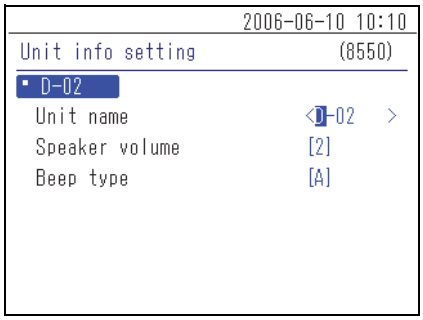
● Setting the unit information

① Press [5] on the [Unit info setting] screen.



② Set the unit information.

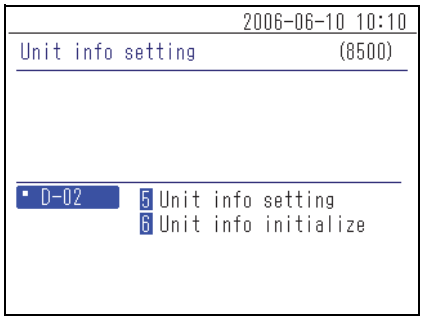
The selected pattern of warning sound at the selected volume is emitted for approximately 3 seconds.



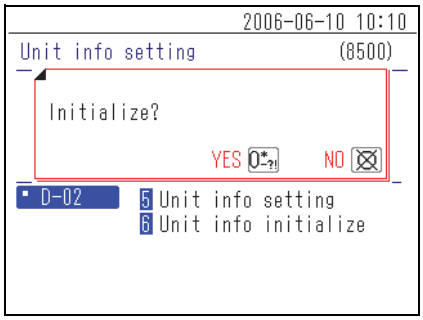
REFERENCE: Enter characters in the [Unit name] field. For details on entering characters, see “2-3-3 Entering Characters” in the “SPOTCHEM D-00 Operating Manual”.

● Initializing the unit information

① Press [6] on the [Unit info setting] screen.



② A message appears prompting a confirmation of initializing the information.



REFERENCE:
- To start initialization, press [0].
- To cancel initialization, press the ⊗ button.

3-5-2 Mode Setting

Select the measurement result printing mode and measurement mode. The available settings are shown in the following table.

Printing mode

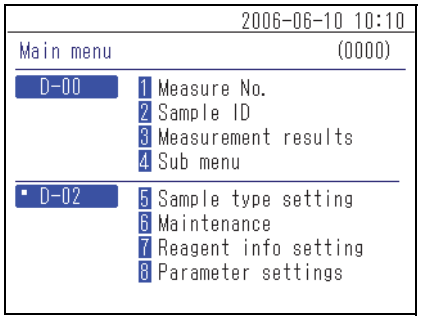
Item	Description
Normal	Prints the normal measurement values.
Survey	Adds and prints the survey measurement values for which unit conversion and correlation correction are not performed.
QC	Prints the QC measurement values for which unit conversion and correlation correction are not performed.

REFERENCE: For more details about the printed measurement result, see “2-5 Viewing the Measurement Result” (page 2-19).

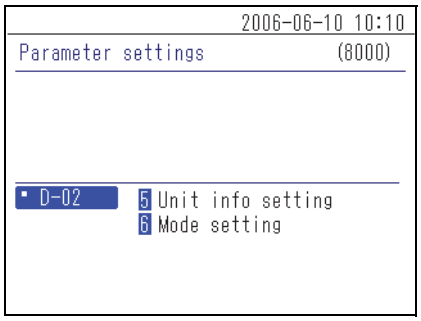
Measurement mode

Item	Description
Normal	Performs normal measurements.
Calibrator	Do not use this item.

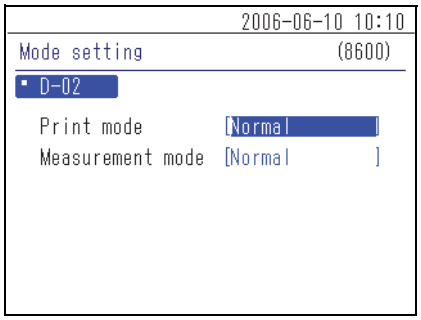
① Press [8] on the [Main menu] screen.



② Press [6] on the [Parameter settings] screen.



③ Press the [—] button, and select the printing and measurement modes.



Chapter 4 Troubleshooting

If a warning, error or malfunction occurs during measurement operation or processing with this instrument, a message may be displayed on the screen.
This chapter describes the content of these messages and troubleshooting techniques.

4-1 Message Types

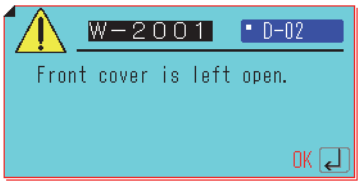
A trouble message appears on the display when the instrument has a problem. There are three levels of such messages based on the severity of the problem.

Message type	Description
Warning	Displayed as “W-20XX”. Follow the displayed message to solve the problem. If the message is repeatedly displayed, turn off the instrument and contact your local distributor.
Error	Displayed as “E-21XX”. See “4-3 Error Messages” (page 4-10) to solve the problem. If the message is repeatedly displayed, turn off the instrument and contact your local distributor.
Trouble	Displayed as “T-2XXX”. A major error has occurred in the instrument. See the message for details. Turn off the instrument and contact your local distributor.

NOTE: Please inform your local distributor of the correct type and number of the message.

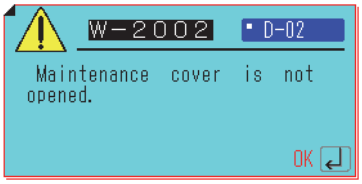
4-2 Warning Messages

W-2001



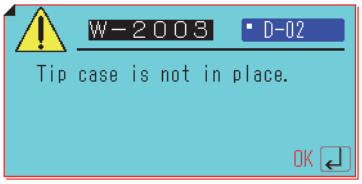
Cause	Possible solution
The front cover or maintenance cover was opened during measurement or startup process.	Check the covers if they are completely closed.
Something is trapped by the front cover.	Remove the object and close the front cover.

W-2002



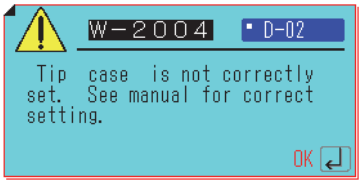
Cause	Possible solution
The maintenance cover is not opened during nozzle cleaning or replacement.	Open the maintenance cover.

W-2003



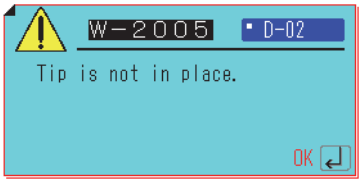
Cause	Possible solution
The tip case is not in place.	Place the tip case.

W-2004



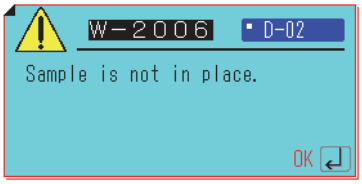
Cause	Possible solution
The tip case is not fully in place.	Check that the tip case is correctly placed in the instrument.
The tip case is dirty.	Clean the tip case.

W-2005



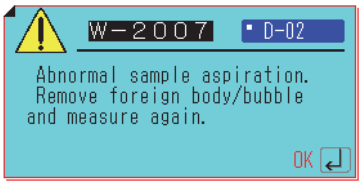
Cause	Possible solution
There are no tips in the tip case.	Correctly place the tips in the tip case.

W-2006



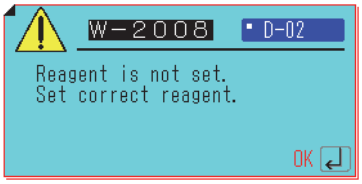
Cause	Possible solution
The cuvette is not in place.	Correctly place the cuvette in the instrument.

W-2007



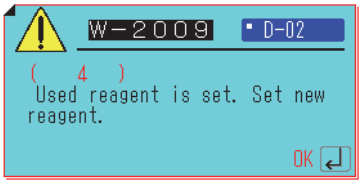
Cause	Possible solution
The sample or reference solution has bubbles or foreign bodies.	Remove the bubbles or foreign bodies.
The piping system or nozzle is clogged or has an air leak.	Clean the nozzle. For details, see “Cleaning the nozzle (Nozzle cleaning)” (page 3-15).
The tip is not correctly attached to the nozzle.	Replace the nozzle. For details, see “Replacing the nozzle (Nozzle replacing)” (page 3-18).

W-2008



Cause	Possible solution
The single/multiple reagent strip or electrolyte plate is not in place.	Place the reagent strips required for measurement in the instrument.

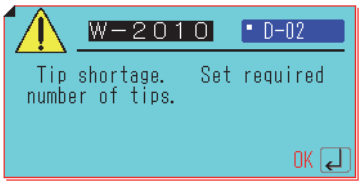
W-2009



REFERENCE: The channel number is displayed on the first line of the message when a used single reagent is placed in the instrument. “M” is displayed on the first line of the message when a used multiple reagent is placed in the instrument.

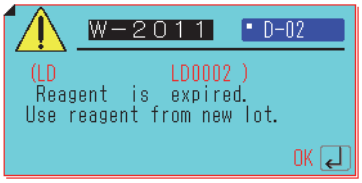
Cause	Possible solution
A used single/multiple reagent strip is placed in the instrument.	Place a new single/multiple reagent strip.
The reagent pad of the single/multiple reagent strip has been discolored due to poor storage environment.	Place a new single/multiple reagent strip.

W-2010



Cause	Possible solution
There are not enough tips for measurement.	Place the number of tips required for measurement in the instrument.

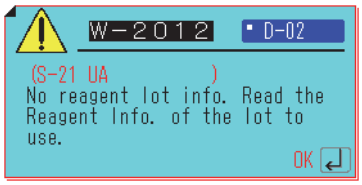
W-2011



REFERENCE: The name and lot number for the expired reagent is displayed on the first line of the message.

Cause	Possible solution
The expired single/multiple reagent strip or electrolyte plate is used.	Use a reagent strip that is not expired.
The built-in clock on the operation unit is not correctly set.	Correctly set the built-in clock on the operation unit. For details, see “4-5-1 Clock Adjustment” in the “SPOTCHEM D-00 Operating Manual”.
The barcode printed on the single/multiple reagent strip or electrolyte plate is unreadable because it is unclear or dirty.	Use a new single/multiple reagent strip or electrolyte plate.

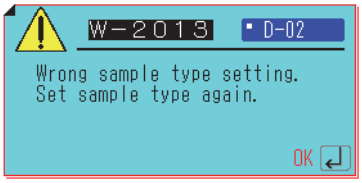
W-2012



REFERENCE: The name of the reagent without lot information is displayed on the first line of the message.

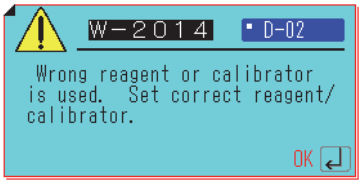
Cause	Possible solution
The Reagent Info. for the single/multiple reagent strip or electrolyte plate has not been read.	Read the Reagent Info. printed on the product box of the single/ multiple reagent strips or electrolyte plate to be measured.
The barcode printed on the single/multiple reagent strip or electrolyte plate is unreadable because it is unclear or dirty.	Use a new single/multiple reagent strip or electrolyte plate.

W-2013



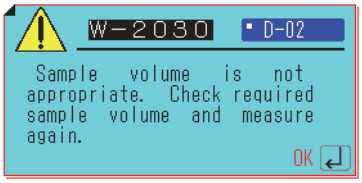
Cause	Possible solution
The sample type setting is incorrect.	To reset the sample type, enter the correct sample type and press the ↵ button.

W-2014



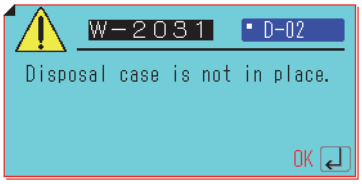
Cause	Possible solution
The calibrator placed in the sample port is incorrect.	Do not use the calibration measurement.
The reagent name or the number of measurements set by calibration by the calibrator kit does not match the type or number of reagent strips placed on the reagent table.	Do not use the calibration measurement.

W-2030



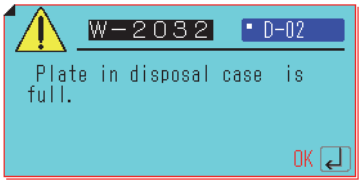
Cause	Possible solution
The sample volume is insufficient.	The required sample volume varies depending on the measurement item. Use a cuvette with an appropriate sample volume.
There is an insufficient volume of distilled water for automatic cleaning of the photometric section.	Add 200 µL of distilled water to the container.
The piping system or nozzle is clogged or has an air leak.	Clean the nozzle. For details, see “Cleaning the nozzle (Nozzle cleaning)” (page 3-15).
The tip is not correctly attached to the nozzle.	Replace the nozzle. For details, see “Replacing the nozzle (Nozzle replacing)” (page 3-18).

W-2031



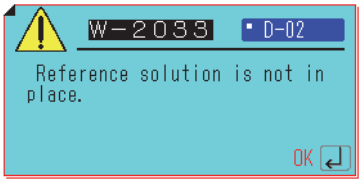
Cause	Possible solution
The disposal case is not in place.	Place the disposal case.

W-2032



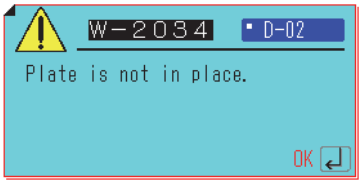
Cause	Possible solution
The disposal case is full of the electrolyte plates.	Remove the electrolyte plates from the disposal case.
There are foreign bodies in the disposal case.	Remove the foreign bodies from the disposal case.
The disposal case is not correctly in place.	Check that the disposal case is correctly in place.

W-2033



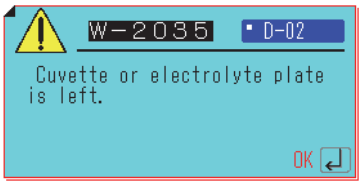
Cause	Possible solution
The reference solution is not in the reference solution port.	Put the reference solution in the port.

W-2034



Cause	Possible solution
The electrolyte plate is not in place.	Place the electrolyte plate on the plate table.
Used reference solution is still on the reference solution port.	Remove the used reference solution from the port.

W-2035



Cause	Possible solution
The cuvette or electrolyte plate is still on the reagent table.	Remove the cuvette or electrolyte plate from the reagent table.

4-3 Error Messages

E-2101	
Cause	**Possible solution**
The instrument turned off during measurement.	① Press the ↵ button. ② Prepare the sample, reagent strip and tip and measure again.

NOTE: If the instrument turns off for some reason during measurement, this message is displayed during the next startup process.

E-2102	
Cause	**Possible solution**
Measurement cannot be performed because an error occurred with one or more of the following. • Temperature control • Optical test • Pressure test • Barcode reader test • Communication with sub-CPU	Press the ⏻ button to restart the instrument.

E-2103	
Cause	**Possible solution**
The tip cannot be attached.	If the O-ring on the nozzle has deteriorated, replace the nozzle. For details, see “Replacing the nozzle (Nozzle replacing)” (page 3-18).

E-2104	
Cause	**Possible solution**
The tip cannot be disposed of.	If the disposal case is full of tips, remove the tips from the disposal case.

E-2105	
Cause	**Possible solution**
The required measurement parameter information has not been entered.	Please contact your local distributor.

REFERENCE: The number of the channel in which the reagent is placed and the reagent or the item number without measurement information are displayed.

E-2106	
Cause	**Possible solution**
The single/multiple reagent strip is not correctly placed on the reagent table.	Correctly place the single/multiple reagent strip on the reagent table. Also, be sure that the single/multiple reagent strip is placed flat on the reagent table.

REFERENCE: The channel with the detected reading error is displayed.

E-2130	
Cause	**Possible solution**
The rubber plate for pressure testing is dirty.	Clean the rubber plate for pressure testing. For details, see “Daily cleaning” (page 3-8).
The nozzle tip is dirty.	Clean the nozzle. For details, see “Cleaning the nozzle (Nozzle cleaning)” (page 3-15).
The piping is disconnected.	Check the piping system and connect it if disconnected.

E-2131	
Cause	**Possible solution**
The white/black plates and/or photometric window are dirty.	Clean the white/black plates and photometric window. For details, see “Automatic cleaning of the photometric window (Windw auto clean)” (page 3-11) and “Daily cleaning” (page 3-8).

REFERENCE: The channel with the detected error is displayed.

E-2132	
Cause	**Possible solution**
The electrolyte plate is not correctly placed on the plate table.	Check that the electrolyte plate is correctly placed on the plate table.
The barcode printed on the electrolyte plate is not clear or unreadable.	Use a new electrolyte plate.

E-2133	
Cause	**Possible solution**
The electrolyte plate is jammed in the plate delivering section.	Remove the electrolyte plate.
There is a foreign body in the disposal case.	Remove the foreign body from the disposal case.

E-2134	
Cause	**Possible solution**
Calibration by calibrator kit failed.	Do not use the calibration measurement.

4-4 Trouble Messages

T-2201	
Cause	**Possible solution**
A supply voltage is abnormal.	Check that the connecting cable is securely connected.

T-2202 / T-2203	
Cause	**Possible solution**
A malfunction occurred with the internal temperature control.	Check the installation/operating environment and use the instrument in an appropriate location.

T-2205	
Cause	**Possible solution**
The optical system in the photometric section has a problem.	Clean the white/black plates and photometric window. For details, see “Daily cleaning” (page 3-8) and “Automatic cleaning of the photometric window (Windw auto clean)” (page 3-11).

T-2204 / T-2210 to T-2999	
Cause	**Possible solution**
An internal malfunction occurred.	Please contact your local distributor.

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5-1 Index

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