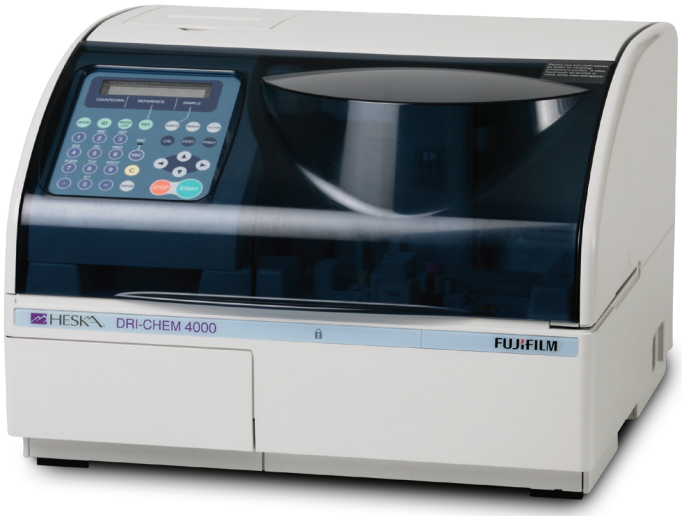
DRI-CHEM 4000

Veterinary Chemistry Analyzer Product Manual



HESKA

Analyzer Description

The DRI-CHEM® 4000 Veterinary Chemistry Analyzer is a multi-parameter in-hospital chemistry analyzer produced for multi-species veterinary applications.

Serial Number

The serial number is located on the rear of the analyzer.

Additional Documentation

Additional documentation available from Heska Corporation includes:

- Quick Steps Guide
- Installation Guide Product Bulletin
- Reference Ranges Chart
- Interfering Substances Product Bulletin
- Performance Summary Booklet
- System Performance Data
- Maintenance and Control Log

Operator Requirements

The following operator requirements must be fulfilled before operating the DRI-CHEM 4000 Veterinary Chemistry Analyzer.

- Basic skills in a laboratory environment.
- Basic skills in diagnostic chemistry.
- It is highly recommended that the operator read and understand this manual.

Optional Accessories and Consumables

Accessories and consumable lists are available from Heska Corporation. Please call 800.464.3752, option 3.

Table of Contents

Section Overview

This section contains safety precautions which must be followed for the safe operation of the DRI-CHEM Analyzer. Before using this equipment, please read this chapter carefully and follow the precautions so that you can operate it correctly.

1.1 Definition of Specific Safety Precautions

Specific safety precautions are noted by the terms **WARNING, CAUTION, IMPORTANT,** and additional information by **NOTE.** The respective meanings are as follows:

⚠ WARNING

Indicates hazardous situations that may lead to serious injury, even death or transmission of infectious agent if the warning is not followed.

⚠ CAUTION

Indicates hazardous situations that may lead to minor or moderate injury or physical damage if the caution is not followed.

ⓘ IMPORTANT

Indicates improper handling that could have an adverse effect on the accuracy of the measurement values.

NOTE: Indicates procedures requiring special attention, instructions that must be followed, supplementary explanations, *etc.*

1.2 Precautions Before Operating This Equipment

⚠ CAUTION

Before using this equipment, please read this User Manual carefully so you can operate it correctly.

⚠ CAUTION

When operating this equipment, be sure to observe the precautions described in this manual. Failure to do so may result in injuries, property damage, or incorrect test results.

⚠ CAUTION

Intended use of this equipment is to quantitate the concentration or the activity of the components in blood by using the DRI-CHEM Analyzer Slides. Do not use the equipment for other purposes. Please read the Instructions for Use for the slides. This equipment is only to be operated by personnel appropriately trained for the intended use and operation.

⚠ CAUTION

In the mode functions described in *Section 6*, there are 2 kinds of modes: one is the administrator mode, which can only be operated by administrators; another is the normal mode, which can be operated by normal operators. The important modes, which affect test results such as Mode 36 (correlation coefficients settings), can only be operated in the administrator mode. The administrator modes must be operated only by the administrators who have the responsibility for the use of the analyzer. Inputting a password in Mode 0 allows the administrators to operate the administrator modes.

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1.3 Biohazards and Disposal

⚠ WARNING

Used (contaminated) consumables (*e.g.*, DRI-CHEM Analyzer Slides, DRI-CHEM Analyzer Auto Tips, DRI-CHEM Analyzer Mixing Cups and sample tubes) and contaminated swabs or cloths used for cleaning the equipment are infectious waste and should be processed in compliance with any applicable local, state or federal regulations.

⚠ WARNING

When discarding the DRI-CHEM Analyzer body that may be contaminated with blood samples, be sure to process it correctly in compliance with any applicable regulations.

⚠ WARNING

When handling samples (blood or urine), slides, tips and cleaning the analyzer or performing maintenance (cleaning the analyzer), always follow biohazard procedures (*e.g.*, wearing gloves, lab coat, and safety goggles). If any part of the body comes in contact with samples, or contaminated supplies or equipment,immediately rinse the contaminated body part thoroughly under running water and disinfect.

1.4 Explosive Hazards

⚠ WARNING

Do not to use flammable and explosive gas around the equipment.

1.5 Electrical Hazards

⚠ WARNING

The power supply voltage applied to the equipment is AC100–240V.
To avoid electrical shock, observe the following precautions:

- Avoid installation sites where water may splash on the equipment.
- Plug the power cable of the equipment into an outlet with a grounding receptacle. Electrical shock may occur, if the equipment is not grounded to a protective earth.
- Make sure that all cables have been properly connected.

⚠ WARNING

Do not remove covers or other parts that are secured with screws, as electrical shock may result from hazardous voltage or injury from moving parts.

1.6 Electromagnetic Compatibility (EMC)

This equipment conforms to the following EMC requirements:
EN61326:1997 + A1:1998 + A2:2001 + A3:2003 (Class A)
FCC Part 15 Subpart B: 2006, Class A
ICES-003 Issue No. 4, Class A

This is a Class A product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures.

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

This Class A digital apparatus complies with Canadian ICES–003.
Cet appareil numerique de las class A est conforme a la norme NMB-003 du Canada.

If this equipment does cause harmful interference to other devices, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving device.
- Increase the separation between the equipment.
- Connect the equipment into an outlet on a circuit different from that to which the other device(s) are connected.

Consult the manufacturer or field service technician for help.

⚠ CAUTION

Do not use other devices which generate and can radiate radio frequency energy near the DRI-CHEM Analyzer. Otherwise, physical damage or malfunction may occur.

1.7 Installation Site Requirements

⚠ WARNING

Plug the power cable of the equipment into an outlet with a grounding receptacle. Electrical shock may occur if the equipment is not grounded to a protective earth.

⚠ CAUTION

Avoid the following installation sites:

- **Places where spills or water leakage may occur.**
- **Places where the equipment is exposed to direct sunlight.**
- **Places near hot sources such as heaters.**
- **Places where temperature drastically changes.**
- **Places where the equipment is subject to vibration or is unstable.**

1. Install the equipment in the following environmental conditions:

Location:	Indoor Use
Illumination:	Below 6000 cd/m^2 (lux) (Below 3000 cd/m^2 (lux) when using the sample barcode reader)
Altitude:	Up to 2000m (6,500 ft)
Transient overvoltage category:	II
Pollution degree:	2
Operating temperature:	59°F to 89°F (15°C to 32°C)
Operating humidity:	30% to 80% RH (no dew condensation)

2. Use the equipment under the following electrical requirements:

Voltage limit:	100–240 V
Frequency:	50–60 Hz
Supply voltage fluctuations:	±10%
Rated wattage:	200 VA
Phase:	Single
Type of protection against electrical shock:	CLASS 1 EQUIPMENT

3. Plug the DRI-CHEM Analyzer into an independent AC outlet separate from other devices.
4. At least 10 cm (4 inches) of clearance is required on all sides.
5. Unplug the equipment from the AC outlet if it will not be used for an extended period of time.

1.8 DRI-CHEM Analyzer Slides (SD)

(Henceforth, DRI-CHEM Analyzer Slides (SD) is shortened into "slide" in this manual).

IMPORTANT

The slides should be stored in a refrigerator (2–8°C, 36–46°F) without opening the individual packages to avoid humidity, light, and heat.

- Only the required number of slides should be taken out of the refrigerator and warmed up to room temperature before opening the individual packages.
- Use immediately after opening the individual package.
- Do not touch either the center part of the surface or the back of the colorimetric test slides.
- Do not touch the thread bridge part of the electrolyte slide.
- A new slide must be used for each measurement. Do not reuse.

NOTE: If slides have not been used and are still in their wrappers, they may be placed back in a refrigerator as long as they are the first to be used the next day.

NOTE: Types of slide packages and containers for liquids (*e.g.*, diluent, reference fluid) are subject to change without notice.

List of DRI-CHEM Analyzer Slides

Classification		Test Name	
Biochemical Tests	Enzymes	ALP	Alkaline Phosphatase
		AMY	Amylase
		CPK	Creatine Phosphokinase
		GGT	Gamma Glutamyltransferase
		GOT/AST	Aspartate Aminotransferase
		GPT/ALT	Alanine Aminotransferase
		LDH	Lactate Dehydrogenase
		LIP	Lipase
	General Chemistry	ALB	Albumin
		BUN	Blood Urea Nitrogen
		Ca	Calcium
		CRE	Creatinine
		GLU	Glucose
		IP	Inorganic Phosphorus
		Mg	Magnesium
		NH3	Ammonia
		TBIL	Total Bilirubin
		TCHO	Total Cholesterol
		TG	Triglyceride
		TP	Total Protein
		UA	Uric Acid
	Electrolytes	Na	Sodium
		K	Potassium
		Cl	Chloride

NOTE: Specifications and capabilities are subject to change without notice.

1.9 Calibration Card System

1. Calibration cards are packed together with slides in the same box. Before you start using a new lot of slides, read the Calibration card using the Calibration card reader. It is advisable to store the Calibration card in the box it came in until the accompanying lot of slides has been used.
2. Read the calibration card when the display shows [Ready], [Warming Up], or [Lamp Off].

1.10 DRI-CHEM Analyzer Auto Tips, Sample Tubes, and DRI-CHEM Analyzer Mixing Cups

(Henceforth, DRI-CHEM Analyzer Auto Tip is shortened into "tip," Sample Tubes into "Sample tubes," and DRI-CHEM Analyzer Mixing Cups into "mixing cup" in this manual).

The sampler of the DRI-CHEM Analyzer performs pipetting automatically. However, it is necessary to load the Auto Tip, Sample Tubes (Heparin or Non-Heparinized Tube), and Mixing Cups designed for use with the DRI-CHEM Analyzer.

The Sample Tubes include the following:

- HEPARIN TUBE 1.5 ml (green cap)
- HEPARIN TUBE 0.5 ml (green cap)
- NON-HEPARINIZED TUBE 1.5 ml (red cap)
- NON-HEPARINIZED TUBE 0.5 ml (red cap)

IMPORTANT

Use new tips, Sample Tubes, and cups for each sample. Do not reuse old ones.

IMPORTANT

Do not use products other than specified products designed for the DRI-CHEM Analyzer, as using non-specified products could cause inaccurate test results and damage the analyzer.

1.11 Light Source Lamp

WARNING

The light source lamp gets very hot. Before replacing the lamp, turn the power off and wait at least 5 minutes.

1. The light source lamp is a halogen lamp. Do not touch the glass surface of the lamp with bare hands.
2. The lamp is expendable. A spare lamp should be readily available in case the lamp burns out.

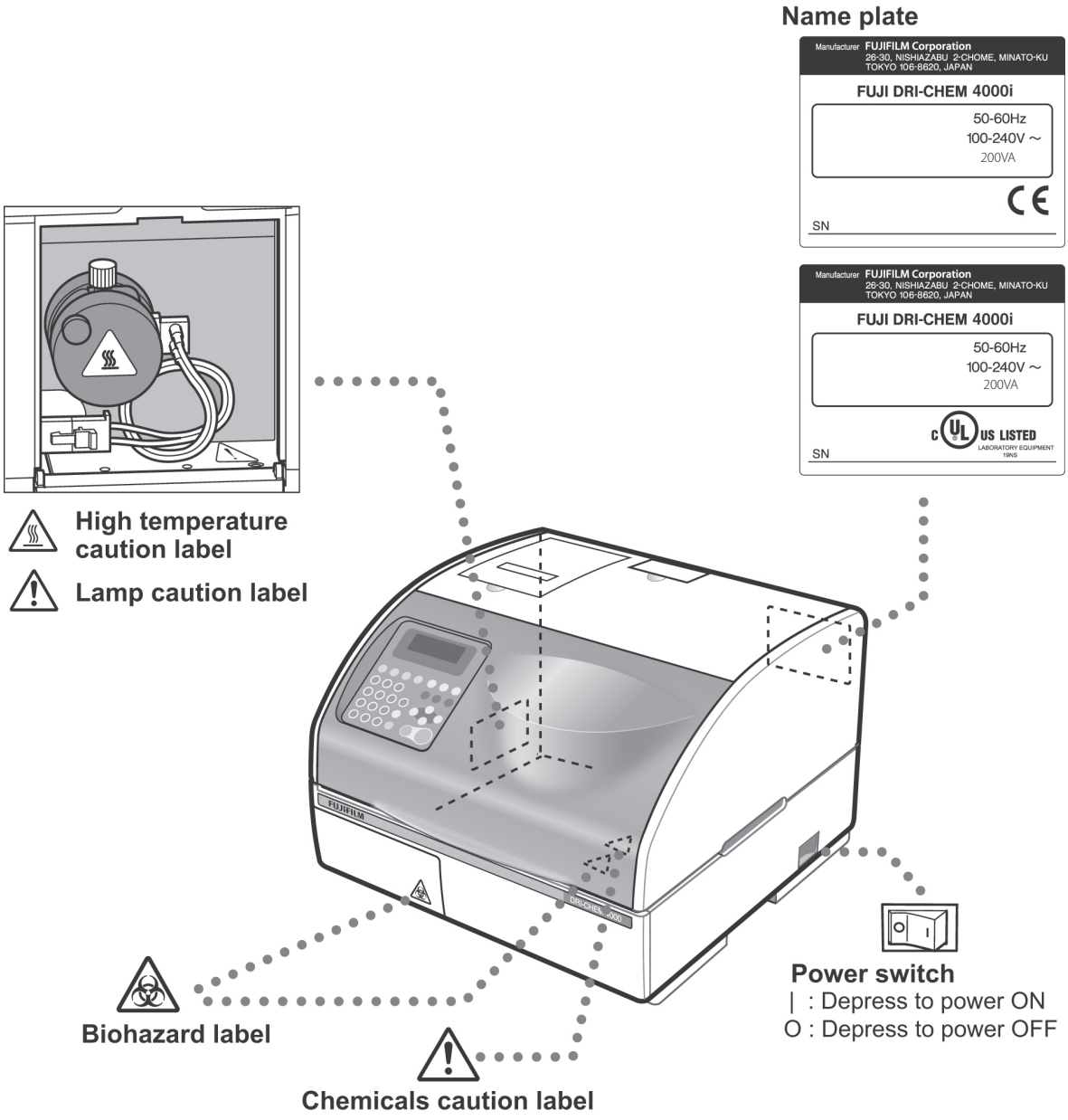
1.12 Recording Paper

1. Use specified recording paper for the DRI-CHEM Analyzer.
2. Do not use paper other than the type specified, as this could damage the printer head.

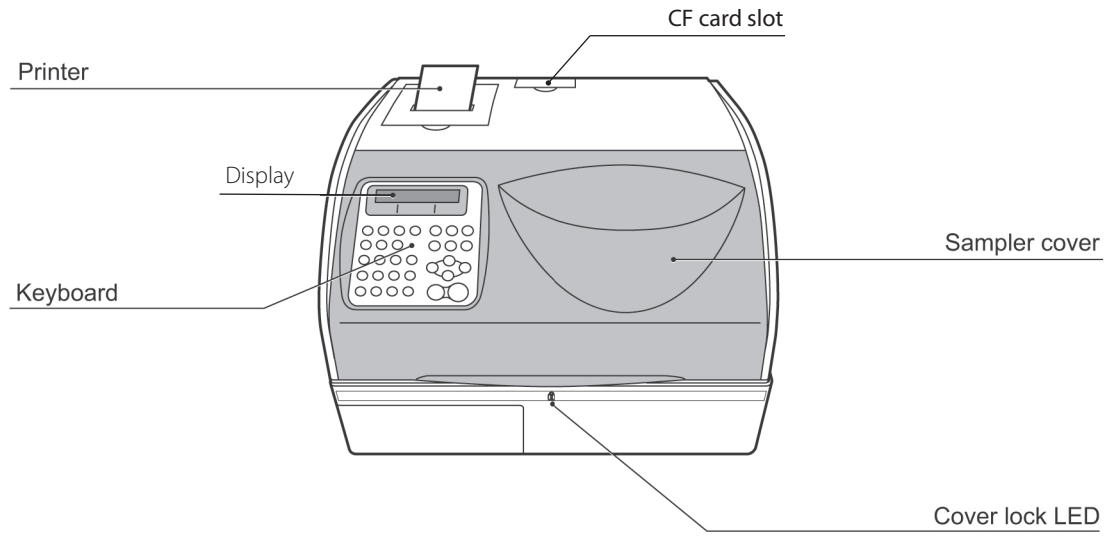
1.13 Warning Labels

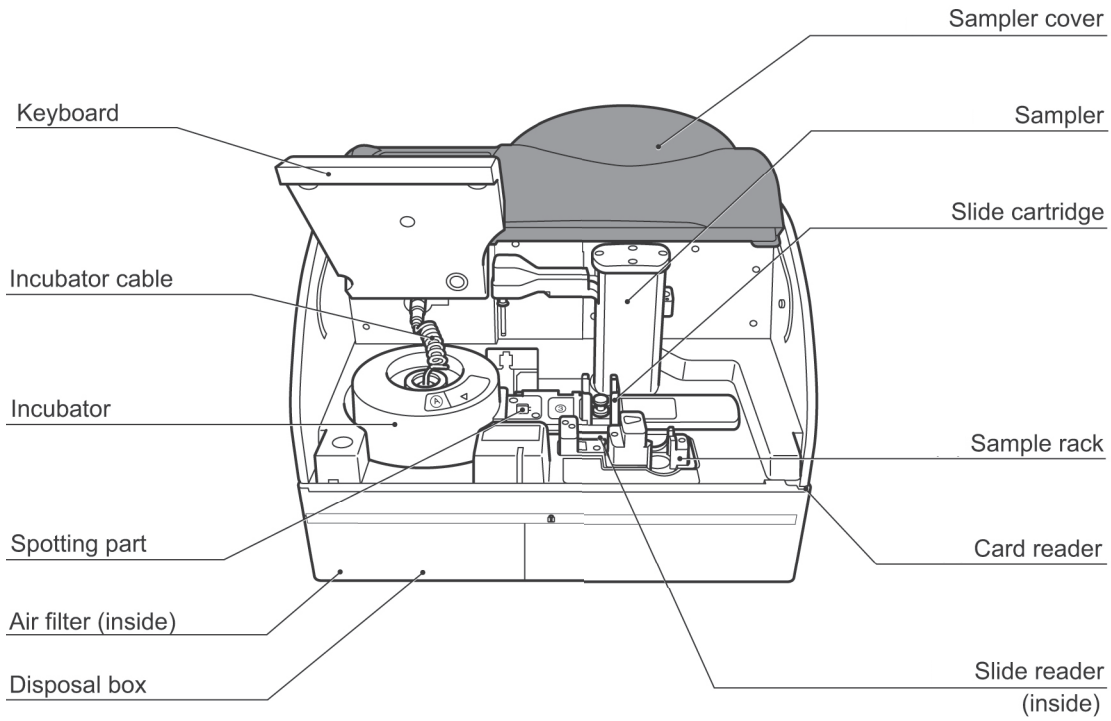
Warning labels and safety labels on the DRI-CHEM Analyzer are:

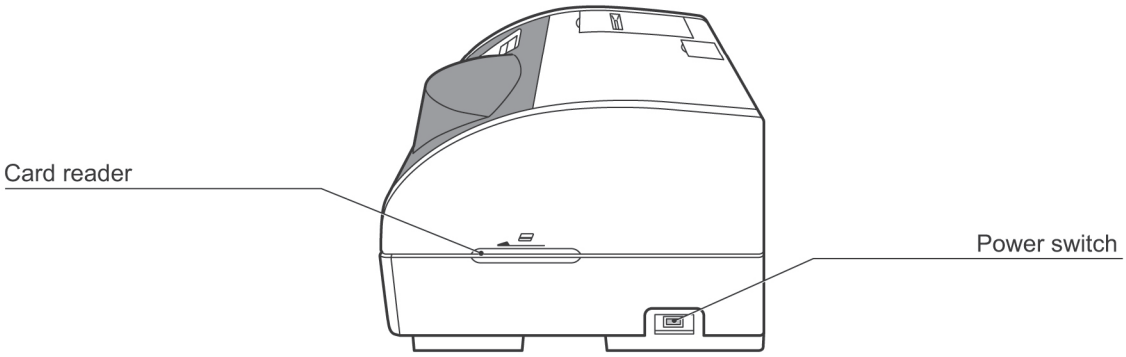
- High temperature caution label
- Lamp caution label
- Biohazard label
- Chemicals caution label
- Power switch
- Name plate

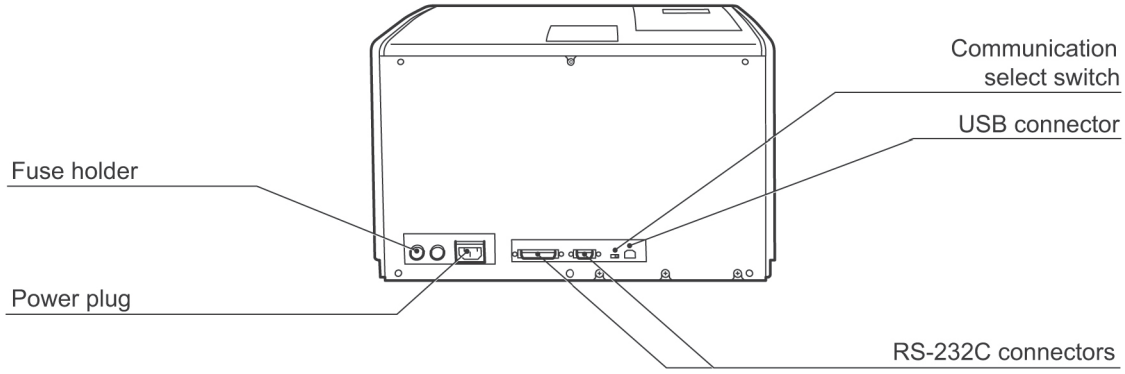


2.1 Component Names







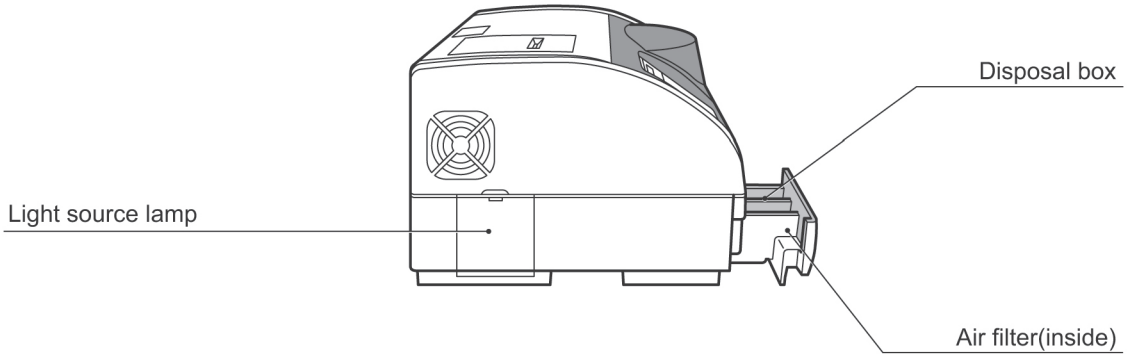


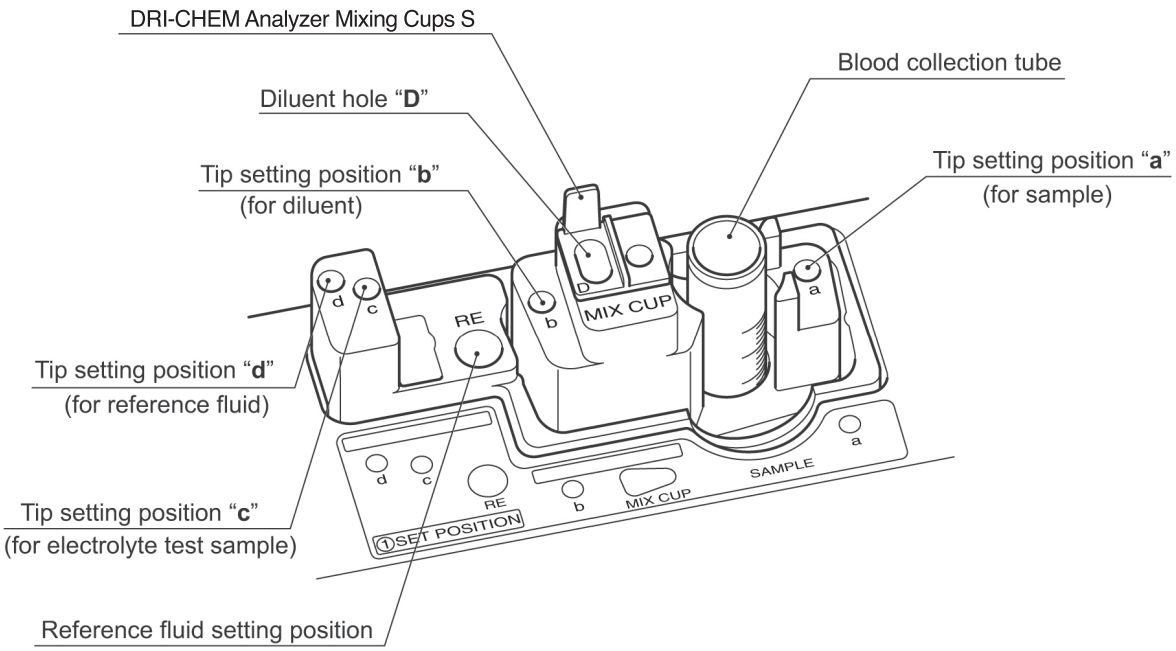
⚠ CAUTION

Do not connect the RS–232C connector to a sample barcode reader other than specified for the DRI-CHEM Analyzer.

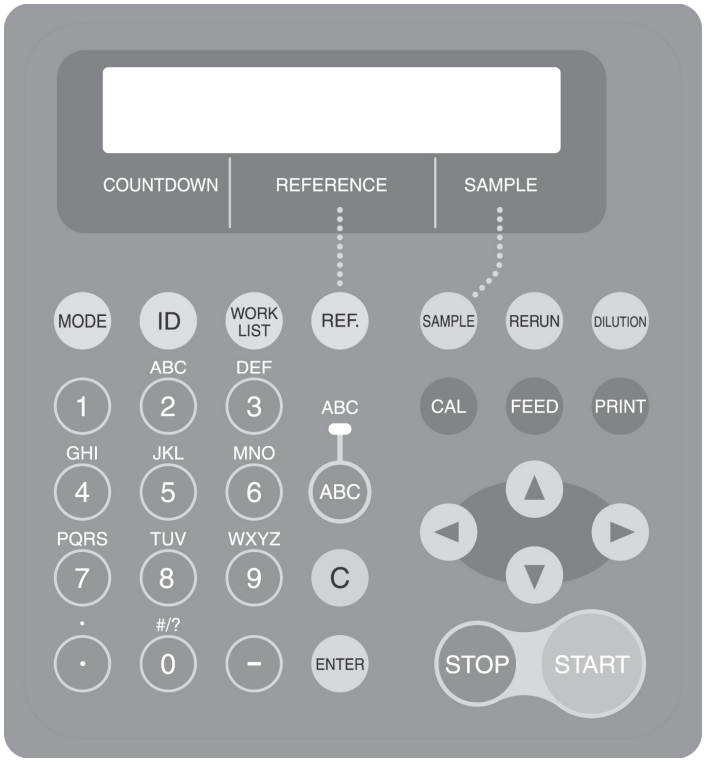
Do not connect the RS–232C or USB connector to a computer or PC which has not been approved by IEC/UL60950–1. (Refer to *Section 6.2.20*)

Do not connect an external printer to the RS–232C or USB connectors.




DRI-CHEM Analyzer Mixing Cups S
Blood collection tube
Diluent hole “D”
Tip setting position “a”
(for sample)
Tip setting position “b”
(for diluent)
Tip setting position “d”
(for reference fluid)
Tip setting position “c”
(for electrolyte test sample)
Reference fluid setting position
d
c
RE
b
D
MIX CUP
a
SAMPLE
①SET POSITION

2.2 Names and Functions of Keyboard Controls



DISPLAY

Displays the status of the "analyzer" and the operating procedures.

COUNTDOWN

Displays estimated time (sec.) to complete current measurements on the analyzer.

REFERENCE

Displays a selected reference interval (*e.g.*, DOG).

SAMPLE

Displays a selected sample type.

Cover lock LED

The LED lights when the sampler cover is locked during sample processing.

MODE KEY

The MODE key is used to enter Mode functions.

ID KEY

The ID key is used to input sample numbers or sample IDs.

WORK LIST KEY

The WORK LIST key is provided for requesting patient ID and test request information (work list) from an external PC.

REF. KEY

The REF. key is used for selecting a species reference interval.

NUMERIC KEYS

The numeric keys are used for inputting alphanumeric characters during sample No./ID input or mode operations.

PERIOD KEY

The period key is used for inputting a decimal point.

MINUS KEY

The – (Minus) key is used for inputting the minus(–) sign.

ABC KEY

The ABC key is used for selecting either alphabetical or numerical character input mode.

ABC indicator light

When the alphabetical character input mode has been selected, the ABC indicator light will be on.

C (clear) KEY

The clear key is used for deleting incorrect input data.

ENTER KEY

The ENTER key is used for completing data input.

SAMPLE KEY

The SAMPLE key will be used for selecting sample types. The sample type changes each time the key is pressed. The order of change is P/S (plasma/serum), U (urine) and W (whole blood). The U + W functions are not used with Heska's current slide set.

RERUN KEY

The RERUN key is used for rerunning tests with the previous sample. The test will be performed using the previous sample No., sample ID and reference interval.

DILUTION KEY

The DILUTION key is used for setting the dilution factor.

CAL KEY

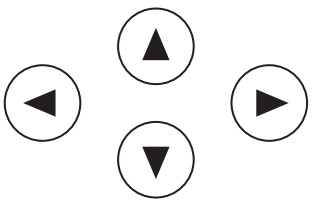
The CAL key is used for performing calibration for immuno-chemical tests. This function is not used with Heska's current slide set.

FEED KEY

The FEED key is used for advancing recording paper in the printer. The paper advances one line each time the key is pressed.

PRINT KEY

The PRINT key is used for printing data during mode operations.



SCROLL KEYS

The scroll keys are used for moving the cursor during key input or selecting a menu.

STOP KEY

The STOP key is used for stopping a sampling process. The sampler stops after discarding tips. To restart the sampling process, load new tips into the sample rack and press the START key. This key is also used for stopping alarms and terminating a mode process.

START KEY

The START key is used to start testing. If tests have not been run for more than 20 minutes, the light source lamp turns off. When START is pressed, the light will turn on and Warming Up will be displayed.

Section Overview

Following is an overview of the operations and processes used to obtain test results. Detailed operation procedures begin with *Section 3.2*.

3.1 Principles of Operations

Slide loading:

The analyzer can compensate for the differences between the slide production lots by reading the Calibration card included with each box of slides. The slides are unwrapped and loaded in the slide cartridge after they reach room temperature. An electrolyte (ISE) slide can be loaded in the cartridge with colorimetric (CM) slides. The cartridge can contain a maximum of 20 slides at one time. The analyzer identifies the test name and slide lot by scanning the printed information on the back side.

Sample loading:

Specific sample tubes (0.5 ml and 1.5 ml) are used. Sample volume to be aspirated is automatically determined for each tube. When running electrolyte tests, reference fluid must also be loaded. When diluting the sample automatically, a mixing cup with diluent must be loaded.

Sampling and spotting:

The sampler detects the surface of the sample, aspirates the required volume of sample, and spots it on the slide. In dilution mode, the sampler dilutes the sample with diluent, and spots it on the slides. The spotted slide is transferred into the incubator.

Incubation:

The incubator can hold a maximum of 6 colorimetric slides and 1 electrolyte slide. Colorimetric slides are incubated for up to 6 minutes (varies by test) at 98.6°F (37°C) and an electrolyte slide for 1 minute at 86°F (30°C). If slides remain in the cartridge, they will be transferred one by one into the incubator until the cartridge is empty.

Photometer and potentiometer readout:

The photometer head below the incubator reads the reflectance of the colorimetric slides as well as the white reference plate and the black reference plate. The analyzer uses the reflectance readings, together with the reference readings, the standard curves, and the calibration information to determine the concentrations of the samples. The potentiometer head below the incubator reads the potential of the electrolyte slide. The analyzer determines the concentrations of the electrolyte in the sample using the potential readings, together with the standard curves. The test results are printed out, and can be transmitted to an external computer if desired.

Consumable disposal:

Used slides and tips are discarded into the disposal box. The used sample tube, mixing cup with diluent, and reference fluid must be removed by hand.

3.2 Detailed Operations

Preparation:

List of daily checks before use.

1. Empty disposal box.
2. Check air filter in disposal box.
3. Remove any used consumables such as mixing cup, reference fluid and sample.
4. Check printer paper for red line appearing along the sides indicating the need to replace.

IMPORTANT

If the disposal box is completely filled, slide transfer and tip eject errors may occur.

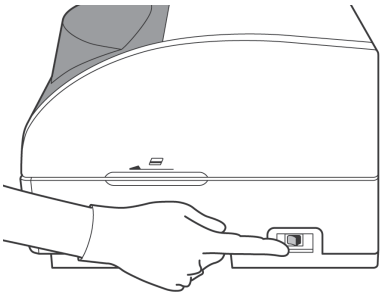
IMPORTANT

If the analyzer is used with a clogged filter or no filter, test results may be affected.

Turning the power on

1. Close the sampler cover.

   NOTE: If the sampler cover is still open, an error will occur.



2. Turn the power switch on. (Depress the [I] side of the power switch.)

   NOTE: Turning the power on for the first time or after the power has been off for a long period of time may cause a and the time using Mode 20. (Refer to *Section 6.2.3*).

   NOTE: When turning the power on, the message below will appear on the display.

```
Empty disposal box
```

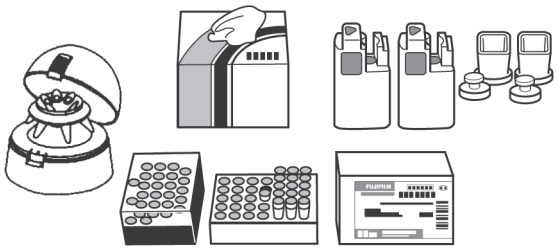
3. Dispose of used slides and tips if they have not already been discarded.
4. Check printed date and time. If the date and time is incorrect, adjust it using Mode 20. Refer to *Section 6.2.3 for Mode 20 operation*.

IMPORTANT

If date and time are not adjusted correctly, the analyzer may fail to determine the expiration dates of the slides, resulting in the possibility of inaccurate test results.

5. Prepare the necessary peripheral accessories.

   Take out the slides from the refrigerator and allow them to stand at room temperature without unwrapping for a minimum of 5 minutes.



List of daily checks after use:

1. Empty disposal box.
2. Remove any used consumables such as mixing cup, reference fluid and sample.
3. Clean any spills on and around the spotting part and sample rack.

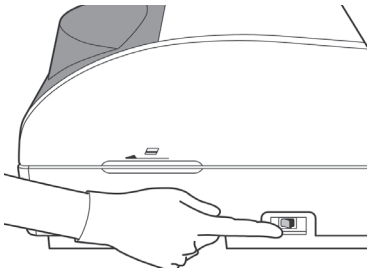
Turning the power off:

1. Before turning the power off make sure that measurements and mode operations are not in progress.

⚠ CAUTION

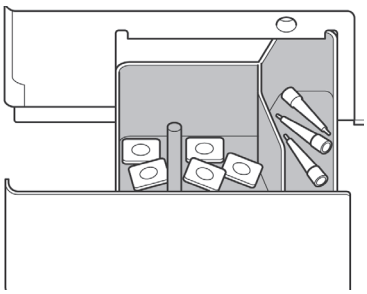
Do not turn off the power during measurement process and mode operations; physical damage may occur. If the power is cut off during measurement process, load consumables (tips, *etc.*) and perform the tests from the beginning. Be sure to replace the mixing cup in case tests require dilution.

2. Turn the power switch off. (Depress the [0] side of the power switch.)

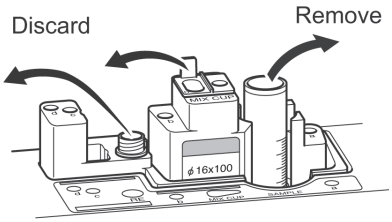


Remove the disposal box and dispose of the tips and slides.

NOTE: When disinfecting the disposal box, use ethyl or isopropyl alcohol or 0.5% sodium hypochlorite solution. When using sodium hypochlorite, wash the disposal box well and dry before use.



Dispose of any used mixing cup, remaining reference fluid and remaining sample.



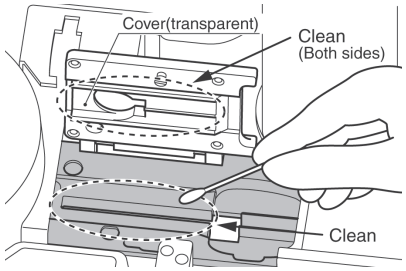
Calibration card system:
The calibration card system compensates for variations between production lots of DRI-CHEM Analyzer slides and ensures uniform performance.

The lot compensation coefficients are magnetically recorded on calibration cards, and one calibration card is packed with each box of slides except electrolytes. When data is input from a new card, the previously stored lot compensation coefficients are updated. In addition to the lot compensation coefficients, each calibration card also has slide data essential for performing measurements. Therefore, read in the new calibration card when you switch to a new lot of slides.

NOTE: The analyzer can store information for 2 lots of each slide type and 2 lots of each panel type. When more than 2 lots of QC information are read, the oldest QC information will be deleted.

Clean the spotting area and around the sample rack. If necessary, use swabs moistened with ethyl alcohol for cleaning.

Close the sampler cover.



Sample racks:

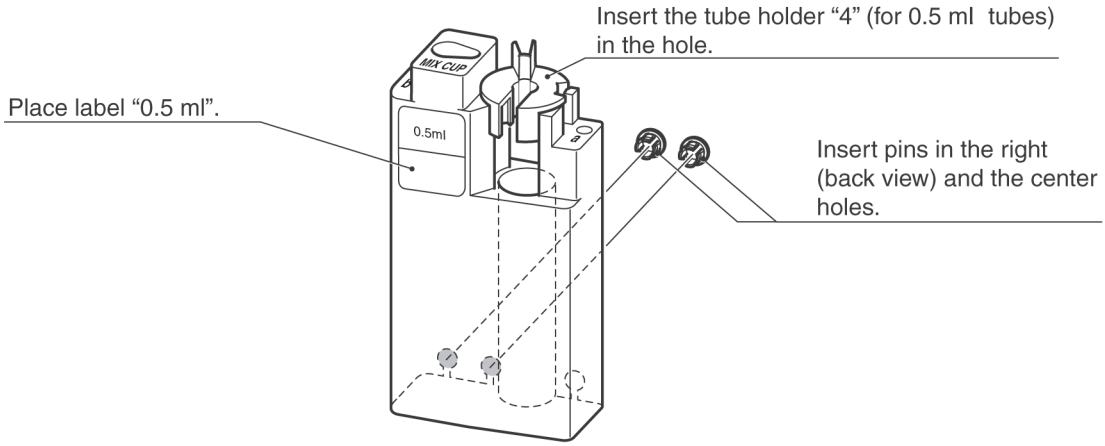
Two pre-assembled sample racks are supplied with the instrument. The proper sample rack must be placed in the instrument depending on the sample tube selected.

1. Sample Rack for 0.5 ml Sample Tubes

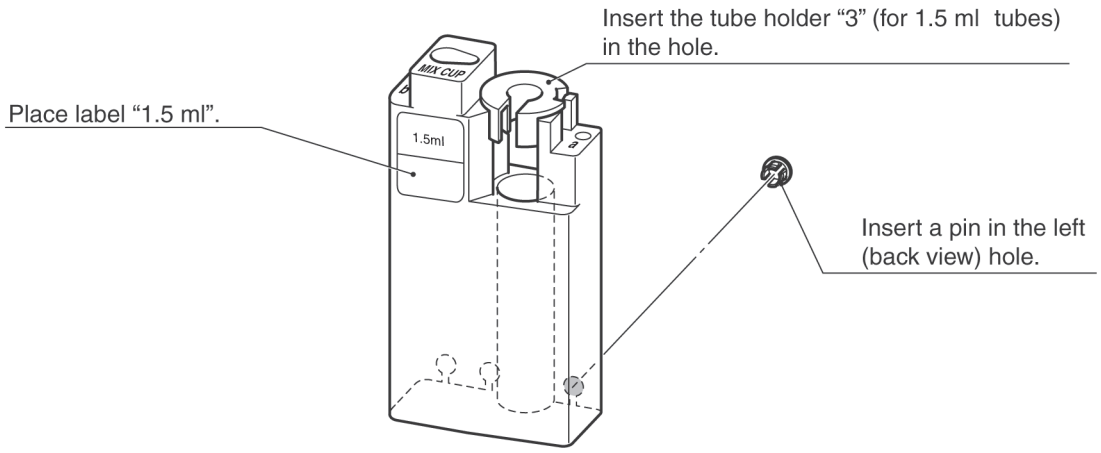
Using QC cards:

1. Read QC cards when a new slide type will be used or when changing to a new lot of slides.
2. Make sure [Ready], [Warming up] or [Lamp OFF] is displayed.
3. Insert a QC card into the card reader on the right side of the instrument, and pull it towards you.
4. The test name and lot number are indicated on the display and the printer.

NOTE: If [QC ERR] appears, read the QC card again.



2. Sample Rack for 1.5 ml Sample Tubes



Using samples with sample tubes

Four types of Sample Tubes are available:

1. 0.5 ml Heparin Tubes (green cap)
2. 1.5 ml Heparin Tubes (green cap)
3. 0.5 ml Non-Heparinized Tubes (red cap)
4. 1.5 ml Non-Heparinized Tubes (red cap)

Obtaining plasma samples

Untreated whole blood can be collected and placed directly into Heparin Tubes (green cap).

Whole blood samples already containing lithium heparin from another collection tube can be transferred into Non-Heparinized Tubes (red cap).

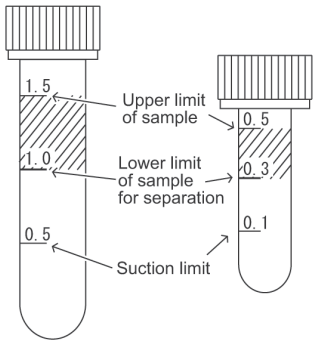
Put caps on the tubes and mix the contents by gently inverting them five or six times.

Centrifuge the samples at least 2 minutes using the supplied centrifuge or another suitable centrifuge.

NOTE: The top surface of the sample fluid must be within the shaded section of the tubes as shown below. If the blood in the tube is below the suction limit mark, the analyzer will display an insufficient sample volume error.

NOTE: For aspirating only the plasma (of the centrifuged sample) and to avoid aspiration of red blood cells, at least 1.0 ml (for 1.5 ml tube) or 0.3 ml (for 0.5 ml tube) of the whole blood sample should be put in each tube.

NOTE: The maximum number of tests that can be performed using a 0.3 ml whole blood sample in a 0.5 ml sample tube is five.



Obtaining serum samples

Collect whole blood samples not processed with anticoagulant into standard glass clinical plain tubes. Allow sample to clot at room temperature for at least 20 minutes (40 minutes for horses). Centrifuge the sample using a standard clinical centrifuge according to standard practices.

Transfer the separated serum into a 0.5 ml non-heparinized tube (red cap) and place in the instrument for analysis.

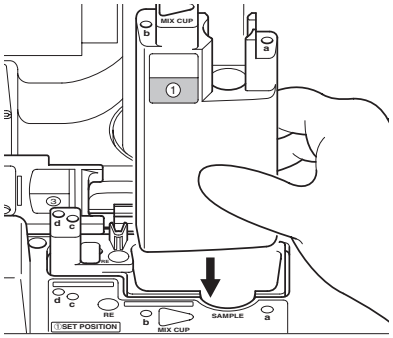
NOTE: The top surface of the sample fluid must be within the shaded section of the tube as shown. If the sample is below the suction limit mark, the analyzer will display an insufficient sample volume error.

NOTE: To avoid an error, make sure there are no bubbles in the sample. Use a centrifuge to remove bubbles if necessary.

3.3 Operations

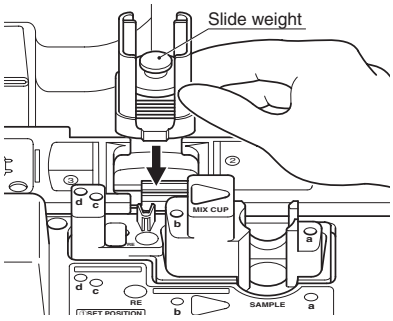
Basic operations (excluding electrolyte tests and tests that require dilution)

1. Make sure [Ready] is displayed.
2. Open the sampler cover.
3. Set a specified sample rack for the sample tube to be used at the "1 SET POSITION" label on the analyzer.
4. Load slides in a slide cartridge. Place slides to be tested, printed test name facing up and barcode facing down.
5. Place a slide weight on the slides.



NOTE: When performing dilution or electrolyte tests for the same sample, there are rules for slide stacking orders. Refer to the Slide Stacking Order later in this section.

6. Place the slide cartridge in the analyzer with the label side facing the "2 SET POSITION" label on the analyzer.
7. Put a DRI-CHEM Analyzer Auto Tip (henceforth, "tip") into hole "a" on the sample rack.
8. Set an appropriate sample tube in the sample rack. Make sure cap is removed.



NOTE: To avoid an error, make sure there are no bubbles in the sample. Use a centrifuge to remove bubbles if necessary.

9. Make sure sample type is set to P/S (plasma or serum). If P/S is not displayed on the screen, press **SAMPLE** until P/S appears.
10. Select a species or control using REF. button. Press REF. to toggle through DOG, CAT, HORSE, OTHER or CONTROL.
11. Input a sample No. and a sample ID as follows:
    - Press **ID**.
    - Input a sample number at "No.=" prompt or simply press **ENTER** to accept the default number.
    - Input a sample ID at the [ID=] prompt using the keypad and ABC button.

NOTE: Refer to *Section 3.4* for input.

NOTE: A maximum of 13 numeric characters can be input for a sample number.

NOTE: A maximum of 13 alphanumeric characters can be input for a sample ID.

NOTE: If no sample ID is input, the sample number will be printed out along with the test results.

12. Close the sampler cover.

NOTE: Measurements cannot start with the sampler cover open.

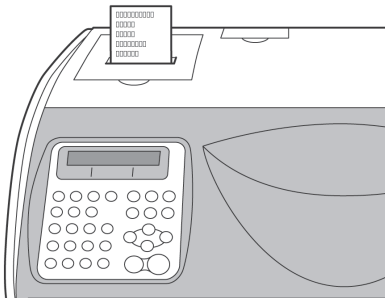
13. Press **START** to start tests.

IMPORTANT

The disposal box must remain closed during testing. Otherwise, the test results may affected.

NOTE: When the message on the display returns to [Ready] and the cover lock LED turns off, the sampler cover can be opened and the next sample and tests can be prepared.

14. The test results will be printed out.
15. After the tests are complete, remove the remaining sample.

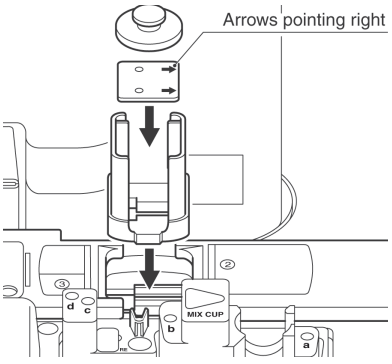


IMPORTANT

The capacity of the disposal box is 80 slides. If the number of slides used per day exceeds 80, the disposal box must be emptied more than once a day.

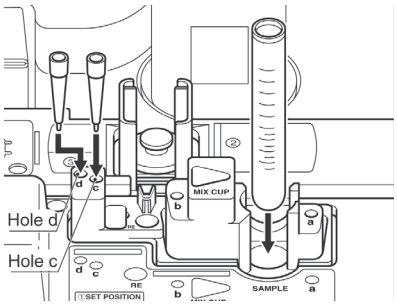
Electrolyte tests

1. Make sure [Ready] is displayed.
2. Open the sampler cover.
3. Set a specified sample rack for the sample tube to be used at the "1 SET POSITION" label on the analyzer.
4. Place an Electrolyte slide in a slide cartridge with the arrow indications facing up and pointing to the right.
5. Place the slide weight on the slide.



NOTE: Only one electrolyte slide can be loaded in a slide cartridge at any given time.

6. Place the slide cartridge with the label side facing the "2 SET POSITION" label on the analyzer.
7. Put tips into holes "c" and "d" on the sample rack.
8. Remove the cap from the Sample Tube which contains sample. Put the tube in the sample rack.



NOTE: To avoid an error, make sure there are no bubbles in the sample. Use a centrifuge to remove bubbles.

9. Pour or pipette at least 100 µL of reference fluid (DRI-CHEM Analyzer Reference Fluid RE) into a 0.5 ml Non-Heparinized Tube and insert it into the set position just before the test. Do not put a cap on the tube.

IMPORTANT

If the sample tube is set in the reference fluid position, erroneous test results will be obtained. Be sure to set in the sample position on the sample rack.

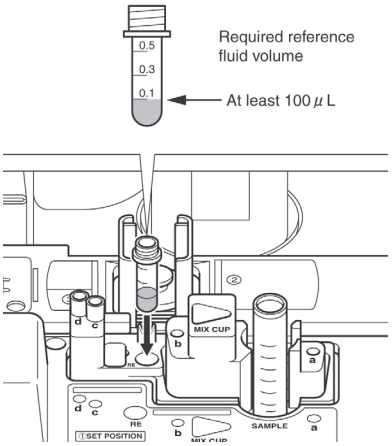
MPORTANT

If the reference fluid is set in the sample setting position, erroneous test results will be obtained. Be sure to set in the reference fluid position.

NOTE: A dead volume of 50 µL of reference fluid will remain in the bottom of the tube and cannot be aspirated.

NOTE: Do not use Heparin Tube for the reference fluid.

NOTE: : As reference fluid evaporates gradually, dispose of remaining liquid after the tests.



10. Enter sample number, sample ID and reference interval as described in Basic Operations
11. Close the sampler cover and press **START**.
12. After the tests are completed, dispose of the remaining reference fluid or cap the reference fluid tube.

About automatic test start

If the analyzer is not used for 20 minutes while [Ready] is indicated on the display, the light source lamp is turned off to save lamp life (according to the default setting for Mode 44). When this occurs the [Lamp Off] message appears.

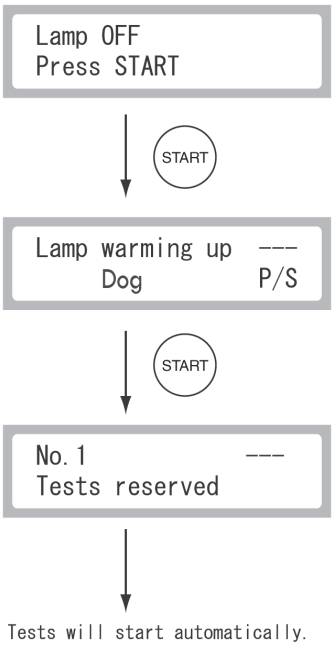
If START is pressed the light source lamp turns on [Warming up] is displayed.

At this point a sample, tip and slides can be loaded and ID information entered. By pressing START during this process, the analyzer is set to start tests automatically when ready. The display will indicate "Tests reserved".

NOTE: To cancel the automatic test start, press **STOP**.

NOTE: When performing rerun tests press **RERUN** prior to pressing **START** to set the automatic test start. Review rerun details later in this section.

NOTE: When performing tests that require dilution, set the dilution factor using the DIL key prior to pressing START to set the automatic test start. Review dilution details later in this section.



Tests that require dilution

There are 2 ways to perform tests that require dilution. The first is using the DILUTION button to set a dilution factor which is described in this section. The second is using Mode 45 to preset a dilution factor for any test type such that any time that test is used the dilution occurs automatically. The Mode 45 method is described fully in *Section 6*.

NOTE: The test results are multiplied by the dilution factor before printing; no re-calculation is necessary.

NOTE: Only one dilution factor can be set for a sample run.

NOTE: The maximum number of dilution tests for one mixing cup is 3.

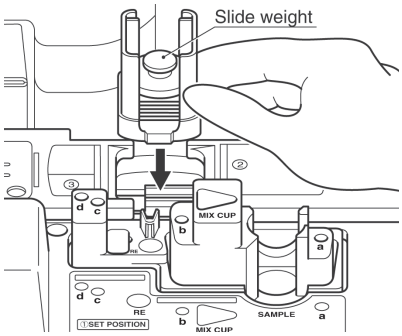
NOTE: The dilution factor set using DILUTION will override the Mode 45 dilution factor.

Using the DILUTION key

1. Make sure [Ready] is displayed.
2. Open the sampler cover and set the appropriate sample rack for the sample tube.
3. Load slides to be run with the diluted sample in a slide cartridge (maximum of 3) and put a slide weight on the slides.
4. Place the slide cartridge with the label side facing the "2 SET POSITION" label in the analyzer.
5. Put tips into holes "a" and "b" on the sample rack.
6. Set an uncapped sample tube in the sample rack.

NOTE: To avoid an error, make sure there are no bubbles in the sample. Use a centrifuge to remove bubbles.

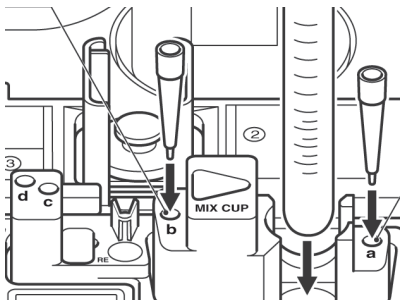
7. Put a DRI-CHEM Analyzer Mixing Cup (henceforth, mixing cup) in the sample rack "MIX CUP" position and pipette 300-400 µL of diluent into the left hole of the mixing cup.



IMPORTANT

Do not pour liquid into the right hole of the mixing cup as this is where the dilution occurs.

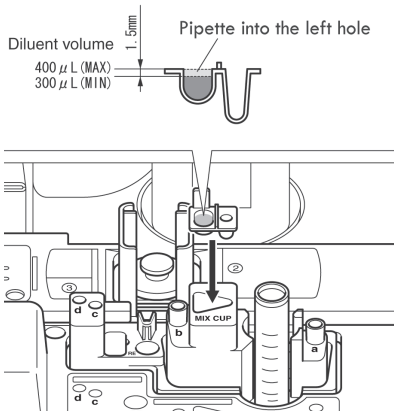
8. Input a sample No. and a sample ID as required. Refer to *Section 3.4* for input.
9. Select a species using **REF.** Each time **REF.** is pressed, the reference interval changes.
10. Select a dilution factor by pressing **DILUTION**. Each time **DILUTION** is pressed, the dilution factor changes in the following order: [2], [3], [4], [5], [10], [1].



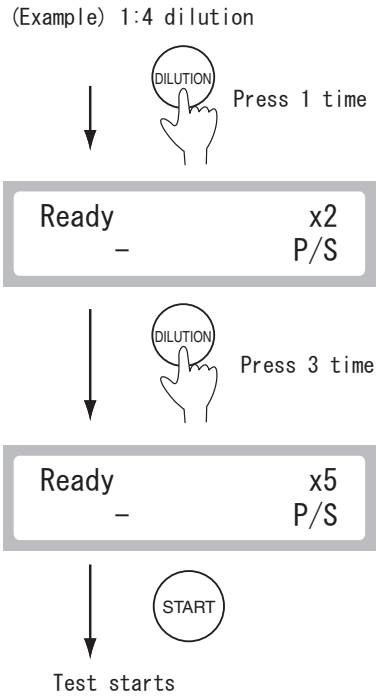
NOTE: A dilution factor of 1 means no dilution (Mode 45 settings are ignored).

NOTE: [---] on the display indicates no dilution unless one is preset using Mode 45.

NOTE: Press **STOP** to cancel a dilution setting.



11. Close the sampler cover.
12. Press **START** to start the tests that require dilution.
13. After the tests are completed, dispose of the used mixing cup and remove the remaining sample.



The RERUN button

When rerunning tests on the previous sample, pressing RERUN will automatically enter the previous sample number, sample ID and reference interval. This feature is used if there were test errors on the previous run, if additional tests are desired for the same sample, or if dilution of the sample is needed to obtain results of tests that were out of range.

IMPORTANT

The RERUN button can only be used to input sample number, sample ID and reference interval of the immediately preceding run.

1. Make sure [Ready] is displayed.
2. Open the sampler cover.
3. Check the sample to make sure enough sample remains.
4. Load slides in a slide cartridge and place a slide weight on the slides.
5. Place the slide cartridge in the analyzer with the label side facing the "2 SET POSITION" label on the analyzer.
6. Put a tip into hole "a" on the sample rack.

NOTE: When performing tests that require dilution, put a tip into hole "b" and place a mixing cup on the sample rack and diluent into the left hole of the mixing cup.

NOTE: When performing an ISE test, put tips into holes "c" and "d" and place a tube with reference fluid into the RE position.

7. Close the sampler cover.
8. Press **RERUN**.

NOTE: When performing tests that require dilution, press DILUTION to set a dilution factor.

9. Press **START** to start tests.
10. After the tests are complete, remove the remaining sample and the mixing cup and reference fluid tube, if used.

Slide stacking order

Be sure to follow the slide stacking rules as follows:

1. Any individual slide can be run by itself.
2. Colorimetric slides (non-electrolyte slides) can be run in any order.
3. An electrolyte slide must be loaded either first or last in the slide cartridge if run with colorimetric slides.
4. Do not load more than one electrolyte slide in the slide cartridge.
5. Colorimetric slides requiring a diluted sample using Mode 45 must be loaded last.

NOTE: The recommended slide order in the slide cartridge is: load electrolyte slide first, then colorimetric slides with colorimetric slides requiring dilution last.

3.4 Inputting Sample ID

Usable letters for sample IDs

The following table lists numbers and letters that can be used for inputting sample IDs.

A maximum of 13 alphanumerical characters can be input for a sample ID.

Operational Key	Numerical Input	Alphabetical Input
1	1	
2	2	abc ABC
3	3	def DEF
4	4	ghi GHI
5	5	jkl JKL
6	6	mno MNO
7	7	pqrs PQRS
8	8	tuv TUV
9	9	wxyz WXYZ
0	0	# / ? ! . , : ; ()

NOTE: A blank space can be input using ▶.

NOTE: Special characters (Ä, ü, ê, *etc.*) cannot be input.

Input procedures

1. Press **ID** to enter the sample number input mode. Next, press **ENTER** to enter the sample ID input mode.
2. Input a sample ID as follows:

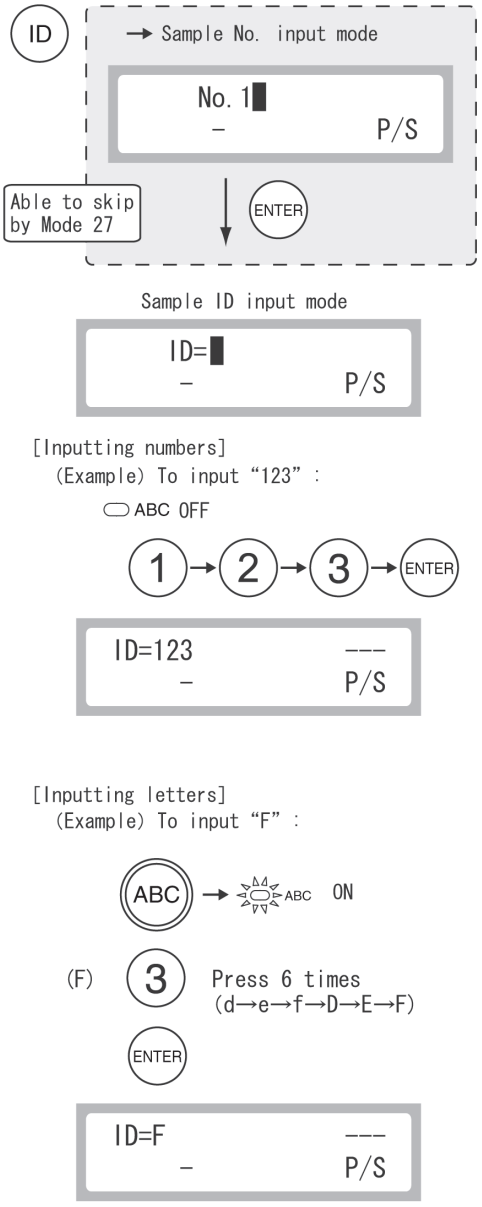
NOTE: The sample number input dialog can be skipped by using Mode 27. Refer to *Section 6.2.8*.

3. Inputting numbers (Example Inputting "123")
   a. Make sure the ABC indicator light is off. If it is on, press **ABC** to turn off the ABC indicator light.
   b. Press numeric keys (**1, 2, 3**).
   c. Press **ENTER** to terminate input dialog.
4. Inputting alphabetical characters

   (Example Inputting an "F")
   a. Press **ABC** to light the ABC indicator light.
   b. Press **3** (the key for D, E, and F) six times until [F]appears (a, b, c, D, E, F).
   c. Press ▶ to move the cursor to the next position. Input the next letter.

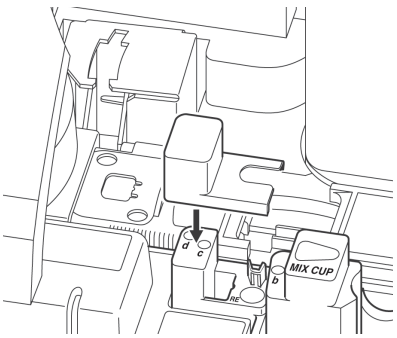
NOTE: If the next letter to be input is on another key, another letter will appear on the display when another key is pressed without pressing ▶.

5. After the sample ID input is completed press **ENTER** to terminate the input dialog.
6. Correcting numbers or letters.
   a. The cursor moves from side to side each time ◀ ▶ are pressed.
   b. Select a number or a letter to be corrected using ◀ ▶ and then press **C** (clear) to erase.
   c. In the input dialog, pressing **C** erases the input characters to return to [ID=].



ISE cover

When electrolyte tests are not used, the tip setting holes (c, d) and the reference fluid setting position can be covered using the ISE cover (an accessory).



Sample barcode reader

By using the optional sample barcode reader, the sample ID can be easily input if barcodes are used for samples at the facility. Prior to using the sample barcode reader it is necessary to set the communicating configuration by using Mode 46. (Refer to *Section 6.2.20*).

⚠ CAUTION

Only the sample barcode reader specified for the DRI-CHEM Analyzer can be used. Do not connect any other barcode reader, otherwise the analyzer may be damaged or a fire may result.

IMPORTANT

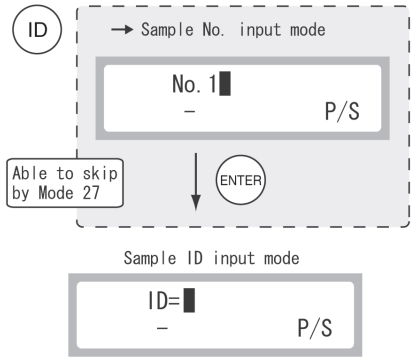
Poor barcode printing quality or malfunction of the sample barcode reader may result in inaccurate sample ID input. Check that the barcode data (sample ID) printed on the test result is correct.

NOTE: The sample barcode reader is an optional accessory.

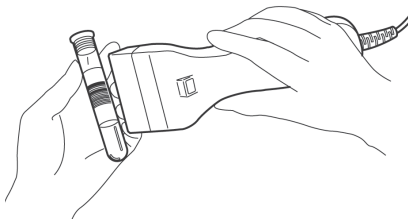
NOTE: Read the instructions included with the sample barcode reader before use. A maximum of 13 alphanumerical characters can be input for a sample ID. Always use the sample barcode reader below 3,000 cd/m2 (lux), avoiding direct sunlight.

Operating procedures:

1. Press the **ID** key followed by **ENTER** to display the ID input dialog.
2. Read a barcode label on the sample tube by using the sample barcode reade



3. After completing the reading, a beep will be heard and the sample ID will be displayed.



In order to keep the analyzer performance at its best, periodic user maintenance and specific Heska service maintenance must be followed.

IMPORTANT

If the periodic maintenance in this manual is not followed, the analyzer's performance and specifications may degrade, and adverse effects on test results may occur.

IMPORTANT

Be sure to reassemble the parts removed for maintenance and tighten thumbscrews securely.

CAUTION

Refer to each section for information about usable solvents for cleaning. For further information, please contact Heska's Technical Support Services for assistance at 800.464.3752.

Do not use alcohol for cleaning the sampler cover (translucent) or surface damage may occur.

NOTE: When cleaning the outer covers of the equipment, wipe with a soft cloth moistened with water.

User periodic maintenance

The following table lists the periodic user maintenance:

Part	Cleaning	Inspection	Replacement	Reference Section
Air filter	Once a month	-	-	4.1
Incubator	Once every three months or when inaccurate test results occur	-	-	4.2
ISE unit	Once every three months or when inaccurate test results occur	-	-	4.2
Spotting part	When slide transfer error or contamination with sample occurs	-	-	4.3
Slide reader	When frequent reading errors occur	-	-	4.3
Recording paper	-	-	Appearance of red lines (both sides of paper)	4.4
Light source lamp	-	-	When a lamp replacement error occurs, or the lamp's cumulative illumination time exceeds 1000 hours	4.5
Sampler O-ring	-	Once a month	Once a year	4.6
Fuse	-	-	At burnout	4.7

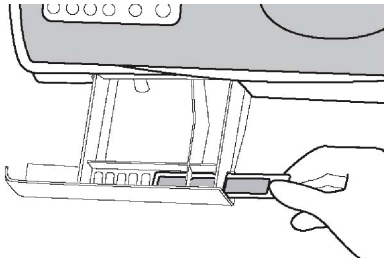
4.1 Cleaning the Air Filter

The air filter may become dirty in some environmental conditions. Check and clean at least once a month.

IMPORTANT

If the air filter is not cleaned, the analyzer temperature will not be regulated properly with adverse effects on test results.

Cleaning procedures



1. Pull out the air filter.
2. Remove dust adhering to the filter with a paper towel, a vacuum cleaner or running water.
3. Put the filter back.

NOTE: If washed with water, make sure it is dried before replacing.

IMPORTANT

If the analyzer is used without the filter, test results may be adversely affected.

4.2 Cleaning the Incubator and ISE Unit

Sample contamination of the incubator may affect test results. Clean the incubator at least once every three months.

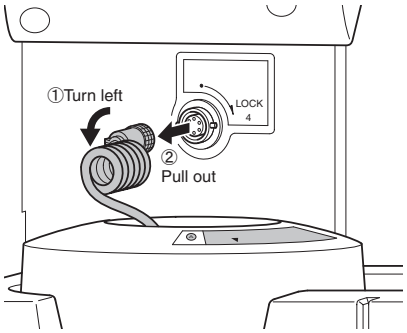
CAUTION

Turn off the analyzer when cleaning the incubator or the ISE unit.

IMPORTANT

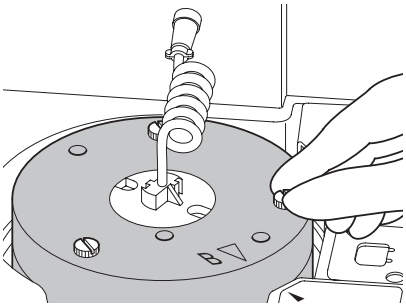
If the analyzer is used without cleaning the incubator and the ISE unit, test results may be adversely affected.

Cleaning procedures



1. Turn the power switch off.
2. Open the sampler cover and the keyboard.
3. Unplug the incubator cable connector. Turn connector counter clockwise and pull out.
4. Remove incubator cover A.

NOTE: Perform the above operations carefully to avoid damaging the connector and cable.



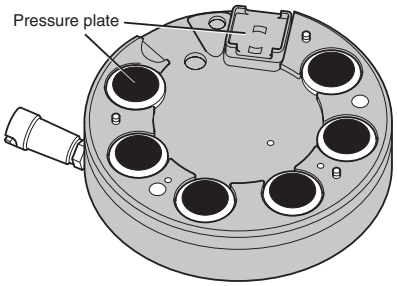
5. Remove incubator B.

   Unscrew the 3 thumbscrews on incubator B and remove the incubator.

6. Clean the pressure plates.

   Wipe off the 7 pressure plates on the backside of the incubator with a soft cloth or swabs lightly moistened with ethyl or isopropyl alcohol.

   Allow the pressure plates to dry by placing the incubator on a counter with the (pressure plate surface) facing up.

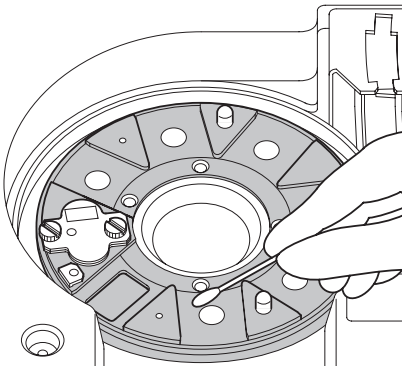


IMPORTANT

Do not touch the surface of the pressure plates with bare hands. Test results may be adversely affected.

7. Clean the incubator cells.

   Clean the incubator cells using a swab moistened with ethyl or isopropyl alcohol and allow the cells to dry.

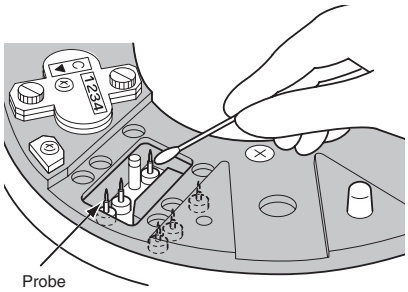


8. Clean the probes in the ISE unit.

   Make sure there is no dust on the 6 probes.

   Check the probes by turning the incubator rotor by hand and moving the square hole of the ISE test cell to expose the probes.

   Use a dry cotton swab to remove dust.



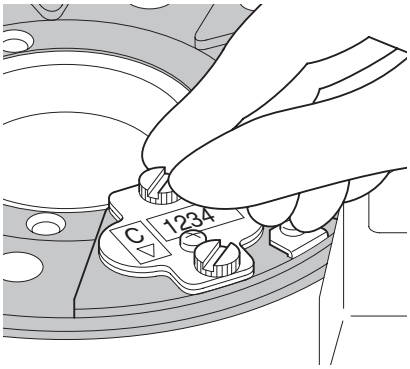
NOTE: Do not use solvents, such as alcohol.

WARNING

Do not touch the needle-shaped probes. The probes can be easily damaged, pay attention not to bend.

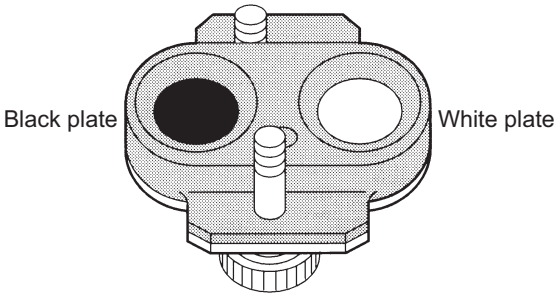
9. Remove reference plate C.

   Loosen the 2 thumbscrews on the black and white reference plate C to remove.



10. Clean reference plate C.

    Turn over reference plate C and clean the black plate and the white plate with a dry cotton swab.



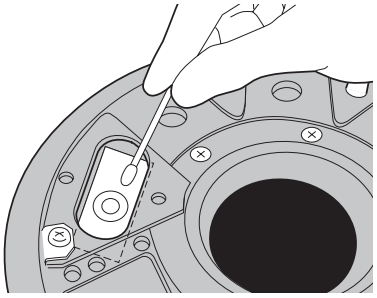
IMPORTANT

Do not touch the surface of the black plate and the white plate with bare hands. Do not use solvents to clean.

11. Clean the photometer head.

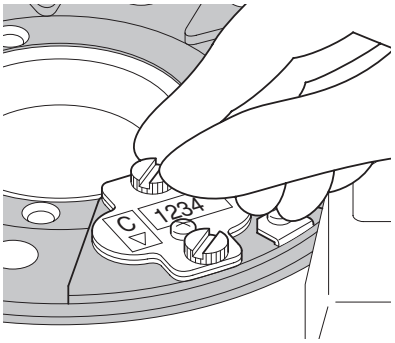
    Turn the incubator rotor by hand to move the elliptically shaped hole for reference plate C to expose the photometer head.

    Clean the glass surface of the photometer head with a **dry** cotton swab.



Reassembling procedures

12. Remount reference plate C by screwing in the 2 thumbscrews (be careful to set the plate horizontally; it is vital that there is no space between the plate and the incubator rotor.



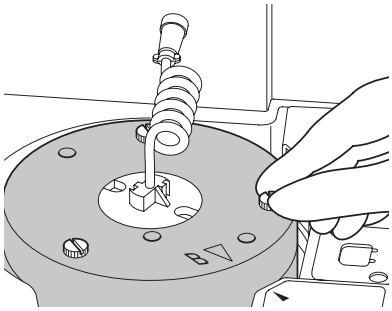
IMPORTANT

Tighten the 2 thumbscrews securely. Otherwise, test results may be adversely affected.

NOTE: Align ▼ on reference plate C with the ▲ mark on the analyzer.

13. Reset incubator B.

    Align the mark on incubator B with the mark on the analyzer and screw in the 3 thumbscrews securely.



IMPORTANT

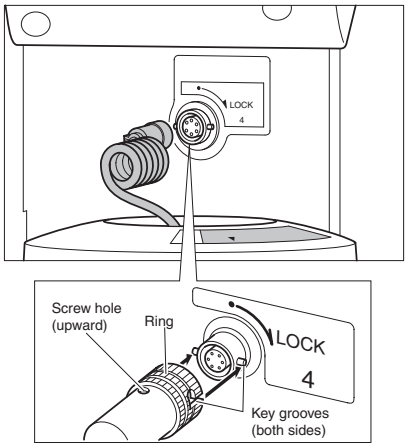
Be careful to align the ▼ mark on reference plate C with the ▲ mark on the analyzer. Otherwise, the surface of the pressure lates may be damaged.

IMPORTANT

Tighten the 3 thumbscrews securely. Otherwise, test results may be adversely affected.

14. Reset incubator cover A and plug in the incubator cable. Pass the cable of incubator B through the hole in the center of incubator cover A. Align ▼ on the incubator cover with the ▲ mark on the analyzer.

    Plug the connector of the incubator cable to the analyzer and lock it by turning it clockwise.



IMPORTANT

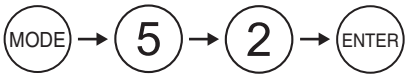
Be sure to set incubator cover A in place. Use without the cover may have adverse effects on test results.

NOTE: To avoid stressing the cable, ensure that the incubator cable is not twisted. If the cable is twisted more than one turn, cable damage may occur.

NOTE: Align the screw hole of the connector facing upward to insert. The key grooves of the ring must be on either side. Lock the connector by turning clockwise.

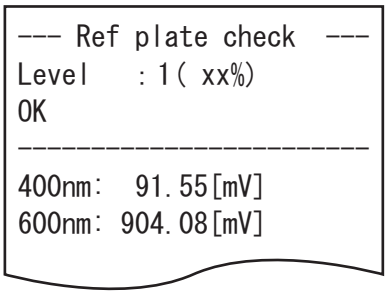
15. Close the sampler cover.
16. Turn the power switch on.
17. Perform reference plate check using Mode 52.

Refer to *Section 6.2.22* for Mode 52 operation.



Make sure that printed level is "1". When the level is "2" or "3", clean the reference plate.

Level	Printout
1	(xx %) OK
2	(xx %) Clean reference plate.
3	(xx %) NG Clean reference plate. (Adverse effects on test results may occur.)



NOTE: "xx" means a given percentage.

IMPORTANT

Level 3 will have adverse effects on test results.

4.3 Cleaning the Slide Reader and the Spotting Part

When the slide reader is dirty, frequent reading errors may occur. When the spotting part is dirty, slide transfer errors may occur. Perform cleaning procedures to avoid these errors.

⚠ CAUTION

Turn off the analyzer when cleaning the slide reader or the spotting part.

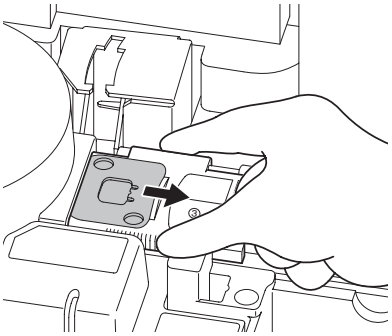
IMPORTANT

If the analyzer is used without cleaning the slide reader and the spotting part, test results may be adversely affected.

Cleaning procedures

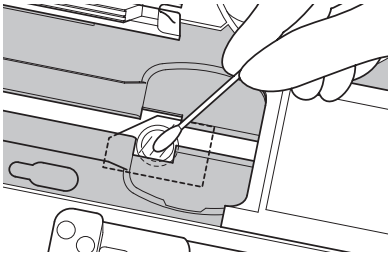
1. Open the sampler cover.
2. Remove the slide cartridge and the sample rack.
3. Open the spotting part cover.

   Slide spotting part cover 3 to the right and lift to open.



4. Clean the slide reader.

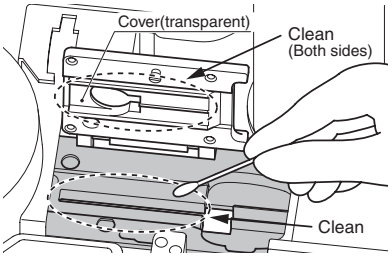
   Clean the glass window of the slide reader with a cotton swab moistened with water, ethyl or isopropyl alcohol. Immediately dry the window with a clean, dry cotton swab. Use a flashlight or another light source to inspect the optics window to verify there are no streaks present.



5. Clean the spotting part.

   Clean the slide transfer part and the cover (transparent, both sides) with a cotton swab moistened with water or ethyl or isopropyl alcohol.

6. Close the spotting part cover and slide it to the left (original position).



4.4 Replacing the Recording Paper

A red line appearing along the sides of the recording paper means that the printer is nearly out of paper. Replace the recording paper roll with a new one.

NOTE: Use specified recording paper from Heska.

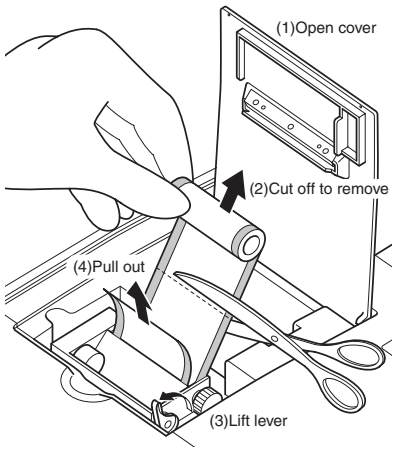
Replacement procedures

1. Open the printer cover.

⚠ CAUTION

Do not touch the edge of the paper cutter. The edge is sharp.

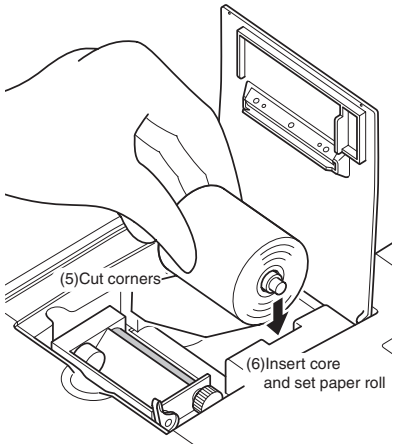
2. Lift the remaining paper roll, cut the paper and remove.
3. Lift the lever to release the paper lock.
4. Pull the remaining paper out in the direction the paper would normally feed.



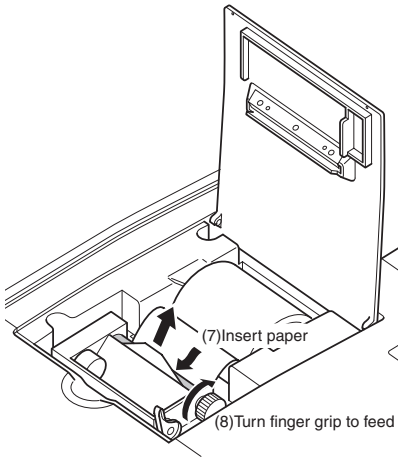
5. Cut off the left and right-hand corners of the end of the new paper.
6. Insert the core into the paper roll and put the paper roll into its loading space.

NOTE: Set the paper roll so the paper is pulled from under the paper.

NOTE: If set incorrectly, the printer will not work.



7. Insert the paper under the rubber roller.
8. Turn the finger grip to advance the paper and remove any slack.

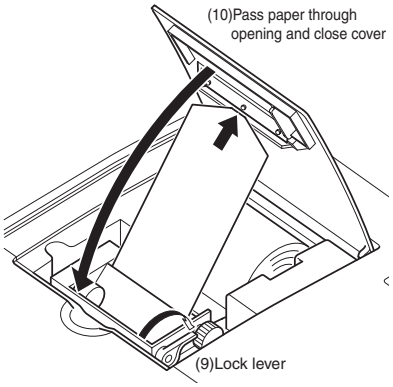


9. Lock the lever.

   Make sure that the paper will advance straight and then lower the lever to lock the paper.

10. Pass paper through the cutter opening on the printer cover and close the cover.

11. Press **FEED** to check that the paper feeds normally.



4.5 Replacing and Cleaning the Light Source Lamp

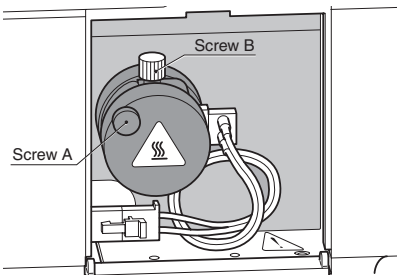
The average life of the lamp is about 1,000 hours. It is necessary to replace the light source lamp if an error related to the lamp occurs or if the lamp's cumulative illumination time has exceeded 1,000 hours.

⚠ CAUTION

The light source lamp gets very hot. Before replacing the lamp, turn the power off and wait at least five minutes. The lamp can be safely replaced once it has cooled.

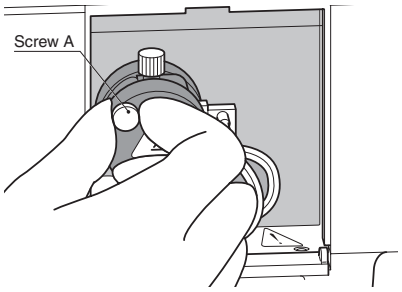
Replacement and cleaning procedures

1. Open the light source lamp cover located on the left-hand side of the analyzer.

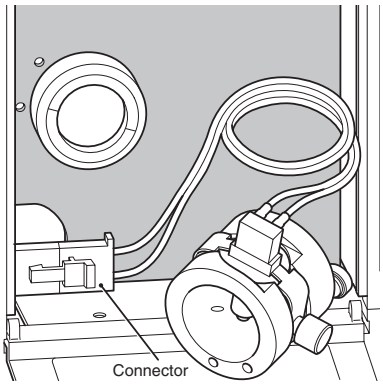


2. Remove the lamp unit.

   Unscrew thumbscrew A to remove the lamp unit.



3. Unplug the connector of the light source lamp to remove the lamp unit.



4. Clean the lens using a dry cotton swab.

NOTE: If cleaning with ethyl or isopropyl alcohol, always wipe off the lens using a dry cotton swab to dry it well.

5. Replace the lamp.

   Unscrew thumbscrew B to remove the lamp. Place new lamp in place and tighten thumbscrew B.

IMPORTANT

Tighten the thumbscrew securely. Otherwise, test results may be adversely affected.

NOTE: Do not touch the glass surface with bare hands. Hold it by its base when replacing.

NOTE: : Fix both hooks on the metal base of the lamp.

6. Remount the lamp unit.

   Remount the lamp connector and insert the lamp unit into the analyzer with thumbscrew B facing up. Screw in thumbscrew A securely.

IMPORTANT

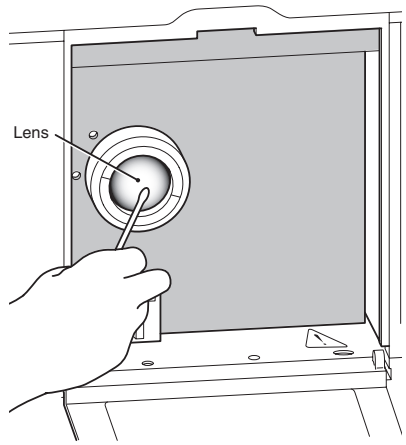
Tighten the thumbscrew securely. Otherwise, test results may be adversely affected.

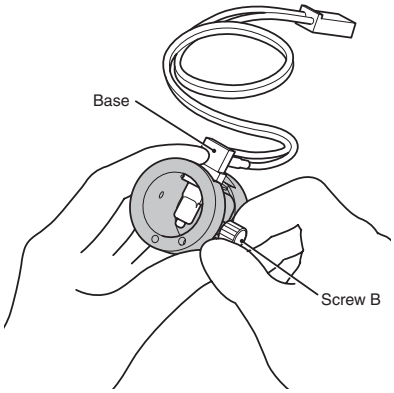
7. Close the light source cover and turn on the analyzer.

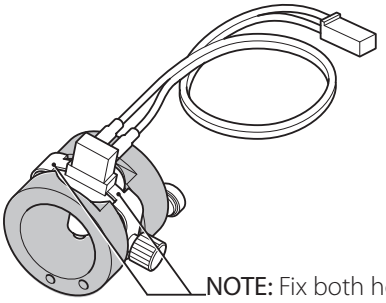
CAUTION

Be sure to close the light source cover. The lamp unit gets very hot.

8. Reset the lamp's cumulative illumination time. After the analyzer has started up, reset the lamp's cumulative illumination time to 0 using Mode 23. Refer to *Section 6.2.4*.







NOTE: Fix both hooks on the metal base of the lamp.

4.6 Inspecting and Replacing the Sampler O-ring

The sampler nozzle O-rings wear with use. Periodic inspection (once a month) and replacement (once a year) are necessary.

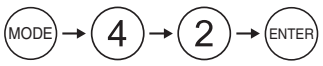
IMPORTANT

If the analyzer is used without inspecting and replacing the sampler O-ring, spotting volume may be inaccurate and test results may be adversely affected.

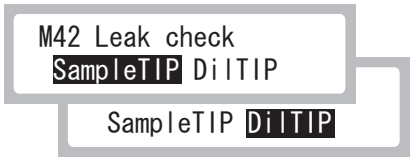
4.6.1 Inspecting the Sampler O-ring

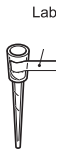
Inspection procedures

1. Select Mode 42 for leak checks.
   NOTE: Mode 42 is an administrator mode. Inputting a password in Mode 0 allows administrators to operate Mode 42. Refer to *Section 6.2.17* for Mode 42 operation.

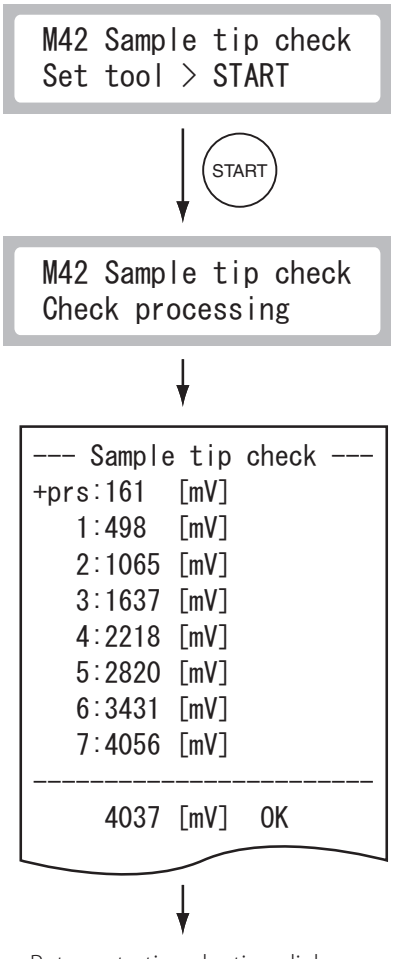


2. Leak check for the sample tip.
   a. Select [Sample TIP] and press **ENTER**.
   b. Put the sampler leak check tool into hole "A" on the sample rack.





   c. Close the sampler cover and press **START**.
      The leak check starts, and the result will be printed out.

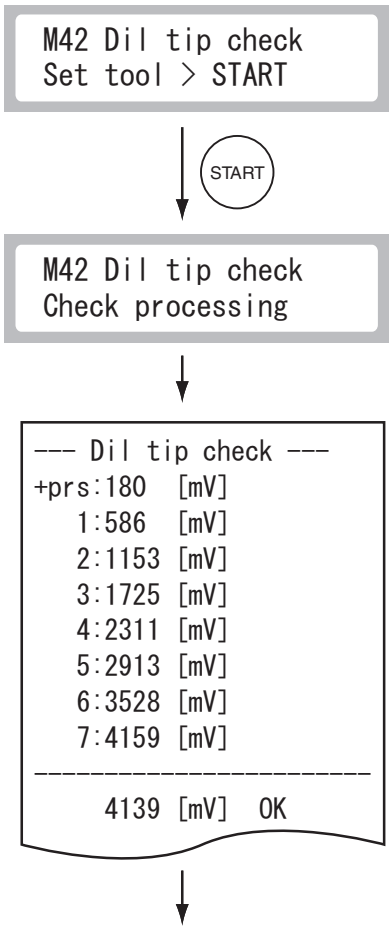


   d. When test is complete, open the sampler cover and remove the leak check tool from the nozzle by hand.

Returns to tip selection dialog

3. Leak check for the dilution tip.
   a. Select [Dil tip] and press **ENTER**.
   b. Put the sampler leak check tool into hole "b" on the sample rack.
   c. Close the sampler cover and press **START**.

      The leak check starts, and the result will be printed out.
   d. When the test is complete, open the sampler cover and remove the leak check tool from the nozzle by hand.
4. Replace the sampler O-ring (refer to *Section 4.6.2*), if an error (ERR) occurs.
5. Press **STOP** to quit mode.



Returns to tip selection dialog

4.6.2 Replacing the Sampler O-ring

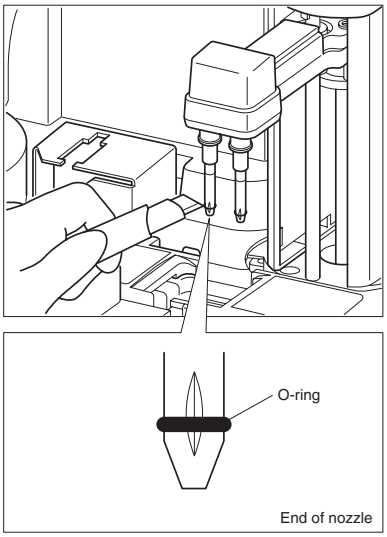
Replace the sampler O-ring once a year or if a leak check fails.

IMPORTANT

If the analyzer is used without inspecting and replacing the sampler O-ring, spotting volume may be inaccurate and test results may be adversely affected.

Replacement procedures

1. Open the sampler cover.
2. Turn the sampler nozzle towards you.
3. Cut off the used O-ring (bring a razor blade into contact with the vertical notch on the end of the nozzle).
4. Mount a new O-ring in the groove around the nozzle by sliding it over the end of the nozzle.
5. Perform O-ring leak check. Refer to *Section 4.6.1*.



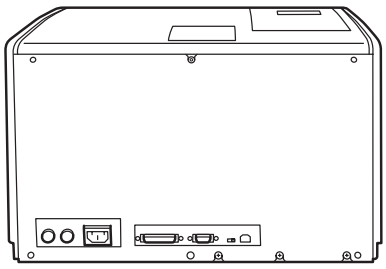
4.7 Replacing the Fuse

WARNING

Before replacing the fuse, always unplug the power cable from the analyzer.

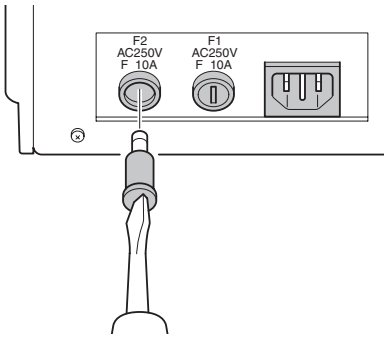
Replacement procedures

1. Unplug the power cable from the analyzer.



2. Replace the fuse.

   Pull out the fuse holder by turning it ¼ turn counter clockwise using a screwdriver. If the fuse has burned out, replace it with a new one. Insert the fuse holder and lock it by turning it ¼ turn clockwise.



CAUTION

Double Pole/Neutral Fusing
Fuse rating: 250V F 10A
Fuse maker: LITTLE FUSE
Model No.: 314010

CAUTION

Be sure to use the above model of fuse (packed as an accessory).

NOTE: If the fuse immediately burns out after the power switch is turned on, contact Heska's Technical Support Services for assistance, 1-800-GO HESKA.

Section Overview

When performing troubleshooting, always follow biohazard procedures (*e.g.*, wearing gloves, lab coat, and safety goggles).

If any part of the body comes in contact with contaminated parts, immediately rinse the contaminated body part thoroughly under running water and then use ethyl alcohol as a disinfectant. Seek medical assistance, if necessary.

5.1 Error Indications

In case analyzer malfunctions (errors) are displayed (printed) before/during test processing, or warning indications are printed out along with test results, the test results may NOT be accurate. Refer to the related troubleshooting pages and rerun the test.

5.1.1 Error code table

Error Code	Error Description	Reference Section
E010	Keyboard is open during testing	5.2.13
E021	Disposal box is open during testing	5.2.13
E025	Sampler cover is open during testing	5.2.13
E035	Photometer controller malfunction	5.2.8
E036	Reference black plate error	5.2.5
E050	Burned out light source lamp	5.2.5
E0100	Tip sensor error	5.2.4
E0110-E0113	Clogging detected during sample sampling	5.2.4
E0120	Failed to detect sample surface	5.2.4
E0121, E0122	Clogging detected during diluent sampling	5.2.4
E0123	Failed to detect diluent surface	5.2.4
E0124-E0128	Clogging detected during sampling (diluted sample, reference fluid)	5.2.4
E0129	Failed to detect reference fluid surface	5.2.4
E0140-E0146	Liquid volume error	5.2.4
E0200-E0210	Errors related to slide transfer	5.2.6
E0300-E0302	Reference white plate read error during initialization	5.2.8
E0500, E0501	Date error	5.2.8
E0509, E0510	Circuit board malfunction	5.2.8
E0510	Photometer controller malfunction	5.2.5
E0530, E0531	ISE self-test error	5.2.11
E0532	Circuit board malfunction	5.2.8
E0600-E0603	Incubator operation error	5.2.6
E0700-E0702	ISE unit operation error	5.2.6
E0900-E0903	Interference filter operation error	5.2.5

Error Code	Error Description	Reference Section
E1000-E1002	Sampler vertical operation error	5.2.4
E1100-E1103	Sampler rotational operation error	5.2.4
E1200-E1204	Syringe operation error	5.2.4
E1500-E1504	Temperature control error	5.2.7
E1510-E1514	Temperature control error	5.2.7
E1521	Room temperature error	5.2.7
E30xx	Circuit board malfunction	5.2.8
E40xx	QC card read error	5.2.9
E5000-E5035	Circuit board malfunction	5.2.8
E5050	CF card has not been set	5.2.8
E5100	Printer error	5.2.2
E5201-E5204	Slide reader control error	5.2.8
E5500	Circuit board malfunction	5.2.8
E9999	Controller malfunction	5.2.8
EFFxx	Circuit board malfunction	5.2.8
W010	Keyboard is open	5.2.13
W020	Disposal box is open	5.2.13
W022	Disposal box is full of slides	5.2.13
W025	Sampler cover is open	5.2.13
W026, W027	Sampler cover lock error	5.2.13
W030	Low light intensity	5.2.5
W040	Incorrect sample type	5.2.10
W060	Insufficient sample during sampling	5.2.4
W070	Interference filter malfunction	5.2.5
W085	Undefined sample rack	5.2.4
W090, W097, W099	Data communication error	5.2.12
W110	No tip has been set	5.2.4
W112	No tip for the next test	5.2.4
W115, W116	Tip eject error	5.2.4
W120	Tip sensor error	5.2.4
W140	An ISE slide is loaded in incorrect direction	5.2.10
W141	Errors related to ISE tests	5.2.11
W150, W160	Errors related to dilution	5.2.4
W170	No calibration card has been read	5.2.9
W173	Slide reader cannot read slide information	5.2.3
W175	No slides have been set	5.2.10
W200	Errors related to sample barcode reader	5.2.12
W500, W501	Faulty fan	5.2.13
W5100	Paper Jam	5.2.2
W5110	No paper	5.2.2
W5120	Wrong setting of the printer head	5.2.2

NOTE: "x" means a given value.

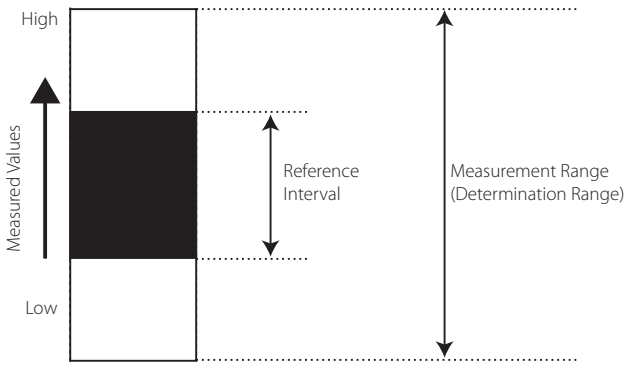
5.1.2 Printout indication table

Printout Message	Description	Reference Section
H	Testing value exceeds the upper limit of the preset reference interval.	-
L	Testing value falls below the lower limit of the preset reference interval.	-
>	Testing value exceeds the upper limit of the measurement range.	-
<	Testing value falls below the lower limit of the measurement range.	-
@	Testing value is outside of the measurement range. The testing value may NOT be accurate.	-
+OR	Testing value for electrolyte test exceeds the upper limit of the measurement range, check ERR = xxx.	5.2.11
-OR	Testing value for electrolyte test falls below the lower limit of the measurement range, check ERR = xxx.	5.2.11
+, -, $	Temperature control error. The testing value may NOT be accurate. Refer to the related troubleshooting pages and rerun the test.	5.2.7
* , ?	Disposal box opened during slide incubation. Fluctuation of light source intensity. The testing value may NOT be accurate. Refer to the related troubleshooting pages and rerun the test.	5.2.5
E	Error due to test interruption. Test result prints as "****".	5.2.13
&	Abnormally high test value. If Ca, then sample not spotted. If Lipase, then glycerol interference.	5.2.13
#	The valid term of the slide has expired. The testing value may NOT be accurate. Refer to the related troubleshooting pages and rerun the test.	5.2.13
¥	Unspotted slide.	5.2.13
C	Testing value is a result in control mode. The control mode can be canceled by using Mode 19.	5.2.13
ERR = xxx	Errors related to electrolyte results (where "x" indicates a number from 0 to 8). The testing value may NOT be accurate. Refer to the related troubleshooting pages and rerun the test.	5.2.11

5.1.3 About Measurement Range

The relation between measurement range (determination range) and reference interval is shown below. Each value depends on each test name. For details, refer to the Instructions for use of each slide.

NOTE: Reference intervals can be input by using Mode 39 (*Section 6.2.15*).



5.2 Troubleshooting

NOTE: To stop beeping when an error occurs, press **STOP**.

NOTE: When an error occurs, the analyzer will terminate the measurements. When rerunning the sample, enter the settings (sample No., sample ID, reference interval, and dilution factor) and replace consumables (tips, RE and mixing cup) from the beginning to start the re-measurements.

NOTE: When an error occurs, the analyzer will terminate the measurements and reset the settings (sample No., sample ID, reference interval, and dilution factor). The **RERUN** key is useful to input the previous sample's settings automatically.

5.2.1 Startup Errors

1. When the analyzer does not start after the power switch is depressed to the [I] side:

   Check that the power cable is properly connected and the fuse is not burned out. Then try turning on the analyzer again.

   If the analyzer still does not start up, please contact Heska's Technical Support Services for assistance at 800.464.3752.

NOTE: Refer to *Section 4.7* for replacing the fuse.

5.2.2 Display or Printer Trouble

1. When the display is too light or dark:

   Adjust the display brightness using Mode 82 (*Section 6.2.26*).

2. When the print is too light or dark:

   Adjust the print density using Mode 82 (*Section 6.2.26*).

3. When printed characters have a white line or a part of character is lacking. The printer head has worn.

   Please contact Heska's Technical Support Services for assistance.

4. Printer trouble.

   a. W5110 (No paper)
   Replace the recording paper, referring to *Section 4.4*.

   b. W5120 (Wrong setting of the printer head)
   Check that the lever of the printer head is locked (down), referring to *Section 4.4*.

   c. E5100 (Paper jam)
   Turn the power off and remove the jammed paper, referring to *Section 4.4* and then turn the power on again.

   If the error still occurs, please contact Heska's Technical Support Services for assistance.

NOTE: The test results can be reprinted after the tests are completed by using Mode 26 (Refer to *Section 6.2.7*).

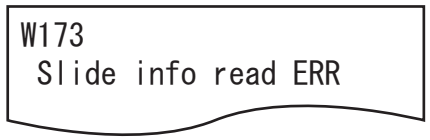
5.2.3 Slide Reading Errors

1. W173

   Slide reader cannot read slide information printed on the reverse side.

   Perform the following troubleshooting and rerun the tests.

   a. After the measurements are completed, clean the slide reader, referring to *Section 4.3*.



⚠ CAUTION

Be sure to turn the power switch off after the measurements are completed when cleaning the slide reader. During the measurements, the slide transfer bar will move.

   b. Check that the analyzer is not exposed to excessive external light.

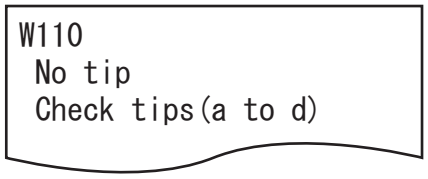
   c. Check that the dot-print part of the slide is not stained or obscured.
   If the error still occurs, contact Heska's Technical Support Services for assistance.

5.2.4 Sampler Errors

1. W110

   During the tip detection process, the analyzer could not detect a tip.

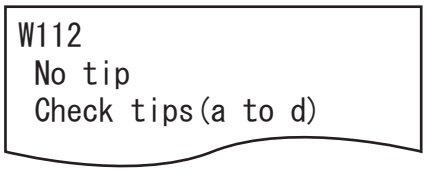
   Put a tip in the setting position and rerun the tests from the beginning.



2. W112

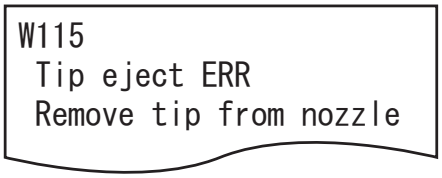
   The tip has already been used and there are no tips for the next sampling.

   Put a tip in the setting position and rerun the tests from the beginning.



3. W115 (Sample nozzle), W116 (Dilution nozzle)

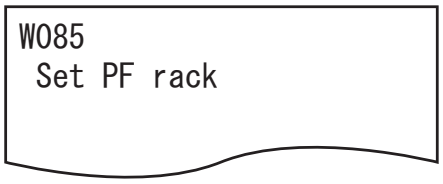
   The analyzer has failed to eject a tip. Remove the tip from the sampler nozzle by hand and empty the disposal box.



4. W085

   Rack type error.

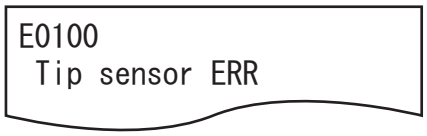
   An undefined sample was placed in the analyzer.



5. E0100

   Tip detection sensor is faulty.

   Turn the power off and empty the disposal box, then turn the power on.



6. W120

   A tip remains on the nozzle.

   Remove the tip from the sampler nozzle by hand and empty the disposal box.

```
W120
Remove tips from nozzles
Empty Disposal box
```

7. E0120, W060

   E0120 => No sample surface found.

   W060 => Sample was found, but the volume is insufficient.

   Perform the following troubleshooting.

   a) Press STOP to stop the alarm.

   b) Make sure that the appropriate sample rack specified for the Sample Tube is used.

   c) Make sure that the sample volume is above the aspiration limit. If it is below the limit, add more sample.

   d) Put a new DRI-CHEM Analyzer Auto Tip on the sample rack and rerun the tests from the beginning.

```
E0120
 No sample found
 Check sample volume
```

```
W060
 No sample found
 Check sample volume
```

8. E0140, E0141, E0142

   Liquid volume is excessive.

   Check the liquid volume and rerun the tests from the beginning.

   E0140 => Check the sample.

   E0141 => Check the diluent.

   E0142 => Check the reference fluid.

```
E0140
 Sample ERR
 Excessive sample
 Check sample
```

```
E0141
 Diluent ERR
 Excessive diluent
 Check diluent
```

```
E0142
 Ref fluid ERR
 Excessive ref fluid
 Check reference fluid
```

9. E0123

   No diluent surface has been found.

   Check the diluent volume.

   Replace the mixing cup, pipette diluent, set tips, and rerun the tests from the beginning.

```
E0123
 No diluent found
 Check diluent
```

10. E0143

    Diluent surface has been found, but the volume is insufficient.

    Check the diluent volume.

    Replace the mixing cup, pour diluent, and set tips, and then rerun the tests from the beginning.

```
E0143
 No diluent found
```

11. E0129

    No reference fluid surface has been found.

    Check the reference fluid volume.

    Set consumables (tips, *etc.*) and rerun the tests from the beginning.

```
E0129
 No ref fluid found
 Check reference fluid
```

12. E0144

    Reference fluid surface has been found, but the volume is insufficient.

    Check the reference fluid volume.

    Set consumables (tips, *etc.*) and rerun the tests from the beginning.

```
E0144
 No reference fluid
```

13. W150

    Sampling from a mixing cup was requested more than 3 times.

    Set tips, a mixing cup, diluent, reference fluid as required.

```
W150
 Dil tests over
 Check ref fluid
```

14. W160

    Tests that require different dilution factors were programmed for a sample, or a test that does not require dilution was programmed after a test requiring dilution.

    Set tips, a mixing cup, diluent and reference fluid as required and rerun the tests from the beginning.

```
W160
 Dil factor ERR
 Check ref fluid
```

15. Spotting error

    When sample has not been spotted onto slides, ◀ or "@" marks will appear repeatedly.

    Measured values with "@" marks may NOT be accurate.

    Perform the following troubleshooting:

    a. Make sure that a DRI-CHEM Analyzer Auto Tip is used.

    b. Make sure that the tip has not been previously used.

    c. Make sure that there are no bubbles on the sample surface of the tube.

    d. Make sure that the appropriate sample rack specified for the test tube or sample tube is used.

    e. Inspect the sampler O-rings. Refer to *Section 4.6*.

```
BUN-PS   <  5.0 mg/dl
TBIL-PS  <  0.2 mg/dl
Ca-PS    <  1.0 mg/dl
```

```
BUN-PS      @
        =  0.1 mg/dl
TBIL-PS     @
        =  0.1 mg/dl
Ca-PS       @
        =  0.1 mg/dl
```

IMPORTANT

DRI-CHEM Analyzer Auto Tips cannot be reused.

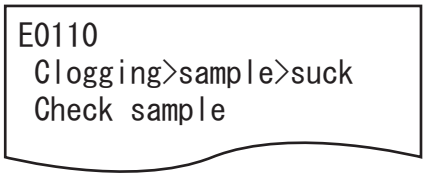
If the error still occurs after troubleshooting, contact Heska's Technical Support Services for assistance.

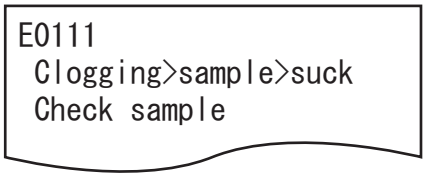
16. E0110, E0111, E0112, E0113, E0124, E0125

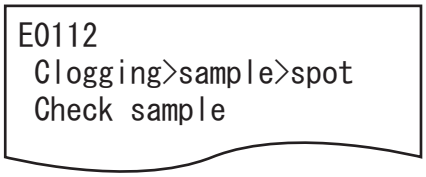
    Clogging error has been detected during sampling. Fibrin may be present in sample.

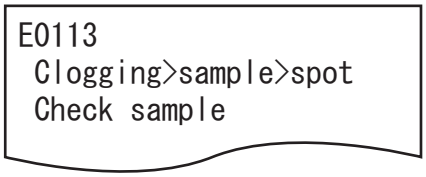
    Remove fibrin from the sample, and set consumables (tips and/or a mixing cup, *etc.*) and rerun the tests from the beginning.

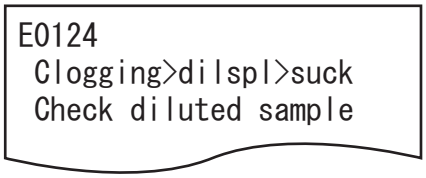
NOTE: If the error still occurs, the pipetting system may be clogged. Contact Heska's Technical Support Services for assistance.

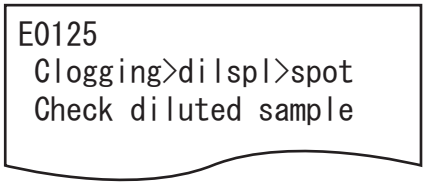












17. E0121, E0122 (For diluent)

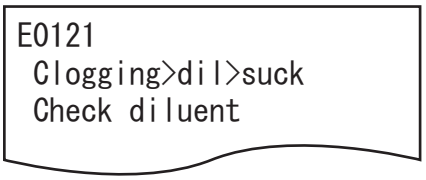
    E0126, E0127, E0128 (For reference fluid)

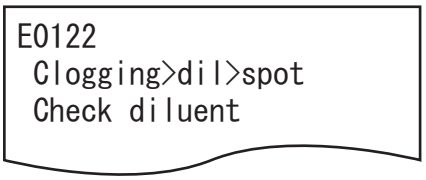
    Clogging error has been detected during diluent or reference fluid sampling.

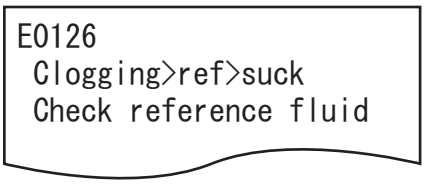
    Check that the mixing cup with diluent or the 0.5-ml PLAIN TUBE with reference fluid is set properly.

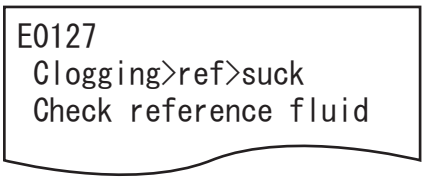
    Replace the mixing cup and set consumables (tips and diluent, *etc.*), and rerun the tests from the beginning.

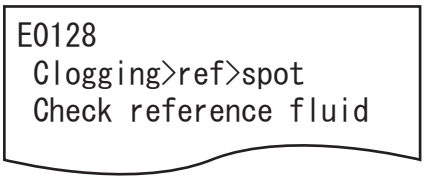
NOTE: If the error still occurs, the pipetting system may be clogged. Contact Heska's Technical Support Services for assistance.











18. E1000 - E1002 (Sampler vertical drive error)

    E1100 - E1103 (Sampler rotational drive error)

    E1200 - E1204 (Syringe motor error)

    Motor drive error has occurred.

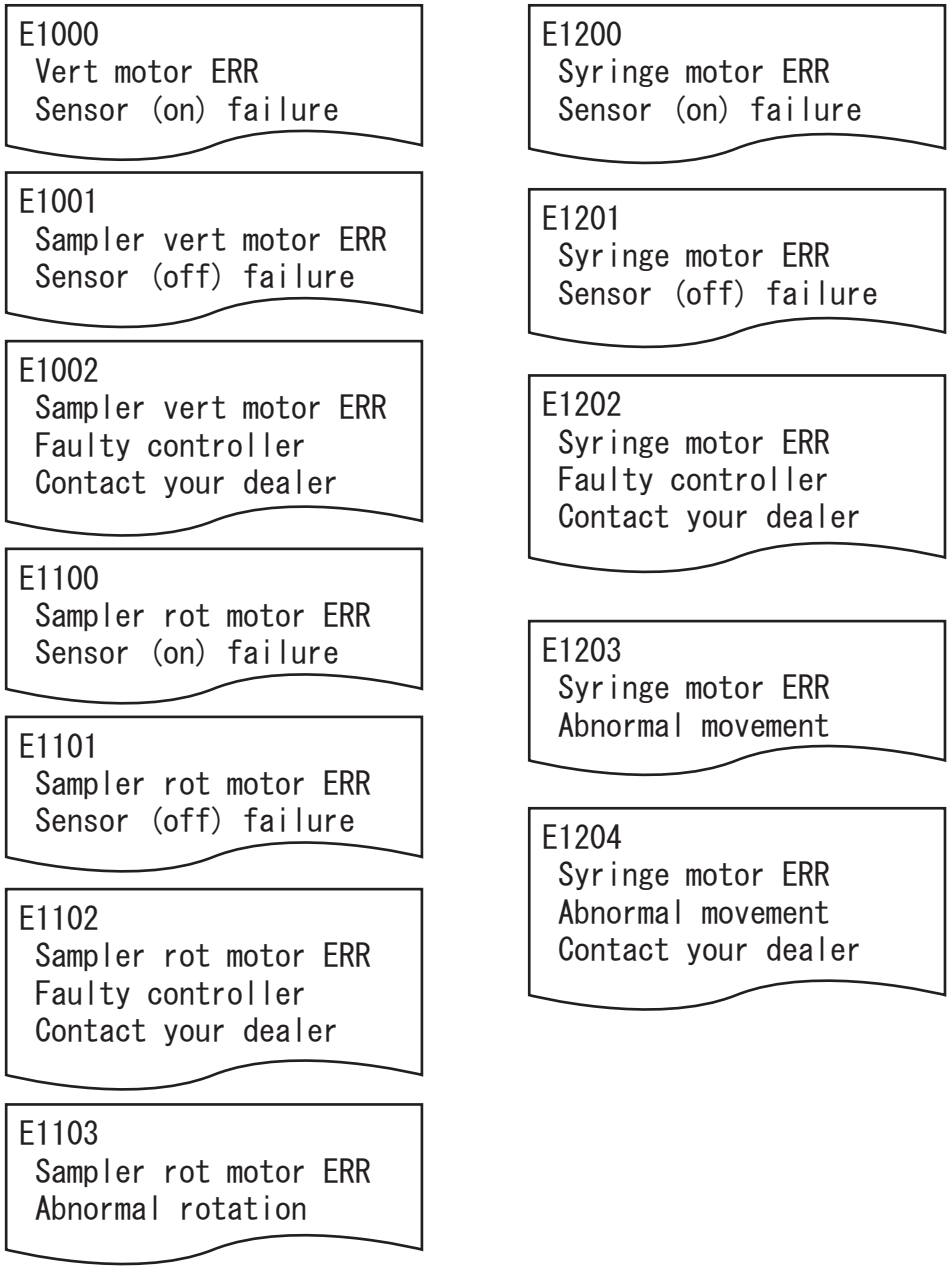
    Perform the following troubleshooting:

    a. Turn the power switch off.

    b. Make sure that no foreign matter (tip or slide) is present around the sampler movement area. Remove foreign matter if present.

    c. Turn the power switch on.

    d. If the error still occurs, contact Heska's Technical Support Services for assistance.



5.2.5 Photometer Errors

IMPORTANT

When errors related to the photometer have occurred, perform the following and rerun the tests.

1. E036, W030, W070, "*", " ? "

   The light source lamp unit, the reference plates, or the photometer may be dirty, or the lamp or the interference filter may have deteriorated.

```
E036
 Clean ref black plate
  (xxxxx[deg])
```

```
W030
 Low light intensity
 Clean photometer
 400nm:  22 [mV]
```

```
W070
 Filter check WARNING
 Clean lens
 Contact your dealer
 400nm : xx.x%
```

NOTE: When the disposal box is open during testing, the "E021" error will occur and the "*" mark will appear on the test results.

Always close the disposal box during testing.

Turn the power switch off, and perform cleaning as follows:

- Lens cleaning (in the lamp unit)
  See (Refer to *Section 4.5*)
- Reference plate cleaning
  See (Refer to *Section 4.2*)
- Photometer cleaning
  See (Refer to *Section 4.2*)

After cleaning, turn the power switch on.

If the error still occurs, replace the light source lamp. Refer to *Section 4.5*. If the error still occurs, contact Heska's Technical Support Services for assistance.

The “*” marks are printed out on test results.

```
BUN-PS  *
        = **** mg/dl
TP-PS   *
        = **** g/dl
```

The “?” marks are printed out on test results.

```
BUN-PS  ?
        = **** mg/dl
TP-PS   ?
        = **** g/dl
```

CAUTION

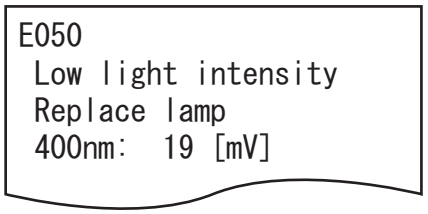
The light source lamp gets very hot. Before replacing the lamp, turn the power off and wait at least 5 minutes. The lamp can be safely replaced once it has cooled down.

2. E050

   The light source lamp is burned out.

   Turn the power switch off, and replace the light source lamp.

   After replacement, turn the power switch on. Refer to *Section 4.5*.



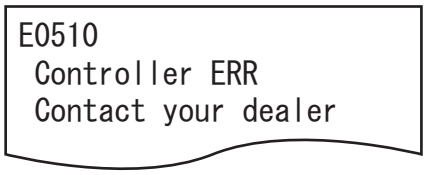
⚠ CAUTION

The light source lamp gets very hot. Before replacing the lamp, turn the power off and wait at least 5 minutes. The lamp can be safely replaced once it has cooled down.

3. E0510

   The circuit board has malfunctioned (abnormal reference white plate reading).

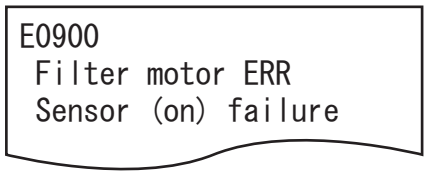
   Turn the power switch off and on. If the error still occurs, contact Heska's Technical Support Services for assistance.

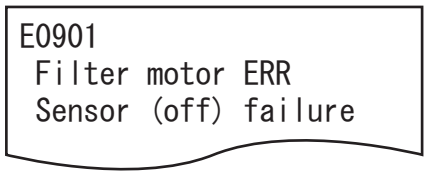


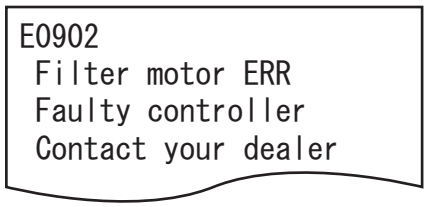
4. E0900 - E0903

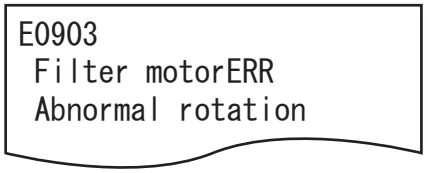
   Interference motor drive error has occurred.

   Turn the power switch off and on. If the error still occurs, contact Heska's Technical Support Services for assistance









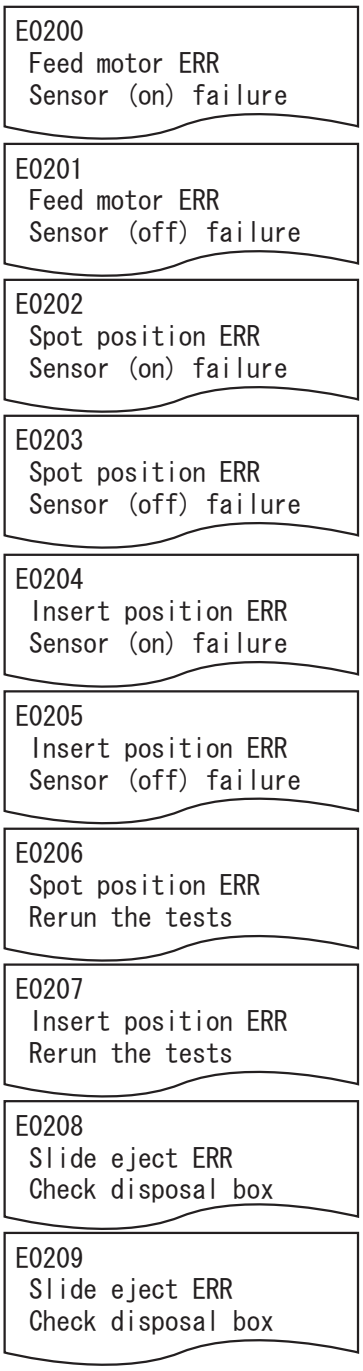
5.2.6 Transfer Errors

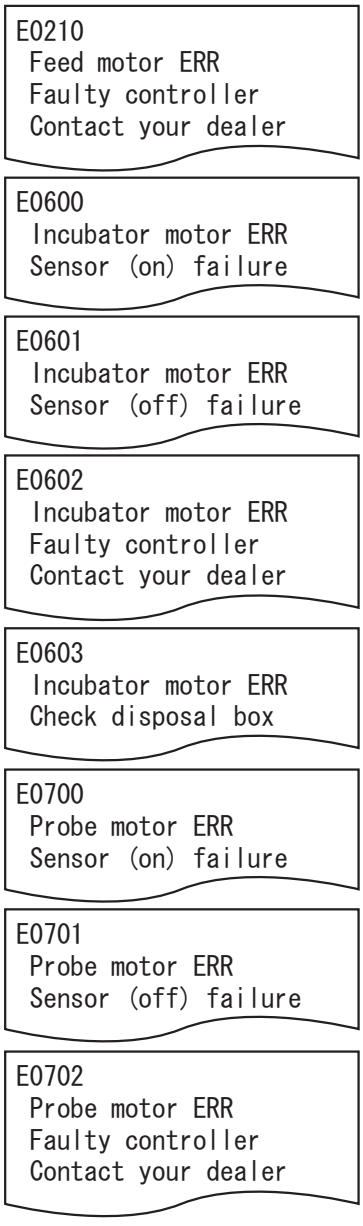
When errors shown below occur, the disposal box may be full of slides, or slides may remain in the incubator or the spotting part.

Turn the power switch off, and perform the following:

- Empty the disposal box.
- Incubator cleaning (Refer to *Section 4.2)*.
- Spotting part cleaning (Refer to *Section 4.3*).

If the error still occurs, contact Heska's Technical Support Services for assistance.





5.2.7 Temperature Control Error

IMPORTANT

Measured values with "+" or "–" marks may NOT be accurate.

1. When "+" or "–" marks appear on test results or the following errors occur:

   E1500, E1501, E1512

   (CM incubator temperature)

   E1504, E1510, E1513

   (ISE incubator temperature)

   E1521 (Environmental temperature)

   Incubator temperature is not within the controlled range.

   Perform the following troubleshooting.

   a. Make sure the room temperature is between 59°F–89°F (15°C–32°C). If it is out of the range, air condition the room.

   b. Turn the power switch off.

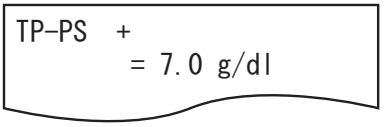
   c. Clean the air filter. Refer to *Section 4.1*.

   d. After the incubator has cooled down (about 10 minutes), turn the power switch on. If the error still occurs, please contact Heska's Technical Support Services for assistance.

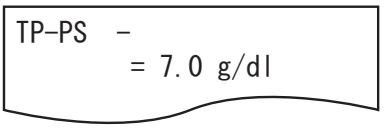
NOTE: When ISE tests are repeatedly measured in high temperature condition, the "E1510" may occur. In this case, turn the power switch off to cool down the incubator (about 10 minutes), and then turn the power switch on.

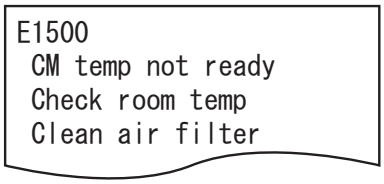
If the error still occurs, please contact Heska's Technical Support Services for assistance.

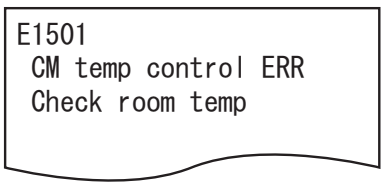
The "+" mark is printed out on test result.

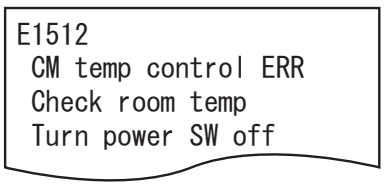


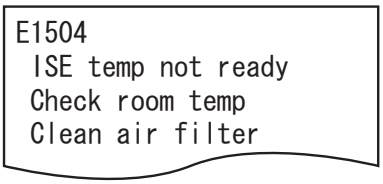
The "-" mark is printed out on test result.

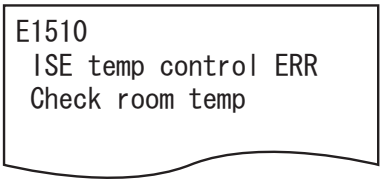


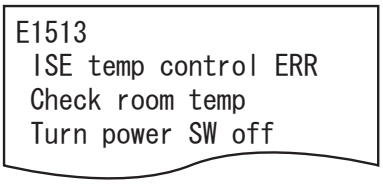


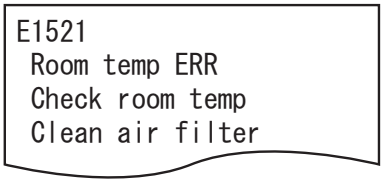












2. When "$" marks appear on test results or the following errors occur:

The “$” mark is printed out on test result.

```
TP-PS  $
       = **** g/dl
```

E1502, E1503, E1511

The incubator cable may not be connected.

Turn the power switch off, unplug the incubator cable, and then plug it in again.

NOTE: To properly plug in the incubator cable, the connector must be turned clockwise to lock it into the receptacle. Refer to *Section 4.2*.

If the error still occurs, contact Heska's Technical Support Services for assistance.

```
E1502
 Faulty CM temp sensor
 Check incu cable
```

```
E1503
 Faulty CM heater
 Check incu cable
```

```
E1511
 ISE temp sensor ERR
```

3. E1514

When starting the measurements, the incubator temperature is not ready.

Wait a moment until the temperature becomes ready.

```
E1514
Temp warning
Tests cannot run
Please wait a moment
```

5.2.8 Circuit Board Malfunction

1. E0500, E0501

The built-in clock has been reset.

Set the date and time using Mode 20.

If the error still occurs, please contact Heska's Technical Support Services for assistance.

```
E0500
 Date ERR
 Run Mode 20
 Set date & time
```

NOTE: Turning the power on for the first time or turning the power continuously off for a long time may cause the date error.

IMPORTANT

If the date and time are not adjusted correctly, the analyzer may fail to determine the expiration of the slides. Test results from out of date slides may NOT be accurate.

```
E0501
 Run Mode 20
 Set date & time
 Contact your dealer
```

2. E5050

No CF card has been set.

Insert a CF card into the slot.

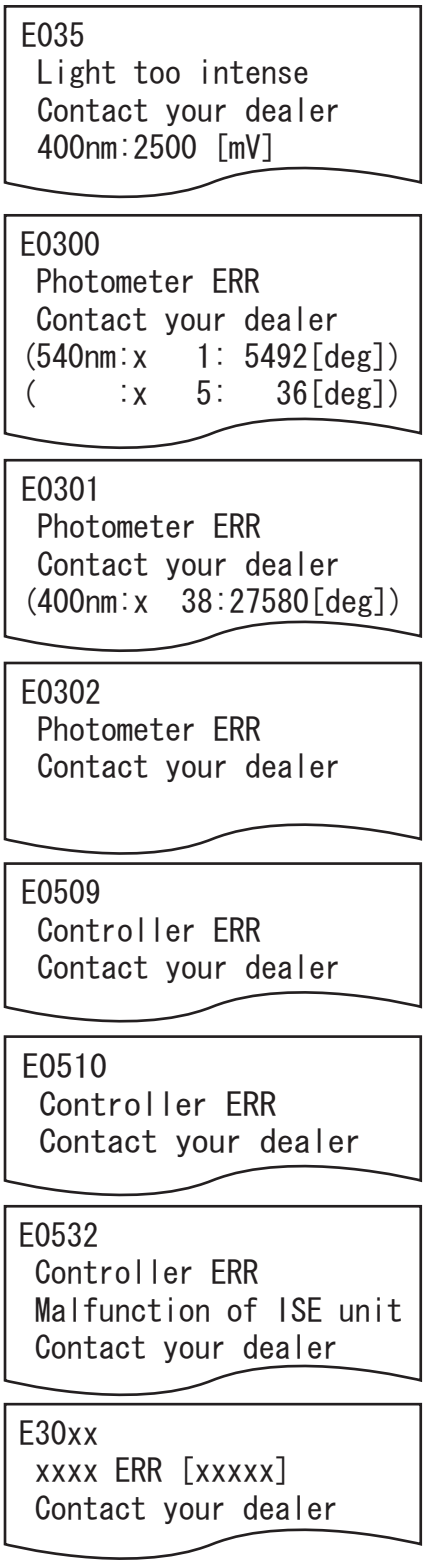
```
E5050
 No CF card
```

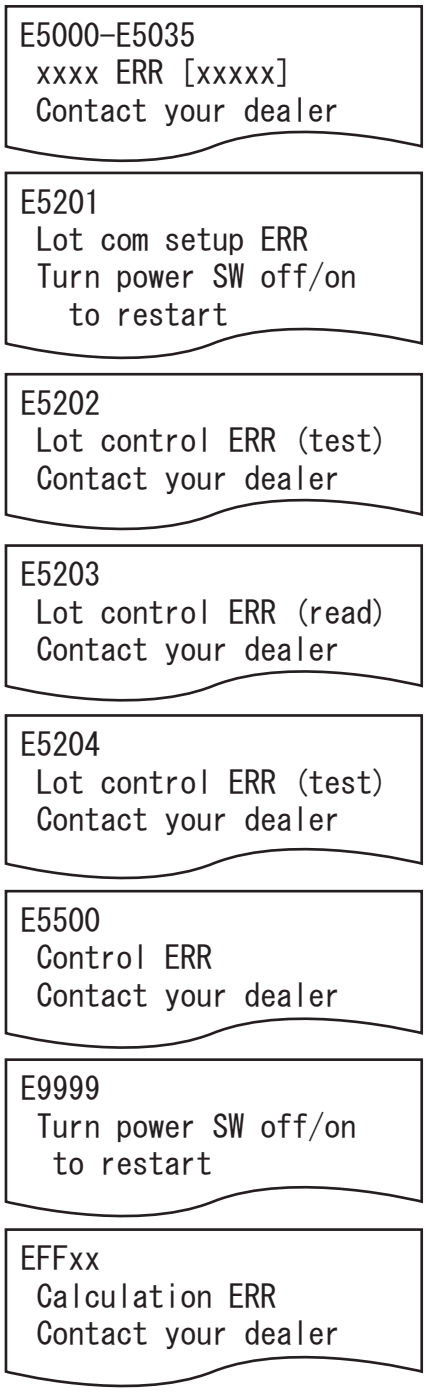
3. E035, E0300 - E0302, E0509, E0510, E0532

E30xx, E5000 - E5035, E5201 - E5204, E5500, E9999, EFFxx

The circuit board has malfunctioned.

If the error still occurs after turning the power off and on, contact Heska's Technical Support Services for assistance.





NOTE: " x " means given value (letter).

5.2.9 Calibration Card Read Error

1. When the display and printer do not acknowledge reading a calibration card.

   The analyzer could not read calibration card information.

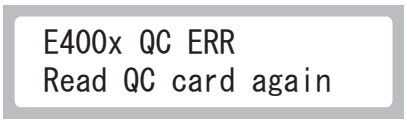
   Read the calibration card again. Refer to *Section 3.2*.

   If the error still occurs, contact Heska's Technical Support Services for assistance.

2. E4000 - E4009

   The analyzer could not read calibration card information. Read the calibration card again.

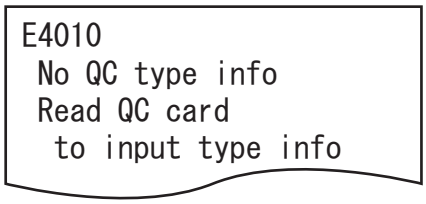
   If the error still occurs, contact Heska's Technical Support Services for assistance.



3. E4010

   When reading a calibration card for panel slides, no standard curve information for specific slide types are memorized in the analyzer.

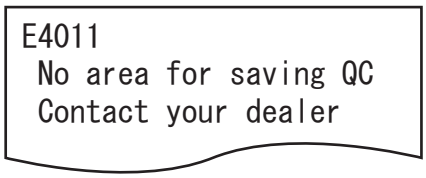
   Read a calibration card corresponding to the slide types in the panel package.



4. E4011

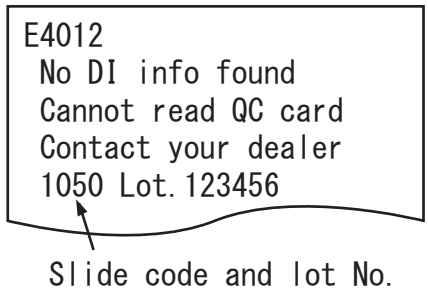
   There is no memory area for saving calibration information of the panel slide.

   A maximum of 10 panel data can be memorized in the analyzer.



5. E4012

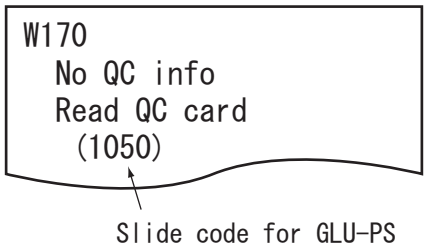
   No DI card information for the slide. Contact Heska's Technical Support Services for assistance.



6. W170

   The calibration card corresponding to the slide in the slide cartridge has not been read.

   Read the calibration card corresponding to the slide code of the error printout.



5.2.10 Slide Loading Errors

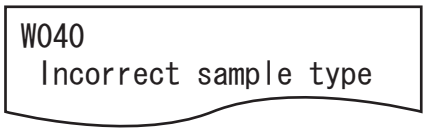
1. W040

   The sample type set by the **SAMPLE** key does not correspond to the slide's sample type loaded in the slide cartridge.

   (Example)

   - A slide for plasma/serum has been loaded while [W] is selected by using **SAMPLE**.

   The sample type setting by the **SAMPLE** key and the slide's sample type to be used must correspond to the sample to be measured. Rerun the tests from the beginning.



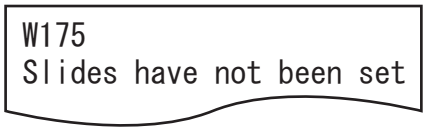
2. W140

   An electrolyte slide is loaded in incorrect direction in the slide cartridge. Load the electrolyte slide in correct direction in the slide cartridge and rerun the test from the beginning.

3. W175

   No slides are loaded in the slide cartridge.

   Load slides to be tested, place a slide weight on top of the slides and rerun the tests from the beginning.



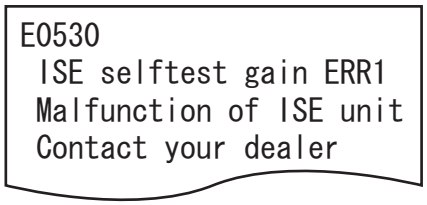
5.2.11 Errors Related to Electrolyte Tests

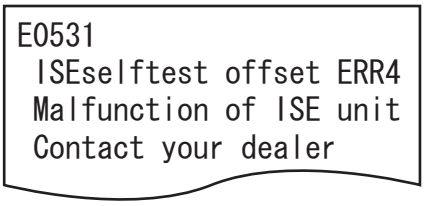
1. E0530, E0531

   A self-test error has been detected before starting ISE tests.

   Turn the power switch off and on, and then rerun the tests.

   If the error still occurs, please contact Heska's Technical Support Services for assistance.

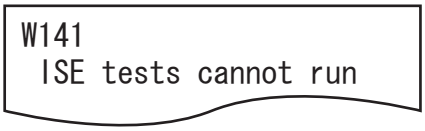




NOTE: Without turning the power off and on, the "W141" will occur. In this case, turn the power switch off and on.

2. W141

   Turn the power switch off and on, and then rerun the test from the beginning.



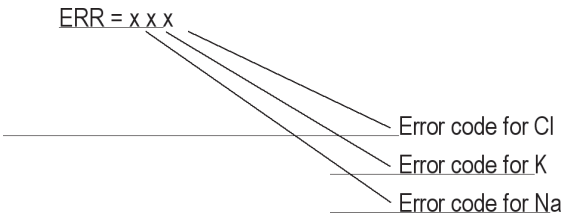
3. When an error code (ERR = xxx) is printed out along with the test results:

   During electrolyte tests, the followings will be checked.

Check Menu	Description
Drift check	Checks abnormal time course (voltage) during testing
Impedance check	Checks the slide impedance after the test is completed
Over range check	Checks that the test results are within the measurement range

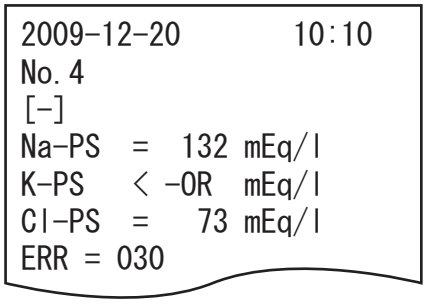
If any errors are detected, [ERR = xxx] will be printed out along with the test results. The 3-digit figures are error codes for Na (sodium), K (potassium), and Cl (chloride).

NOTE: "x" indicates a numeric number from 0 to 8.



Error Code	Description
0	No problem
1	Drift error
2	Impedance error
3	Outside of the measurement range (This is not an analyzer malfunction)
4	Drift error and impedance error
5	Impedance error and outside of the measurement range
6	Drift error and outside of the measurement range
7	Drift error, impedance error, and outside of the measurement range
8	Impossible measurement

   a. When the error codes are a number other than 0 or 3: Sample or reference fluid may not be sufficiently absorbed into the slide.



Perform the following troubleshooting.

1. Ensure proper handling of reference fluid.
2. Perform an ISE test again and check the following:
   - Aspirated fluids (sample and reference fluid) in the tips are almost equal in volume.

     If the aspirated volume is not normal, perform inspection or replacement of sampler O-ring. Refer to *Section 4.6*.
   - Spotted fluids in the spotting holes on the slide are almost equal in volume.

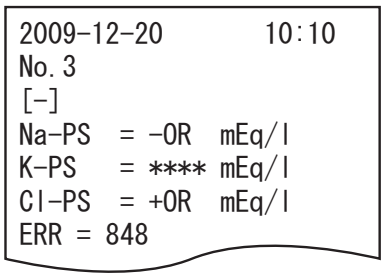
     If the fluids are not spotted into the spotting holes normally, please contact Heska's Technical Support Services for assistance.

3. Clean the probes in the ISE unit (referring to *Section 4.2*) and the spotting part (referring to *Section 4.3*).

NOTE: If the error still occurs after the above troubleshooting is performed, contact Heska's Technical Support Services for assistance.

b. When the error code is 3:
This is not an analyzer malfunction. This means the concentration of the sample is out of the measurement range.

NOTE: For the measurement range, refer to the *Instructions for Use* for the slide.

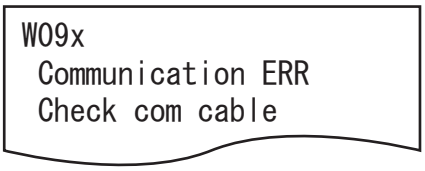


5.2.12 Errors Related to Data Communication or Sample Barcode Reader

1. W090, W097, W099

When data communication errors occur, perform the following:

- Make sure that the communication cable has been connected properly.
- Make sure that the status of the computer is ready to communicate.
- Make sure that the communication settings (Mode 46) have been set correctly.



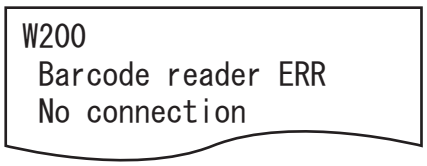
NOTE: If the error still occurs, contact Heska's Technical Support Services for assistance.

NOTE: "x" means given value.

2. W200

The sample barcode reader has not been connected to the analyzer.

Connect the sample barcode reader to COM2 of the analyzer.



NOTE: If the error still occurs, contact Heska's Technical Support Services for assistance.

5.2.13 Other Errors

1. W010

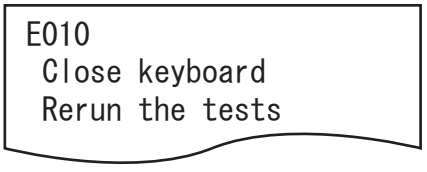
The **START** key has been pressed when the keyboard is open.

Close the keyboard, and press **START**.

2. E010

The keyboard is open during testing.

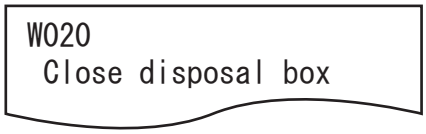
Close the keyboard, and rerun the tests from the beginning.



3. W020

   The **START** key has been pressed when the disposal box is open.

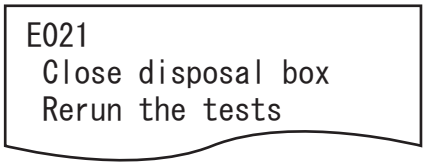
   Close the disposal box, and press **START**.



4. E021

   The disposal box is open during testing.

   Close the disposal box, and rerun the tests from the beginning.



5. W022

   The disposal box is full of slides and tips.

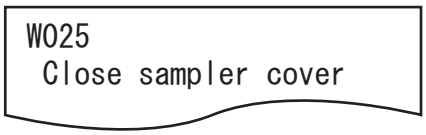
   Empty the disposal box when measurements are not in progress.

NOTE: When the number of slides in the disposal box reaches 80, W022 will occur. Once the disposal box is pulled out, the count will be reset. Always empty the disposal box every time it is pulled out.

6. W025

   The **START** key has been pressed when the sampler cover is open.

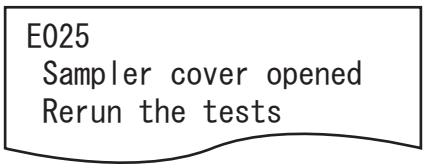
   Close the sampler cover, and press **START**.



7. E025

   The sampler cover is open during testing.

   Be sure to close the sampler cover when starting the next test.

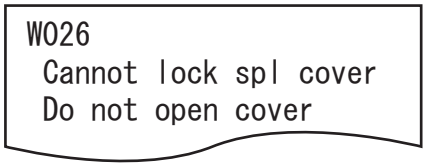


8. W026

   The analyzer has failed to lock the sampler cover.

   Please contact Heska's Technical Support Services for assistance.

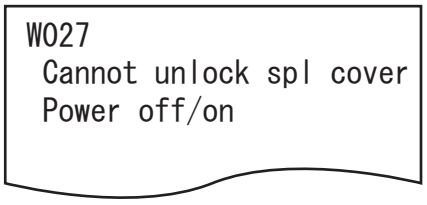
   Closing the sampler cover allows testing to continue.



9. W027

   The analyzer has failed to unlock the sampler cover.

   Turn the power switch off and on. If the error still occurs, contact Heska's Technical Support Services for assistance.



10. W500, W501

    A fan is faulty.

    Contact Heska's Technical Support Services for assistance.

```
W500
 Faulty fan
 Contact your dealer
```

```
W501
 Faulty incu fan
 Contact your dealer
```

11. When "&" marks appear on test results:

IMPORTANT

Measured values with a "&" mark may NOT be accurate.

a. In case of Ca-P tests, the sample has not been spotted. Rerun the tests.

b. In case of LIP test, the sample may have glycerol interference.

c. For other tests, the test results are abnormal.

   Perform tests that require dilution, following the directions on the Instructions for Use of the slides.

```
Ca-PS      &
         >   16 mg/dl
```

12. When "#" marks appear on test results:

    The valid term of the slides has expired.

IMPORTANT

Measured values with a "#" mark may NOT be accurate. Expired slides cannot be used. Use valid slides for expiration date.

```
GLU-PS      #
         = 104 mg/dl
```

13. When "¥" marks appear on test results:

    The sample may not be spotted normally.

    Rerun the tests.

```
GLU-PS      ¥
         = **** mg/dl
```

14. When "C" marks appear on test results:

    The test results were obtained with Mode 19 set.

    The control mode can be canceled by using Mode 19.

    Refer to *Section 6.2.2*.

```
2009-01-01          10:00
No. 33                   C
[-]
GLU-PS  =   92 mg/dl
```

15. When "E" marks appear on test results:

    This means that the analyzer could not calculate the test result due to interruption of testing (*e.g.*, slide jam).

    Check if other errors occurred, and perform the necessary troubleshooting.

```
2009-01-01          10:20
No. 34
[-]
TP-PS                    E
        = **** g/dl
```

6.1 Mode Function List and Mode Selection

Mode functions are used for changing functions, inputting or printing parameters, or cleaning the analyzer.

6.1.1 Mode List

Visual checking

There are two kinds of modes: one is the administrator mode, which can only be operated by administrators; another is the normal mode, which can be operated by normal operators.

Inputting a password in Mode 0 allows administrators to operate the administrator modes.

Mode Number	Mode Description	Reference Section	Operator
0	Changes mode type	6.2.1	Normal
19	Turns on the control mode (a, b canceled)	6.2.2	Normal
20	Sets date and time	6.2.3	Normal
23	Displays and resets the lamp's cumulative illumination time	6.2.4	Normal
24	Unit conversion [Unit (A)/Unit (B) switch]	6.2.5	Admin.
25	Data retransmission to host computer	6.2.6	Normal
26	Reprints test results	6.2.7	Normal
27	Sample No. and sample ID settings	6.2.8	Admin.
28	Switches display method for values outside of the determination range	6.2.9	Admin.
29	Prints out slide lot numbers	6.2.10	Normal
30	Work list display item setting	6.2.11	Admin.
35	Edits sample No. and sample ID	6.2.12	Admin.
36	Correlation coefficients (a, b) settings and printout	6.2.13	Admin.
37	Lot compensation coefficients (c, d, e) settings and printout	6.2.14	Admin.
39	Reference interval settings and printout	6.2.15	Admin.
40	Sets spotting count	6.2.16	Admin.
42	Leak check	6.2.17	Admin.
44	Lamp off selection	6.2.18	Admin.
45	Dilution factor settings	6.2.19	Admin.
46	Selects communication destinations	6.2.20	Admin.
49	Prints out error logs	6.2.21	Normal
52	Reference plate level check	6.2.22	Normal
55	Selects language	6.2.23	Admin.
76	Prints out DI card information	6.2.24	Normal
81	Alarm sound settings	6.2.25	Admin.
82	Display brightness and print density	6.2.26	Admin.
83	Test result print sheets setting	6.2.27	Admin.
85	Display order of reference intervals	6.2.28	Admin.
86	Edits and inputs reference interval names	6.2.29	Admin.
103	Displays temperature and humidity	6.2.30	Normal

6.1.2 How to Select Each Mode

1. To enter a mode operation:

   There are 2 ways to select a mode:

   - Select a Mode by scrolling: a)
   - Input a Mode No. directly: b)

   a. Selecting a Mode by scrolling:

      When the display shows [Warming Up] or [Ready], press **MODE** to display the mode number input dialog.

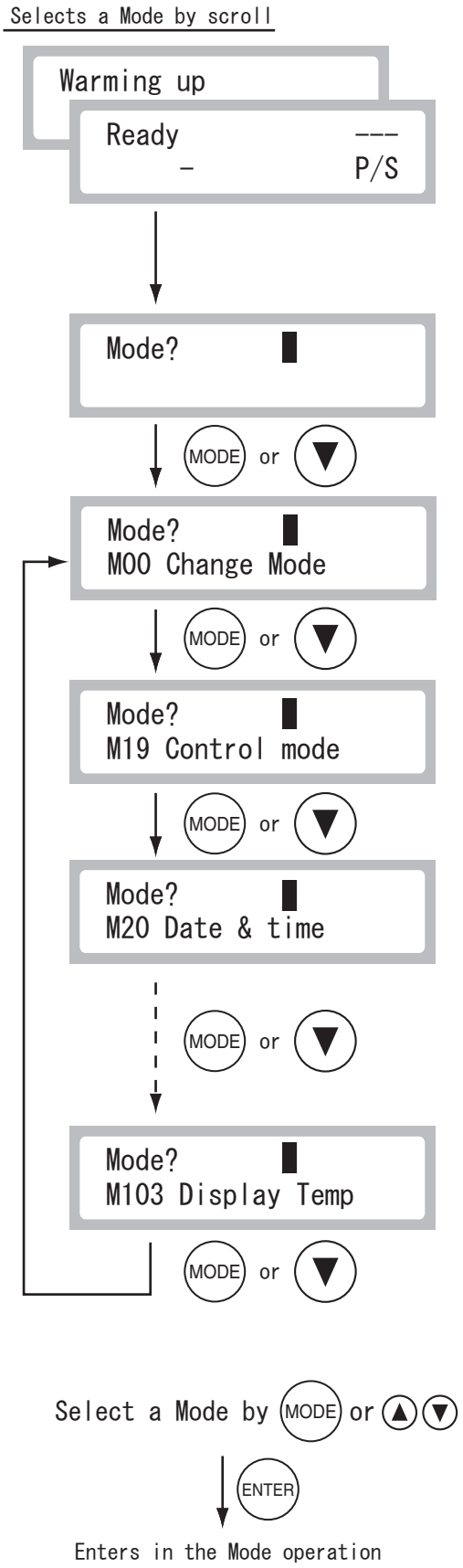
NOTE: ◯ indicates a key, and → indicates input order.

Next, press **MODE** or ▼ to display a mode menu.

By pressing **MODE** or ▼ the menu will scroll.

NOTE: By pressing ▲ the menu can scroll back.

When the desired menu is displayed, press **ENTER** to display the first dialog of the mode.



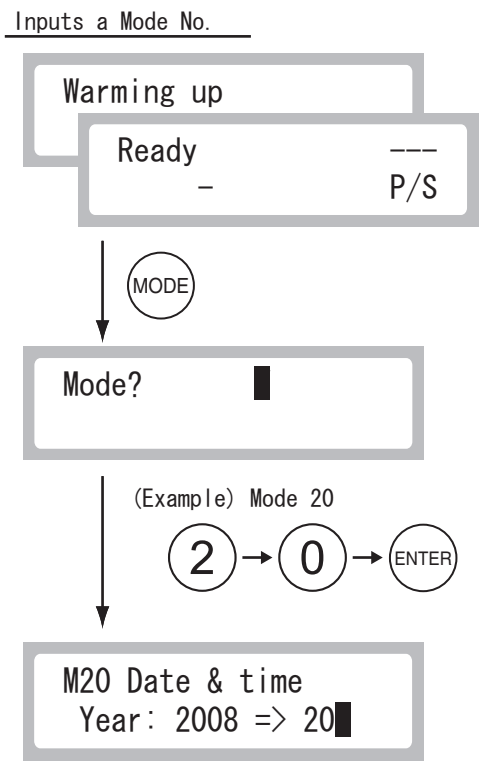
b. Inputting a Mode No. directly:

When the display shows [Warming Up] or [Ready], press **MODE** to display the mode number input dialog.

Input a Mode No. from the keyboard and press **ENTER** to display the first dialog of the mode.

NOTE: ◯ indicates a key, and → indicates input order.

2. To quit a mode operation, press **STOP**.



6.2 Mode Functions

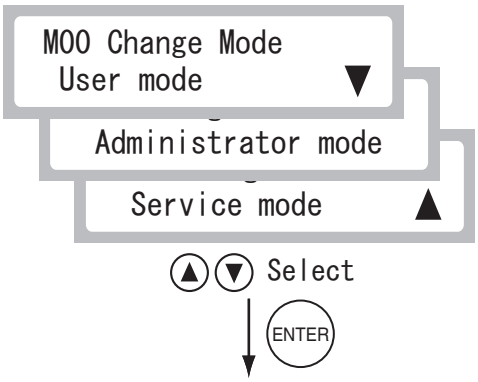
6.2.1 Mode 0 changing Mode type <Normal>

1. Enter into Mode 0.

2. Select [Administrator mode].

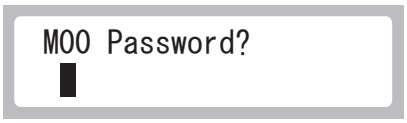
   Select [Administrator mode] by using the scroll keys, then press **ENTER**.

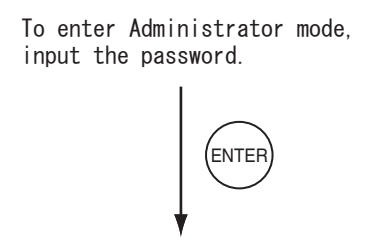
NOTE: Although the service mode will be displayed on the menu, the mode is not available.



3. Input the password.

   Input the password and press **ENTER**. The password is "4000".

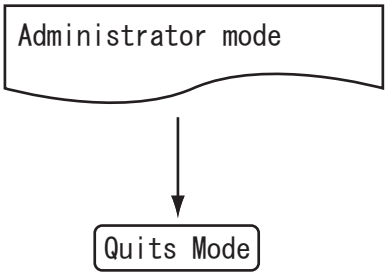




4. The analyzer has entered into [Administrator mode], and shows it on the printout.

NOTE: The important modes which can affect test results can only be operated in [Administrator mode].

NOTE: When turning the power off, the [Administrator mode] will be canceled.



6.2.2 Mode 19 Turning on the Control Mode (a, b canceled) <Normal>

This mode is used for performing control evaluation using DRI-CHEM Analyzer CONTROL QPL and QPH.

When the control mode is selected, the analyzer calculates the concentration with the correlation coefficients for all tests reset to a=1 and b=0. In control mode, the following conditions are set:

Correlation coefficients for all test names (Mode 36 settings) ==> Resets to a=1, b=0

Units (Mode 24 settings) ==> Resets to the unit (A)

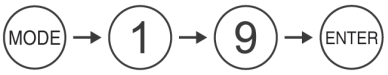
Dilution factors (Mode 45 settings) ==> Resets to no dilution

On the printout for each measurement, the indication "C" appears after the sample No.

NOTE: This mode should NOT be set for use with HESKA Chemistry Control.

NOTE: Turning off the power cancels this mode.

1. Enter into Mode 19.



2. Select [Set] or [Reset].

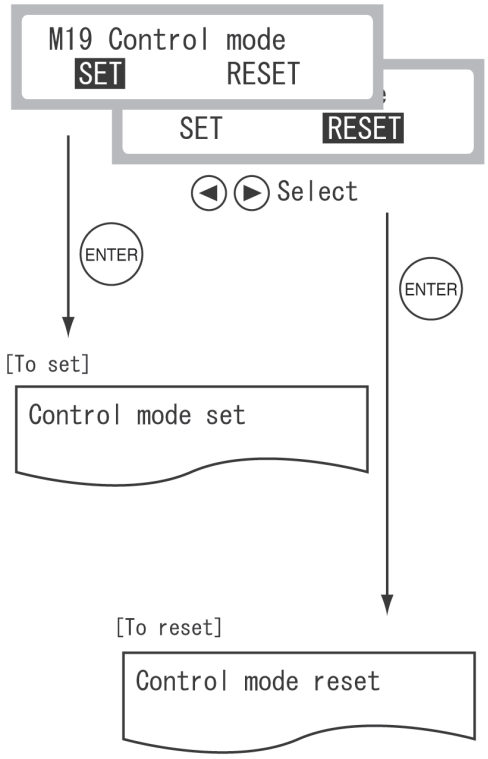
   Select a menu using ◀ ▶ whether to set or reset the control mode and press **ENTER**.

   SET = MODE 19 on.

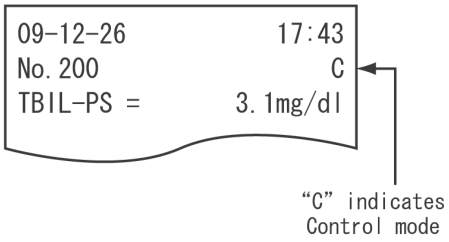
   RESET = MODE 19 off.

NOTE: The shaded part is a selected menu.

The analyzer prints out the selection [Set] or [Reset] and quits the mode operation.



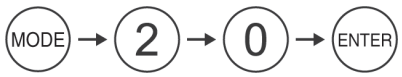
(Example)Printout in control mode



6.2.3 Mode 20 Setting Date and Time <Normal>

This mode is used to set the date and time.

1. Enter into Mode 20.

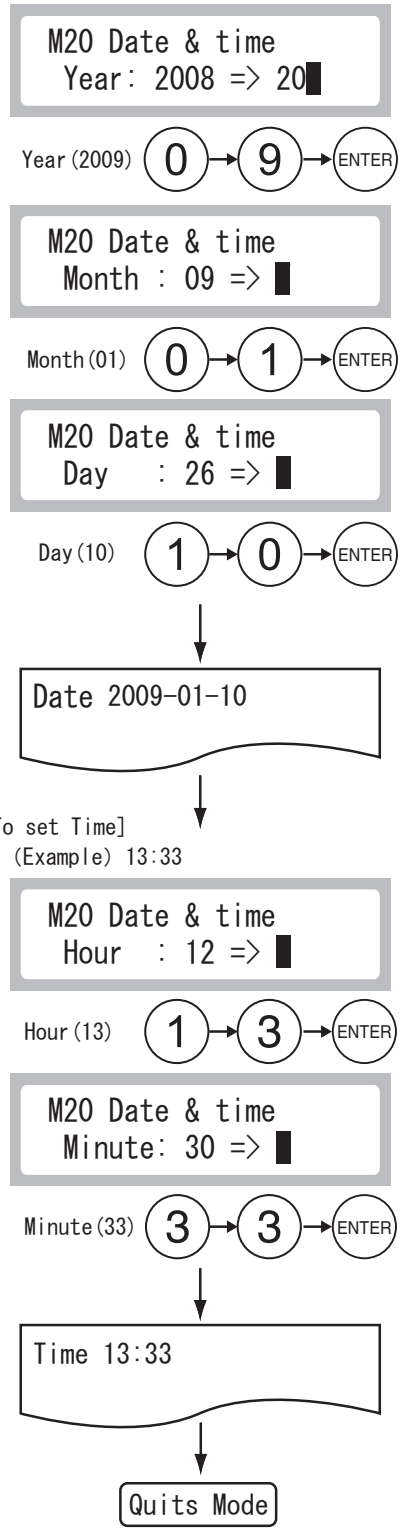


2. Input date.
   a. Input the year from the keyboard and press **ENTER**.

NOTE: Input the last 2 digits of the year.

   b. Input the month from the keyboard and press **ENTER**.
   c. Input the day from the keyboard and press **ENTER**. The new date will be printed.

[To set date]
(Example) Jan. 10, 2009



3. Input time.
   a. Input the hour from the keyboard (24 hour format) and press **ENTER**.
   b. Input the minute from the keyboard and press **ENTER**. The analyzer prints out the new time and quits the mode operation.

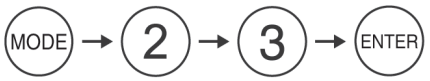
6.2.4 Mode 23 Displaying and resetting the lamp's cumulative illumination time <Normal>

This mode is used to display and reset the cumulative illumination time of the lamp currently installed in the analyzer.

The illumination time will be counted up to 9,999 hours if not reset.

When replacing the light source lamp, reset the cumulative illumination time using this mode.

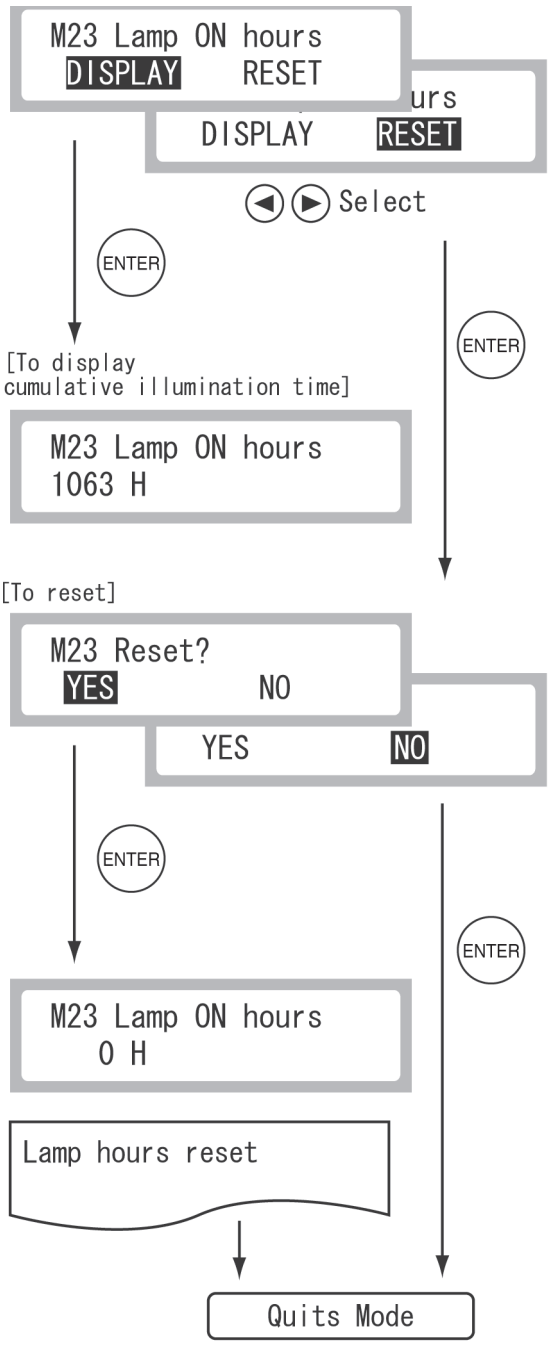
1. Enter into Mode 23.



2. Select [Display] or [Reset].

   Select a menu using ◀ ▶ to display or reset the cumulative illumination time and press **ENTER**.

   NOTE: The shaded part is a selected menu.



3. Display lamp's cumulative illumination time.

   The analyzer displays the current cumulative illumination time for 5 seconds and quits the mode.

4. Select whether to reset the cumulative illumination time or not.

   a. To reset the cumulative illumination time:

      Select [Yes] followed by **ENTER**. The analyzer displays the current cumulative illumination time reset to zero for 5 seconds and quits the mode.

   b. To leave the cumulative illumination time as set:

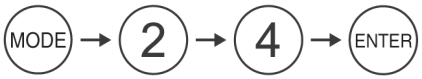
      Select [No] followed by **ENTER**.

      The analyzer quits the mode.

6.2.5 Mode 24 Unit Conversion [Unit (A) / Unit (B) Switch] <Admin.>

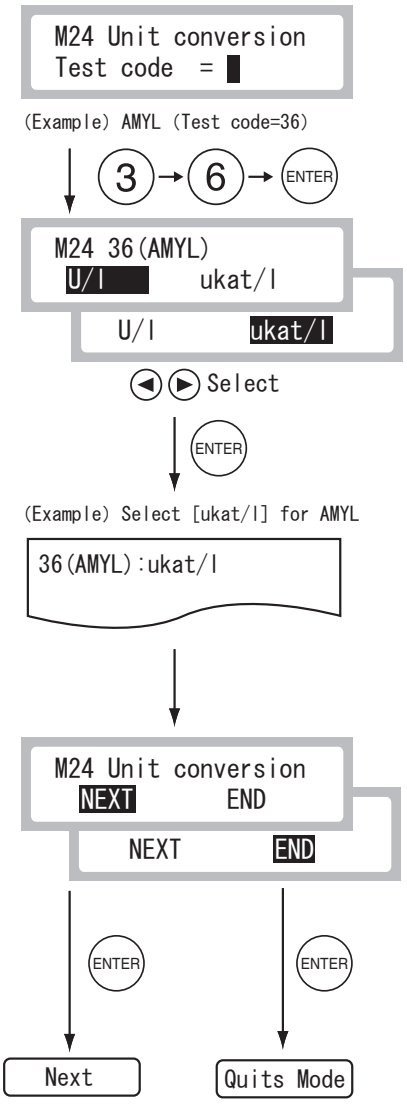
This mode is used to switch the test units printed or transmitted to a computer. The Unit (A) and Unit (B) for each test code are listed on the table on the following page.

1. Enter into Mode 24.



2. Input a test code.

   Input a test code and press **ENTER**.



3. Select a unit.

   Select a unit using ◀ ▶ and press **ENTER**.

NOTE: The shaded part is a selected menu.

The new unit name will be printed out.

4. To quit the mode:

   Select [End] and press **ENTER** to quit the mode.

NOTE: To switch a unit for other test codes, select [Next] followed by **ENTER**.

Classification		Test Name	Test Code	Unit (A)	Unit (B)	Conversion Coefficient
Biochemical Tests	Enzymes	ALP	35	U/L	µkat/L	0.0167
		vAMY	43	U/L	µkat/L	0.0167
		CPK	33	U/L	µkat/L	0.0167
		GGT	30	U/L	µkat/L	0.0167
		AST/GOT	31	U/L	µkat/L	0.0167
		ALT/GPT	32	U/L	µkat/L	0.0167
		LDH	34	U/L	µkat/L	0.0167
		vLIP	44	U/L	µkat/L	0.0167
	General Chemistry	ALB	20	g/dL	g/L	10
		BUN	11	mg/dL	mmol/L	0.357
		Ca	23	mg/dL	mmol/L	0.25
		CRE	17	mg/dL	µmol/L	88.4
		GLU	10	mg/dL	mmol/L	0.05551
		IP	24	mg/dL	mmol/L	0.3228
		Mg	28	mg/dL	mmol/L	0.4114
		NH_3	15	µg/dL	µmol/L	0.7139
		TBIL	21	mg/dL	µmol/L	17.1
		TCHO	14	mg/dL	mmol/L	0.02586
		TG	16	mg/dL	mmol/L	0.01129
		TP	18	g/dL	g/L	10
		UA	13	mg/dL	µmol/L	59.48
	Electrolytes	Na	91	mEq/L	mmol/L	1
		K	92	mEq/L	mmol/L	1
		CL	93	mEq/L	mmol/L	1

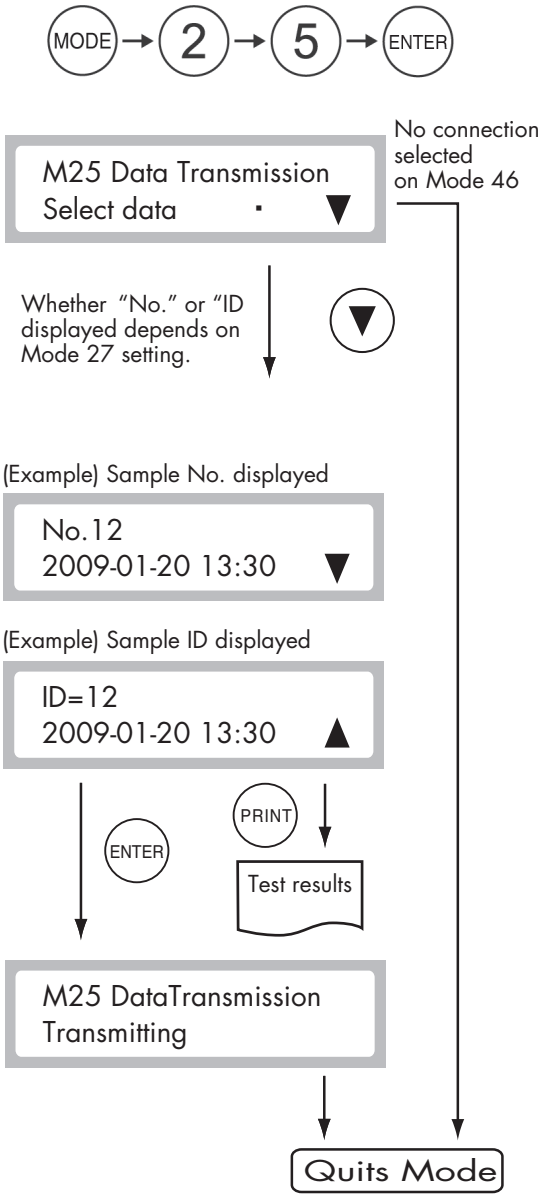
NOTE: Unit (B) = Unit (A) x Conversion coefficient.

NOTE: Slide codes are subject to change without notice.
Slide codes are printed out on the slide's outer package.

6.2.6 Mode 25 Data Retransmission to Host Computer <Normal>

This mode is used to retransmit test results to a host computer via the RS232C or USB connector. Prior to using this mode, it is necessary to set the communication destination and the protocol using Mode 46.

1. Enter into Mode 25.



2. Select data you want to send.

   Press ▼ to display a data selection dialog with a sample No. (or a sample ID) and test date and time.

NOTE: The display format depends on Mode 27 setting as follows.

Mode 27 Setting	Display on Mode 25
No./ID	Sample ID (*1)
ID	Sample ID (*1)
No.	Sample No.

Select data you want to send using the ▲▼ keys.

NOTE: (*1) If no ID input, the sample No. will be displayed.

NOTE: The data will be displayed in order from most recent (maximum 100 samples).

NOTE: The ▲ on the display means the last (oldest) data in the analyzer memory.

NOTE: When the "LIS com setting" is set to [No] in Mode 46, pressing ▼ quits the mode operation.

NOTE: Pressing **PRINT** at the data selection dialog prints out the test results.

3. Send the data.

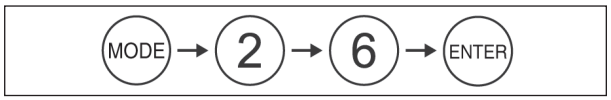
   Press **ENTER** to transmit the data which is currently displayed on the LCD.

   The analyzer displays the transmitting message during the process, and quits the mode after the transmission is completed.

6.2.7 Mode 26 Reprinting Test Results <Normal>

This mode is used to output test results stored in the analyzer memory to the printer or the display in sequence beginning with the most recent data. A maximum of 100 samples are stored in memory and can be reprinted (displayed).

1. Enter into Mode 26.



2. Select an output destination.

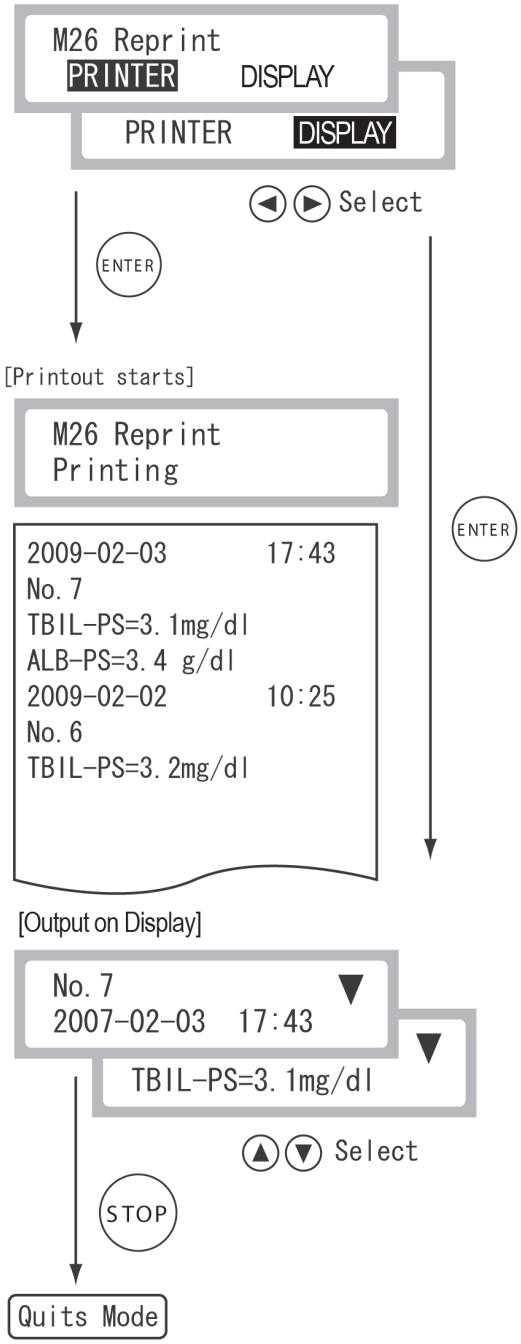
   Select [Printer] or [Display] using ◀ ▶ and press **ENTER**.

NOTE: The shaded part is a selected menu.

3. To output to the printer:

   Select [Printer] and press **ENTER** to start printing.

NOTE: To stop the printing in midcourse, press **STOP**.



4. To output to the Display:

   Select [Display] and press **ENTER** to display data.

   Scroll through the data using ▲▼.

NOTE: To stop browsing, press **STOP**.

6.2.8 Mode 27 Sample No. and Sample ID Settings <Admin>

This mode is used to change the settings for sample No. and sample ID.

1. Enter into Mode 27.

2. Select sample No. and/or sample ID printed along with test results.

   To print out both a sample No. and a sample ID, select [No./ID]

   To print out only a sample ID, select [ID]

   To print out only a sample No., select [No.]

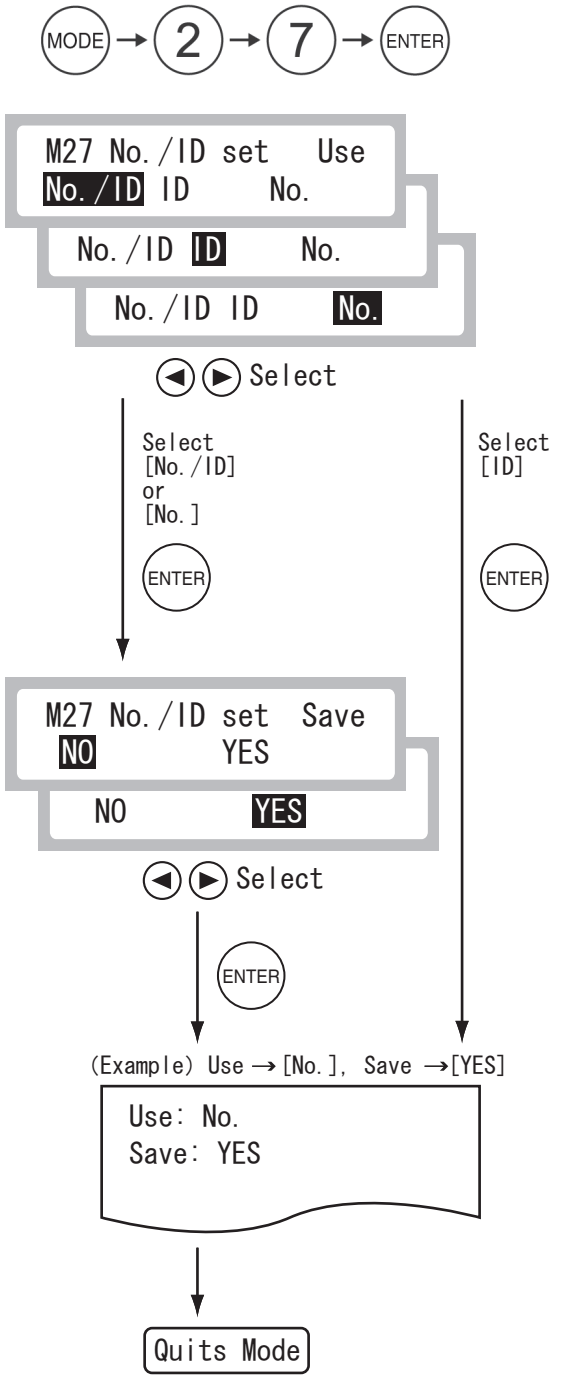
3. Select whether the sample No. is saved [Yes] or not [No].

   When selecting [Yes], the sample No. is incremented (the latest No. + 1) even if the power is turned off and on.

   When selecting [No], the sample No. is reset to [No.=1] after turning off and on.

4. New settings will be printed out.

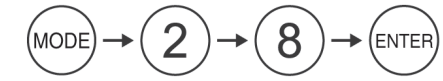
   The analyzer prints out the settings and quits the mode operation.



6.2.9 Mode 28 Switching Display Method for Values outside of the Determination Range <Admin>

This mode is used to switch the display method for results outside of the determination range for all tests.

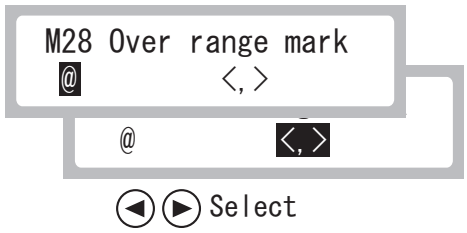
1. Enter into Mode 28.



2. Select a display format.

   a. To print out a numeric value with "@" mark for a value outside of the determination range:

      Select [@] using ◀ ▶ and press **ENTER**.

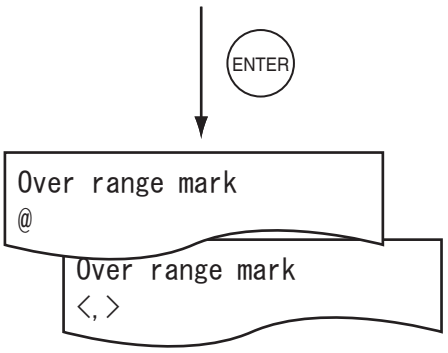


IMPORTANT

Measured values with a "@" mark may NOT be accurate.

(Printout example)

```
2009-12-20     14:00
No.16
[-]
BUN-PS    @
        = 4.5 mg/dl
```

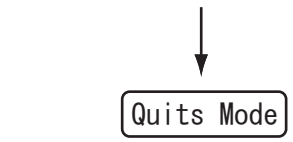


   b. To print out that the value is outside of the determination range using a "<" or ">" mark:

      Select [<, >] using ◀ ▶ and press **ENTER**.

(Printout example)

```
2009-12-20     14:00
No.16
[-]
BUN-PS < 5.0 mg/dl
```



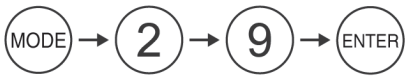
3. New selection will be printed out.

   The analyzer prints out the selection and quits the mode operation.

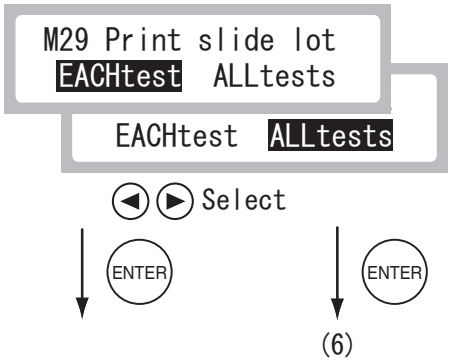
6.2.10 Mode 29 Printing out Slide Lot Numbers <Normal>

This mode is used to print out slide lot numbers recorded in the analyzer memory.

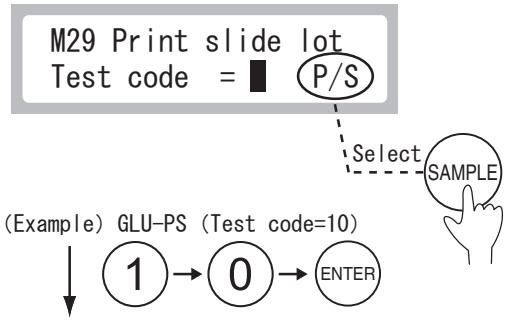
1. Enter into Mode 29.

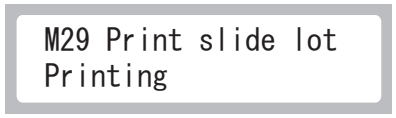


2. Select a print format.
   Select [Each test] or [All tests] using ◀ ▶ and press **ENTER**.

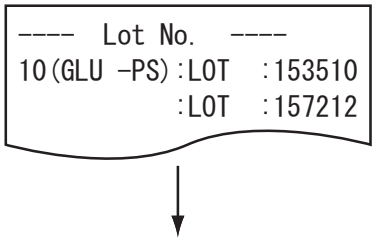


3. To print out a lot number for a selected test:
   Input a test code and press **ENTER**.

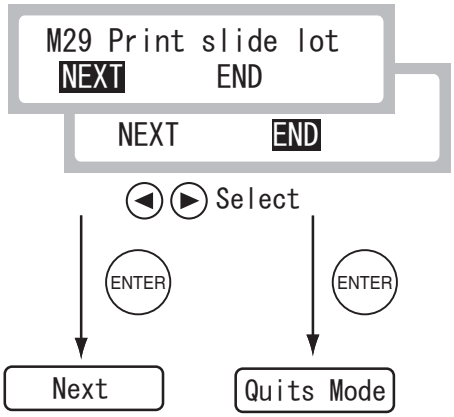




4. The lot numbers are printed out.



5. Select [End] to terminate the mode.

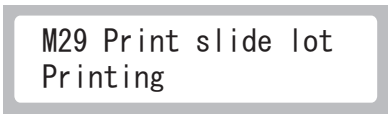


NOTE: To print out lot numbers for other tests, select [Next] followed by **ENTER**.

6. To print out lot numbers for all tests at once:

   By selecting [All tests] followed by **ENTER** in the dialog of (2), all lot number information in the analyzer memory will be printed out.

   After the printout is complete, the analyzer quits the mode operation.



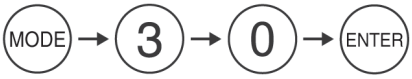
(Example) To print out for all test

```
----  Lot No.  ----
10(GLU -PS):LOT  :153510
10(GLU -PS):LOT  :157212
  [P13]    :LOT  :154902
           :LOT  :153103
11(BUN -PS):LOT  :250602
11(BUN -PS):LOT  :253305
91(Na     ):LOT  :100000
91(K      ):LOT  :100000
91(Cl     ):LOT  :100000
```

6.2.11 Mode 30 Work List Display Item Setting <Admin.>

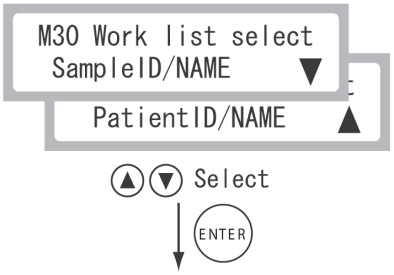
This mode is used to select items displayed on the work list dialog.

1. Enter into Mode 30.



2. Select a display format.

   Select [Sample ID/Name] or [Patient ID/Name] using ▲▼ and press **ENTER**.

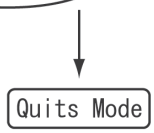


3. The new selection will be printed out.

   After the selection is printed out, the analyzer quits the mode operation

(Example) Select [SampleID/NAME]

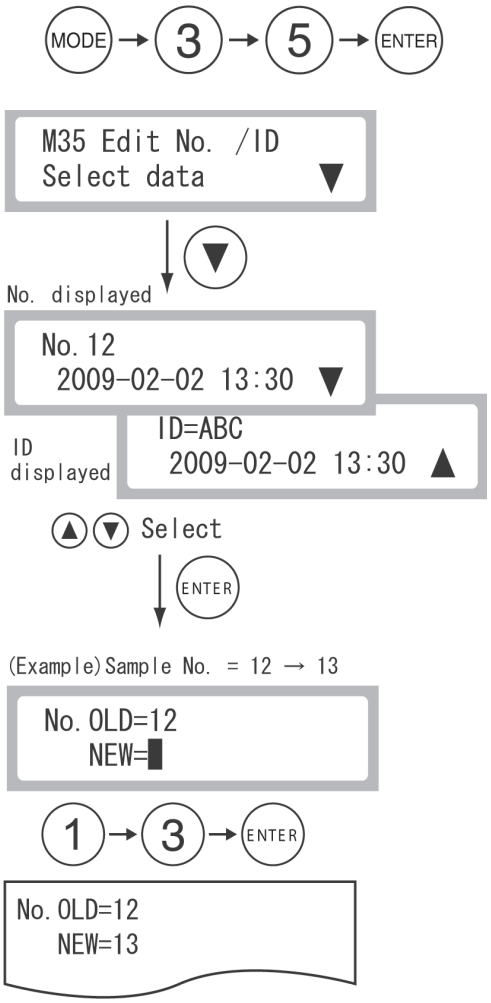
```
--- Work list select ---
SampleID/NAME
```



6.2.12 Mode 35 Editing Sample No. and Sample ID <Admin.>

This mode is used to edit sample No. and sample IDs memorized in the analyzer memory. The edited data can be sent to a host computer.

1. Enter into Mode 35.



2. Select data to be edited.

   Press ▼ to display a data selection dialog which shows a sample No. (or a sample ID) and its test date and time.

NOTE: The display format depends on Mode 27 setting as follows.

Mode 27 Setting	Display on Mode 35
No./ID	Sample ID (*1)
ID	Sample ID (*1)
No.	Sample No.

   Select data you want to edit using ▲▼. Press **ENTER** to display the edit dialog.

NOTE: (*1) If no ID input, the sample No. will be displayed.

NOTE: The data will be displayed in order from the most recent (maximum 100 samples).

NOTE: The ▲ on the LCD means the last (oldest) data in the analyzer memory.

3. Input a new number for the sample No.

   Input a new sample No. from the keyboard and press **ENTER**.

4. The edited result (the new sample No.) will be printed out. Check the result before editing [OLD=xxxx] and after editing [NEW=xxxx] to make sure it is correct.

5. Put new alphanumerical characters for the sample ID.

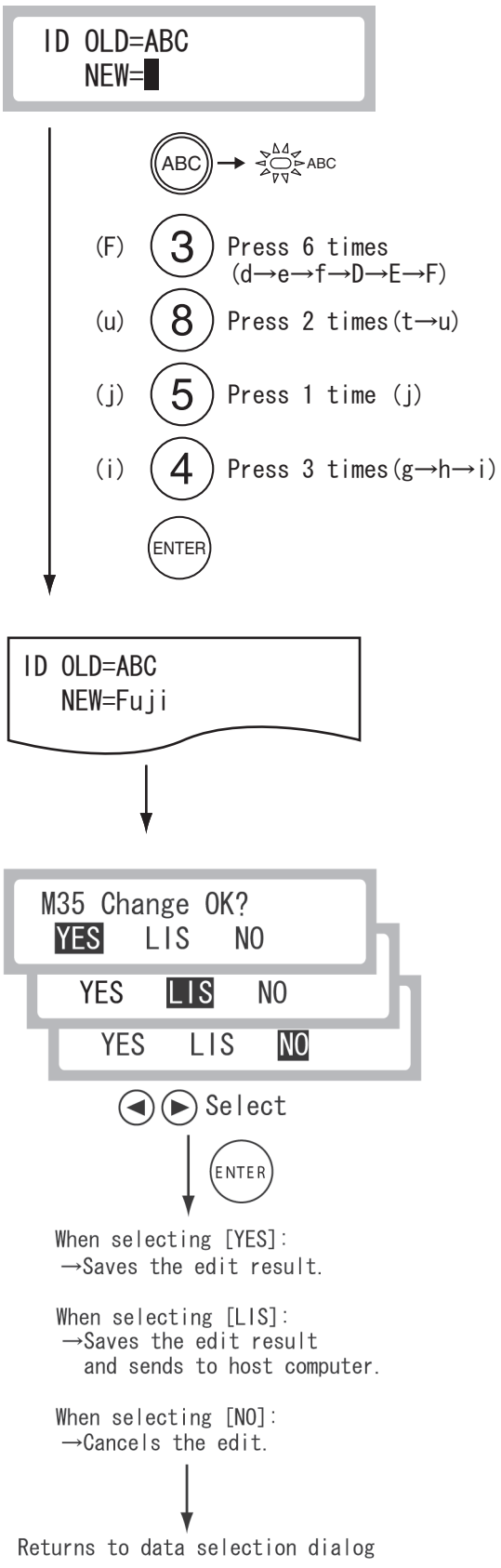
   Select a sample ID you want to edit.

   Input a new sample ID from the keyboard and press **ENTER**.

6. The edited result (the new sample ID) will be printed out.

   Check the result before editing [Old=xxxx] and after editing [New=xxxx] to make sure it is correct.

(Example) Edits sample ID=ABC to ID=Fuji



7. Accept the edited result.

   After checking the edited result, select a menu using the ◀ ▶ keys and press **ENTER**.

   To accept the edited result: [Yes]

   To accept the edited result and send to LIS: [LIS]

   Not to accept (cancel the edit): [No]

8. The display returns to the data selection dialog. Press **STOP** to quit the mode.

6.2.13 Mode 36 Correlation Coefficients (a, b) Settings and Printout <Admin>

This mode is used to input, reset or print out correlation coefficients (a, b) for each test and sample type (W, P/S, U).

For further details, refer to the Description of the Correlation Function at the end of this section.

IMPORTANT

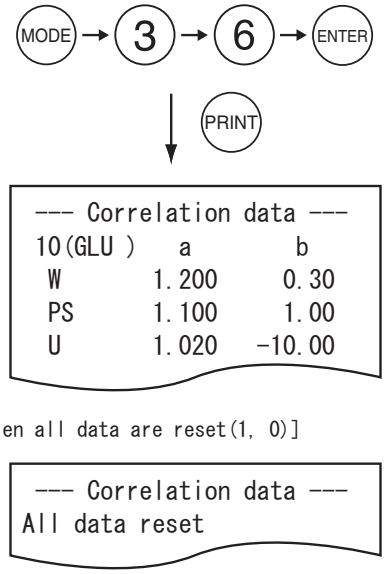
Incorrect inputs for (a, b) will cause incorrect test results. Make sure that the inputs (a, b) are correct using this mode.

1. Enter into Mode 36.
2. To print out the current settings:

   Press **PRINT** at the first menu dialog.

NOTE: Only the coefficients other than (a=1, b=0) are printed out.

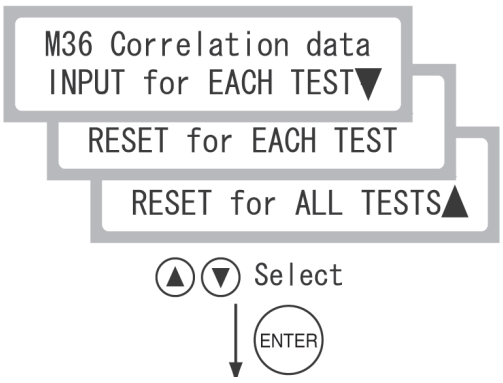
NOTE: To stop the printing in midcourse, press **STOP**.



3. Select a menu.

   Menu
   - To input coefficients for each test: See 4.
   - To reset coefficients for each test: See 5.
   - To reset coefficients for all tests: See 6.

NOTE: Pressing ▲▼ changes the menu on the display.

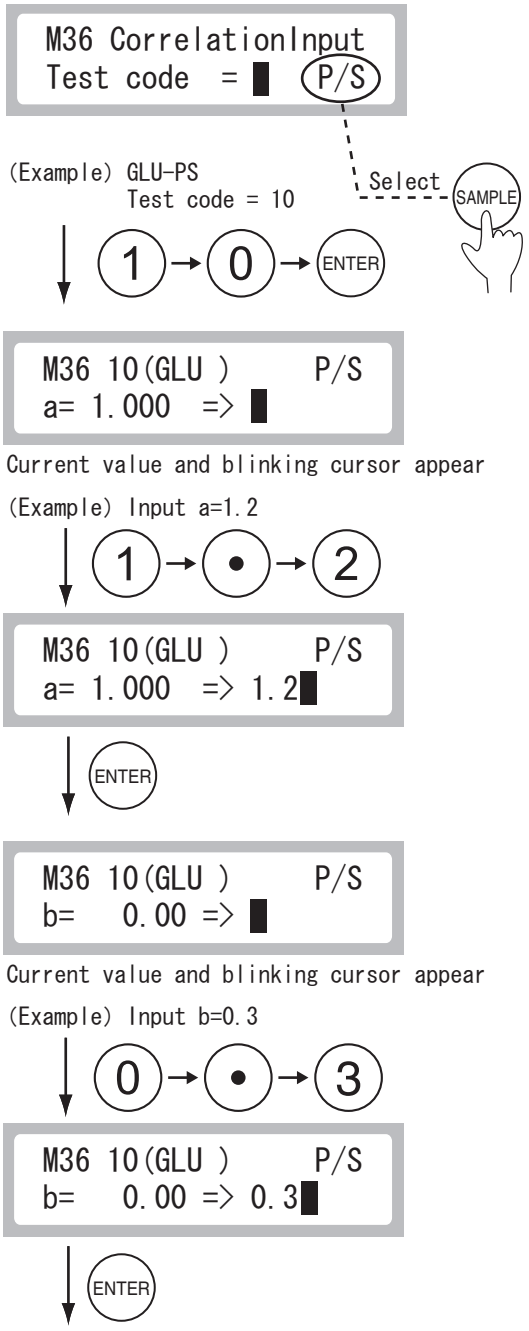


4. To input coefficients for each test:

   Select [Input for Each Test] from the menu and press **ENTER**.

   a. Select a sample type and input a test code. The default setting for the sample type is [P/S]. Input a test code and press **ENTER**.

NOTE: Refer to *Section 8.3* for the test codes.



   b. Input a new value for coefficient a. The current value is displayed. Input a new value for "a" and press **ENTER**.

   c. Input a new value for coefficient b in the same manner.

d. After completing the inputs of (a, b), the old values, the input values, and the new values are printed out.

IMPORTANT

Incorrect inputs for (a, b) will cause incorrect test results. Make sure that the printed new values for (a, b) are correct.

NOTE: If values for (a, b) have already been input, old values will not be canceled as follows. If the old values are represented as (a1, b1), and the new values as (a2, b2), the resulting values for (a, b) will be determined according to the following formulas:

$a = a1 \times a2,\ b = a1 \times b2 + b1$

For further details, refer to the Description of the Correlation Function at the end of this section.

e. Select [End] to terminate the mode.

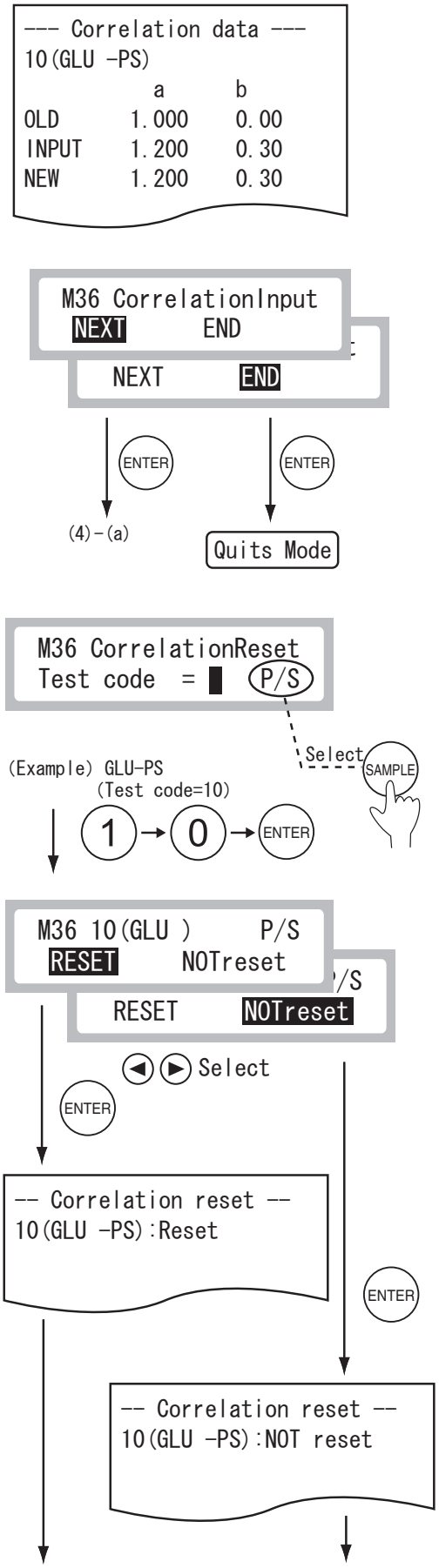
To input coefficients for other tests, select [Next] followed by **ENTER**.

5. To reset coefficients for each test:

   Select [Reset for Each Test] from the menu and press **ENTER**.

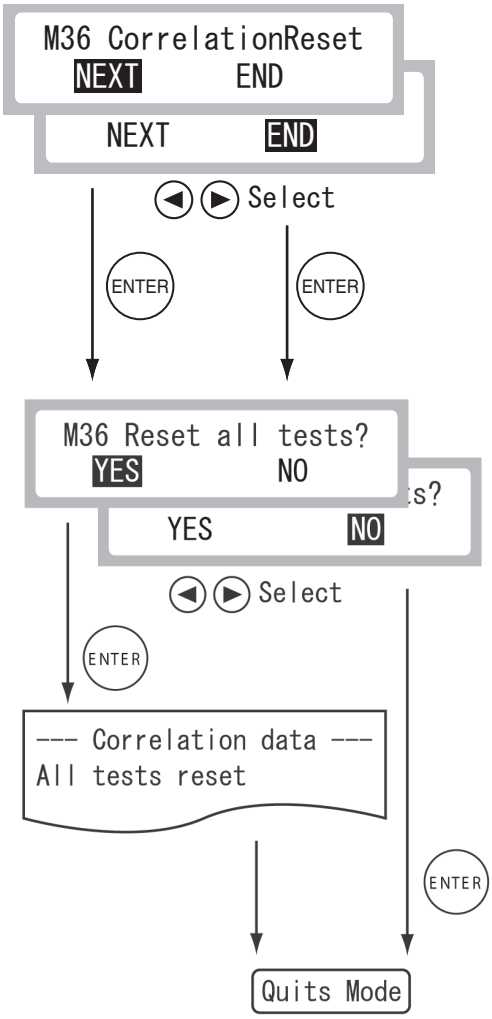
   a. Select a sample type and input a test code. The default setting for the sample type is [P/S]. Input a test code and press **ENTER**.

   b. Select whether to reset the coefficients or not. Select a menu using ◀ ▶ and press **ENTER**.



c. Select [End] to terminate the mode.

To reset coefficients for other tests, select [Next] followed by **ENTER**.



6. To reset coefficients for all tests:

   Select a menu using the ◀ ▶ keys and press **ENTER**.

   a. When selecting [Yes] (reset):

      The analyzer prints out that all coefficients have been reset and quits the mode operation.

   b. When selecting [No] (not to reset): The analyzer quits the mode.

Description of the correlation function

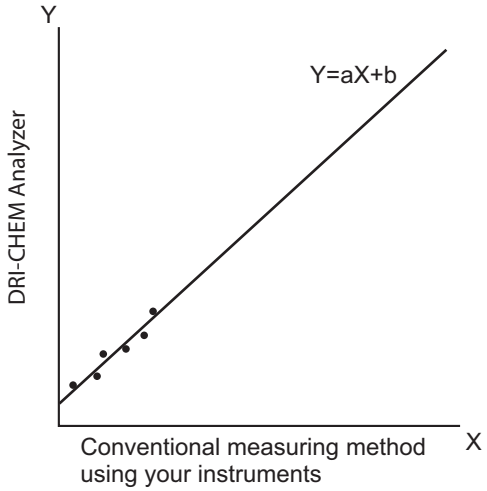
This function is designed to determine the correlation between the measured data obtained using the DRI-CHEM Analyzer and the data obtained using the conventional measuring method of a reference instrument.

On the X-axis, the measured data obtained using reference instruments are plotted and on the Y-axis, the measured data obtained using the DRI-CHEM Analyzer.

The correlation regression equation in this case is Y = aX + b.

Once values for the two coefficients (a, b) are recorded in the analyzer memory, the DRI-CHEM Analyzer performs compensation calculations internally using the formula

X = (Y-b)/a. In this way, the DRI-CHEM Analyzer's measured data (Y) are adjusted to match those that would be obtained using the reference instruments with the conventional method.



NOTE: In order to obtain a better correlation, it is essential to exercise caution regarding the number of data points and the sample type.

1. It is possible to set separate a and b values for each sample type.
2. The correlation function is independent of other compensation functions.
3. If values for (a, b) have already been input, old values will not be canceled as follows. If the old values are represented as (a1, b1), and the new values as (a2, b2), the resulting values for (a, b) will be determined according to the following formulas:

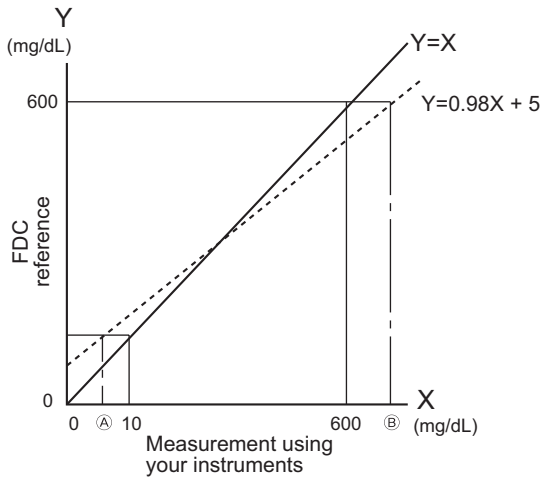
   a = a1 x a2
   b = a1 x b2 + b1

4. Measurement range after inputting coefficients (a, b)will shift as follows:

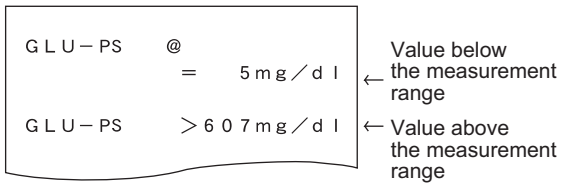
   (Example) GLU measurements

   If a = 1 and b = 0 (Y = X), the measurement range is 10-600 mg/dL. But by inputting regression coefficients as shown, the lower limit changes to A and the upper limit to B.

   If the regression formula is Y = 0.98x + 5:
   A = 5 mg/dL,
   B = 607 mg/dL



Example printout

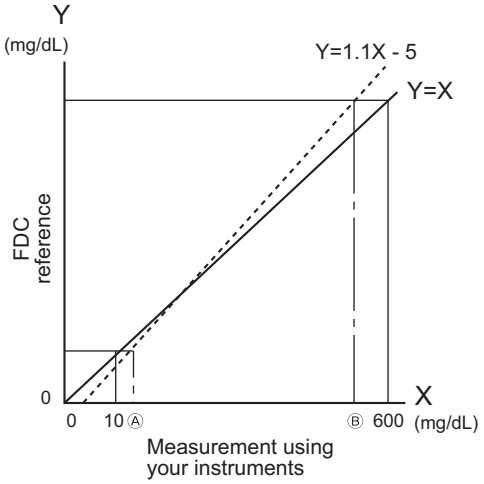


   If the regression formula is Y = 1.1X -5:
   A = 14 mg/dL,
   B = 550 mg/dL

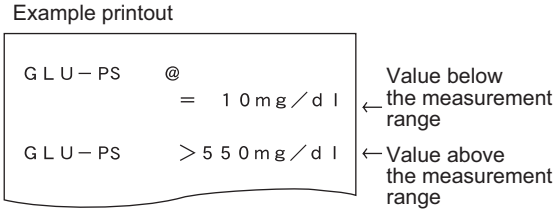
   If the measured data is below the measurement range, an "@" indication is printed out, as shown at the top of the example printout.

   If the measured data is above the measurement range, a greater than indication ">" is printed out, as shown in the example printout.

NOTE: Whether "@" or "<and>" are printed depends on Mode 28 setting.



Example printout



6.2.14 Mode 37 Lot Compensation Coefficients (c, d, e) Settings and Printout <Admin.>

This mode is used to input, reset or print out the values (c, d, e) printed on the calibration cards included with slides. This mode is needed if it is not possible to read in the data directly from a calibration card due to loss or damage.

IMPORTANT

Incorrect inputs for (c, d, e) will cause incorrect test results. Make sure that the inputs for (c, d, e) are correct using this mode.

IMPORTANT

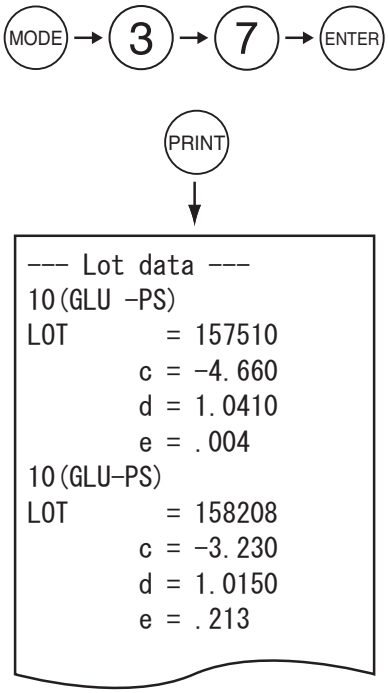
In Mode 37, it is possible to input values for (c, d, e) only for the slide lots which the Slide Type Number's standard curve information has already been input into the analyzer. It is necessary to read in the calibration card for the slide lots which have a new Slide Type Number.

NOTE: The Slide Type Number is the most significant digit of a lot number. (Example) The Slide Type Number of "Lot No. 123456" is 1.

1. Enter into Mode 37.
2. To print out the current input data:

   Press **PRINT** at the first menu dialog.

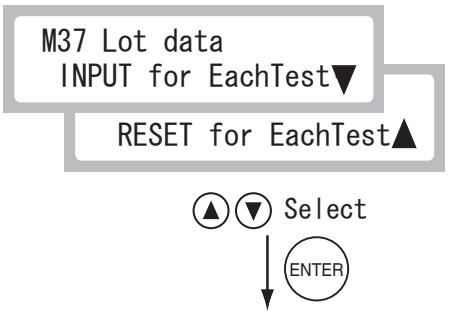
NOTE: To stop the printing in midcourse, press **STOP**.



3. Select a menu.

   Menu
   - To input coefficents for each test: See 4.
   - To reset coefficients for each test: See 5.

NOTE: Pressing the▲▼ keys changes the menu on the display.



4. To input coefficients for each test:

   Select [Input for Each Test] from the menu and press **ENTER**.

   a. Select a sample type and input a test code. The default setting for the sample type is [P/S].

      Input a test code and press **ENTER**.

   b. Input a slide lot No. which has the same Slide Type Number and is currently not in use.

      After the input, press **ENTER**.

NOTE: When reading a calibration card, the old calibration information is automatically deleted. In this mode, select the slide lot No. to be deleted and input it.

NOTE: Memorized slide lot numbers can be browsed by Mode 29 or the printout of (2) above.

   c. Input the slide lot No. to be newly used.

      After the input, press **ENTER**.

NOTE: As the same Slide Type Number (the most significant digit) appears on the display, input the new lot No. from the second digit.

   d. Input a new value for coefficient "c".

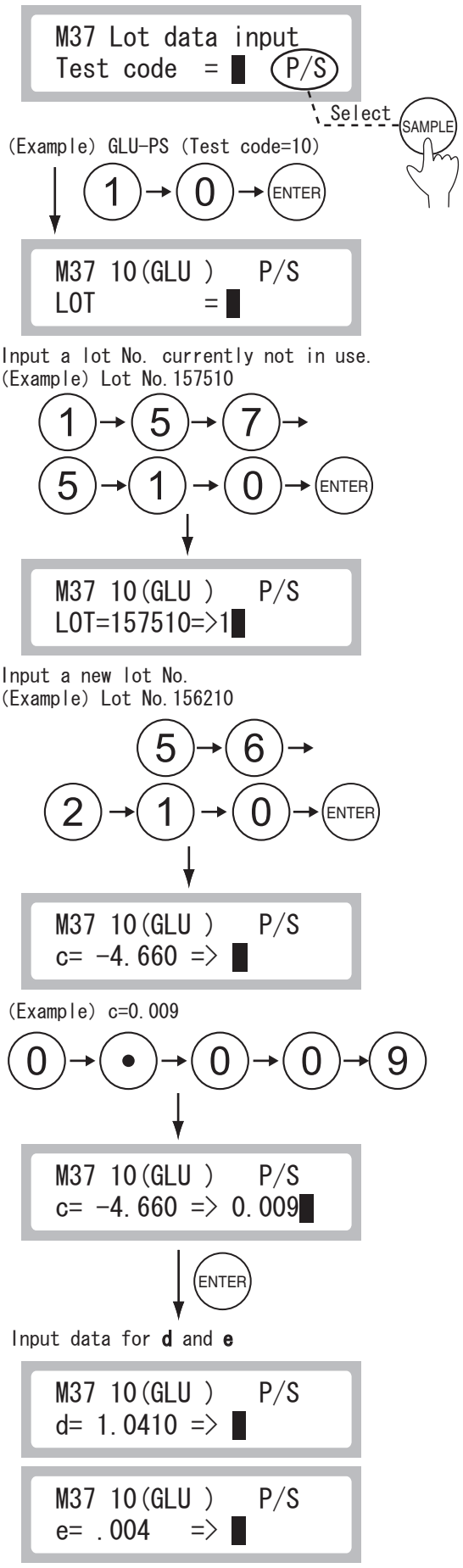
      After the input, press the **ENTER** key.

   e. Input a new value for coefficient "d".

      After the input, press **ENTER**.

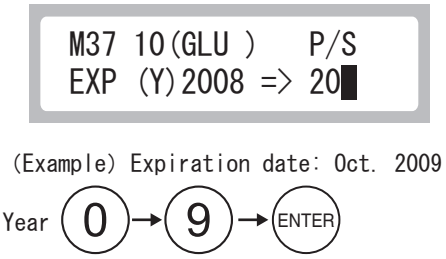
   f. Input a new value for coefficient "e".

      After the input, press **ENTER**.



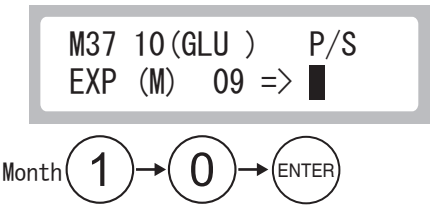
g. Input the expiration date.

Input year from the keyboard and press **ENTER**.

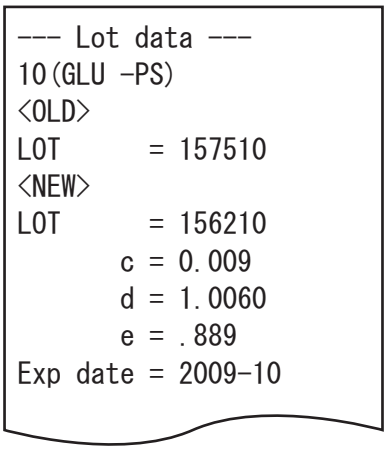


NOTE: Input the last 2 digits for inputting the year.

Input month from the keyboard and press **ENTER**.



h. The new input data will be printed out. The new input coefficients for (c, d, e) and the expiration date will be printed out.

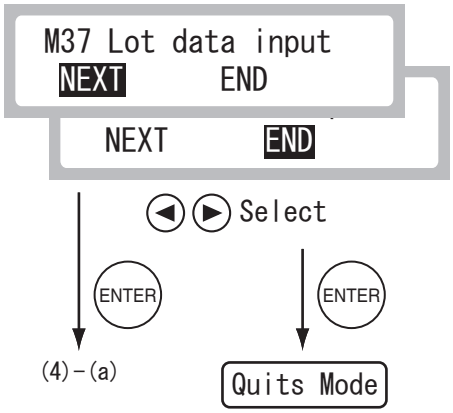


IMPORTANT

Incorrect inputs for (c, d, e) will cause incorrect test results.
Make sure that the printed new values for (c, d, e) are correct.

i. Select [End] to terminate the mode.

To input coefficients for other tests, select [Next] followed by **ENTER**.



5. To reset coefficients for each test:

   Select [Reset for Each Test] from the menu and press **ENTER**.

   a. Select a sample type and input a test code.
      The default setting for the sample type is [P/S].

      Input a test code and press **ENTER**.

   b. Select whether to reset the coefficients or not.

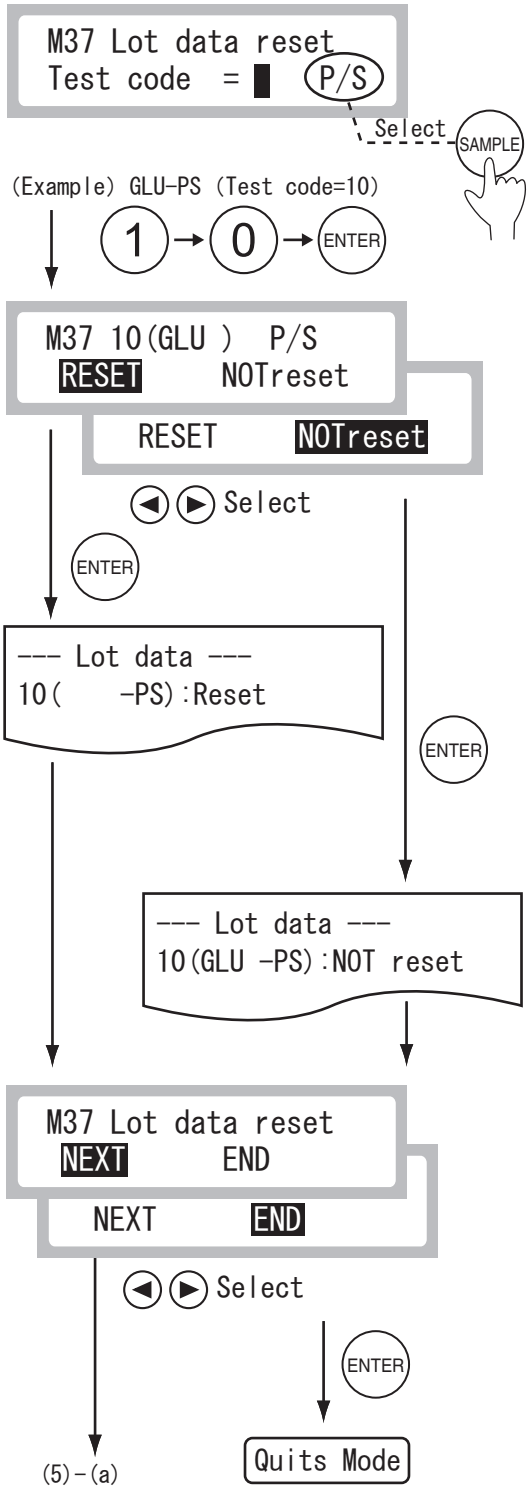
      Select a menu using ◀ ▶ whether to reset the coefficients (c, d, e) or not and press **ENTER**.

IMPORTANT

Coefficients for all slide lots of the test type will be deleted.

   c. Select [End] to terminate the mode.

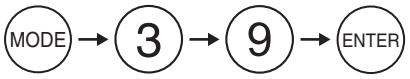
      To reset coefficients for other tests, select [Next] followed by **ENTER**.



6.2.15 Mode 39 Reference Interval Settings and Printout <Admin.>

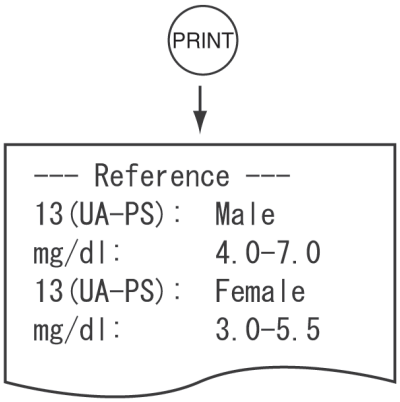
This mode is used to input reference intervals for each reference interval name, for each sample type (W, P/S, U), and for each unit [Unit (A), Unit (B)] respectively. The reference intervals for DOG, CAT, HORSE and CONTROL have been set at the factory.

1. Enter into Mode 39.



2. To print out the current settings:

   Press **PRINT** at the first menu dialog.



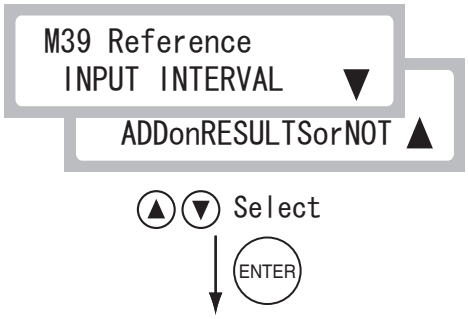
NOTE: The analyzer only prints the reference intervals which have been keyed in.

NOTE: To stop the printing in mid-course, press **STOP**.

3. Select a menu.

   Menu
   - To input reference intervals: See 4.
   - To print out reference intervals along with results: See 5.

NOTE: Pressing ▲▼ will change the menu on the display.

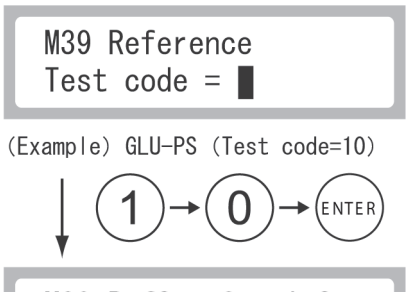


4. To input reference intervals:

   Select [Input Interval] from the menu and press **ENTER**.

   a. Input a test code and press **ENTER**.

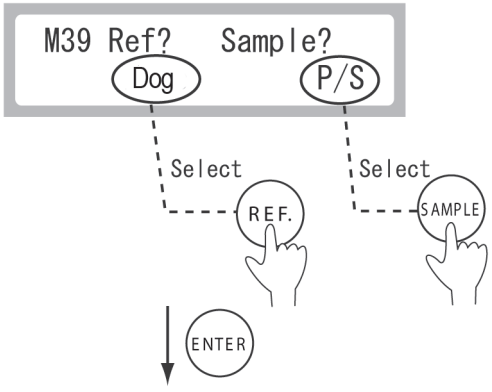
      The left is an example for test code = 10.



NOTE: Refer to *Section 8.3* for the test codes.

   b. Select a reference interval name and a sample type. Using **REF.**, select a reference interval name.

      The default setting for the sample type is [P/S].



      After the selection, press **ENTER**.

c. Input a lower limit value.

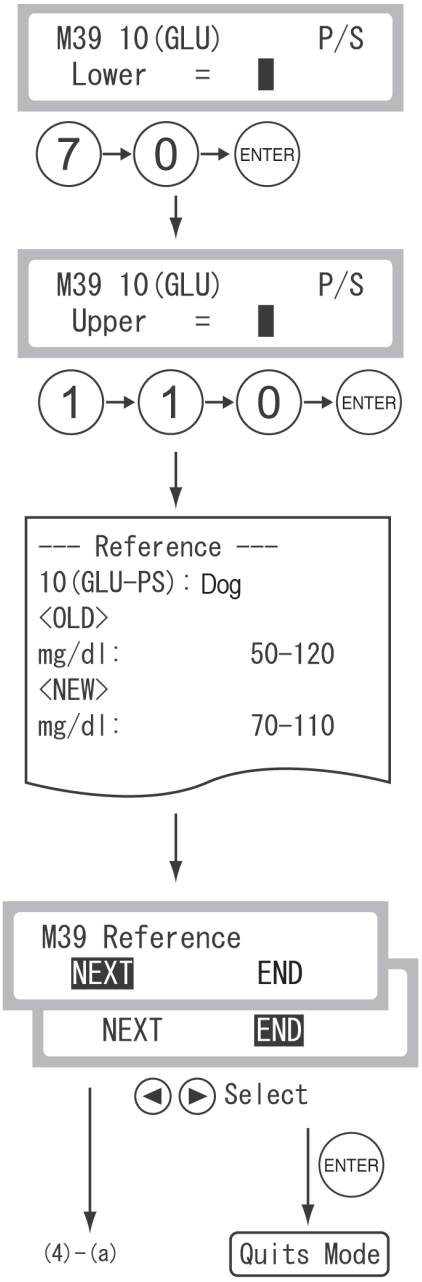
After the input, press **ENTER**.

d. Input a upper limit value.

After the input, press **ENTER**.

e. The new data will be printed out.

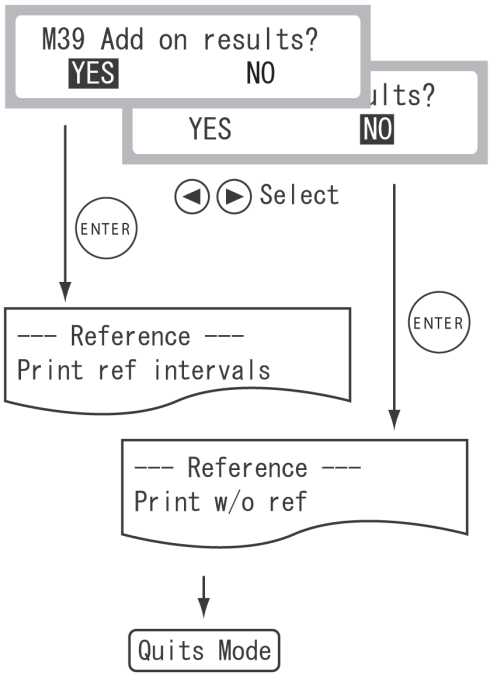
f. To input reference intervals for other tests, select [Next] followed by **ENTER**. Select [End} to terminate the mode.



5. To print out reference intervals along with results:

   Select a menu using ◀ ▶ and press **ENTER**.

   After the selection has printed out, the analyzer quits the mode operation.

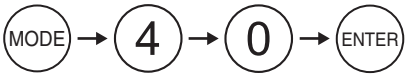


6.2.16 Mode 40 Setting Spotting Count <Admin.>

The number of tests per one sample in automatic sampling can be changed within the range of 1 to 20.

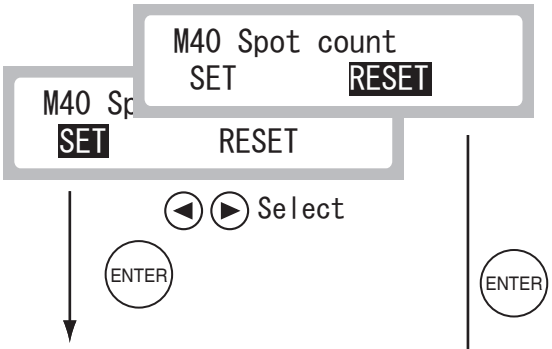
When the spotting count is reset, the number is set to 20. The default setting of the spotting count is [Reset].

1. Enter into Mode 40.



2. Select [Set] or [Reset].

   Select a menu using ◀ ▶ and press **ENTER**.



3. To set a spotting count:

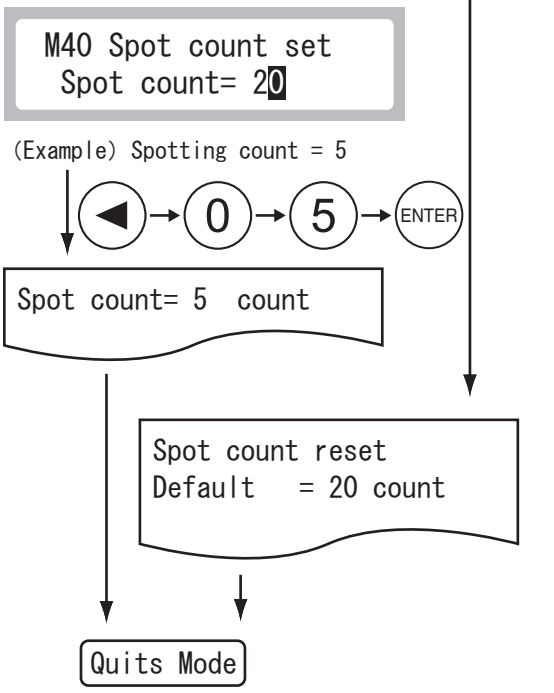
   a. Input a spotting count from the keyboard.

      After the input, press **ENTER**.

   b. The new spotting count will be printed out.

      After the new spotting count is printed out, the analyzer quits the mode operation. To reset the spotting count:

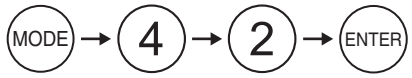
      The analyzer prints out that the count has been reset to 20 (default) and quits the mode operation.



6.2.17 Mode 42 Leak Check <Admin.>

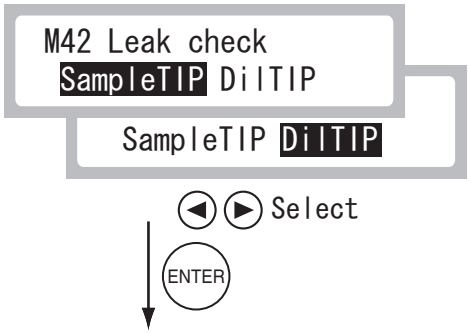
This mode is used to test sampler leakage. Prior to using the mode, prepare a sampler leak check tool (packed as an accessory).

1. Enter into Mode 42.



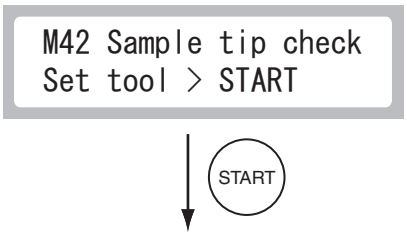
2. Select sample tip [Sample Tip] or dilution tip [Dil Tip].

   Select a menu using ◀ ▶ whether to check the sample tip or the dilution tip, and press **ENTER**.



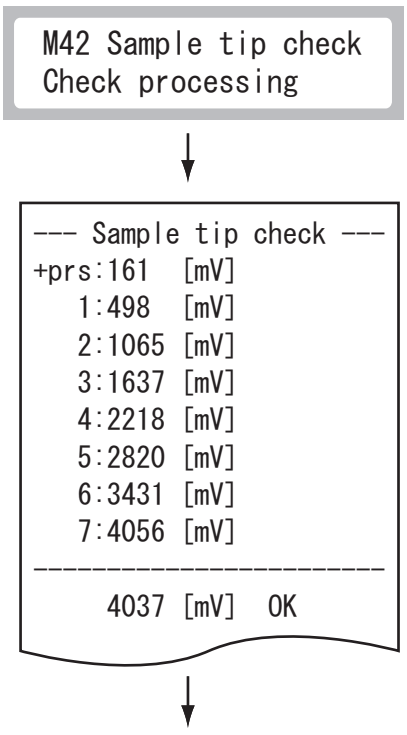
3. To check the sampler nozzle:

   Put a leak check tool into hole a on the sample rack. Close the sampler cover and press **START**.



   The LCD displays [Check processing].

   After the leak check is completed, the analyzer will print out the result and return to the tip selection dialog.



   Replace the sampler O-ring (refer to *Section 4.6.2*), if an error occurs.

   Remove the leak check tool from the nozzle by hand. Press **STOP** to quit.

4. To check the dilution nozzle:

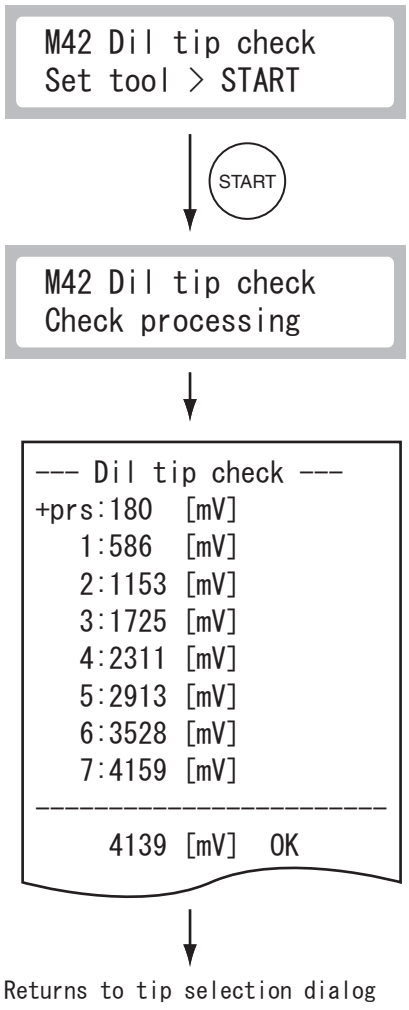
   Put a leak check tool into hole b on the sample rack. Close the sampler cover and press **START**.

   After the leak check is completed, the analyzer will print out the result and return to the tip selection dialog.

   Replace the sampler O-ring (refer to *Section 4.6.2*), if an error occurs.

   Remove the leak check tool from the nozzle by hand.

   Press **STOP** to quit.

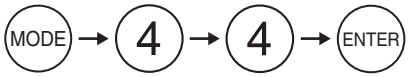


6.2.18 Mode 44 Lamp off Selection <Admin.>

This mode is used to select whether to turn off the light source lamp after the analyzer has not been used for 20 minutes in the "Ready" state. The default selection is to turn off the lamp after 20 minutes.

NOTE: The average life of the lamp is about 1000 hours if the lamp is continuously on. If the power is continuously switched on for 24 hours in the "Lamp on" selection, the lamp life will be used up in 40 days.

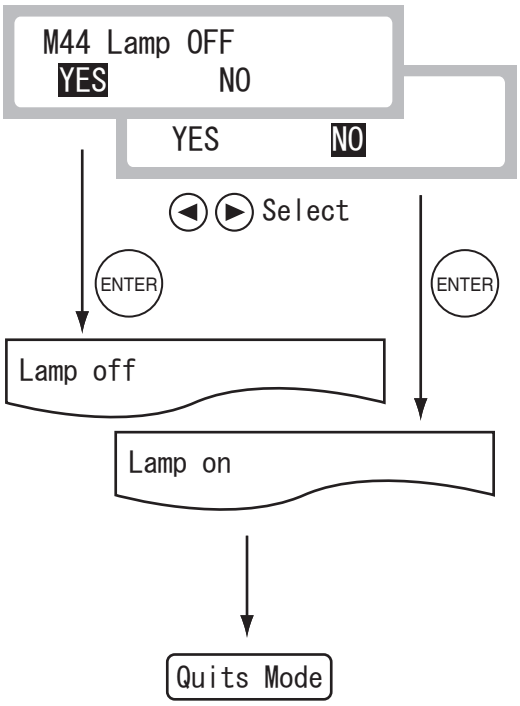
1. Enter into Mode 44.



2. Select whether to turn off the lamp or not.

   Select a menu using ◀ ▶ whether to turn off the lamp or not, and press **ENTER**.

   After the selection is printed out, the analyzer quits the mode operation.

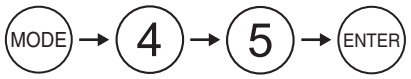


6.2.19 Mode 45 Dilution Factor Settings <Admin.>

This mode is used to set dilution factors for each test and for each sample type (P/S, U).

When performing tests without setting a dilution factor using the **DILUTION** key, the analyzer performs tests according to the preset dilution factors in this mode.

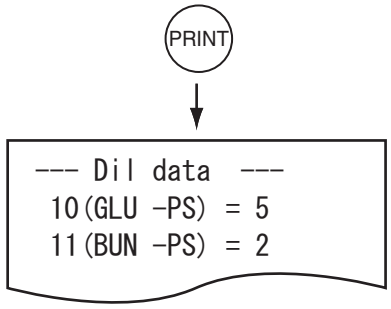
1. Enter into Mode 45.



2. To print out the current settings:

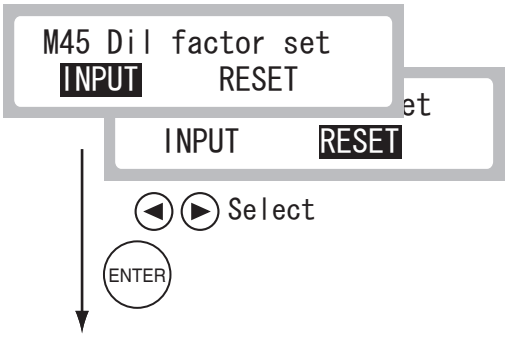
   Press **PRINT** at the first menu dialog.

   NOTE: To stop the printing in midcourse, press **STOP**.



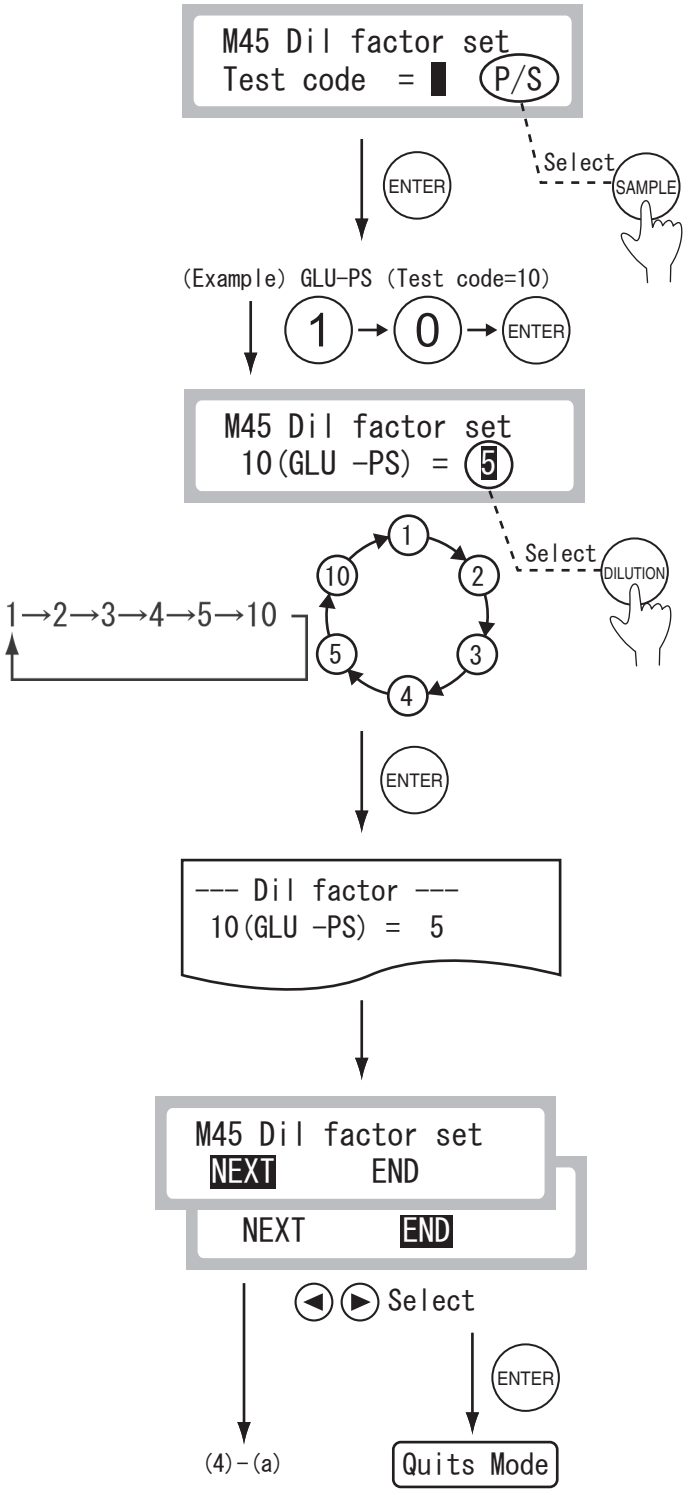
3. Select a menu.

- To input dilution factors for each test, see 4.
- To reset dilution factors for all tests, see 5.



4. To input dilution factors:

   Select [Input] from the previous menu and press **ENTER**.



   a. Select a sample type and input a test code.

      The default setting for the sample type is [P/S].

      Input a test code and press **ENTER**.

      NOTE: Refer to *Section 8.3* for the test codes.

   b. Select a dilution factor.

      Press **DILUTION** to select a dilution factor.

      NOTE: Each time **DILUTION** is pressed, the dilution factor changes in the following order:

   To accept the dilution factor, press **ENTER**.

   The new dilution factor will be printed out.

   c. Select [End] to terminate the mode.

      To input dilution factors for other tests, select [Next] followed by **ENTER**.

5. To reset dilution factors:

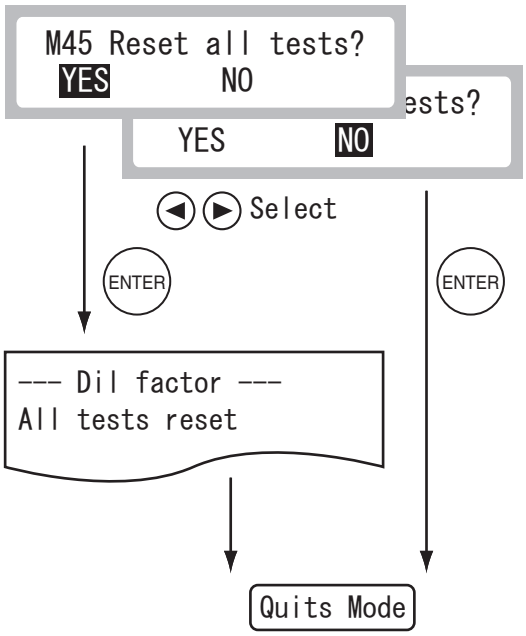
   Select [Reset] from the previous menu in (3) and press ENTER.

   a. When selecting [Yes] (reset):

      The analyzer prints out that all dilution factors have been reset and quits the mode operation.

   b. When selecting [No] (not to reset):

      The analyzer quits the mode.



6.2.20 Mode 46 Selecting Communication Destinations <Admin.>

The DRI-CHEM Analyzer is able to communicate with the host computer/PC (IEC/UL60950–1 approved) and/or the sample barcode reader via serial interface connectors (COM1A, COM2) and an USB connector (COM1B).

This mode is used to select communication destinations and to set communication parameters.

⚠ CAUTION

The sample barcode reader specified for the DRI-CHEM Analyzer can be used.

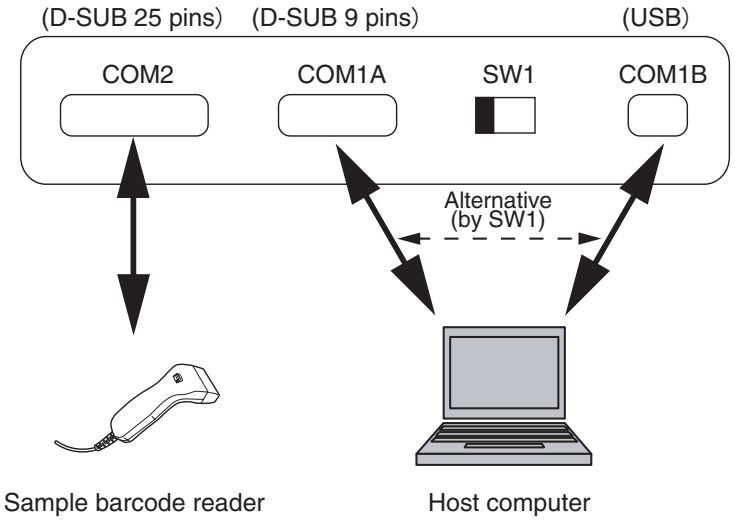
Do not connect a barcode reader other than that specified for the DRI-CHEM Analyzer. Otherwise, physical damage or fire may result.

NOTE: Do not connect the DRI-CHEM Analyzer to the host computer or PC, which has not been approved by IEC/UL60950–1.

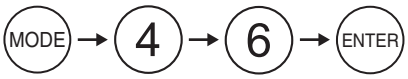
NOTE: When connecting to the host computer, select either COM1A or COM1B by the SW1 on the rear panel.

It is not possible to communicate through both connectors at the same time.

NOTE: Perform this mode operation after connecting the communication cables.



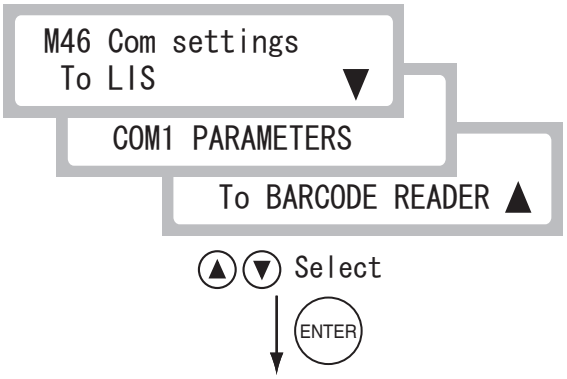
1. Enter into Mode 46.



2. Select a menu.

   Menu
   Setting for host computer: See 3.
   Communication parameter settings for COM1A and B: See 4.
   Setting for barcode reader: See 5.

NOTE: Pressing ▲▼ can change the menu on the LCD.



3. Setting for host computer

   a. Select a menu ([No], [PrtOn], or [PrtOff]) using ◀ ▶ and press **ENTER**.

      [No] No communication with host computer.

      [PrtOn]

      Use communication, and the built-in printer of the FDC4000 is on.

      [PrtOff]

      Use communication, and the built-in printer of the FDC4000 is off.

   b. Select a protocol [Type1, Type2, or Type3] to be connected to the host computer using ◀ ▶ and press **ENTER**.

      [Type1]

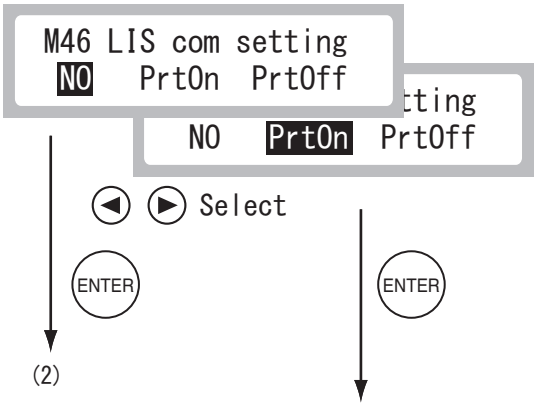
      Type1 is 2-way communication requesting a Work list (patient names, test names, *etc*.).

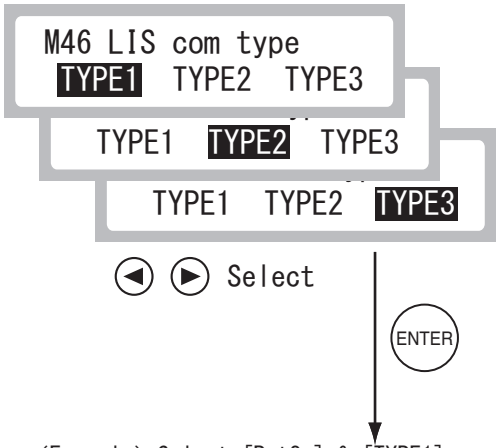
      [Type2]

      Type2 does not request the Work list, but performs one-way transmission of test results (from analyzer to host computer) by using the Type1 protocol.

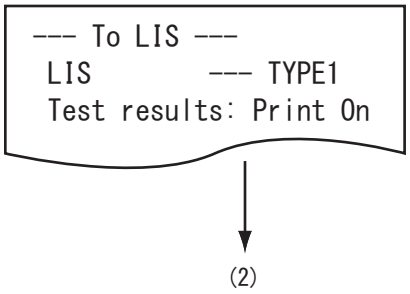
      [Type3]

      Type3 is one-way transmission of test results using the same protocol as the FDC3500. After the new selection is printed out, the analyzer quits the mode operation.





(Example) Select [PrtOn] & [TYPE1]



4. Communication parameter settings for COM1A and B:

   a. Select a baud rate.

      Select a baud rate ([19200], [9600] or [1200]) using ◀ ▶ and press **ENTER**.

   b. Set vertical parity.

      Select a menu ([None], [Odd], or [Even]) using ◀ ▶ and press **ENTER**.

   c. Set horizontal parity.

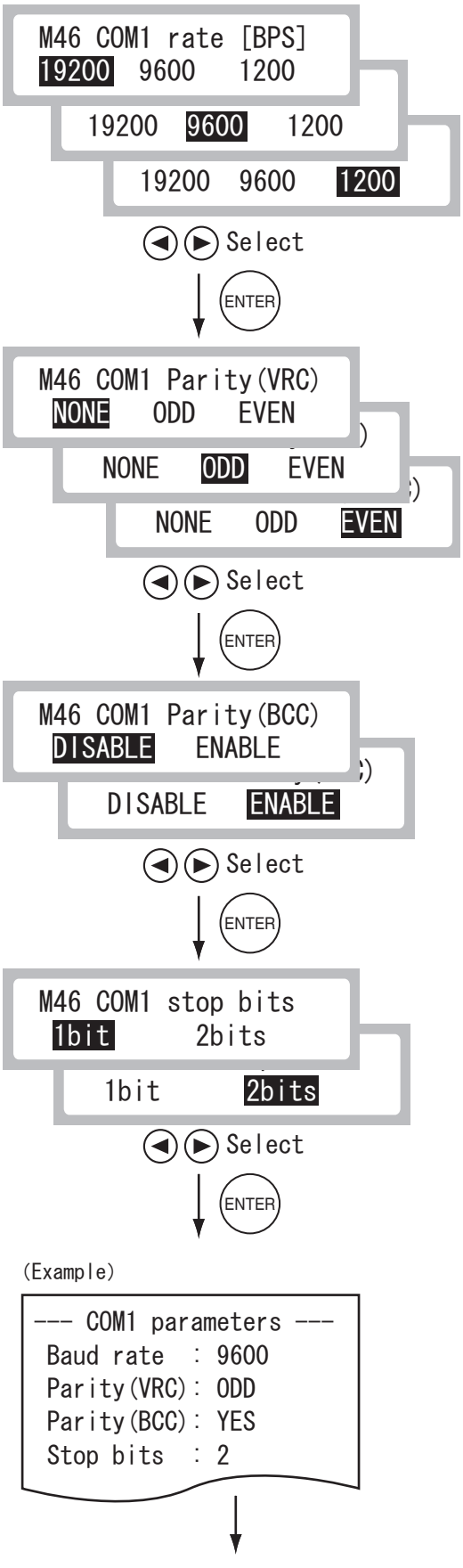
      Select a menu ([Disable] or [Enable]) using ◀ ▶ and press **ENTER**.

   d. Select stop bit.

      Select a menu ([1bit] or [2bits]) using ◀ ▶ and press **ENTER**.

   e. The new selection will be printed out.

      After the selection is printed out, the display returns to the menu dialog (2).



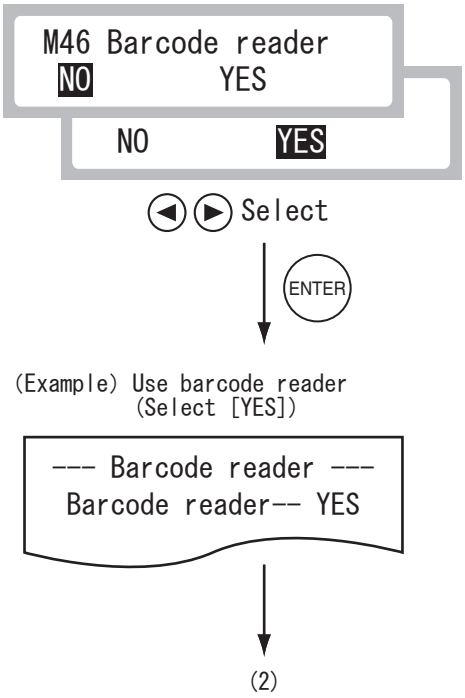
(Example)

```
--- COM1 parameters ---
 Baud rate  : 9600
 Parity(VRC): ODD
 Parity(BCC): YES
 Stop bits  : 2
```

5. Setting for barcode reader:

   Select a menu using ◀ ▶ whether to use a sample barcode reader or not, and press **ENTER**.

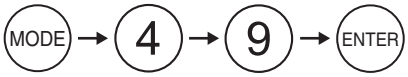
   After the new selection is printed out, the analyzer quits the mode operation.



6.2.21 Mode 49 Printing out Error Logs <Normal>

This mode is used to display error logs stored in the analyzer's memory.

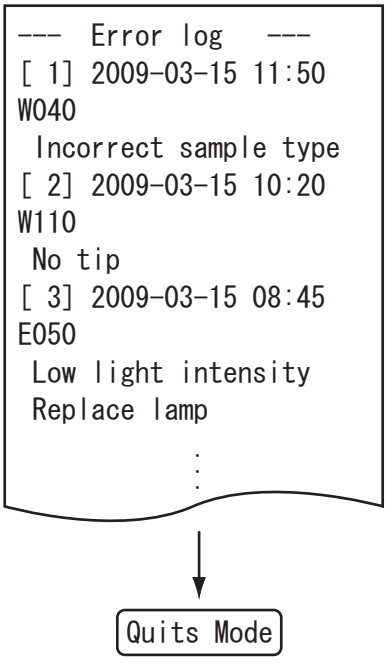
1. Enter into Mode 49.



2. Error logs will be printed out.

NOTE: To stop the printing in midcourse, press **STOP**.

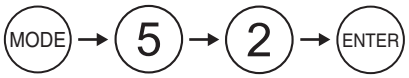
After the printout is complete, the analyzer quits the mode operation.



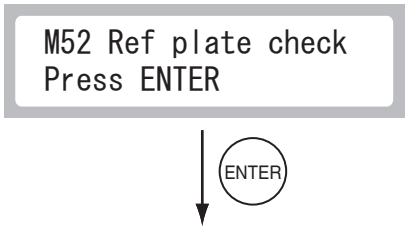
6.2.22 Mode 52 Reference Plate Level Check <Normal>

This mode is used to check the quality level for the reference plate of the photometer.

1. Enter into Mode 52.

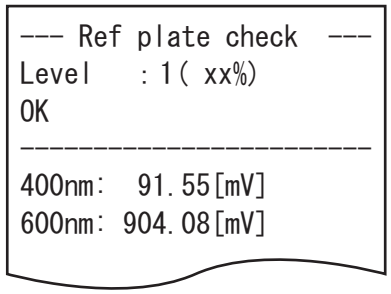


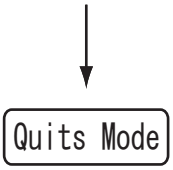
2. Press **ENTER**.



3. The reference plate level check will start.

4. The result will be printed out. After the check is completed, the analyzer prints out the result and quits the mode operation.





Level	Printout
1	Level 1: (xx%) OK
2	Level 2: (xx%) Clean reference plate.
3	Level 3: NG Clean reference plate. (Adverse effects on test results may occur. Clean the reference plate.)

NOTE: "xx" means given value.

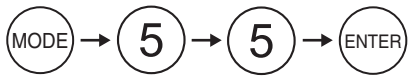
IMPORTANT

Level 3 will have adverse effects on test results. Refer to *Section 4.2* for cleaning the reference plate.

6.2.23 Mode 55 Selecting Language <Admin.>

This mode is used to select a language for display and printout.

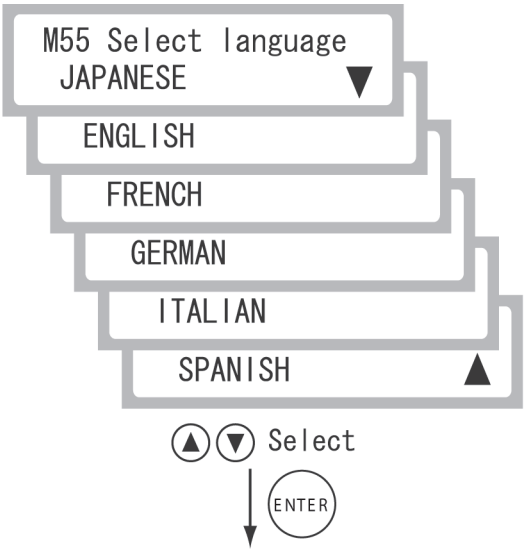
1. Enter into Mode 55.



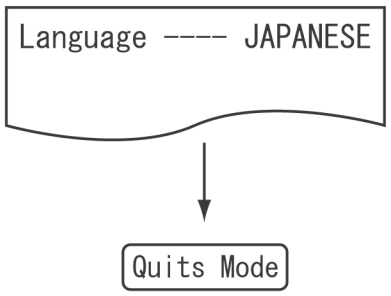
2. Select a language.

   Select a language using ▲▼ and press **ENTER**.

   Menu
   - [Japanese]
   - [English]
   - [French]
   - [German]
   - [Italian]
   - [Spanish]



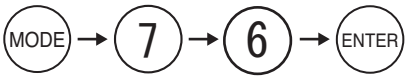
3. After the new selection is printed out, the analyzer quits the mode operation.



6.2.24 Mode 76 - Printing out DI card information <Normal>

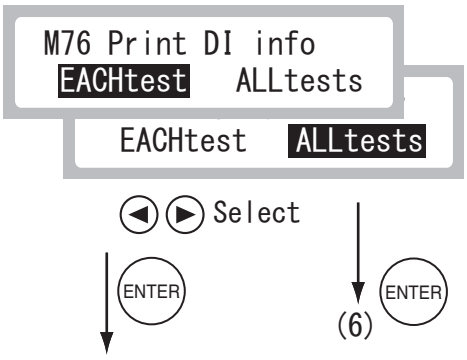
This mode is used to print out DI card information presently recorded in the analyzer memory

1. Enter into Mode 76.



2. Select a print format.

   Select [Each test] or [All tests] using ◀ ▶ and press **ENTER**.

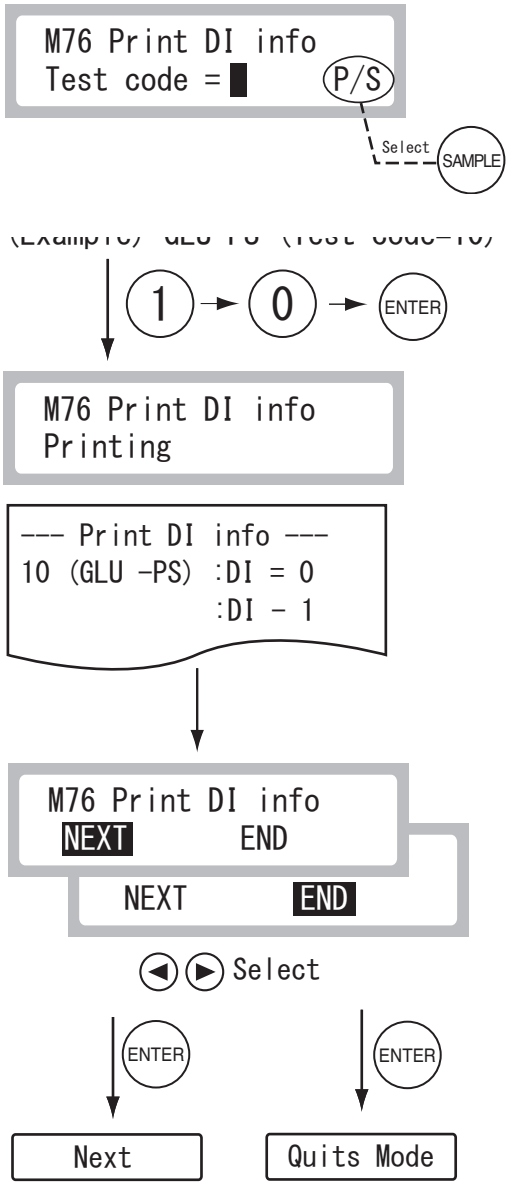


3. To print out for each test:

NOTE: Make sure the sample type is correct.

The default setting is [P/S].

Input a test code and press **ENTER**.



4. The DI card information is printed out.
5. Select [End] to terminate the mode.

NOTE: To print information for other tests, select [Next] followed by **ENTER**.

6. To print out for all tests at once:

By selecting [ALL tests] followed by **ENTER** in the dialog of (2), all DI card information in the analyzer memory will be printed.

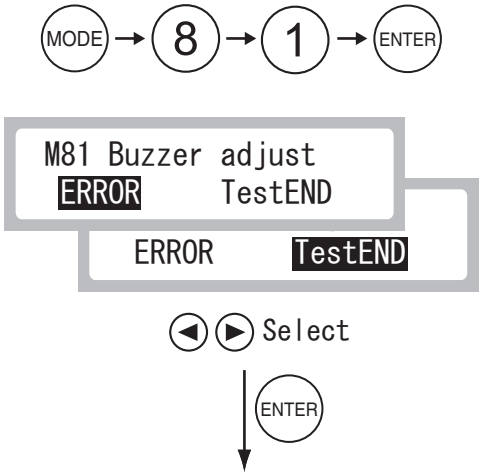
After the printing is completed, the analyzer quits the mode operation.

6.2.25 Mode 81 Alarm Sound Settings <Admin.>

This mode is used to change the alarm sound settings (error warning, end of test).

1. Enter into Mode 81.

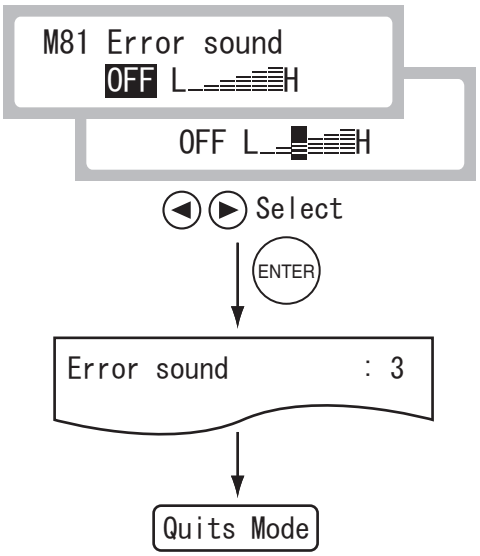
2. Select [Error] (error sound) or [Test End] (final sound of test) using ◀ ▶ and press **ENTER**.



3. To change error volume:

   When entered, the currently set volume will be heard. (When the setting [Off] is set, the beep will not be heard.)

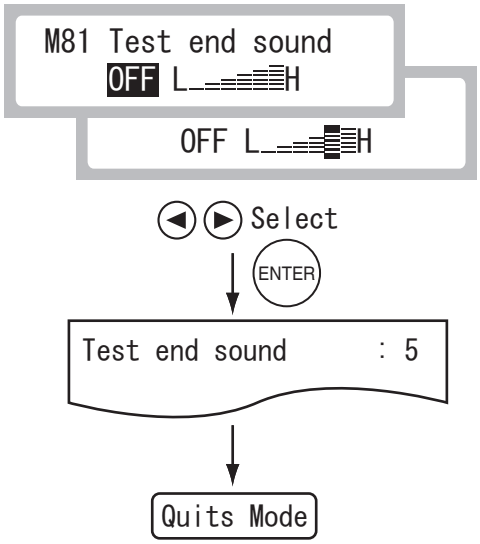
   By moving the shaded part (cursor) using ◀ ▶ the volume change is heard. Select the desired volume and press **ENTER**. The analyzer will terminate the mode.



4. To change the test end sound volume:

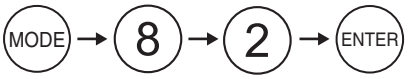
   When entered, the currently set volume, will be heard. (When the setting [Off] is set, the alarm will not be heard.)

   By moving the shaded part (cursor) using ◀ ▶ the volume change is heard. Select the desired volume and press **ENTER**. The analyzer will terminate the mode.

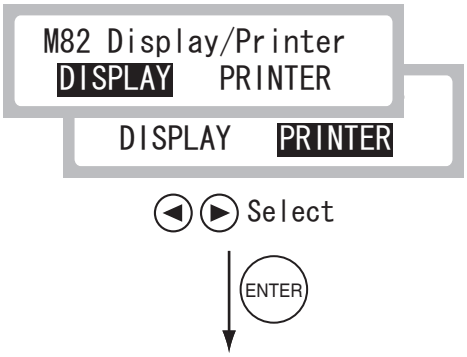


6.2.26 Mode 82 Display Brightness and Print Density <Admin.>

1. Enter into Mode 82.



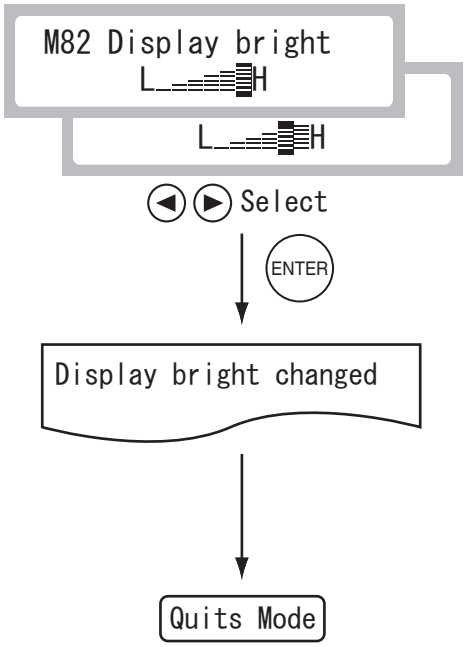
2. Select [Display] or **PRINTER** using ◀ ▶ and press **ENTER**.



3. To adjust Display Brightness:

   Move the shaded part (cursor) using ◀ ▶ to change brightness. Select the desired brightness and press **ENTER**.

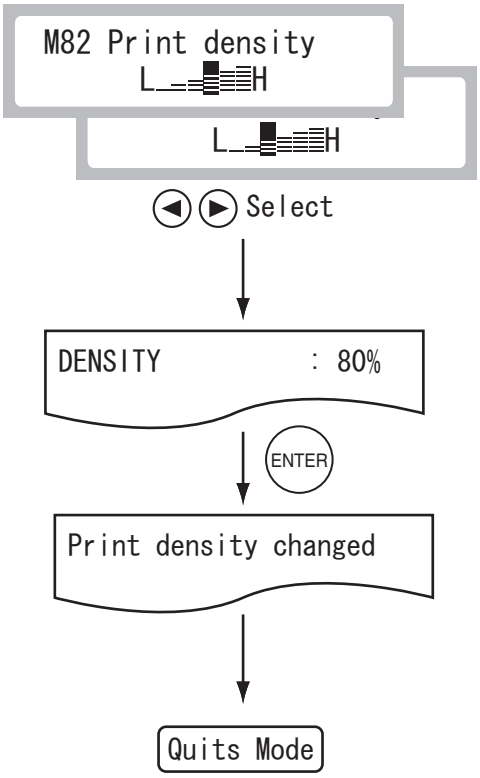
   After printing, the analyzer quits the mode operation.



4. To adjust print density:

   By moving the shaded part (cursor) using ◀ ▶ a test printout is made at the changed density. Select desired density and press **ENTER**.

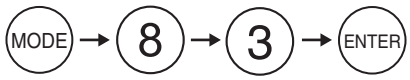
   After printing, the analyzer quits the mode operation.



6.2.27 Mode 83 Test Result Print Sheet Setting <Admin.>

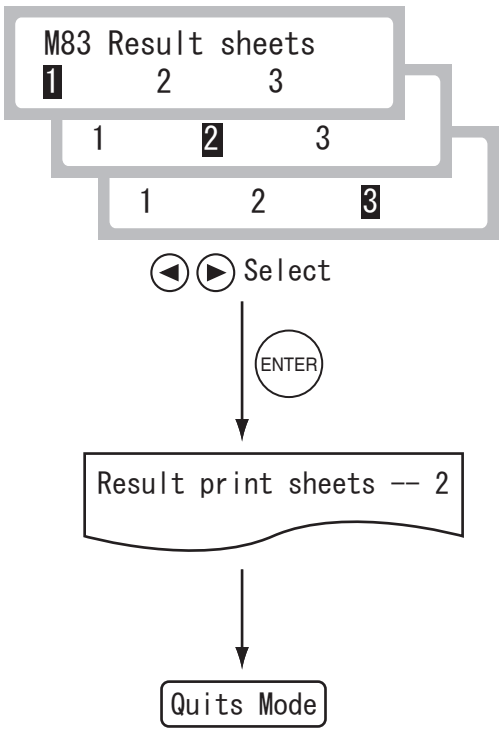
This mode is used to set the number of result print sheets (selectable 1, 2, or 3).

1. Enter into Mode 83.



2. Select the number of print sheets, using ◀ ▶ and press ENTER.

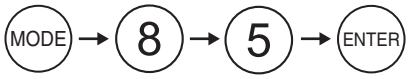
   After the new selection is printed out, the analyzer quits the mode operation.



6.2.28 Mode 85 Display Order of Reference Interval Names <Admin.>

This mode is used to change the display order in the selection dialog for reference interval names.

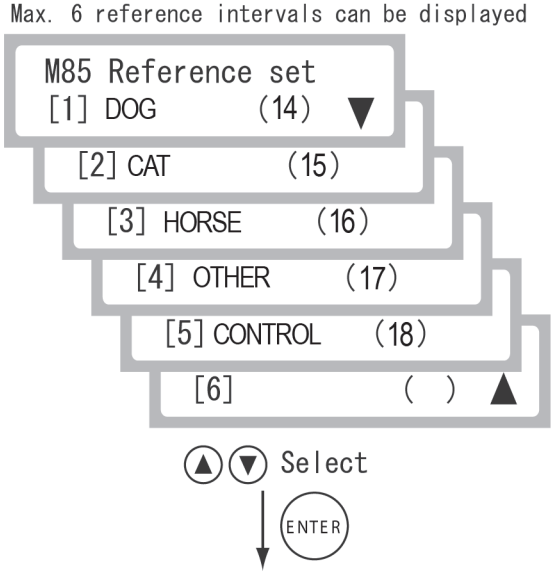
1. Enter into Mode 85.



2. Select an order number (from [1] to [6]) to be changed.

   Select an order to be changed using ◀ ▶ and press ENTER.

NOTE: When there are more than one undefined reference interval names, only one (*) is displayed.



3. Select a menu to change by scrolling or input a number of the menu directly.

   By selecting an order to be changed followed by **ENTER** in (2), the edit dialog for the order will appear.

   There are 2 ways to select a reference interval name to input:

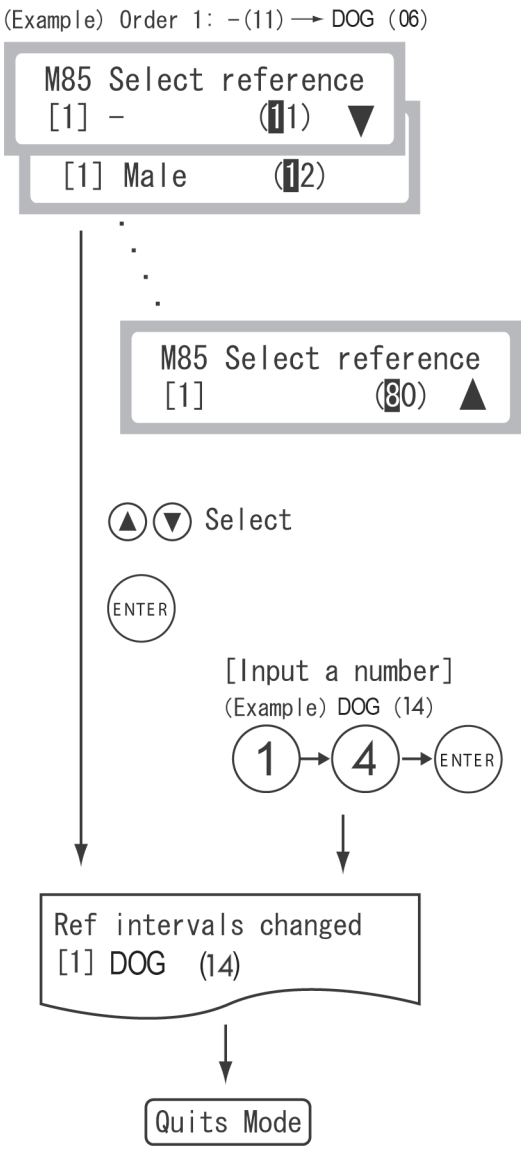
   a. To select a reference interval by using ◀ ▶:

      Select a reference interval on the display and press **ENTER**.

   b. To input a number for the menu directly: Input a number in 2 digits and press **ENTER**.

NOTE: The number to be input is defined by Mode 86.

4. After the new setting is printed out, the analyzer quits the mode operation.



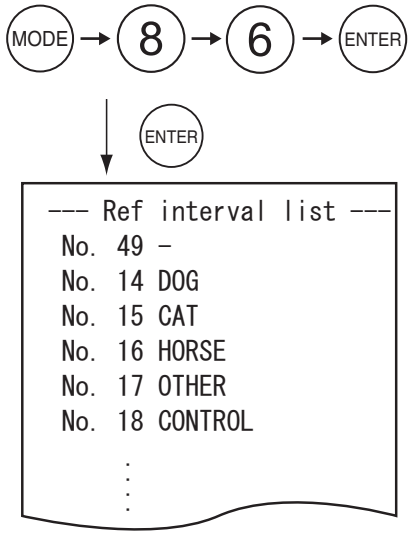
6.2.29 Mode 86 Editing and Inputting Reference Interval Names <Admin.>

This mode is used to edit or input reference interval names.

1. Enter into Mode 86.

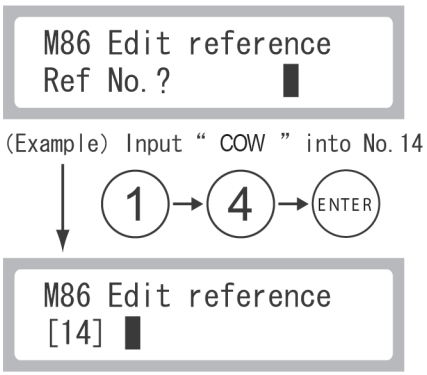
2. Print the current input reference interval list.

   Pressing **PRINT** prints the current input reference interval list.



3. Input a [Ref No.] to be edited. Input a number in 2 digits.

NOTE: Available input numbers: 6 to 49

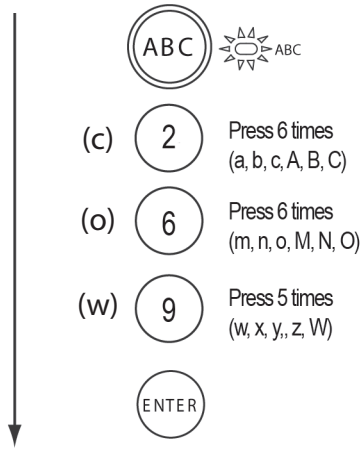


4. Type a name for the reference interval.

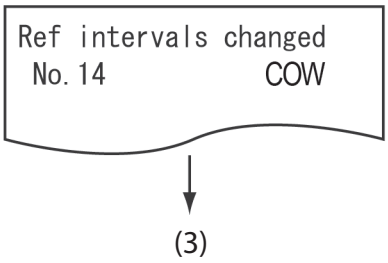
   After the input, press **ENTER**.

   The left is an example for inputting "COW" into No. [14].

NOTE: A maximum of 13 alphanumerical characters can be input.



5. After the new setting is printed out, the display returns to the input dialog. Press **STOP** to quit the mode.

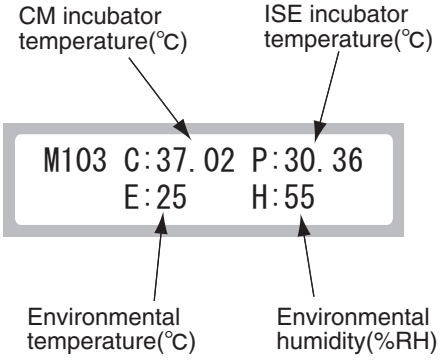


6.2.30 Mode 103 Displaying Temperature and Humidity <Normal>

This mode is used to display CM & ISE incubator temperature and environmental temperature and environmental humidity (inner body).

1. Enter into Mode 103.

2. The temperature and humidity will be displayed for 5 seconds. The analyzer quits the mode automatically.



7.1 Data Communication

The analyzer can transmit test results to a computer or PC which has already been approved by IEC/UL60950–1.

NOTE: Do not connect the analyzer to a host computer or PC which has not been approved by IEC/UL60950–1.

To communicate, it is necessary to:

1. Connect an appropriate cable from either the USB port (COM1B) or the RS–232C port (COM1A) of the analyzer to the computer.
2. Toggle the communication select switch (SW1) to either the USB or RS–232C position depending on the method of cable connection.
3. Set up the analyzer's communication protocol using Mode 46 (*Section 6.2.20*).

NOTE: When using this function for the first time, consult the computer software manual and contact Heska's

Technical Support Services for assistance at 800.464.3752.

CF card

The slot for a CF card on the top of the analyzer is used for upgrading the software on the DRI-CHEM Analyzer.

NOTE: Do not insert a CF card into the slot without instruction from Heska's Technical Support Services.

8.1 Specifications

Throughput:	60 tests/hour (CM)
	77 tests/hour (simultaneous CM and ISE tests)
Number of incubator cells:	CM 6, ISE 1
Incubation temperature:	99°F (37°C) (CM)
	86°F (30°C) or environmental temperature +2°C (ISE)
Incubation time:	1 to 6 minutes
Number of slides that can be loaded at a time:	20
Sampler Pipetting fluid volume: Dilution:	 < 50 µL (automatic switching) Automatic dilution (maximum dilution factor: 10)
Slide ejection:	Automatic ejection (max. 80 slides in the disposal box)
Used tip ejection:	Automatic ejection (into the disposal box)
Measurement wavelengths:	400 nm, 505 nm, 540 nm, 577 nm, 600 nm, 625 nm, 650 nm
Light source:	Halogen lamp (6 V, 10 W)
Measurement precision:	0.0004 OD/5 minutes
Measurement accuracy:	0.005 OD (600 nm)
Indications:	VFD, 20 characters, 2 line; Indicator light (ABC)
Printer:	Thermal type (paper size: 58 mm x 25 m)
Warming up time:	Approx. 10 minutes/77°F (25°C), approx. 20 minutes/59°F (15°C)
Environmental conditions Location: Illumination: Altitude: Transient overvoltage category: Pollution degree: Operating temperature: Operating humidity:	 Indoor use Below 6000 cd/m^2 (lux) (Below 3000 cd/m^2 (lux) when using the sample barcode reader) Up to 2000m (6,500 ft) II 2 59–90°F (15 to 32°C) 30–80% RH (no condensation)
Storage and transportation conditions Temperature: Humidity:	 14–122°F (-10 to 50°C) 10–90% RH (no condensation)

8.1 Specifications (cont'd)

Electrical requirements Voltage limit: Frequency: Supply voltage fluctuations: Rated wattage: Phase: Type of protection against electrical shock:	 100–240 V~ 50–60 Hz ± 10% 200 VA Single CLASS 1 EQUIPMENT
Data transfer:	RS-232C interface (1 port), USB interface (1 port)
External dimensions:	16.3 (W) x 15.2 (D) x 11.4 (H) in 415 (W) x 385 (D) x 290 (H) mm
Weight:	50.7 lb (23kg)
Expected life:	6 years (after installation) (Providing the precautions for use are followed and the regular periodic maintenance is performed.)

8.1.1 Standard Accessories

Fuses (10A)	2
Recording paper (thermal)	2 rolls
Spindle	1
Slide cartridges	2
Slide weights	2
Light source lamp	1
O-ring	2
Sample racks	2
Sampler leak check tool	2
DRI-CHEM Analyzer Auto Tips	1 case
Plain Tube 0.5 (0.5 ml type x 50)	1 pack
DRI-CHEM Analyzer Mixing Cups	1 box
ISE cover	1
Instruction manual	1
Installation quick guide	1

NOTE: Specifications and capabilities are subject to change without notice.

8.2 Consumables and Optional Accessories

To purchase consumables or optional accessories listed below, please contact Heska at 800.464.3752.

8.2.1 Consumables

Accessories	Package
*DRI-CHEM Analyzer Auto Tips	96 tips/box
Sample Tubes	
*Heparin Tube 1.5 (1.5 ml containing Heparin Li)	500 tubes per box
Heparin Tube 0.5 (0.5 ml containing Heparin Li)	500 tubes per box
Plain Tube 1.5 (1.5 ml plain)	500 tubes per box
*Plain Tube 0.5 (0.5 ml plain)	500 tubes per box
*Recording paper (thermal)	6 rolls per box
*Light source lamp	1
*O-ring	2 O-rings per package
*DRI-CHEM Analyzer Mixing Cups	100 cups per box
DRI-CHEM Analyzer Reference Fluid	
HESKA® Chemistry Control	

8.2.2 Optional Accessories

Name	Package
Sample barcode reader (Specified for DRI-CHEM Analyzer, See CAUTION)	1
*Sample racks	1 set
*Slide cartridge	1
*Slide weight	1

⚠ CAUTION

The sample barcode reader specified for the DRI-CHEM Analyzer can be used. Do not connect a sample barcode reader other than specified for the DRI-CHEM Analyzer. Damage or fire may result.

NOTE: Parts names marked with " * " are the same parts packed with the DRI-CHEM Analyzer.

8.3 Slide Code Table

Test	Slide Code		Test	Slide Code	
	Test code	Sample code		Test code	Sample code
GLU-P	10	50	Mg-P	28	50
BUN-P	11	50	GGT-P	30	50
UA-P	13	50	GOT/AST-P	31	50
TCHO-P	14	50	GPT/ALT-P	32	50
NH_3-P	15	50	CPK-P	33	50
TG-P	16	50	LDH	34	50
CRE-P	17	50	ALP-P	35	50
TP-P	18	50	vAMY-P	43	50
ALB-P	20	50	vLIP-P	44	50
TBIL-P	21	50	Na	91	00
Ca-P	23	50	K	92	00
IP-P	24	50	Cl	93	00

Glossary of the display and printout messages.

NOTE: Because the display spaces and printouts are limited, some abbreviations are used.

NOTE: Periods will not be used after abbreviations on the display and printout messages.

Abbreviation	Meaning
avg	average
BCC	Block Check Character
cal	calibration
CM	colorimetric
coeff	coefficient
com	communication
ctrl	control
dil	dilution
dilspl	diluted sample
dir	direction
ERR	error
exp	expiration
incu	incubator
info	information
mt	motor
NG	No Good
OD	Optical Density
pos	position
prs	pressure
ref	reference
rot	rotation
spl	sample
std	standard
temp	temperature
vert	vertical
VRC	Vertical Redundancy Check

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