

Service Manual

Celltac α Automated Hematology Analyzer MEK-1301, MEK-1302

Celltac α + Automated Hematology and Clinical Chemistry Analyzer MEK-1303

Celltac α + Automated Hematology and ESR Analyzer MEK-1305



About This Manual

In order to use this product safely and fully understand all its functions, read this manual before using the product.

Keep this manual near the instrument or in the reach of the operator and refer to it whenever the operation is unclear.

Accompanying Documentation

The analyzer comes with the following manuals. Refer to the manual depending on your needs.

Operator's Manual

Describes the operation and settings of the analyzer. Read this manual before use.

Service Manual (This Manual)

For qualified service personnel. Describes information on servicing the analyzer.

Only qualified service personnel can service the analyzer.

Trademark

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This product stores personal patient information. Manage the information appropriately.

Patient names on the screen shots and recording examples in this manual are fictional and any resemblance to any person living or dead is purely coincidental.

The contents of this manual are subject to change without notice.

If you have any comments or suggestions on this manual, please contact us at:

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The CE mark with the Notified Body number 0123 applies to the MEK-1303 automated hematology and clinical chemistry analyzer. The CE mark without a Notified Body number applies to the MEK-1301 and MEK-1302 automated hematology analyzers and the MEK-1305 automated hematology and ESR analyzer.



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General Handling Precautions

In order to operate this device safely and correctly, read the following precautions thoroughly before operation.

These precautions are a list of general provisions for ensuring the safe operation of medical devices and the safety of patients and operators and may include some items that are not relevant to the operation of this device.

For precautions related to the operation of this device, refer to the other sections of this manual.

1. This device is for use by qualified medical personnel only.

2. When using, installing or storing the device, take the following precautions:

- (1) Place the device in a location where the specified environment conditions are satisfied.
- (2) Avoid moisture or contact with water, direct sunlight, dust, and saline or sulphuric air.
- (3) Place the device on an even, level floor. Avoid vibration and mechanical shock, even during transport.
- (4) Avoid placing the device in an area where chemicals are stored or where there is possibility of gas leakage.
- (5) Connect the device to a grounded 3-pin medical power supply that satisfies the requirements of the device specifications.

3. Before Operation

- (1) Check that the specified power cord is used.
- (2) Check that all cables and cords are connected properly. Make sure that sensors and electrodes are properly connected to the device and correctly attached to the patient.
- (3) When the device is used in combination with other devices, check that there is no interference between any of the devices and that all of the devices can be used safely together.

4. During Operation

- (1) Only use the device for the time period or number of times necessary for the current examination or other medical procedure.
- (2) Both the device and the patient must receive continual, careful attention.
- (3) Take all appropriate measures to assure the safety of the patient whenever any abnormality is detected in the operation of the device or in the patient condition.
- (4) Avoid direct contact between the device housing and the patient.

5. After Operation

- (1) Turn the power off by following the specified procedures.
- (2) Remove the cords gently. Do not use force to remove them or unplug them by pulling the cable.
- (3) Clean all accessories, cords and electrodes and store them appropriately.
- (4) Clean the device for its next use.

6. When trouble occurs

- (1) Remove all electrodes and sensors from the patient.
- (2) Turn the power off and remove the power cord from the AC power source.
- (3) Attach an "Out of Order" or "Do Not Use" warning label to the device and immediately contact your Nihon Kohden representative.

7. The device must not be altered or modified in any way.

8. Ensure that the device receives daily checks and periodic inspections and check that it can be used properly and safely.

9. Always have an alternative method of performing the device's function prepared in case of an accident or malfunction affecting the operation of the device.

10. Be careful of malfunctions that may occur when the device is exposed to strong electromagnetic fields.

Interference from a strong electromagnetic field may cause the device to malfunction or noise to appear in the waveforms. If an unexpected malfunction occurs during operation of the device, check the electromagnetic environment and take the necessary measures to rectify the situation.

The following items describe some common causes of interference and the recommended actions to take in response.

- (1) **Use of cellular phones**
Electromagnetic interference can cause errors in the operation of the device. Turn off cellular phones and other wireless devices, remove them from the location where the device and/or system is installed, or exclude them from the facility altogether.
- (2) **Radio-frequency interference from other devices through the AC power supply of the device and/or system**
 - Identify the source of the interference and apply measures such as noise reduction circuits to reduce the interference.
 - If the source of the interference is a device that can be turned off, stop using that device and turn its power off.
 - Connect the device to different AC power supply.
- (3) **Effect of direct or indirect discharge of electrostatic energy to the device or the surrounding area**
 - Make sure all users and patients in contact with the device and/or system are free from electrostatic energy before using it.
 - A humid room can help lessen this problem.
- (4) **Lightning**
When lightning occurs near the location where the device and/or system is installed, it may induce an excessive voltage in the device and/or system. In such a case, take the following measures when using the device.
 - Remove the power cord from the AC outlet and operate the device using the internal battery.
 - Use an uninterruptible power supply.
- (5) If the device and/or system interferes with any radio wave receiver such as a radio or television set, locate the device and/or system as far as possible from the radio wave receiver.
- (6) **Warning: Use adjacent to or stacked with other equipment**
Malfunctions may occur during operation when the device and/or system is adjacent to or stacked with other equipment. Before use, check that the device and/or system operates normally with the other equipment.
- (7) **Warning: Use of unspecified devices and/or cables**
When an unspecified device and/or cable is connected to this device and/or system, it may cause increased electromagnetic emissions or decreased electromagnetic immunity.
This device and/or system complies with all requirements of the relevant EMC standards when used with the specified accessories and cables. Only use this device and/or system with the specified accessories and cables.
- (8) **Measurement with excessive sensitivity**
The device and/or system is designed to measure bioelectrical signals with a specified sensitivity. If the device and/or system is used with excessive sensitivity, artifact may appear as a result of electromagnetic interference and this may cause mis-diagnosis. When unexpected artifact appears, inspect the surrounding electromagnetic conditions and remove the source of the artifact.
- (9) **Use with radiation therapy devices**
When the device and/or system is used in a radiotherapy room, it may cause failure or malfunction due to electromagnetic radiation or corpuscular radiation. When you bring the device and/or system into a radiotherapy room, constantly observe the operation of the device and/or system. Prepare countermeasures in case of failure or malfunction.
- (10) **Other**
When the device and/or system is used in an unspecified system configuration different from the configuration used for EMC testing, it may cause increased electromagnetic emissions or decreased electromagnetic immunity.

WARRANTY POLICY

Nihon Kohden Corporation (NKC) shall warrant its products against all defects in materials and workmanship for one year from the date of delivery. However, consumable materials such as recording paper, ink, stylus and battery are excluded from the warranty.

NKC or its authorized agents will repair or replace any products which prove to be defective during the warranty period, provided these products are used as prescribed by the operating instructions given in the operator's and service manuals.

No other party is authorized to make any warranty or assume liability for NKC's products. NKC will not recognize any other warranty, either implied or in writing. In addition, service, technical modification or any other product change performed by someone other than NKC or its authorized agents without prior consent of NKC may be cause for voiding this warranty.

Defective products or parts must be returned to NKC or its authorized agents, along with an explanation of the failure. Shipping costs must be pre-paid.

This warranty does not apply to products that have been modified, disassembled, reinstalled or repaired without Nihon Kohden approval or which have been subjected to neglect or accident, damage due to accident, fire, lightning, vandalism, water or other casualty, improper installation or application, or on which the original identification marks have been removed.




In the USA and Canada other warranty policies may apply.

Other Caution



United States law restricts this device to sale by or on the order of a physician.

Conventions Used in this Manual and Instrument

Dangers, Warnings and Cautions

Level	Description
 DANGER	A danger alerts the user to a hazardous situation which causes death or serious injury.
 WARNING	A warning alerts the user to possible injury or death associated with the use or misuse of the instrument.
 CAUTION	A caution alerts the user to possible injury or problems with the instrument associated with its use or misuse such as instrument malfunction, instrument failure, damage to the instrument, or damage to other property.

Icons in this Manual

Icon	Meaning	Description
	Hint	Gives additional information and alternative operation methods.
	Reference	Indicates related pages in this or other manuals which give more details.

Safety Standards

Safety Standard Classification of the Hematology Analyzer

Type of protection against electrical shock:

CLASS I EQUIPMENT

Degree of protection against harmful ingress of water:

IPX0 (non-protected)

Degree of safety of application in the presence of FLAMMABLE ANAESTHETIC MIXTURE WITH AIR, OR WITH OXYGEN OR NITROUS OXIDE:

Equipment not suitable for use in the presence of FLAMMABLE ANAESTHETIC MIXTURE WITH AIR, OR WITH OXYGEN OR NITROUS OXIDE

Mode of operation:

CONTINUOUS OPERATION

ME EQUIPMENT type:

STATIONARY type

Revision History














Edition	Date	Details	Code Number
1st Edition	24 Jan 2020	Initial issue	0634-901079A
6th Edition	04 Oct 2022	IVDR compliance	0634-901079F













NOTE: Changes made in the most recent edition are indicated by a bar in the left margin of each page.

Symbols



The following symbols are used with the analyzer. The descriptions of each symbol are given in the table below.



Analyzer

Symbol	Description
	AC power off
	AC power on
	Main power lamp
	“Off” only for part of the equipment
	“On” only for part of the equipment
	Reset
	Measurement button
	Caution
	Consult instructions for use
	Inlet
	Outlet
ISO3/4	ISOTONAC•3/ISOTONAC•4 inlet
CLN 710	CLEANAC•710 inlet
HEMO 310	HEMOLYNAC•310 inlet
CLN 3	CLEANAC•3 inlet
WASTE	Waste outlet
	Alternating current
	Equipotential terminal





Symbol	Description
	Fuse
	USB socket
	In vitro diagnostic medical device
	Biohazard
	LAN socket
	Serial port 1
	Serial port 2
	SD card socket
	SD card slot
	The CE mark is a protected conformity mark of the European Union. (MEK-1301/MEK-1302/MEK-1305)
	The CE mark is a protected conformity mark of the European Union. The four digits after the CE mark indicate the identification number of the Notified Body involved in assessing the product's conformity as a medical device. (MEK-1303)
	Products marked with this symbol comply with the European WEEE directive 2012/19/EU and require separate waste collection. For Nihon Kohden products marked with this symbol, contact your Nihon Kohden representative for disposal.





Transport Package

Symbol	Description
	This way up
	Fragile



Symbol	Description
	Keep away from rain
	Stacking limit by number (“n” is the limiting number)



WA-130W Compact Printer

Symbol	Description
	AC power off
	AC power on
 Background color: blue	Follow instructions for use
	Direct current

Symbol	Description
	Serial interface
	Unwind (continuous material); unroll (continuous material)
	Input/output
	Eject key





Transport Package





Symbol	Description
	This way up
	Fragile

Symbol	Description
	Keep away from rain
	Stacking limit by number ("n" is the limiting number)

On Screen and Printed Data

Screen Keys

Symbol	Description
	Measurement screen key
	Menu key
	Return key
	Sampling nozzle key

Symbol	Description
	Eject key
	Information key
	Change Operator key
	Guide illustration key

1

General

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1-1. Introduction

⚠ CAUTION

Do the maintenance procedure according to the schedule specified by Nihon Kohden. Otherwise, maximum performance cannot be guaranteed. Refer to Section 6 “Maintenance” for details.

This service manual provides useful information to qualified service personnel to understand, troubleshoot, service, maintain and repair the MEK-1301/MEK-1302 automated hematology analyzer, the MEK-1303 automated hematology and clinical chemistry analyzer and the MEK-1305 automated hematology and ESR analyzer.

The maintenance must be periodically performed because the analyzer has fluid paths and precision parts. Accordingly, the user is responsible for performing the periodic maintenance. The “Maintenance” section in this service manual describes the maintenance that should be performed by qualified service personnel. The “Maintenance” section in the operator’s manual describes the maintenance that can be performed by the user.

NOTE: If the analyzer has a problem and there has been no periodic maintenance, the analyzer will usually be normal again by cleaning the fluid paths or replacing a consumable with a new one.

The information in the operator’s manual is primarily for the user. However, it is important for service personnel to thoroughly read the operator’s manual and service manual before starting to troubleshoot, service, maintain or repair this analyzer. This is because service personnel needs to understand the operation of the analyzer in order to effectively use the information in the service manual.

1-2. Service Policy

⚠ WARNING

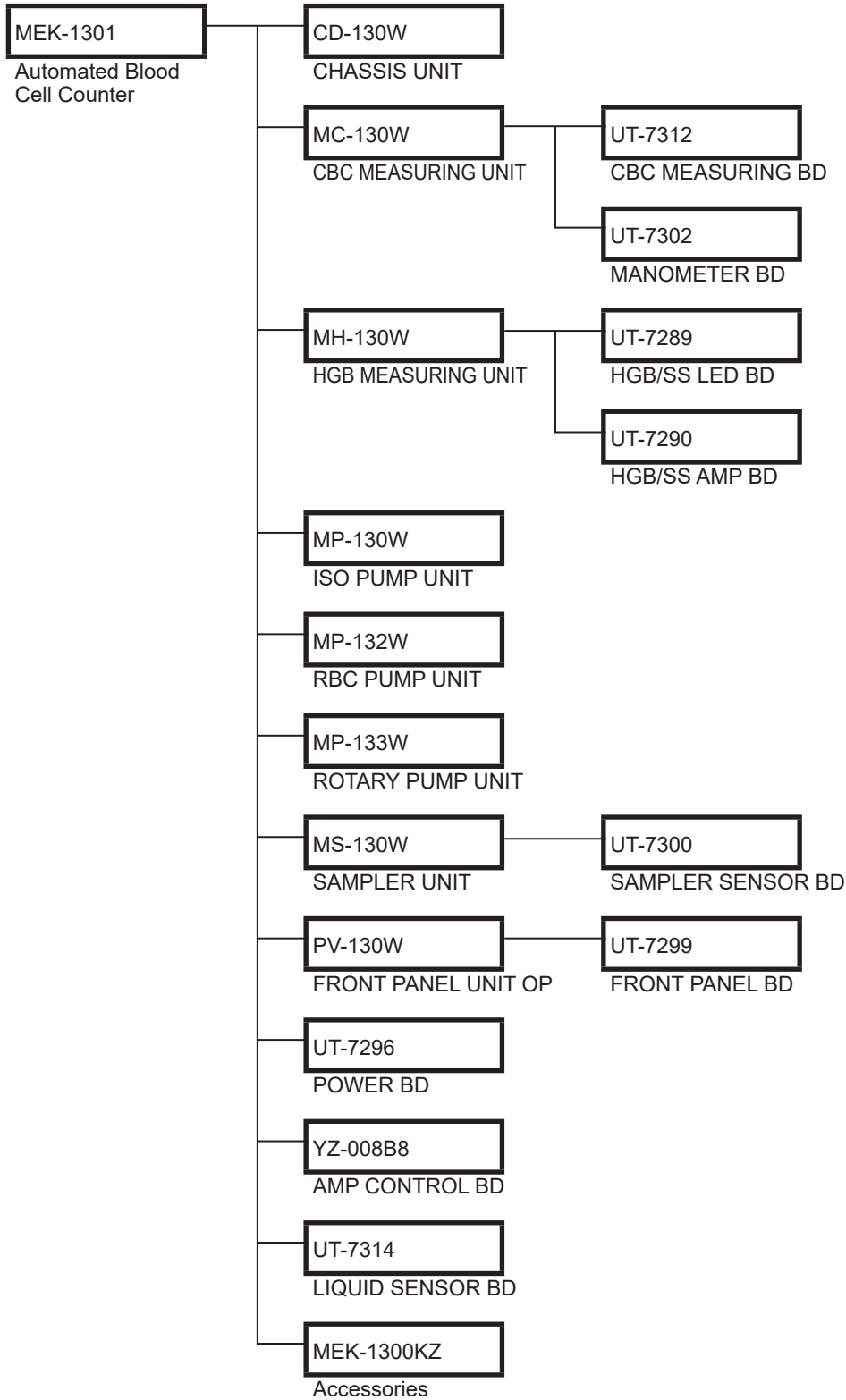
- Be careful not to directly touch any place where blood sample is or may have contacted.
- Always wear rubber gloves to protect yourself from infection.

Nihon Kohden's basic policy for technical service is to replace faulty units, printed circuit boards or parts. We do not support component level repair of boards and units outside the factory.

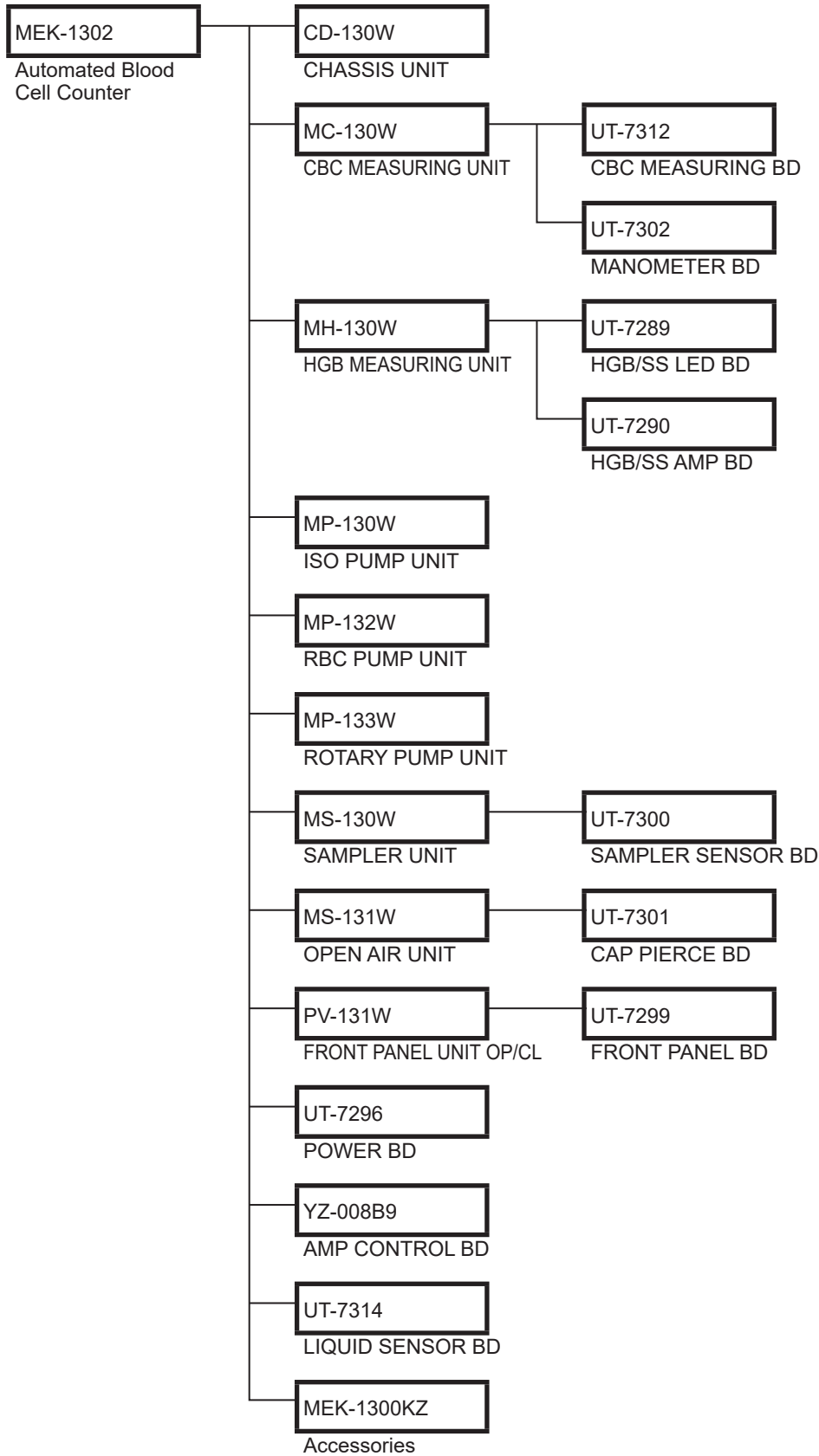
- NOTE
- When ordering parts or accessories from your nearest Nihon Kohden representative, please quote the code number and part name which are listed in this service manual, and the name or model of the unit in which the required part is located. This will help us to promptly attend to your needs.
 - Always use parts and accessories recommended or supplied by Nihon Kohden to assure maximum performance from your instrument.

1-3. Composition

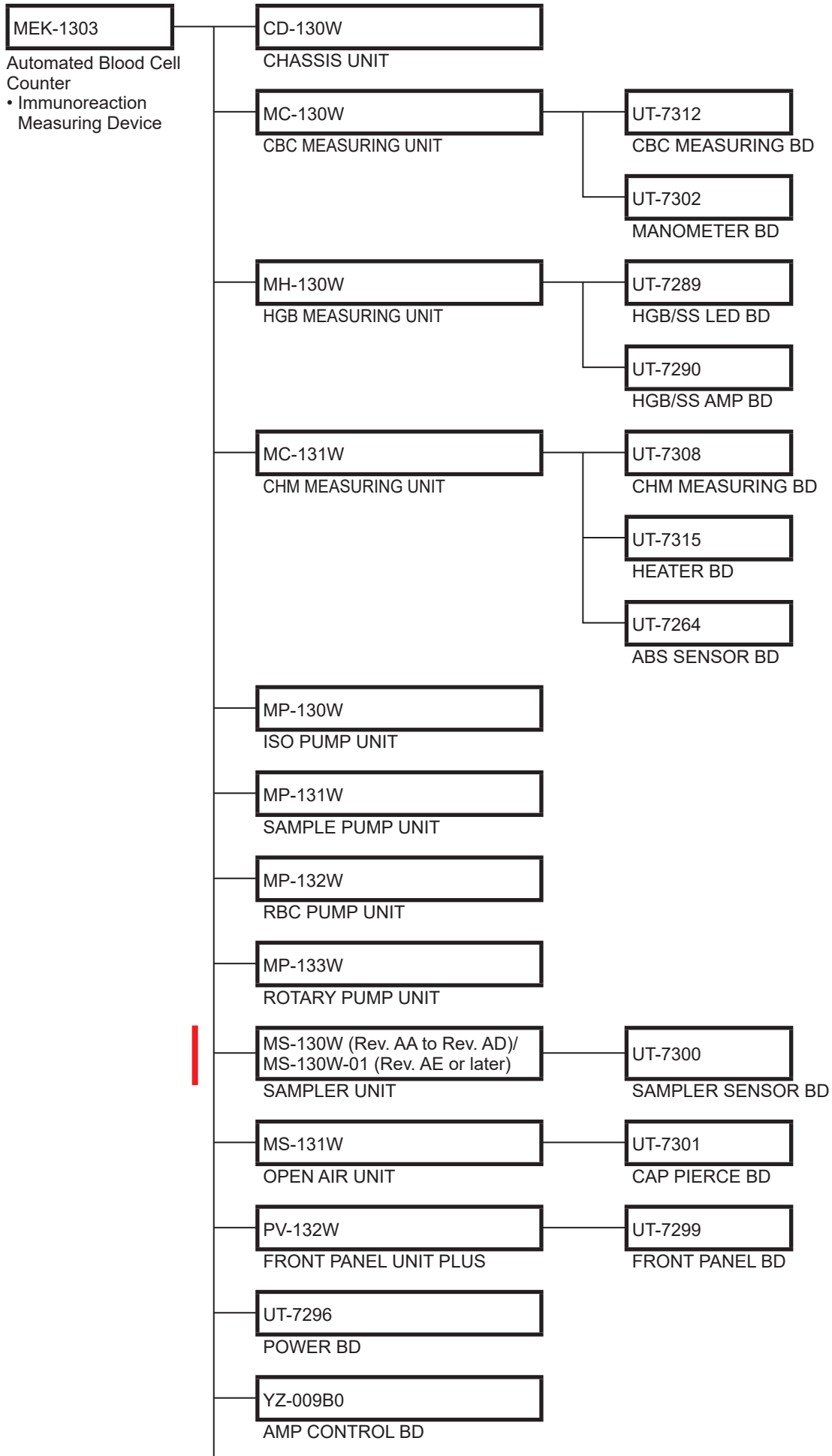
1-3-1. MEK-1301

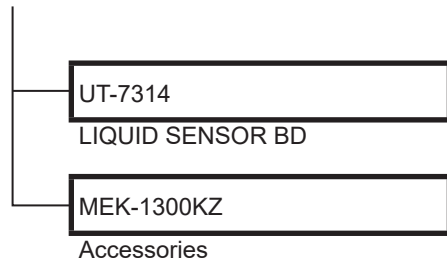


1-3-2. MEK-1302

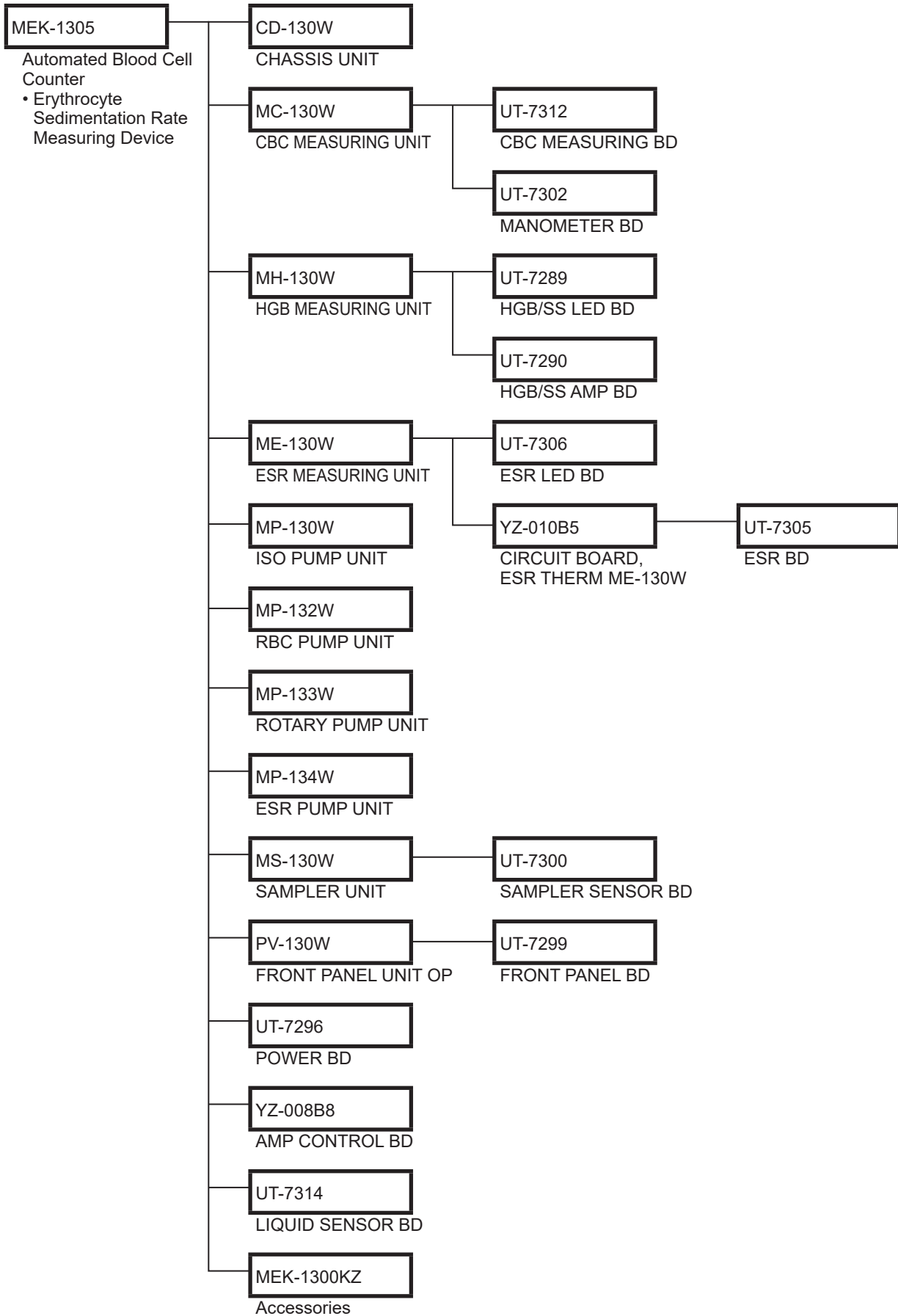


1-3-3. MEK-1303





1-3-4. MEK-1305



1-4. Replaceable Units and Boards

1-4-1. Units

Unit Name	Code No.	Replaceable Part Name
CHASSIS UNIT	RP-CD130W	Unit. CHASSIS UNIT
CBC MEASURING UNIT	RP-MC130W	Unit. CBC MEASURING UNIT
HGB MEASURING UNIT	RP-MH130W	Unit. HGB MEASURING UNIT
ISO PUMP UNIT	RP-MP130W	Unit. ISO syringe driver
SAMPLE PUMP UNIT	RPK-MP131W (MEK-1303)	Unit. SAMPLE syringe driver
RBC PUMP UNIT	RPK-MP132W	Unit. RBC syringe driver
ESR PUMP UNIT	RPK-MP134W (MEK-1305)	Unit. ESR syringe driver
ROTARY PUMP UNIT	RP-MP133W	Unit. ROTARY driver
SAMPLER UNIT	RP-MS130W (MEK-1301/MEK-1302/MEK-1305)	Unit. SAMPLER UNIT
	MS-130W-01 (MEK-1303)	
OPEN AIR UNIT	RP-MS131W (MEK-1302/MEK-1303)	Unit. OPEN AIR UNIT
FRONT PANEL UNIT OP	RPK-6124912919 (MEK-1301)	Kit. FRONT PANEL UNIT MEK-1301
	RPK-6124912923 (MEK-1305)	Kit. FRONT PANEL UNIT MEK-1305
FRONT PANEL UNIT OP/CL	RPK-6124912920 (MEK-1302)	Kit. FRONT PANEL UNIT MEK-1302
FRONT PANEL UNIT PLUS	RPK-6124912922 (MEK-1303)	Kit. FRONT PANEL UNIT MEK-1303 + HbA1c
CHM MEASURING UNIT	RP-MC131W (MEK-1303)	Unit. CHM MEASURING UNIT
ESR MEASURING UNIT	RP-ME130W (MEK-1305)	Unit, ESR MEASURING UNIT

1-4-2. Boards

Board Name	Code No.	Replaceable Part Name
CBC MEASURING BD	RP-UT7312	Circuit board. CBC MEASURING BD
MANOMETER BD	RP-UT7302	Circuit board. MANOMETER BD
HGB/SS LED BD	RP-UT7289	Circuit board. HGB/SS LED BD
HGB/SS AMP BD	RP-UT7290	Circuit board. HGB/SS AMP BD
SAMPLER SENSOR BD	RP-UT7300	Circuit board. SAMPLER SENSOR BD
CAP PIERCE BD	RP-UT7301	Circuit board. CAP PIERCE BD
FRONT PANEL BD	RP-UT7299	Circuit board. FRONT PANEL BD
AMP CONTROL BD	RP-YZ008B8 (MEK-1301)	Circuit board. AMP CONTROL MEK-1301
	RP-YZ008B9 (MEK-1302)	Circuit board. AMP CONTROL MEK-1302
	RP-YZ009B0 (MEK-1303)	Circuit board. AMP CONTROL MEK-1303
	RP-YZ010B4 (MEK-1305)	Circuit board. AMP CONTROL MEK-1305
POWER BD	RP-UT7296	Circuit board. POWER BD
LIQUID SENSOR BD	RP-UT7314	Circuit board. LIQUID SENSOR BD
CHM MEASURING BD	RP-UT7308 (MEK-1303)	Circuit board. CHM MEASURING BD
ABS SENSOR BD	RP-UT7264 (MEK-1303)	Circuit board. ABS SENSOR BD
ESR BD	RP-YZ010B5 (MEK-1305)	Circuit board. ESR THERM
ESR LED BD	RP-UT7306 (MEK-1305)	Circuit board. ESR LED BD
SWITCHING POWER SUPPLY	RP-9000064606	Module. LFP150F-24-J1Y

1-4-3. Options

Name	Code No.	Replaceable Part Name
ZK-130W handy barcode reader	RP-9000065219	Reader. TD1120-WH-65-C414-NK14
WA-130W compact printer	RP-9000065660	Printer. 54-J800701

1-5. Tightening Torque

To prevent loosening, damage or deformation of screws, tighten the screw with the specified torque. The following table shows the rated value for each screw.

Nominal Diameter	Standard Torque (N•cm)	Tightening Torque (N•cm)
M2	18.6	15.7 to 20.6
M2.3	29.4	24.5 to 33.3
M2.5	36.7	31.4 to 41.9
M2.6	41.2	36.3 to 47.0
M3	65.7	55.9 to 75.5
M4	152.9	130.3 to 174.4
M5	307.7	263.6 to 351.8
M6	521.4	445.9 to 595.8

Depending on where the screw is used, a different torque may be specified. Use the specified torque.

1-6. Change Information

1-6-1. SAMPLER UNIT of the MEK-1303

The SAMPLER UNIT for the MEK-1303 automated hematology and clinical chemistry analyzer has been changed from the MS-130W to the MS-130W-01. When replacing the SAMPLER UNIT of a MEK-1303 automated hematology and clinical chemistry analyzer, order the MS-130W-01.

Analyzer Model	Rev. No	Sampler Unit Installed In	Sampler Unit to Replace With	
			Code No.	Replaceable Part Name
MEK-1303	Rev. AA to Rev. AD	MS-130W	MS-130W-01	Unit. SAMPLER UNIT
	Rev. AE or later	MS-130W-01		
MEK-1301, MEK-1302, MEK-1305	Rev. AA or later	MS-130W	RP-MS130W	Unit. SAMPLER UNIT

2

Technical Information

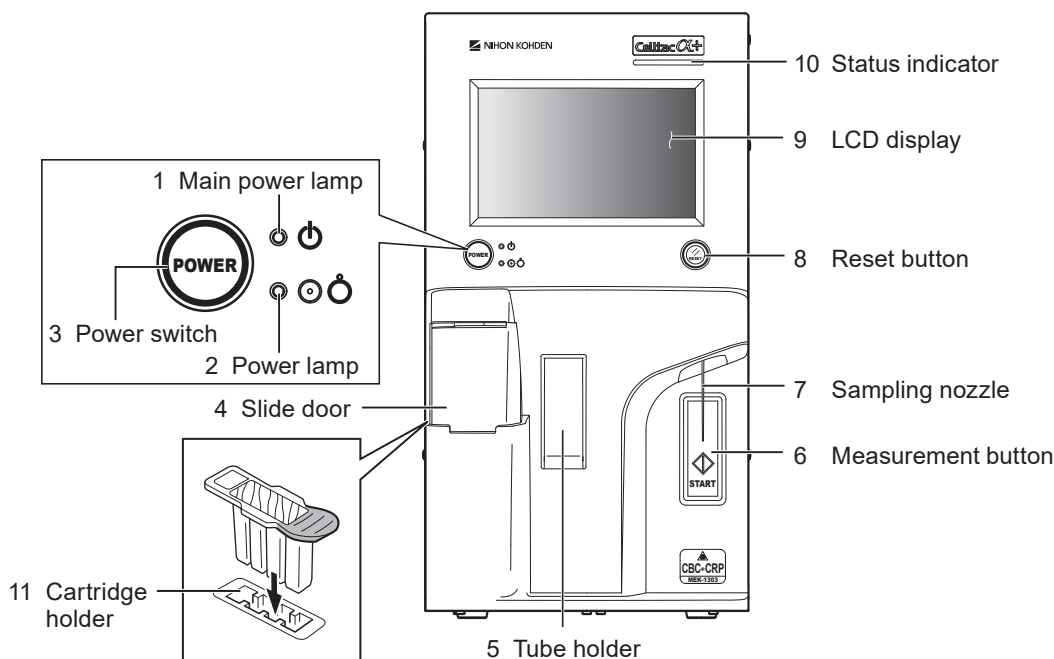
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2-1. Panel Description

2-1-1. Front Panel

Example: MEK-1303



1 Main power lamp

Lights when the Main power switch on the rear panel is turned on.

2 Power lamp

Lights when the Main power switch on the rear panel and the Power switch on the front panel are turned on.

3 Power switch

Turns the analyzer power on or off when the Main power switch on the rear panel is turned on.

When the power is turned on, the analyzer starts, the LCD display turns on, and the status indicator (10) lights.

When the power is turned off, the analyzer conducts an automatic cleaning operation before powering off.

4 Slide door (MEK-1303 only)

Automatically opens when the eject key is pressed or when specific measurement parameters are selected. When a test cartridge is inserted in the cartridge holder and the slide door is closed, the test cartridge is pulled inside the analyzer and the analyzer is ready to start measurement.

5 Tube holder (MEK-1302 and MEK-1303 only)

Measurement begins when the tube holder is closed with a sample tube loaded. The tube holder opens automatically after aspiration of sample.

6 Measurement button

When this button is pressed, samples are aspirated from the sampling nozzles and measurement begins.

7 Sampling nozzle

Aspirates samples.

8 Reset button

Stops operation when pressed during operations such as measurement and cleaning.

9 LCD display

Displays messages, ID numbers, measured parameters, measurement values, setting values and alarms. The LCD display has a touchscreen function for changing settings.

10 Status indicator

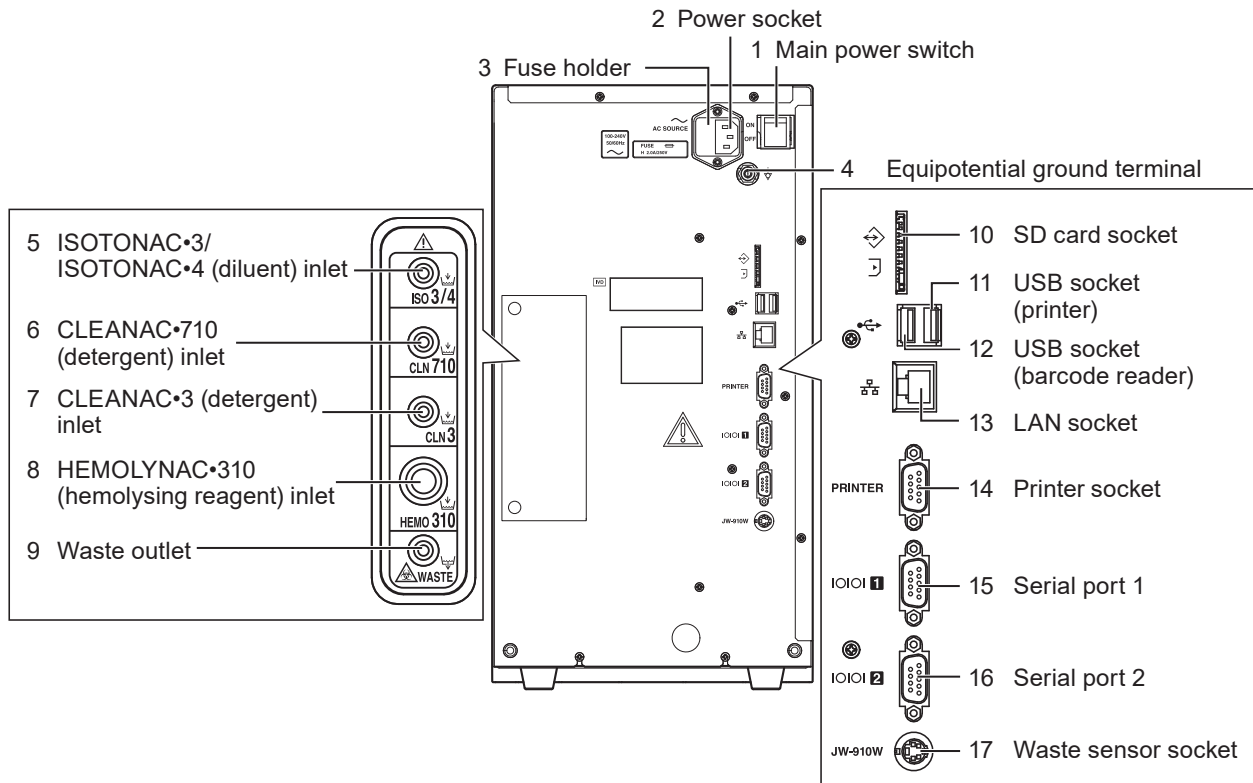
The LED indicator color and blinking pattern indicate the status of the analyzer such as standby, normal operation, or paused with error.

 | "Status Indicator" (p. 2-7)

11 Cartridge holder

Holds a test cartridge, which is used for CBC+CRP or HbA1c measurement.

2-1-2. Rear Panel



1 Main power switch

Turns the analyzer power on or off. Under normal conditions, keep this switch turned on.

2 Power socket

Connect the AC power cord to provide the analyzer with a commercial AC power supply.

3 Fuse holder

Contains a fuse to protect the power supply. To replace the fuse, contact your Nihon Kohden representative or a specialist electrician.

4 Equipotential ground terminal

Equipotentially grounds the analyzer to other devices using the provided earth wire.

5 ISOTONAC•3/ISOTONAC•4 (diluent) inlet

Intakes ISOTONAC•3 or ISOTONAC•4 (diluent). Firmly connect to the diluent container with tubing.

6 CLEANAC•710 (detergent) inlet

Intakes CLEANAC•710 (detergent). Firmly connect to the detergent container (for CLEANAC•710) with tubing.

7 CLEANAC•3 (detergent) inlet

Intakes CLEANAC•3 (detergent). Firmly connect to the detergent container (for CLEANAC•3) with tubing.

8 HEMOLYNAC•310 (hemolysing reagent) inlet

Intakes HEMOLYNAC•310 (hemolysing reagent). Firmly connect to the hemolysing reagent container (for HEMOLYNAC) with HEMOLYNAC•3 tubing.

9 Waste outlet

Discharges the used diluent, detergent and aspirated sample. Connect to the waste container using the provided waste tube.

10 SD card socket

Insert an optional SD card to save data when updating the software.

11 USB socket (printer)

An external PCL-compliant ink-jet printer can be connected.

12 USB socket (barcode reader)

A ZK-130W barcode reader can be connected.

13 LAN socket

Connect a compact printer or PCL printer. Uses LAN communication to transfer measurement data.

14 Printer socket

Connect a compact printer.

15 Serial port 1

Connect an external computer. Uses serial communication to transfer measurement data.

16 Serial port 2

Connect a card printer (option). Uses serial communications to transfer measurement data.

17 Waste sensor socket

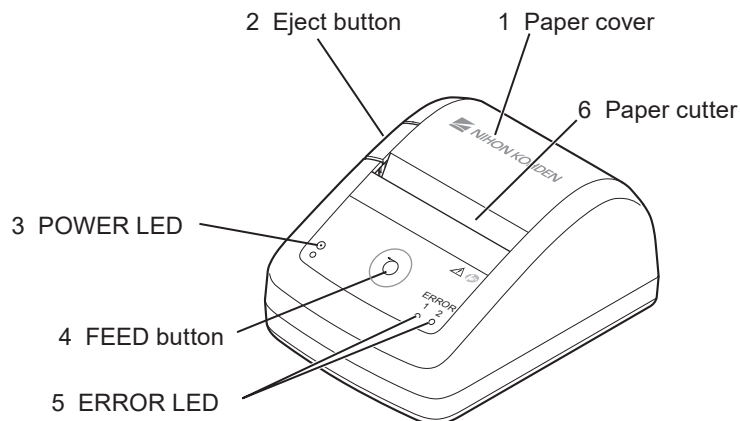
Connect a waste sensor (option) to monitor the liquid level in the waste container.

2-1-3. Options

2-1-3-1. WA-130W Compact Printer

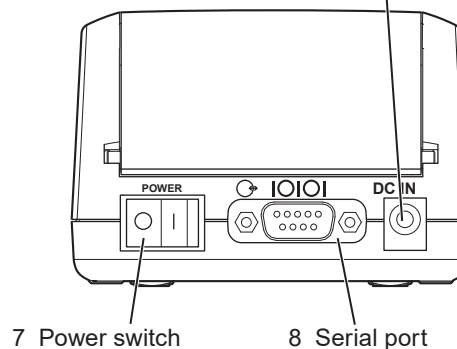
Prints measurement results as well as histograms and standard value graphs on a recording paper.

Front Panel



Rear Panel

The "DC IN" connector is not used.
An AC adaptor is not necessary when
using the compact printer.



1 Paper cover

Open to replace the recording paper.

2 Eject button

Opens the paper cover.

3 POWER LED

Lights in green when the power is turned on. Not lit when the power is turned off.

4 FEED button

Feeds the recording paper.

5 ERROR LED

Lights to indicate the status of the WA-130W compact printer.

6 Paper cutter

Cuts the recording paper.

7 Power switch

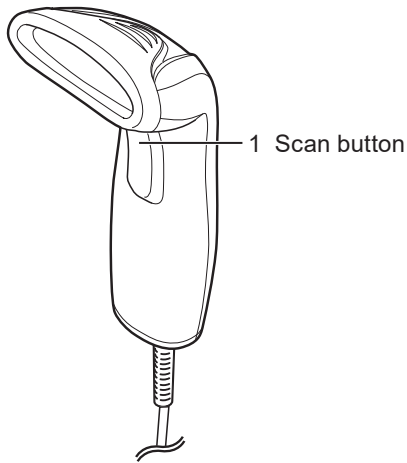
Turns the printer power on or off.

8 Serial port

For data communication with the analyzer.

2-1-3-2. ZK-130W Barcode Reader

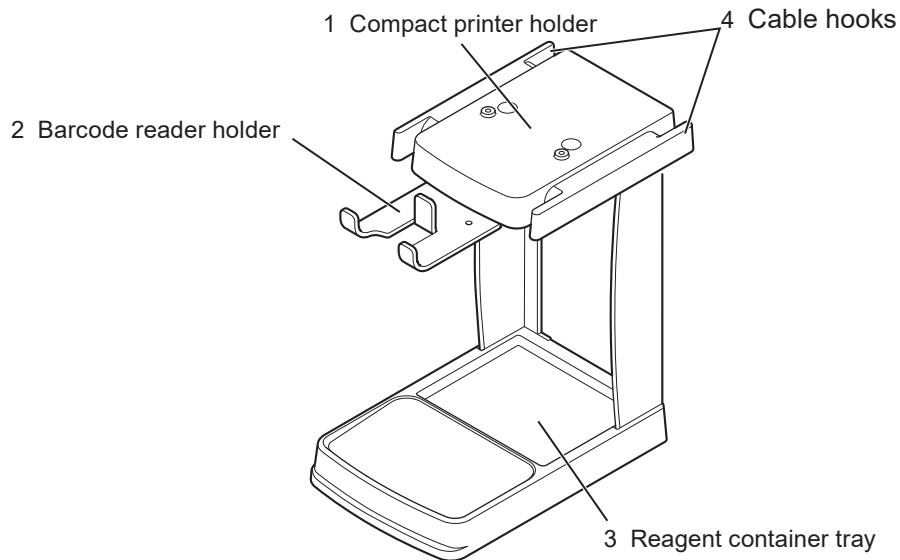
Scans barcodes to enter data such as patient information or reagent information.



- 1 Scan button
Press to scan a barcode.

2-1-3-3. YZ-008B7 Reagent Rack

Holds a compact printer (option), barcode reader and reagent containers (CLEANAC•3 (500 mL) 1 and HEMOLYNAC•310).



1 Compact printer holder

Fix the compact printer onto this holder with screws.

2 Barcode reader holder

Hook the barcode reader to this holder.

3 Reagent container tray

Put reagent (CLEANAC•3 and HEMOLYNAC•310) containers on this tray.

4 Cable hooks

When installing the barcode reader, wrap the surplus cable to this part.

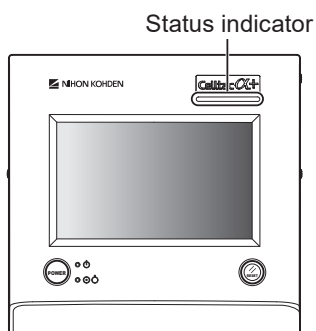


Refer to the operator's manual for the YZ-008B7 reagent rack together with this manual.

2-2. Checking the Analyzer Status

Check the status indicator on the front panel and the status icons at the top of the screen.

2-2-1. Status Indicator






The color of the indicator displays the operation status (starting, operating, stopped, etc.). Before starting measurement, confirm that the indicator is green (standby).

Display		Status
Green	Lit	Standby
	Blinking	Operating
Orange or red	Lit	A device message is displayed.
Blue	Lit	Display off (sleep mode)
Off		Power off

2-2-2. Status Icons



The status icons indicate the status of the reagent management, quality control and user maintenance. This can be checked by pressing the Information key (**i**). Confirm that all status indicators are green before starting a measurement.

Status Icon	Status
 Reagent Management	Green when all the following conditions are met: <ul style="list-style-type: none"> • All reagents are within the valid period (before the expiration date and before the expiration after opening date). • All reagents have more than 0% remaining. • The waste amount is below 100%.
 Quality Control	Green when all the following conditions are met: <ul style="list-style-type: none"> • Quality control measurement is performed for all control samples in use. • The last quality controlled measured results of all control samples in use meet the quality control judgment criteria or are approved by the operator.
 User Maintenance	Green when the following condition is met: <ul style="list-style-type: none"> • The analyzer self check has been performed and all items passed.

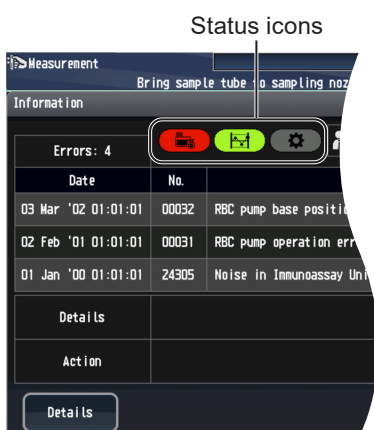
NOTE: Even if the above conditions are met, the quality control and user maintenance status is red if the following conditions apply.

- When power is turned on (when starting)
- More than 25 hours since the last quality control measurement (Quality Control status) or self check (User Maintenance status)
- When a user logs in (Quality Control status)¹

¹ The status icon display setting (which color to display when a user logs in) can be changed in the Settings screen.



When the status is displayed in red, the Information key (**i**) is lit in red. When a device message is displayed, it blinks in red.



2-3. Specifications

2-3-1. Function and Performance

2-3-1-1. Measured Parameters

- Blood cell count (WBC, RBC, PLT): Electrical resistance detection
- Hemoglobin concentration (HGB): Colorimetric method (surfactant method)
- Hematocrit (HCT): Peak integration method using blood cell pulses (calculated from RBC histogram)
- RBC distribution width (MCV, MCH, MCHC): Calculated from RBC, HGB and HCT
- WBC blood cell differential (LY%, MO%, GR%, LY, MO, GR): Calculated from histogram
- Platelet crit (PCT): Peak integration method using blood cell pulses (calculated from PLT histogram)
- Mean platelet volume (MPV): Calculated from PLT and PCT
- RBC distribution width (RDW-CV, RDW-SD): Calculated from RBC histogram
- Platelet distribution width (PDW): Calculated from PLT histogram
- Platelet large cell ratio (P-LCR): Calculated from PLT histogram
- C-reactive protein (CRP)¹: Latex agglutination immunoassay method
- Glycohemoglobin A1c (HbA1c)¹: Latex agglutination immunoassay method
- Erythrocyte sedimentation rate (ESR)²: Calculated from sylectogram, HCT and MCV

¹ MEK-1303 only ² MEK-1305 only

2-3-1-2. Measuring Range (Display Range)

Measured Parameters	Name	Measuring Range (Display Range)
White Blood Cell Count	WBC	0.0 to 999.0 × 10 ² /μL 0.0 to 2999.0 × 10 ² /μL (in high concentration mode)
Lymphocyte Percent	LY%	0.0 to 100.00%
Monocyte Percent	MO%	
Granulocyte Percent	GR%	
Lymphocyte Count	LY	0.0 to 999.0 × 10 ² /μL 0.0 to 2999.0 × 10 ² /μL (in high concentration mode)
Monocyte Count	MO	
Granulocyte Count	GR	
Red Blood Cell Count	RBC	0 to 999 × 10 ⁴ /μL
Hemoglobin Concentration	HGB	0.00 to 29.90 g/dL
Hematocrit Percent	HCT	0.0 to 99.9%
Mean Corpuscular Volume	MCV	20.0 to 199.0 fL
Mean Corpuscular Hemoglobin	MCH	10.0 to 50.0 pg
Mean Corpuscular Hemoglobin Concentration	MCHC	10.0 to 50.0 g/dL
Red Blood Cell Distribution Width in Coefficient of Variation	RDW-CV	0.0 to 50.0%
Red Blood Cell Distribution Width in Standard Deviation	RDW-SD	0.0 to 199.0 fL
Platelet Count	PLT	0.00 to 149.00 × 10 ⁴ /μL
Platelet Crit	PCT	0.00 to 2.99%
Mean Platelet Volume	MPV	0.0 to 20.0 fL
Platelet Distribution Width	PDW	0.0 to 50.0%
Platelet Large Cell Ratio	P-LCR	0.0 to 100.0%

Measured Parameters	Name	Measuring Range (Display Range)
C-reactive protein ¹	CRP	0.1 to 20.00 mg/dL (serum or plasma) 0.1 to 33.33 mg/dL (whole blood, HCT of 40%)
Glycohemoglobin A1c ¹	HbA1c	4.0 to 13.0%
Erythrocyte sedimentation rate ²	ESR	0 to 200 mm

¹ MEK-1303 only ² MEK-1305 only

2-3-1-3. Reproducibility

- Normal mode (CV or SD value)

WBC: 2.0% or less (WBC: $40.0 \times 10^2/\mu\text{L}$ or more)

RBC: 1.5% or less (RBC: $400 \times 10^4/\mu\text{L}$ or more)

HGB: 1.5% or less

HCT: 1.5% or less

MCV: 1.0% or less

MCH: 2.0% or less

MCHC: 2.0% or less

RDW-CV: 3.0% or less

RDW-SD: 3.0% or less

PLT: 4.0% or less (PLT: $10.0 \times 10^4/\mu\text{L}$ or more)

PCT: 6.0% or less

MPV: 4.0% or less

PDW: 10.0 % or less

P-LCR: 18.0 % or less

LY%: 5.0 % or less, or SD 1.8 or less (WBC $40.0 \times 10^2/\mu\text{L}$ or more)

MO%: 12.0 % or less, or SD 0.6 or less (WBC $40.0 \times 10^2/\mu\text{L}$ or more)

GR%: 5.0 % or less (GR 30.0 % or more and WBC $40.0 \times 10^2/\mu\text{L}$ or more)

LY: 8.0 % or less

LY SD: 1.6 or less

MO: 20.0 % or less

MO SD: 0.6 or less

GR: 8.0% or less (GR $12.0 \times 10^2/\mu\text{L}$ or more)

CRP¹: 10.0% or less

HbA1c¹: 5.0 % or less

ESR²: 10.0% or less, or SD 1.5 mm or less

¹ MEK-1303 only ² MEK-1305 only

2-3-1-4. Linearity

- WBC: within $\pm 3.0\%$ or $\pm 3 \times 10^2/\mu\text{L}$ (WBC: 2.0 to $999 \times 10^2/\mu\text{L}$)
- RBC: within $\pm 3.0\%$ or $\pm 8 \times 10^4/\mu\text{L}$ (RBC: 2 to $800 \times 10^4/\mu\text{L}$)
- HGB: within $\pm 1.5\%$ or $\pm 0.2 \text{ g/dL}$ (HGB: 0.10 to 25.0 g/dL)
- HCT: within $\pm 3.0\%$ or $\pm 1.0\%$ (HCT: 20.0 to 60.0%)
- PLT: within $\pm 10.0\%$ or $\pm 2.0 \times 10^4/\mu\text{L}$ (PLT: 1.00 to $149 \times 10^4/\mu\text{L}$)
- CRP¹: within $\pm 15\%$ or $\pm 0.1 \text{ mg/dL}$
(0.1 to 33 mg/dL (whole blood [in case of HCT: 40%]))
(0.1 to 20 mg/dL (serum or plasma))
- HbA1c¹: within $\pm 10.0\%$

¹ MEK-1303 only

(Specifications above apply to the normal mode)

2-3-1-5. Measurement Times (From Aspiration of Sample to Display of Results)

MEK-1301 and MEK-1302

- CBC (open mode): within 1 min
- CBC (closed mode): within 1 min 30 s

MEK-1303

- CBC (open mode): within 1 min
- CBC (closed mode): within 1 min 30 s
- CRP: within 3 min 40 s
- HbA1c: within 5 min 30 s

MEK-1305

- CBC (open mode): within 1 min
- CBC+ESR (open mode): within 2 min

2-3-1-6. Sample Volume

MEK-1301 or MEK-1302

- Normal and panic value measurement mode
20 µL
- Pre-dilution mode: 10 or 20 µL
- Capillary mode: 10 µL

MEK-1303

- Normal and panic value measurement mode
 - CBC and CRP: 26 µL
 - CBC: 20 µL
 - HbA1c: 10 µL
- Pre-dilution mode (CBC): 10 or 20 µL
- Capillary mode
 - CBC or CBC+CRP: 10 or 20 µL
 - HbA1c: 10 µL

MEK-1305

- Normal mode (CBC+ESR): 80 µL
- Normal mode (CBC): 20 µL
- Pre-dilution mode (CBC): 10 or 20 µL
- Capillary mode (CBC): 10 µL

2-3-1-7. Background Noise (Normal Mode)

- WBC: $2.0 \times 10^2/\mu\text{L}$ or less
- RBC: $2 \times 10^4/\mu\text{L}$ or less
- HGB: 0.10 g/dL or less
- PLT: $1.00 \times 10^4/\mu\text{L}$ or less

2-3-1-8. Carryover (Normal Mode)

- WBC: 1.0% or less
- RBC: 1.0% or less
- HGB: 1.0% or less
- PLT: 1.0% or less

2-3-2. Safety Standards

- IEC 61010-1:2010+Amendment 1:2016 ¹
 - IEC 61010-2-101:2015
 - IEC 61010-2-081:2015
 - IEC 61326-1:2012
 - IEC 61326-2-6:2012
 - IEC 62304:2006+Amendment 1:2015
 - CISPR 11:2009 Group 1 Class B+Amendment 1:2010
 - EN 13612:2002+Amending Corrigendum:2002
 - EN 55011:2009 Group 1 Class B+Amendment 1:2010
 - EN 61010-1:2010
 - EN 61010-1:2010+Amendment 1:2019+Amending Corrigendum:2019 ¹
 - EN 61010-2-101:2017
 - EN 61010-2-081:2015
 - EN 61326-1:2013
 - EN 61326-2-6:2013
 - EN 62304:2006+Amendment 1:2015
 - EN ISO 14971:2012
 - EN ISO 14971:2019 ¹
 - EN ISO 15223-1:2016 ¹
 - EN ISO 17511:2003 ¹
 - EN ISO 18113-1:2011 ¹
 - EN ISO 18113-3:2011 ¹
- ¹ MEK-1303 only

2-3-3. Classification

Type of protection against electrical shock:

CLASS I EQUIPMENT

Degree of protection against harmful ingress of water

IPX0 (non-protected)

Degree of safety of application in the presence of FLAMMABLE ANAESTHETIC MIXTURE WITH AIR, OR WITH OXYGEN OR NITROUS OXIDE

Equipment not suitable for use in the presence of FLAMMABLE ANAESTHETIC MIXTURE WITH AIR, OR WITH OXYGEN OR NITROUS OXIDE

Mode of operation:

CONTINUOUS OPERATION

ME EQUIPMENT type

STATIONARY type

2-3-4. Environment

2-3-4-1. Storage Environment

- Temperature: -20 to +60°C (-4 to +140°F)
- Humidity: 10 to 95%RH (noncondensing)
- Atmospheric pressure: 700 to 1060 hPa

2-3-4-2. Transport Environment

- Temperature: -20 to +60°C (-4 to +140°F)
- Humidity: 10 to 95%RH (noncondensing)
- Atmospheric pressure: 700 to 1060 hPa

2-3-4-3. Operating Environment and Power

Operating environment

- Temperature: 15 to 30°C (59 to 86°F)
- Humidity: 30 to 85%RH (noncondensing)
- Atmospheric pressure: 700 to 1060 hPa

Power requirements

- Line voltage: AC only
- Allowable fluctuation range: AC 100 to 240 V
- AC type: ±10%
- AC type: Switching regulator
- Power input: 150 VA
- Line frequency: 50 or 60 Hz
- Allowable fluctuation range: ±5%

Cooling system

Natural cooling

2-3-5. EMC Standards

- CISPR 11:2009 Group 1 Class B+Amendment 1:2010
- IEC 61326-1:2012
- IEC 61326-2-6:2012
- EN 55011:2009 Group 1 Class B+Amendment 1:2010
- EN 61326-1:2013
- EN 61326-2-6:2013

2-3-6. Dimensions and Weight

Dimensions

230 W × 450 D × 428 H (mm) ±10% (Main unit only, excluding protruding parts)

Weight:

- MEK-1301 or MEK-1302: 20 kg ±10%
- MEK-1303: 22 kg ±10%
- MEK-1305: 21 kg ±10%

2-4. Clock Accuracy

The clock IC used by the analyzer is not perfectly accurate, so the date and time indication may be slightly off. The operating environment may also adversely affect the accuracy of the date and time indication.

Check that the date and time is correct every time you start using the analyzer. The date and time must be adjusted if they are not correct.

2-5. Standard Accessories, Options and Consumables

2-5-1. Standard Accessories

⚠ CAUTION

Only use Nihon Kohden specified reagents and consumables. Otherwise the measurement result cannot be guaranteed and incorrect reagent concentration can cause equipment damaged.

Name and Model		Qty	Supply Code or Code No.
Power cord N		1	936266
Power cord UL		1	936248
Ground lead D		1	L912
Fuse (time-lag, 250V, 2.0A, ø5.2×20 mm)		2	—
Filter assy		3	T802
ISOTONAC•3/ISOTONAC•4 tube assy	YZ-009B3 diluent tube	1	YZ-009B3
	18L cap	1	T723A
CLEANAC•710 tube assy	YZ-009B4 detergent tube	2	YZ-009B4
	MEK cap	1	T469
	AAA-50123 tube assy	1	T470A
CLEANAC•3 tube assy	YZ-009B9 CLEANAC•3 tube assy	2	YZ-009B9
	YZ-0399 500mL tube assy (with a cap)	1	T464C
HEMOLYNAC•310 tube assy	YZ-009B5 HEMOLYNAC•310 tube	1	YZ-009B5
	YZ-0399 HEMOLYNAC•310 cap	1	T447D
YZ-009B2 waste tube		1	YZ-009B2
Waste container (2L)		1	—
YZ-010B0 pump tube assy		1	YZ-010B0
ZK-130W handy barcode reader		1	ZK-130W
Reagent port cover		1	—
Cooler bag (MEK-1303)		2	—
P/C lock A (loop-and-hook fasteners for fixing the compact printer, etc.)		4	—
P/C lock B (loop-and-hook fasteners for fixing the compact printer, etc.)		4	—

2-5-2. Options and Consumables

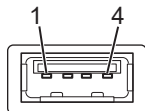
Name and Model		Qty	Supply Code or Code No.
YZ-008B7 reagent rack		1	YZ-008B7
RQW58-2 recording paper		1	A819B
WA-130W compact printer		1	WA-130W
WA-131W ink jet printer		1	—
WA-461V card printer		1	—
USB cable		1	—
YZ-0323 serial D9-D9 crossover cable		1	—
LAN cable		1	—
QS-025W software kit		1	QS-025W
SD card (1GB)		1	Y154D
SD card (2GB)		1	Y154F
ISOTONAC•3		1	T436D
ISOTONAC•4		1	—
CLEANAC•710	2 L	1	T438H
	3 L	1	—
CLEANAC•3	500 mL	1	T438E
	1 L	1	—
HEMOLYNAC•310		1	T493D
MEK-CAL (Calibrator for an Nihon Kohden hematology analyzer)		— ²	—
Hematology control (for the MEK-1301, MEK-1302 and MEK-1305)	MEK-3DN	— ²	—
	MEK-3DL	— ²	—
	MEK-3DH	— ²	—
Hematology control+CRP (for the MEK-1303)	MK-3CN	— ²	—
	MK-3CL	— ²	—
	MK-3CH	— ²	—
Celltac chemi CRP 4N	CR-420W	1	CR-420W
	CR-421W ¹	1	CR-421W
Celltac chemi HbA1c N	HA-420W	1	HA-420W
	HA-421W ¹	1	HA-421W
CLEANAC•710 3 L tube assy ¹	YZ-009B4 detergent tube	2	YZ-009B4
	MEK cap	1	T469
	YZ-006B9 3 L tube assy	1	—
CLEANAC•3 1 L tube assy ¹	YZ-009B9 CLEANAC•3 tube assy	2	YZ-009B9
	YZ-001B7 1 L tube assy (with a cap)	1	—
Waste container (10 L)		1	T417B
CR-CAL CRP calibrator (MEK-1303)		1	CR-CAL
JW-910W waste sensor		1	—

¹ These may not be available in some countries or regions. For details, contact your Nihon Kohden representative.

² Contact your Nihon Kohden representative.

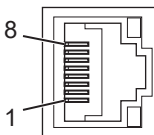
2-6. Socket Pin Assignment

2-6-1. USB Socket (Barcode Reader and Printer)



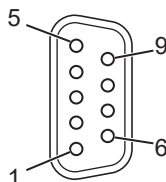
No.	Signal
1	VBus
2	-Data (D-)
3	+Data (D+)
4	GND

2-6-2. LAN Socket



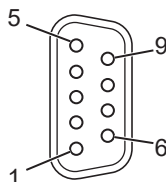
No.	Signal	No.	Signal
1	TD+	5	NC
2	TD-	6	RD-
3	RD+	7	NC
4	NC	8	NC

2-6-3. Serial Port



No.	Signal	No.	Signal
1	NC	6	DSR
2	RxD	7	RTS
3	TxD	8	CTS
4	DTR	9	NC
5	GND (SG)		

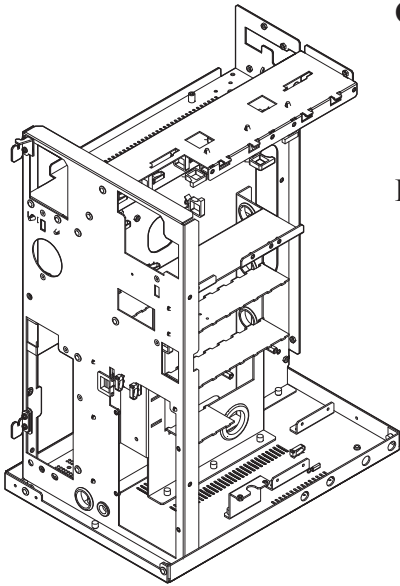
2-6-4. Printer Port Connector



No.	Signal	No.	Signal
1	VCC	6	BUSY
2	RxD	7	VCC
3	TxD	8	SEL2
4	SEL1	9	GND
5	SG		

2-7. Board/Unit Description

2-7-1. CD-130W CHASSIS UNIT



Overview

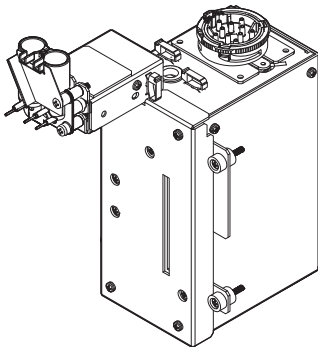
This is the chassis of the main unit.

The main unit consists of the chassis and electrical wiring.

Function

It provides a chassis structure for holding each component.

2-7-2. MC-130W CBC MEASURING UNIT



Overview

The main purpose of the measuring unit is measuring dispensed samples.

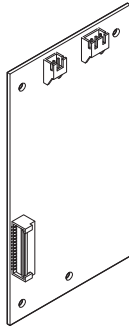
It is made up of a chassis, detection unit, insulating chamber, piping tube, manometer, sample cup, UT-7312 (Measuring BD) and UT-7302 (Manometer BD).

Function

Transmits the blood cell pulse to the BD of the main unit.

The control signal from the AMP CONTROL BD switches the internal flow path according to the operation mode. When a blood cell passes through a detection hole, the pulse signal is amplified and output according to its size.

2-7-3. UT-7312 CBC MEASURING BD



Overview

In order to sense the pulses of red and white blood cells, a constant current flows to the electrodes and this is used to detect and amplify minute changes in the voltage and then transmit them to the AMP CONTROL BD.

It consists of the following circuits for red blood cells and white blood cells.

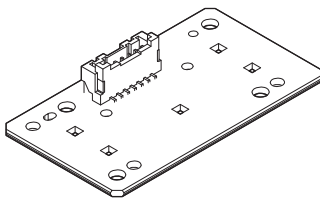
- Constant current circuit
- Detection signal amplification
- Switching circuits for electrodes, test pulse (CAL pulse) and applying voltage to clear blockages.

It is also equipped with a condenser for eliminating noise in the white blood cell flow path.

Function

- Provides a constant current to electrodes, detects and amplifies changes in voltage at the electrodes, and transmits them to the AMP CONTROL BD.
- Amplifies the test pulse (CAL pulse) generated by the AMP CONTROL BD and transmits it to the AMP CONTROL BD.
- Relays the voltage generated by the AMP CONTROL BD, which is to say, the removal voltage, to the electrodes.

2-7-4. UT-7302 MANOMETER BD



Overview

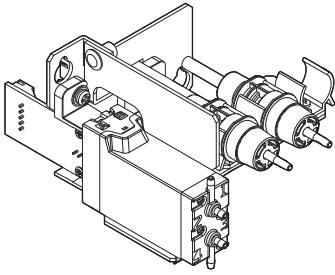
Monitors the liquid level of the manometer of the WBC measurement unit.

Two sets of light emitters (LED) and receivers (photo-transistors) are arrayed on the manometer (fixed capacity plastic column) to monitor the liquid level at its top and bottom.

Function

- When there is liquid in the manometer, light from the LED passes through the plastic column and a lot of light reaches the photo transistor on the receiving side. In places where there is no liquid, the amount of light that reaches the receiving side drops due to refraction and irregular reflection. The received voltage is input to the AMP CONTROL BD, which determines whether or not liquid is present.
- The result of determining whether there is liquid via the level in the manometer is input by the AMP CONTROL BD and reflected by the LED lighting (liquid present) or being off (absent).

2-7-5. MH-130W HGB MEASURING UNIT



Overview

The purpose of this unit is measuring the HGB in a diluted or dispensed sample.

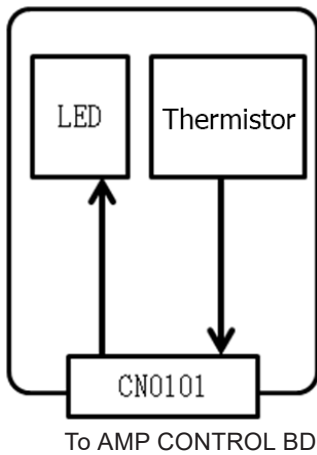
It consists of a test cartridge, UT-7289 (HGB/SS LED BD), UT-7290 (HGB/SS AMP BD) and a two-way valve.

Function

The unit shines an LED on the sample in the test cartridge; light that penetrates the sample is received and converted to voltage by the HGB/SS AMP BD, and that voltage is transmitted to the AMP CONTROL BD.

A thermistor mounted on the HGB/SS LED BD transmits HGB LED temperature data to the AMP CONTROL BD. The solenoid valve is also opened/closed under its control.

2-7-6. UT-7289 HGB/SS LED BD



Overview

The LED on the board emits the HGB measurement light and a short sample check light.

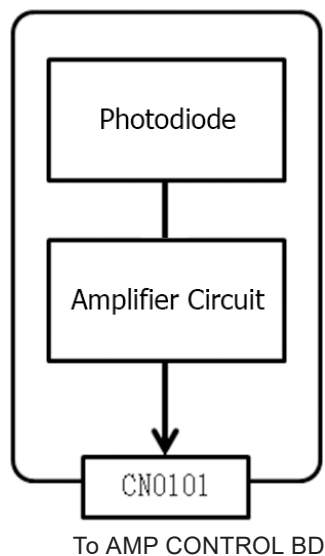
A board temperature signal is sent to the AMP CONTROL BD via a thermistor on the board.

It consists of an LED for HGB measurements and short sample checks, and a thermistor.

Function

- The LED lights for HGB measurements and for short sample checks.
- It sends board temperature data.

2-7-7. UT-7290 HGB/SS AMP BD



Overview

Converts the LED light for HGB measurements and for short sample checks into voltage and transmits the signal to the AMP CONTROL BD.

It consists of a photodiode for detecting light and an operational amplifier for amplifying the voltage.

Function

With the MH-130W, it converts the HGB measurement LED light into voltage.

Connector Signals

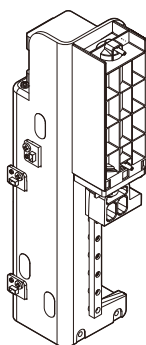
CN0101

Product Name: S4B-XH-A (LF) (SN)

Connects to: AMP CONTROL BD

Pin No.	Signal Name	I/O	Function
1	-15 V	VCC	-15 V power supply
2	HANA	O	Voltage output
3	+15 V	VCC	+15 V power supply
4	EA	GND	EA ground

2-7-8. MP-130W ISO PUMP UNIT



Overview

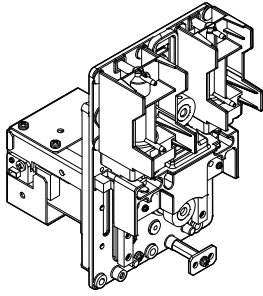
The primary purpose of the diluent pump unit is diluting various kinds of samples.

It consists of a vertical piston mechanism, a piston, a cylinder block, a stepping motor for driving it and a photo-sensor for detecting positions.

Function

- Aspirates and dispenses solutions in order to dilute and mix various samples.
- It aspirates and dispenses cleaning solutions for things like cups and aspirates and dispenses detergent for cleaning.

2-7-9. MP-131W SAMPLE PUMP UNIT (MEK-1303)



Overview

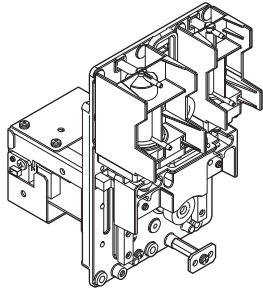
The unit is used as a pump for aspirating and discharging samples and for aspirating, discharging and stirring reagents inside cartridges.

It consists of a vertical piston mechanism, pulleys and a belt for driving the piston, a piston, a cylinder block, a geared stepping motor for driving it and a photo-sensor for detecting positions.

Function

- $\phi 2$ piston → Aspirates whole blood, dispenses dispensate and dispenses RBC samples
- $\phi 8$ piston → Dispenses reagent between cartridges

2-7-10. MP-132W RBC PUMP UNIT



Overview

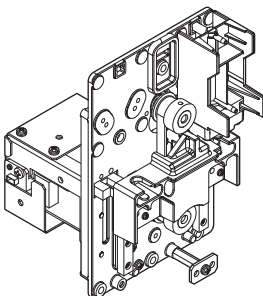
The unit is used as a pump for aspirating and discharging whole blood and for discharging RBC samples and sheath.

It consists of a vertical piston mechanism, pulleys and a belt for driving the piston, a piston, a cylinder block, a geared stepping motor for driving it and a photo-sensor for detecting positions.

Function

- $\phi 2$ piston → Aspirates whole blood, dispenses dispensate and dispenses RBC samples
- $\phi 12$ piston → Dispenses RBC sheath

2-7-11. MP-134W ESR PUMP UNIT (MEK-1305)



Overview

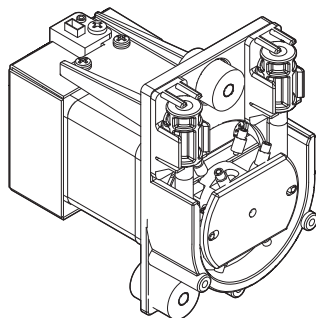
The unit is used as a pump for aspirating and discharging samples.

It consists of a vertical piston mechanism, pulleys and a belt for driving the piston, a piston, a cylinder block, a geared stepping motor for driving it and a photo-sensor for detecting positions.

Function

- $\phi 2$ piston → Aspirates whole blood, dispenses dispensate

2-7-12. MP-133W ROTARY PUMP UNIT



Overview

This rotary pump is responsible for supplying and draining various cups and flow paths.

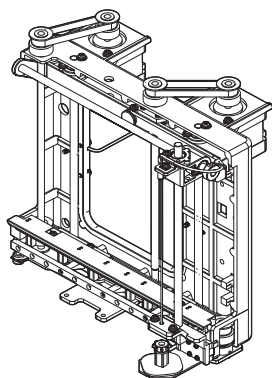
It consists of a rotor for stripping tubes and supplying fluids, a stepping motor for turning the rotor and a photo-sensor for detecting the position of the rotor.

Function

- Supplies and drains various cups and flow paths
- Backup of reduced suction pressure during quantitative sample analysis
- Pressure source for driving diaphragm pumps

2-7-13. MS-130W/MS-130W-01 SAMPLER UNIT

 | "SAMPLER UNIT of the MEK-1303" (p. 1-12)



Overview

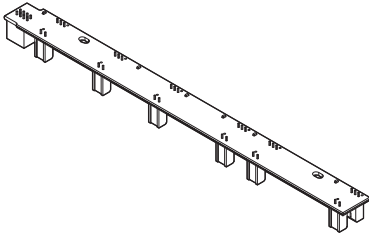
The unit is equipped with an actuator for driving the sampling nozzle up/down & left/right and is responsible for aspirating samples → rinsing around the sampling nozzle → dispensing to various measurement cups.

- 1) Sampling nozzle vertical drive mechanism (also serves as sample tube piercing mechanism)
Consists of a slide screw, slide block, guide shaft, stepping motor and photo-sensor for detecting position.
- 2) Sampling nozzle horizontal drive mechanism
Consists of drive pulleys and belt, linear guide, guide shaft, stepping motor and a BD (UT-7300) with a photo-sensor for detecting position.

Function

- 1) Aspirates sample from open mode position
- 2) Aspirates sample of vacuum sample tube supplied from closed mode position
- 3) After aspirating samples above, rinses contamination around sampling nozzle (As needed)
- 4) Dispenses sample aspirated as above into various measuring cups and/or cartridges.
(Note: includes dispensing between cartridges and stirring)

2-7-14. UT-7300 SAMPLER SENSOR BD



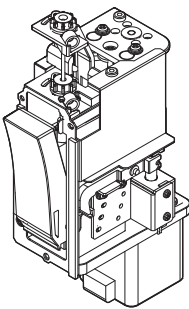
Overview

The sampler sensor board monitors the X-axis position of the sampling nozzle. Six position sensors (photo interrupters) are arrayed in specified positions.

Function

Position information on the X-axis of the sampling nozzle is detected by the six position sensors arrayed on the board and sent to the AMP CONTROL BD.

2-7-15. MS-131W OPEN AIR UNIT (MEK-1302/MEK-1303)



Overview

The unit is equipped with an actuator that drives the open air tube (release nozzle) up/down and is responsible for piercing the vacuum sample tube → releasing vacuum in the sample tube → rinsing around the sampling nozzle.

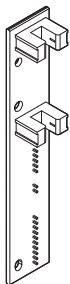
Open air tube (release nozzle) up/down drive mechanism

Consists of a slide screw, slide block, guide shaft, stepping motor and photo-sensor for detecting position.

Function

- 1) Pierces and releases pressure in vacuum sample tubes set in this unit.
- 2) After aspirating samples above, rinses contamination around sampling nozzle

2-7-16. UT-7301 CAP PIERCE BD (MEK-1302/MEK-1303)



Overview

Senses the needle position for releasing pressure of sample tubes, drives the solenoid for opening the sample tube door and plays the role of a sensor relay board for detecting the presence of sample tube and the door status.

It consists of 2 photosensors and 3 connectors.

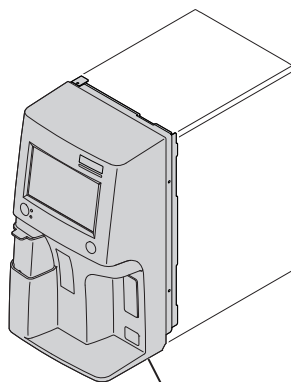
Function

- Detects the vertical position of the needle via the 2 photosensors.
- Relays the solenoid signal for opening the door of the sample tube.
- Relays the sensor signals for detecting the presence of a sample tube and whether its door is open.

2-7-17. PV-130W/PV-131W/PV-132W FRONT PANEL UNIT

FRONT PANEL UNIT is different according to the model.

2



FRONT PANEL UNIT
(PV-130W:MEK-1301/MEK-1305)
(PV-131W:MEK-1302)
(PV-132W:MEK-1303)

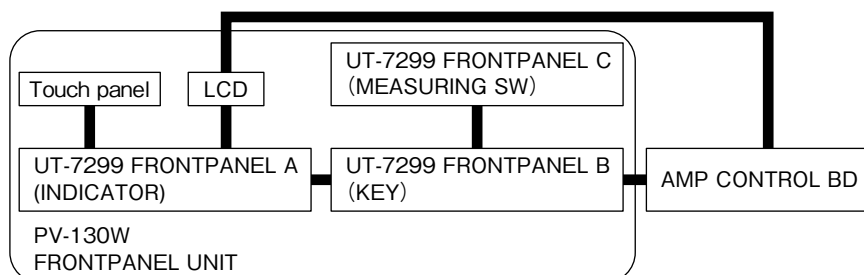
Model Name	Unit
MEK-1301/MEK-1305	PV-130W FRONT PANEL UNIT OP
MEK-1302	PV-131W FRONT PANEL UNIT OP/CL
MEK-1303	PV-132W FRONT PANEL UNIT PLUS

2-7-17-1. PV-130W FRONT PANEL UNIT OP (MEK-1301/MEK-1305)

Overview

The unit displays data, outputs buzzer sounds, detects key input and lights LEDs.

It consists of a front panel, LCD, a touch panel and the UT-7299 (FRONT PANEL BD).



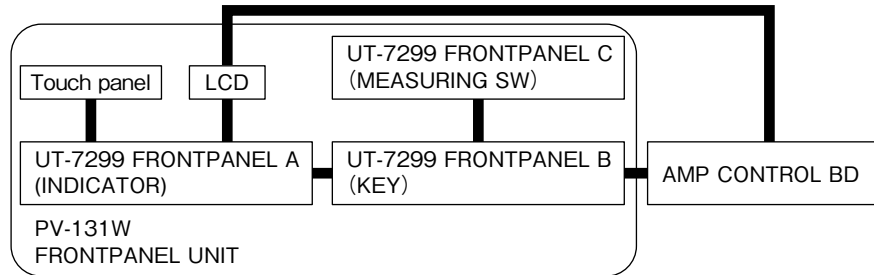
Function

- The unit uses control signals from the AMP CONTROL BD for the LCD display, LED lights, generating buzzer sounds and indicating information via the three-color LED. It also sends the input signals to the touch panel and from its various switches to the AMP CONTROL BD.

2-7-17-2. PV-131W FRONT PANEL UNIT OP/CL (MEK-1302)

Overview

The unit displays data, outputs buzzer sounds, detects key input and lights LEDs. It consists of a front panel, LCD, a touch panel and the UT-7299 (FRONT PANEL BD).



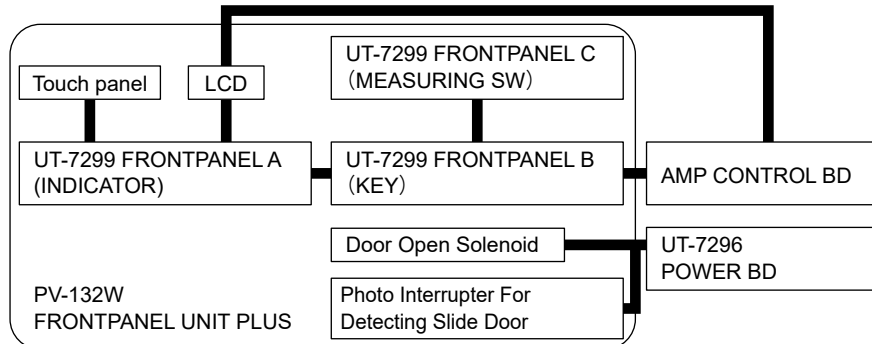
Function

- The unit uses control signals from the AMP CONTROL BD for the LCD display, LED lights, generating buzzer sounds and indicating information via the three-color LED. It also sends the input signals to the touch panel and from its various switches to the AMP CONTROL BD.

2-7-17-3. PV-132W FRONT PANEL UNIT PLUS (MEK-1303)

Overview

The unit displays data, outputs buzzer sounds, detects key input and lights LEDs. It consists of a front panel, LCD, a touch panel, UT-7299 (FRONT PANEL BD), door opening solenoid and photo interrupter for detecting the slide door.



Function

- The unit uses control signals from the AMP CONTROL BD for the LCD display, LED lights, generating buzzer sounds and indicating information via the three-color LED. It also sends the input signals to the touch panel and from its various switches to the AMP CONTROL BD.
- Slide door components: the mechanism that automatically lowers the slide door operates via control of the door opening solenoid by the AMP CONTROL BD; the door is unlocked when the solenoid is energized and the slide door lowers automatically. It detects whether the slide door is open or closed via photo interrupter and transmits the signal to the UT-7299 (FRONT PANEL BD).

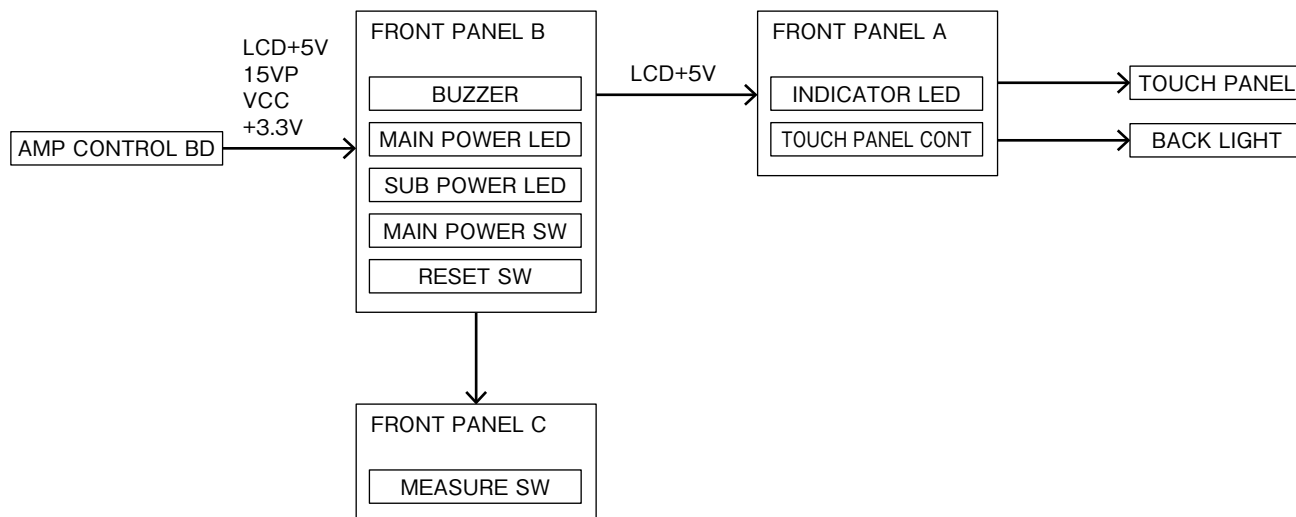
2-7-18. UT-7299 FRONT PANEL BD

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Overview

Actuates the buzzer, main and sub power LEDs, indicator LED, detects input to the various switches, relays the LCD backlight signal and controls the touch panel.

The FRONT PANEL BD (UT-7299) consists of three boards, as shown in the block diagram below.



Function

The control signal from the AMP CONTROL BD enables the operations.

- Sounds the buzzer. Allows the volume to be adjusted in three stages via an input signal.
- Turns the main and sub power LEDs ON/OFF.
- Turns the indicator LED ON/OFF.
- Obtains touch panel input data and sends it to the AMP CONTROL BD.
- Relays the LCD backlight signal.
- Detects when the main power, Reset and Measure switches are pressed.

2-7-19. AMP CONTROL BD

Overview

This board controls the actuator systems and display and processes measurement-related signals and external IN/OUT signals according to the installed program.

It is equipped with a Renesas ARM micro-controller (RZ-A1H) and controls the LCD display, external interfaces (USB×2, LAN, SD card×2, RS-232C×3), and uses 2 kinds of FPGA for system control and controlling the actuators (motors, solenoids and sensors). It also has an AD converter for capturing RBC/WBC blood pulse, HGB, thermistor and liquid level sensor voltages. Power is supplied at 3.3 V from the UT-7296 via interboard connectors and at 36 V, ±15 V and 6 V for analog power supply, with a 15 V supply for compact printer power.

It uses 10 MByte of SRAM on-board the micro-controller and 16 MByte of nonvolatile FLASH memory for the program. Setting information is stored in FRAM (32 kByte). The clock uses RTC and has a battery (CR2032) for backup.

It has two SD card channels, one each for internal and external use; the internal SD card mainly stores sample analysis data, while the external SD card is primarily for software installation.

This board is common to the entire MEK-1300 series. The program can determine the model installed by checking the cable connected to CN0102 and perform dedicated operations.

Board Structure of the MEK-1300 Series

Model Name	Board Used	Synopsis of Model
MEK-1301	YZ-008B8	CBC Only Model (OPEN measurement only)
MEK-1302	YZ-008B9	CBC Only Model (OPEN/CLOSED measurements)
MEK-1303	YZ-009B0	CBC+CRP+HbA1c Integrated Model
MEK-1305	YZ-010B4	CBC+ESR Integrated Model

Function

Digital Control

(1) Program and memory-related

- The system program and FPGA data can be installed using the SD card.
- Information such as settings and sample analysis data are stored in nonvolatile memory.
- Clock data is backed up with a battery.

(2) Control of units and devices

It has functions for the following unit control and sensing. It also has functions for controlling devices such as solenoids and QR code readers that are not included in the unit structure.

- 1) FRONT PANEL UNIT: PV-130W,131W,132W
- 2) CBC MEASURING UNIT: MC-130W
- 3) HGB AMP BD, HGB LED BD: MH-130W
- 4) LIQUID SENSOR BD: UT-7314
- 5) ISO PUMP UNIT: MP-130W
- 6) SAMPLE PUMP UNIT: MP-131W

- 7) RBC PUMP UNIT: MP-132W
- 8) ESR PUMP UNIT: MP-134W
- 9) ROTARY PUMP UNIT: MP-133W
- 10) SAMPLER UNIT: MS-130W/MS-130W-01
- 11) OPEN AIR UNIT: MS-131W
- 12) CHM MEASURING UNIT: MC-131W
- 13) ESR MEASURING UNIT: ME-130W

(3) Control of user interface

- Can control the LCD (including the backlight).
- Can control the touch panel.
- Can control main power, sub-power and indicator LEDs.
- Can detect the state of the power, Reset and Measure keys.
- Can control buzzers.

(4) Control of external interface

- Can transmit data externally at the capacity of the RS-232 , such as to a computer.
- Can print measurement data at the capacity of the RS-232C to a compact printer or card printer.
- Can print on an inkjet printer via USB connection.
- Can read data sent from a 1D handheld barcode reader via USB connection.
- Can connect to an external computer via Ethernet (10/100 base) connection.
- Can update the software version via external SD card.

Analog Control

(1) Measurement-related Signal Processing

- Can read electrode voltage and blood pulse data detected by the MC-130W.
- Measures HGB voltage detected by the MH-130W.
- Reads CRP and HbA1c measurement data (voltage) from the MC-131W.
- Reads ESR measurement data (voltage) from the ME-130W.
- Can generate a CAL pulse and test the MEASURING BD circuit.
- Can detect baseline swing between RBC/WBC electrodes.
- Can read information from thermistors.

(2) Signal Processing of Sensors

- Can read the manometer voltage from the MC-130W and determine the presence/absence of liquid. (WBC measurement unit)
- Can read the voltage of the liquid sensor and determine the presence/absence of liquid.
- Can detect when the waste sensor of optional equipment is full.

(3) Generation of Clog Removal Voltage

- Can generate a voltage of about 240 V for clearing clogs and supply it to the UT-7312 CBC MEASURING BD.

2-7-20. UT-7296 POWER BD

Overview

The board has the following functions.

- Generates the power supply that supplies boards and actuators (motors, solenoids and sensors).
- It is equipped with actuator driver circuits and transmits drive signals according to the control signals of the AMP CONTROL BD.
- Relays signals such as of actuator sensors, liquid sensors and CAP PIERCE BD connections to the AMP CONTROL BD.
- It monitors power supply output, solenoid output and outputs monitoring signals to the AMP CONTROL BD according to the select signal from the AMP CONTROL BD.

Generates DC voltages from 24 V to +5 V, +3.3 V, +24 V, +15 V, -15 V, +15 VP (power supply for compact printer), +36 V, +6 V, Vcc (+3.3 V) from the external switching power supply. Vcc, +5 V, +15 V, -15 V, +36 V, +6 V and +15 VP are generated on-board by a DC-DC converter. Only Vcc is supplied to the AMP CONTROL BD and KEY BD when the main power supply is ON.

Function

Generation of Power Supply

The board generates the following voltage from the DC 24 V power supplied from the external switching power supply, and it supplies them to the various circuits.

- Vcc: For secondary power supply control
- +3.3 V: For digital circuits
- +5 V: For clearing clogs, module interfaces and LCD backlight
- +6 V, 15 V: For analog circuits
- +36 V: For the constant current circuits of electrodes
- +24 V: For driving motors, solenoids, valves and heater
- +15 VP: For driving the compact printer

Power Supply Control

All power supplies other than Vcc are controlled as follows. (Vcc comes ON when the main power supply is turned ON.)

1) When ON

- Pressing the sub-power supply switch turns +3.3 V ON.
- The control signal from the AMP CONTROL BD turns power supplies other than +3.3 V ON.

2) When OFF

- The control signal from the AMP CONTROL BD turns power supplies other than +3.3 V OFF.

Valve, Heater & Solenoid Drive

Drives the 44 valves, 2 solenoids and 1 heater.

The control signal for the drive is supplied from the AMP CONTROL BD.

Motor Drive

Drives the 8 bipolar stepping motors provided for the 2 sampler units, 3 pump units, 1 cap piercing unit, 1 rotary pump unit and 1 CHM module unit. The control signal for the drive is supplied from the AMP CONTROL BD.

Alarm detection

If an error occurs at any power supply, an alarm signal is output to the AMP CONTROL BD.

2-7-21. UT-7314 LIQUID SENSOR BD

Overview

Detects the presence/absence of liquid in the flow route.

An LED illuminates the flow path fixed in a specific position and a photo transistor receives the reflected light. If there is liquid, the light is focused, increasing the amount of light; if no liquid is present, the light scatters, reducing the amount received. The AMP CONTROL BD captures the collector voltage of the photo transistor and uses it for determining if liquid is present.

Function

- Emits infrared light from an LED.
- Reflected light is collected by a photo transistor and transmitted to the AMP CONTROL BD.

2-7-22. MC-131W CHM MEASURING UNIT (MEK-1303)

Overview

The main purpose of the measuring unit is measuring dispensed samples.

It consists of a cartridge holder, forward/backward feed mechanism, temperature control mechanism, photometric mechanism and a rinse cup.

Function

It has the following three functions.

- Forward/backward feed mechanism: moves the cartridge holder forward/backward via a linear motor.
- Temperature control mechanism: (Normally $37\pm 0.3^{\circ}\text{C}$ ($98.6\pm 0.54^{\circ}\text{F}$))
- Photometric mechanism (three measurement wave lengths, with upper and lower optical paths for each wave length: HGB:520 nm, CRP: 880 nm)

Control Overview

- Forward/backward feed mechanism: moves the cartridge holder forward/backward via a linear motor. Controlled from the UT-7296 POWER BD. It has photo interrupters at the origin and cartridge inject positions, and the signals are transmitted to the AMP CONTROL BD.

Motor specifications: bipolar stepping motor

Stepping angle and steps: 7.5° , 48 steps

Direct drive screw lead: 1.20 mm (drives 00.25 mm/pulse)

- Temperature control mechanism: Temperature information obtained from the temperature sensor is used to change the duty ratio for energizing the heater and controlling feedback.
- Photometric function: Selects upper or lower LED wave length, emits light and transmits the amount of light at the receiving element positioned on the opposite side to the AMP CONTROL BD.

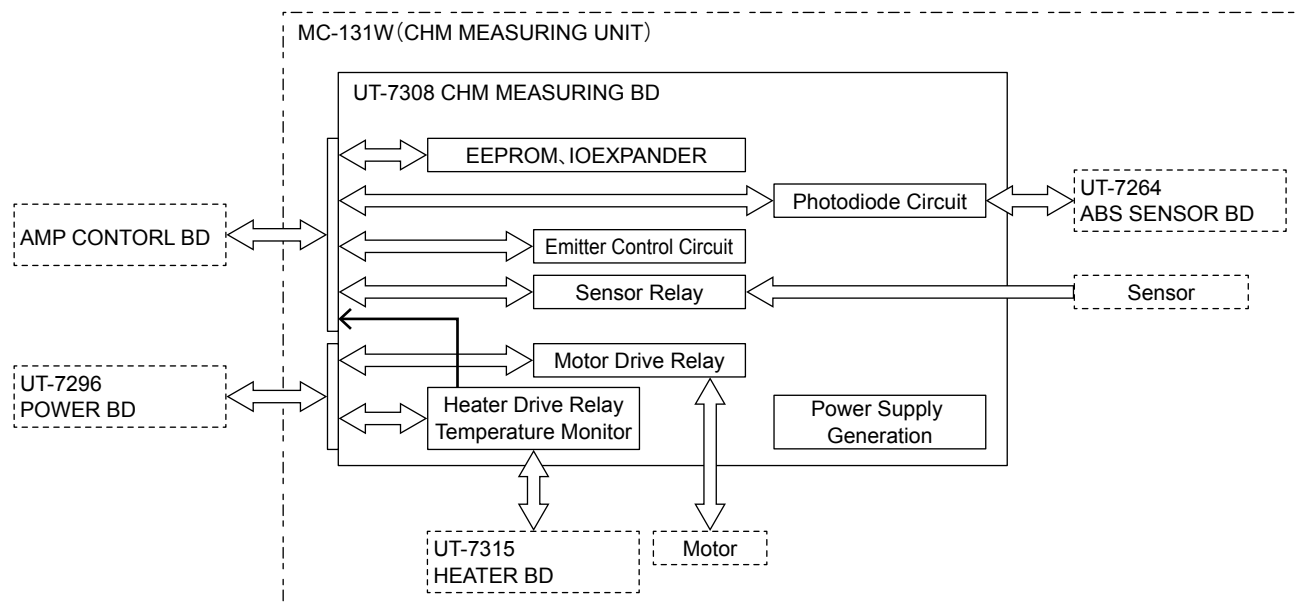
2-7-23. UT-7308 CHM MEASURING BD (MEK-1303)

2

Overview

The board is mounted on the MC-131W (CHM MEASURING UNIT) and controls LED emitting and receiving units, controls monitoring of heater temperature and relays motor and heater controls.

It is mounted on in the MC-131W and connects to boards as follows.



Function

- The light emitting control circuit controls the emitting of light from two (upper & lower) LEDs in 3 wave lengths (520, 660 and 880 nm).
- The light receiving control circuit selects the light receiving circuit (upper & lower).
- It relays control and the light receiving unit voltage to the UT-7264 (ABS SENSOR BD).
- If it detects the heater temperature is abnormally high, or low (disconnected), it sends a signal to the AMP CONTROL BD and the UT-7296 (POWER BD).
- Information on the measuring unit is stored in the EEPROM.
- It relays between the UT-7296 and the UT-7315 (HEATER BD).
- It relays between the motor and UT-7296.
- It relays between the position sensor and the AMP CONTROL BD.

2-7-24. UT-7315 HEATER BD (MEK-1303)

Overview

It is mounted in the MC-131W (CHM MEASURING UNIT) and relays data for driving the heater in the unit; the fuse is mounted so the heater signal is interrupted when the heater shorts. It also relays the thermistor signal for sensing the heater temperature and transmits it to the AMP CONTROL BD via the UT-7308.

It has a connectors for connecting to the UT-7308 (CHM MEASURING BD) and with the heater; a thermal fuse is mounted in series with the signal to the heater. A thermistor is also mounted for measuring temperature.

Function

- Connected to the UT-7308 and relays heater drive signals.
- When the temperature of the cartridge holder on which the thermal fuse is mounted becomes abnormal, the signal to the heater is cut off and it stops heating.
- The thermistor mounted on the cartridge holder measures the temperature and connects to the UT-7308.

2-7-25. UT-7264 ABS SENSOR BD (MEK-1303)

Overview

This board pre-amplifies the light receiving unit.

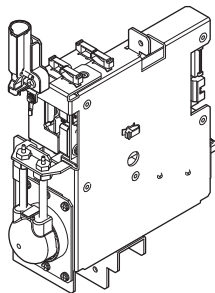
It consists of the following circuits.

- Detector elements (two-upper and lower)
- Light receiving unit preamp circuit (for 2 places, upper & lower)

Function

Receives the LED light from the MEASURING BD with the detector elements and preamplifies the signal. It sends the output according to the amount of light to the MEASURING BD.

2-7-26. ME-130W ESR MEASURING UNIT (MEK-1305)



Overview

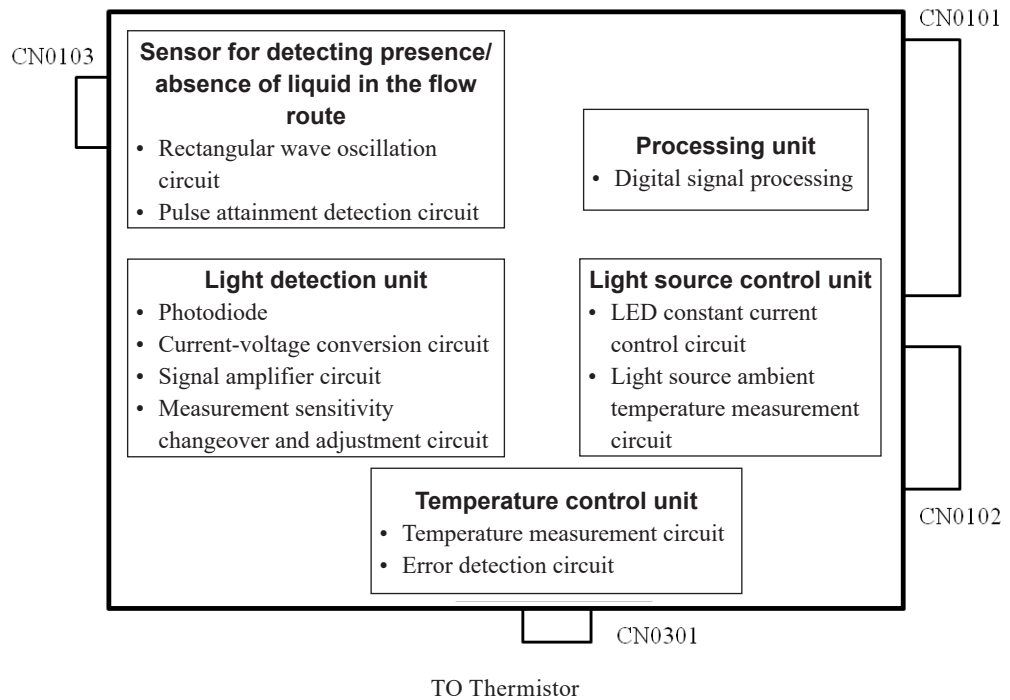
This unit is used to detect and transfer information on the changes over time of the optical density of the sample for calculating the ESR (Erythrocyte Sedimentation Rate).

It consists of an ESR cup, impedance liquid sensor, detection units (photometric unit, temperature control unit), pinch valve, and tube pump.

Function

- ESR cup → Holds measurement sample, filling fluid, and detergent.
- Impedance liquid sensor → Indicates whether any liquid is detected.
- Detection unit (photometric unit) → Detects changes over time in the optical density.
- Detection unit (temperature control unit) → Adjusts the temperature of the detection unit to $37.0 \pm 0.1^{\circ}\text{C}$ ($98.6 \pm 0.18^{\circ}\text{F}$).
- Pinch valve → Switches the flow path for discharging and supplying (ESR cup and tube pump), which performs a sudden stop on fluid movement after blood mixing.
- Tube pump → Performs fluid movement and refilling.

2-7-27. UT-7305 ESR BD (MEK-1305)



Overview

This performs digital signal processing, temperature monitoring, flow route impedance detection, and optical signal measurement.

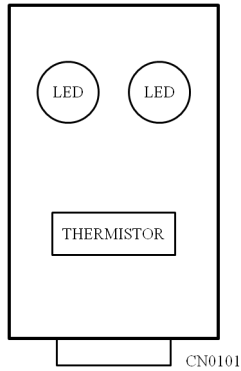
This is a board installed in the ME-130W (ESR measuring unit).

It consists of a processing unit, light detection unit, light source control unit, temperature control unit, and sensor for detecting absence/presence of liquid in the flow route.

Function

- Processing unit
 - Performs bidirectional communication with control unit in UT-7297 and performs device control.
- Light detection unit
 - Uses a photodiode to detect the LED transmitted light of the glass cartridge. Signals are converted to voltage signals and transmitted to the UT-7297 by passing through an amplifier circuit.
- Light source control unit
 - Controls the LEDs installed in the UT-7306. Also, the thermistor installed in the UT-7306 is used to convert and transfer the LED ambient temperature information.
- Temperature control unit
 - The temperature information obtained from the thermistor cable connected to the CN0301 is converted and transmitted to electrical signals. It also detects anomalies in the thermistor, and it outputs a signal for stopping heater operation.
- Sensor for detecting absence/presence of liquid in the flow route
 - Detects and determines whether there is any conductive liquid in the flow route.

2-7-28. UT-7306 ESR LED BD (MEK-1305)



Overview

It consists of a light source LED and thermistor for measuring the temperature. This is a board installed in the ME-130W (ESR measuring unit).

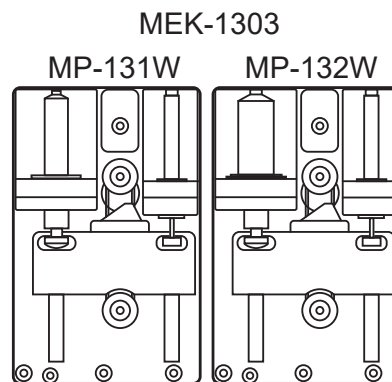
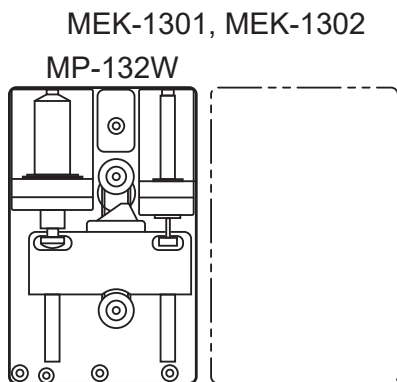
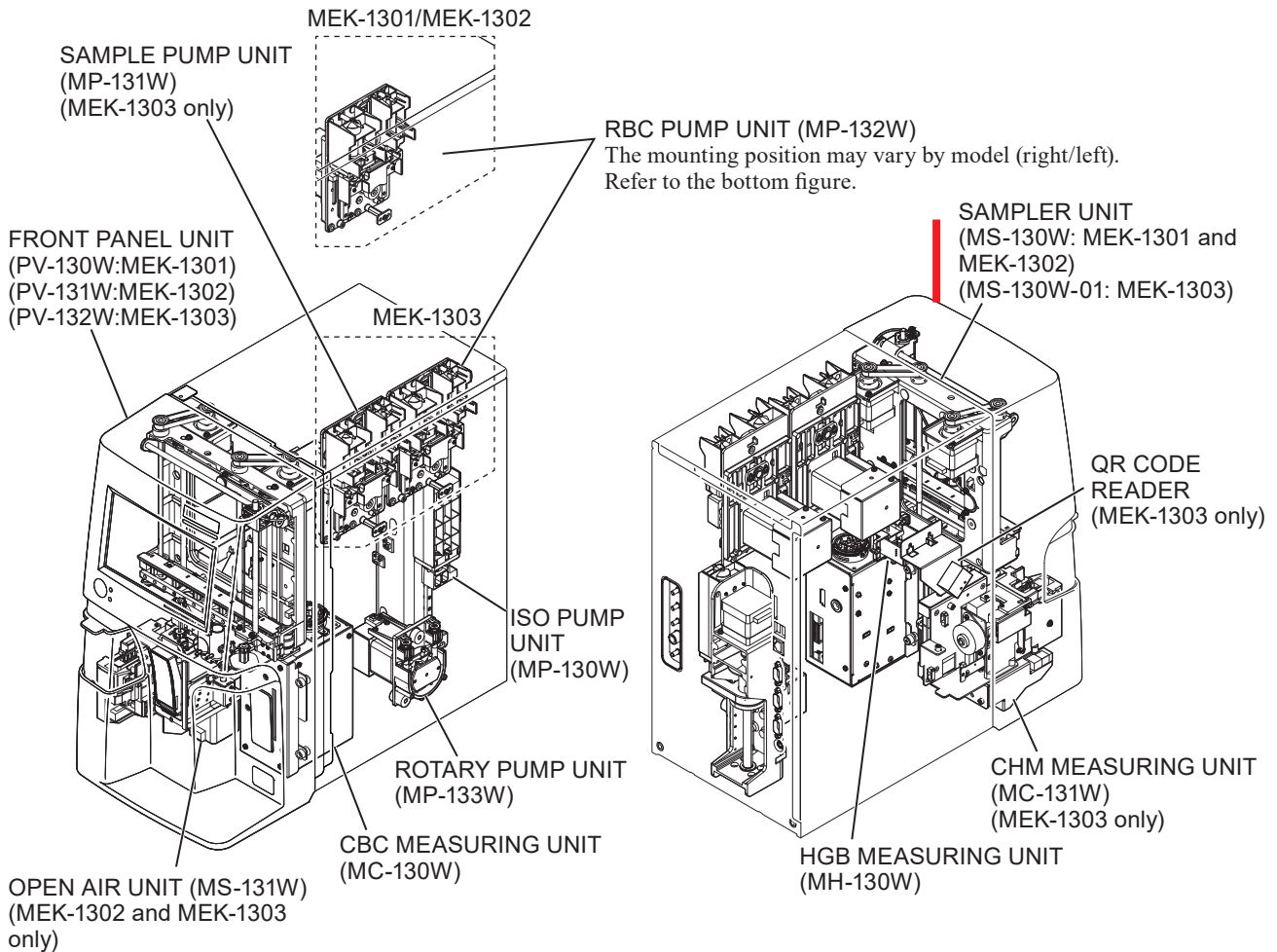
Function

- Infrared LED → Light source for measuring the transmitted light of the ESR measurement cartridge.
- Thermistor → Has a temperature measurement function for compensating for changes in the LED light intensity due to continuous measurement and environment changes.

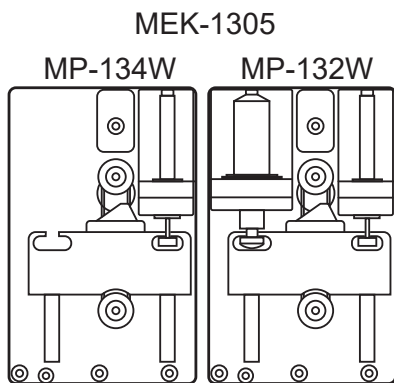
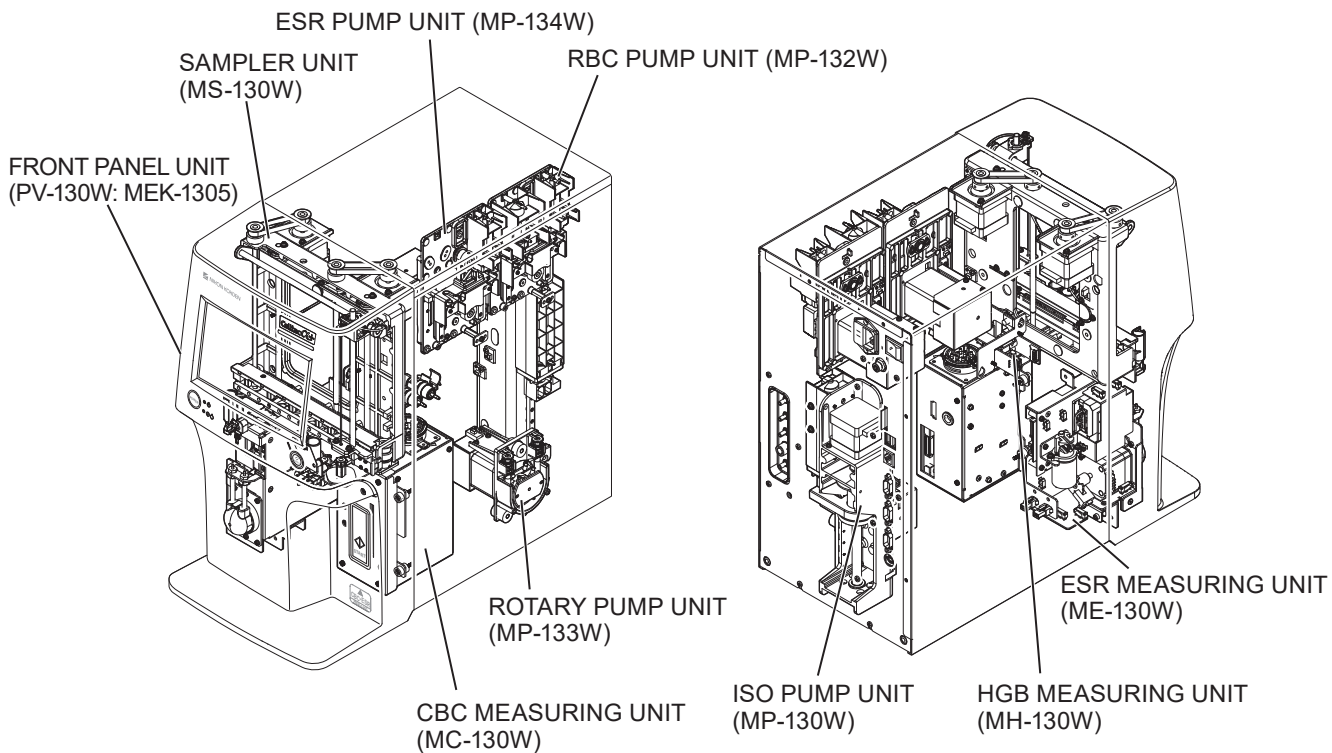
2-8. Units and Boards

2-8-1. Unit Location

2-8-1-1. MEK-1301, MEK-1302, MEK-1303

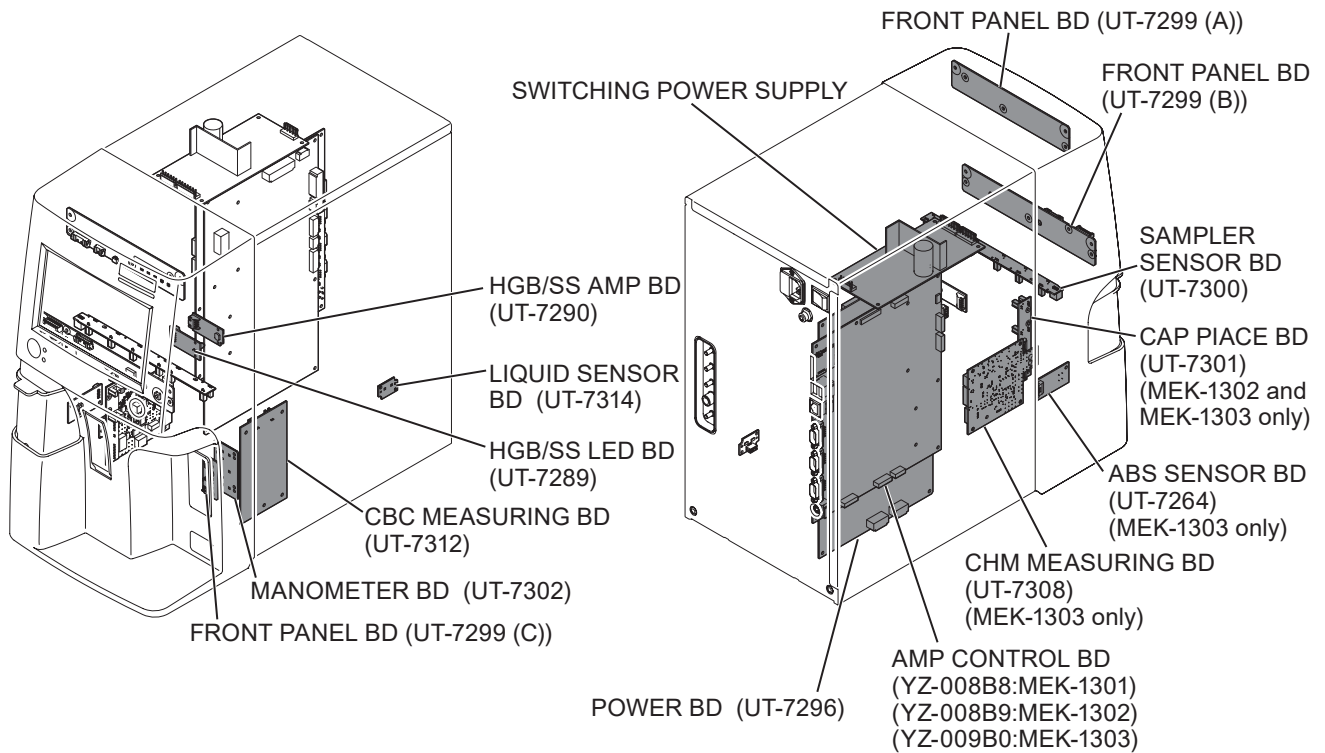


2-8-1-2. MEK-1305

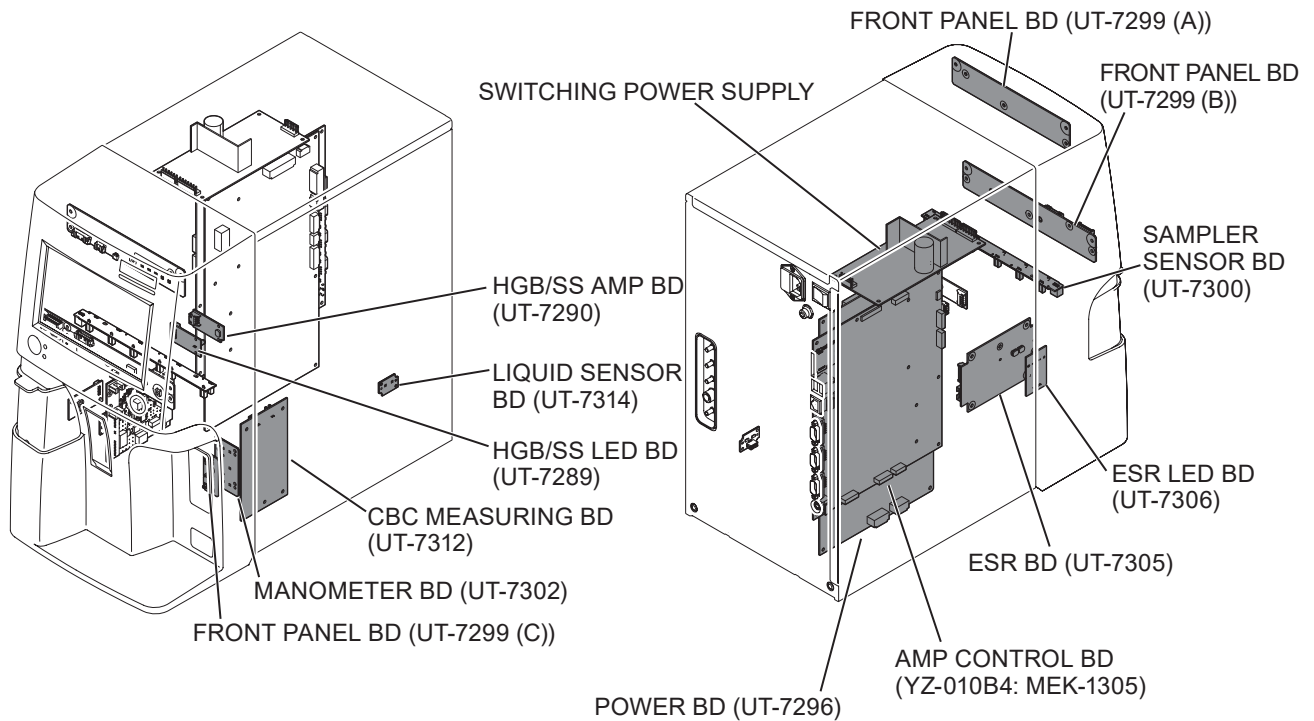


2-8-2. Board Location

2-8-2-1. MEK-1301, MEK-1302, MEK-1303



2-8-2-2. MEK-1305



3

Troubleshooting

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3-1. Check Procedure

When a problem arises, first check the state of the following.

- 1) Are there any leaks, unusual noises, smells or smoke?
- 2) Has a system error occurred?
- 3) Has an alarm occurred?

Further, if a problem with measurement data has occurred, check the following.

- 1) Perform a background measurement and see if the measurement data is under the control value.
- 2) Measure a hematology control; is the measurement data within the assay value?
- 3) Is the reproducibility (CV%) for at least 10 times within the specified value?

3-1-1. Checking the Measurement Environment and Sample Handling

Measurement Environment

It is very important when making measurements with a blood cell counter that the usage environment conditions are within their specified range. This is particularly true for temperature; if the diluent or lysing agent is cold, it impacts the measurement data of parameters like hemoglobin concentration, white blood cell count, and WBC classification, and it may result in a poor hemolyzation flag or sample error alarm.

<Operating Environment Conditions>

Ambient temperature: 15 to 30°C (59 to 86°F) (both analyzer and reagent)

Relative humidity: 30 to 85 %

Air pressure: 700 to 1060 hPa

In the winter, even if the air temperature in the lab meets the foregoing, the reagent may have cooled down overnight, so it may still be cold.

All due consideration must be given to controlling the temperature of the diluent to isolate it from cold air from the floor, such as putting the diluent on an insulating mat made of Styrofoam, or putting it on a simple heat-regulating device, such as a pet heater.

Notes on Handling Samples

- 1) Samples stored in a refrigerator or samples stored for 12 hours or longer since being collected may be affected in terms of the WBC classification.
- 2) If some samples are measured within 30 minutes of being collected, it may result in poor hemolyzation. In such cases, let them sit for at least 30 minutes before measuring them.
- 3) If times elapses after collecting a blood sample, mix it carefully again immediately before measuring it.
- 4) Be careful not to mix it too vigorously and cause foaming, as that will cause hemolysis.

- 5) Do not attempt to measure aggregating or coagulated specimens as it may cause analyzer failure.
- 6) Blood that has been stored for 1 day or longer under refrigeration should be returned to room temperature, then inverted and mixed thoroughly. However, when this is done, WBC classification cannot be done.

Notes on Preparing Pre-dilution Samples

Prepare samples carefully as the occurrence of abnormal data from pre-dilution analysis is extremely common due to the technique of collecting blood and diluting it.

Also, it is quite common to be unable to collect blood again for a pre-dilution analysis, so be very careful in the dilution process.

- When in the pre-dilution analysis mode, aspirate about 1 ml of diluted sample from the sampling nozzle. When doing so, if venous blood is accidentally aspirated, it will be discharged almost completely undiluted into the flow path, where it may clog, preventing the background from coming down and it may cause the analyzer to fail. Be very careful when measuring blood.

Special Samples


Be careful with samples that contain interfering substances, as they may affect the measured values.



“Interfering Substances” (p. 2-16)

3-2. Overview of Error Messages


When something abnormal is detected while the analyzer is being used, an error message appears.



 Error messages can be classified as measurement messages (5-3), color messages (5-4) and analyzer messages (5-5).

The causes, detailed information and steps to take to resolve error messages are listed in Chapter 5. After taking countermeasures, check and make sure measurement messages do not appear after the next measurement and that analyzer messages do not appear on the Information screen.

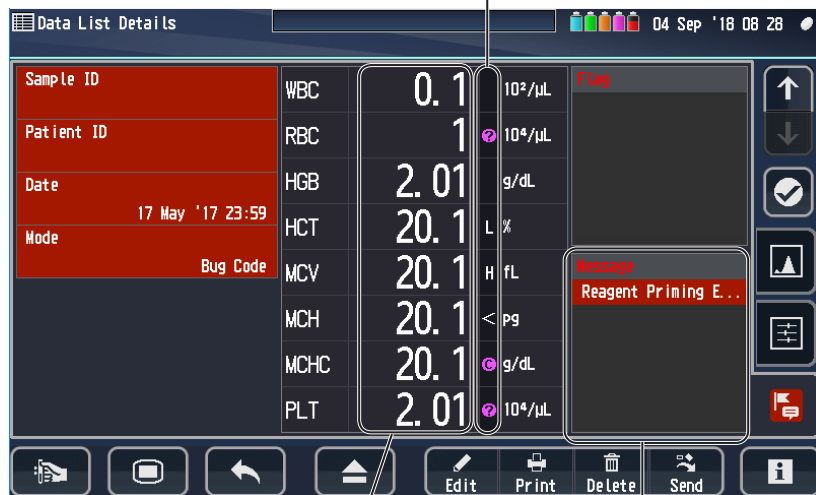
3-3. Measurement Messages

The measurement message indicates a measurement error.

To check the message, display the Data List Detail screen by touching [Detail] on the Data List screen, then touch  on the Data List Detail window.

 Measurement messages are suffixed with a number like 6xxxxx, while an analyzer message with the same content is saved (User Information [4xxxx]). Touching  at the bottom of the screen while a measurement message is displayed opens the Information screen, where the relevant “User Information [4xxxx]” (p. 3-57) can be checked.

An identifier (such as “H”, “L” and “?”) is displayed related to the detected error.



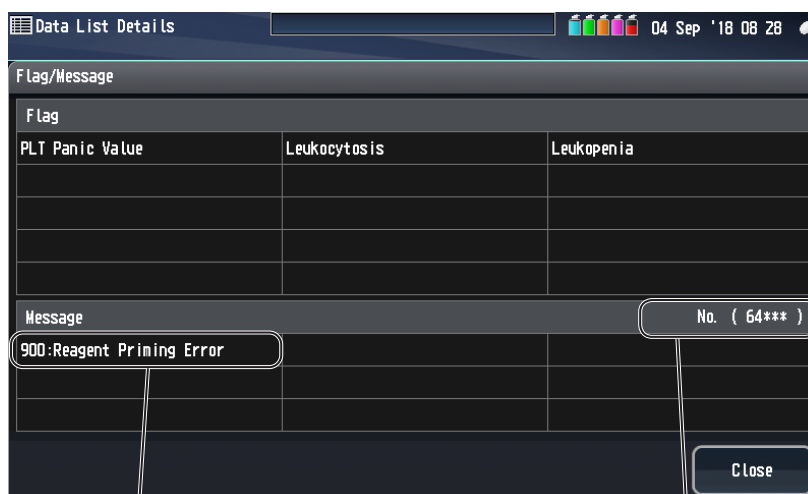
A measurement message appears. Touching it opens a Flag/Message screen, where the maintenance message number (6xxxx) can be checked.

Depending on the detected error, the measurement value of the related parameter might not be displayed.



Touching the measurement message window on the Data List Details screen opens a Flag/Message screen, where the message number (6xxxx) can be checked.

Example: Display of “64516 Sampling nozzle clog”



The last three digits (516) are displayed.

The first two digits (64***) are displayed.

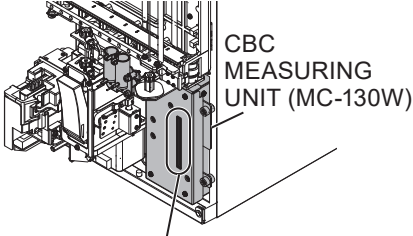
The following data identifiers are added to the parameter on the analyzer. The data identifiers for the measurement messages are “*”, “C”, “?”, “!” and “<”.




“Analyzer Messages” (p. 3-12)

Classification	Data Identifier	Measurement Value	Description
Data cannot be analyzed	None	Related parameter measurement value not displayed	The data cannot be analyzed.
Measurement condition error detected	None	Related parameter measurement value not displayed	Measurement operation error was detected.
Data with low reliability (Error found during measurement)	?	Measurement value displayed	The analyzer was not used under the specified environment condition and the measurement values with this identifier are unreliable. Only use the measurement values with this identifier for the reference purpose.
Data with low reliability (Abnormal flag detected)	!	Measurement value displayed	The reliability of the displayed parameters is low due to the presence of foreign matter such as abnormal cells. If the white blood cell or platelet value is low, it is recommended to create a blood smear and observe it under a microscope.
	*		The reliability of the related parameters is low due to the presence of foreign matter such as abnormal cells, and as a result the reliability of the displayed parameters is low. If the white blood cell or platelet value is low, it is recommended to create a blood smear and observe it under a microscope. This icon is also displayed when the temperature of the reagents (diluent) is low. Check whether the temperature of reagent is within the specified usage range (15 to 30 °C)
	C		The reliability of measured data is low because PLT clumps are detected.
Out of normal range	H	Measurement value displayed	The measurement value is outside the range of the upper and lower limits set in the “Sample Type” in the Settings screen.
	L		
Above measurement range	None	OVER	The measurement value exceeds the measurable range.
Below measurement range	<	CRP 0.10 mg/dL ¹	The measurement value is below the measurable range.


¹ Only available for the MEK-1303 automated hematology analyzer.

3-3-1. Measurement Message List

Code	Error	Possible Cause	Action
64100	WBC air bubble 1	When the liquid of the WBC manometer started to lower, the sensor that had previously detected the liquid as full detected air (bubbles).	After taking the steps in the analyzer message shown on the Information screen, reanalyze the sample on which the error was detected.
64101	WBC air bubble 2	While the liquid of the WBC manometer was lowering, the upper sensor of the manometer, which had previously detected air (no liquid), detected liquid.	
64102	WBC air bubble 3	When the liquid of the WBC manometer started to rise while measuring the pulse, the lower sensor that had previously detected the liquid as full detected air (bubbles).	
64103	WBC air bubble 4	As the measurement time of blood cell pulse was too fast, the analyzer may have detected either bubbles mixed in or a leak.	
64104	WBC insufficient volume 1	<p>Insufficient pressure for WBC measurement preparation.</p> <p>(The liquid sensor of the WBC manometer (upper) fails to recognize the surface passing within the specified time from the start of liquid lowering in the manometer.)</p>  <p>The liquid sensors are inside the slit (two places, upper and lower).</p>	Check the potential causes in order and take steps accordingly.
64105	WBC insufficient volume 2	<p>Insufficient pressure for WBC measurement preparation.</p> <p>(After the liquid sensor of the WBC manometer (upper) recognized the surface passing, the lower liquid sensor failed to recognize the surface passing within the specified time from the start of liquid lowering in the manometer.)</p>	
64106	WBC insufficient volume 3	Blood clot, dirt, or rubber debris clogging the detection hole	
64107	WBC Aperture Clog	As the measurement time of blood cell pulse was too slow, the analyzer detected that the detection hole may be clogged.	
64108	WBC noise	<ul style="list-style-type: none"> • Unstable power supply • External noise • Layout of grounding • Reagent contamination • Inside of analyzer dirty • Crack in detection hole • Foam mixed in 	
64109	WBC Time Series Message	<ul style="list-style-type: none"> • Using a 2P power cord • Using the same outlet as devices prone to creating noise, such as refrigerators or centrifuges. • Not grounded • Electrode disconnected • Detection hole faulty • UT-7312 CBC MEASURING BD faulty • AMP CONTROL BD faulty 	


Code	Error	Possible Cause	Action
64111	WBC Measuring Unit Bubble	Blood cell pulse containing bubbles detected during WBC measurement	After taking the steps in the analyzer message shown on the Information screen, reanalyze the sample on which the error was detected.
64200	RBC Detection Aperture Clog	Blood clot, dirt, or rubber debris clogging the detection hole	
64201	RBC noise	<ul style="list-style-type: none"> • Unstable power supply • External noise • Earth grounded • Reagent contamination • Inside of analyzer dirty • Crack in detection hole • Foam mixed in 	
64202	RBC Time Series Message	<ul style="list-style-type: none"> • Using a 2P power cord • Using the same outlet as devices prone to creating noise, such as refrigerators or centrifuges. • Not grounded • Electrode disconnected 	Check the potential causes in order and take steps accordingly.
64203	PLT Time Series Message	<ul style="list-style-type: none"> • Detection hole faulty • UT-7312 CBC MEASURING BD faulty • AMP CONTROL BD faulty 	
64300	Immunoassay Unit Temp. Err.	Temperature of immunoassay unit exceeded 37°C (98.6°F) during measurement	After taking the steps in the analyzer message shown on the Information screen, reanalyze the sample on which the error was detected.
64301	Immunoassay Unit Prim. Err.	When the photodiode voltage of the test cartridge (positions 1 to 4) was being measured, the tank that should have been full of reagent was empty.	The reagent may not have been aspirated or dispensed from the sampling nozzle normally. Check whether the sampling nozzle is clogged.
64302	Immunoassay Unit Power Err.	When the photodiode voltage of the test cartridge (position 4) was checked, the tank that should have been empty had reagent in it.	
64303	Short Sample	There is a large variance (30% or more) between the voltage corresponding to HGB measured with the immunoassay unit and the HGB value measured with the MC-130W CBC MEASURING UNIT or the MH-130W HGB MEASURING UNIT.	<p>Measure again and check the test cartridge after all blood measurements.</p> <p>If the test cartridge is red: Check the state of the MC-130W CBC MEASURING UNIT, MH-130W HGB MEASURING UNIT and the nearby flow paths. If no abnormalities are detected, but the message continues to appear frequently, adjust the immunoassay unit with blood.</p> <p> 6-7 (p.6-14)</p> <p>If the test cartridge is not red: Take the following steps.</p> <ul style="list-style-type: none"> • Check whether the sampling nozzle is clogged. • Check the dispensing mechanism, which includes the SAMPLER UNIT.
64304	Obstr. in Immunoassay Unit	The measured voltage of the immunoassay unit varies high/low during measurement.	<p>Take the following steps.</p> <ul style="list-style-type: none"> • Clean cartridge holder light path  7-5-2-8 (p.7-94) • Perform a self check on the Maintenance screen  7-2-2-2 (p.7-6)

3. Troubleshooting

Code	Error	Possible Cause	Action
64305	Noise in Immunoassay Unit	<ul style="list-style-type: none"> • Reagent in the test cartridge has deteriorated • A small amount of suspended solids is in the test cartridge • Affected by external noise during measurement 	Take the following steps. <ul style="list-style-type: none"> • Measure in a new test cartridge that is not deteriorated • Position the analyzer in a flat, stable location free of vibration • Connect the ground wire (improve the noise environment) • Replace the sampling nozzle  7-4-1-7 (p.7-79)
64306	Slight Noise in Imm. Unit	<ul style="list-style-type: none"> • Affected by vibration during measurement • Test cartridge is foaming 	
64307	Immunoassay Unit HCT Limit	HCT measured by the MC-130W CBC MEASURING UNIT exceeded 75%	This is the performance limit for immunoassay with MEK-1300 series.
64308	Imm. Unit HCT Out of Range	HCT measured by the MC-130W CBC MEASURING UNIT exceeded 60%	
64309	Immunoassay Unit HGB Limit	HGB measured by the MC-130W CBC MEASURING UNIT was under 5.0 mg/dL	This is the performance limit for immunoassay with MEK-1300 series. If this message appears frequently, adjust the immunoassay unit with blood.
64310	Immunoassay Unit HGB Out of Range	HGB measured by the MC-130W CBC MEASURING UNIT was under 7.0 mg/dL	
64311	Immunoassay unit ct. error	A circuit inside the immunoassay unit is not working properly	After taking the steps in the analyzer message shown on the Information screen, reanalyze the sample on which the error was detected.
64400	ESR blank out of range	When inspecting the circuit, the blank light receiving value has exceeded the threshold value. Air bubbles or dirt may be mixed in the flow route or a circuit malfunction may have occurred.	After taking the steps in the analyzer message shown on the Information screen, perform a self check again.
64401	ESR Air Bubble	<ul style="list-style-type: none"> • External noise • Bubbles mixed into measurement unit 	After taking the steps in the analyzer message shown on the Information screen, reanalyze the sample on which the error was detected.
64402	ESR Analyze Impossible	<ul style="list-style-type: none"> • Bubbles mixed into measurement unit • Short Sample • Sampling nozzle clog 	
64403	RBC Aggrgtn Cannot Detect	<ul style="list-style-type: none"> • Short Sample • Problem originating from sample 	In the hematology controls (MEK-3DL/3DN), no aggregation reaction could be detected, and so measure in QC mode. Also, the blood may not have been aspirated or dispensed from the sampling nozzle normally. Check that the sampling nozzle is not clogged and that the sample flow route is not leaking.
64404	ESR Analyze Impossible(HCT)	HCT could not be measured by the MC-130W CBC measuring unit.	Reanalyze the sample where the error was detected.
64405	ESR Analyze Impossible(MCV)	MCV could not be measured by the MC-130W CBC measuring unit.	If the problem fails to be resolved by measuring unit protein cleaning, replace the following parts as needed. MC-130W CBC MEASURING UNIT
64406	ESR Minor Air Bubble	Bubbles are mixed in the measuring unit.	Reanalyze the sample where the error was detected.
64407	No liquid in ESR Meas Unit	<ul style="list-style-type: none"> • The liquid in the ESR cup evaporated because it was left out for an extended period of time. • The analyzer is out of liquid. 	
64408	ESR Meas Unit Temp Rise	The temperature of the ESR measurement unit exceeded 37.3°C (99.14°F)	Check that the installation environment of the analyzer is in the range from 15°C to 30°C (59°F to 86°F). Reanalyze the sample where the error was detected.
64409	ESR Meas Unit Temp Drop	The temperature of the ESR measurement unit dropped below 36.7°C (98.06°F)	

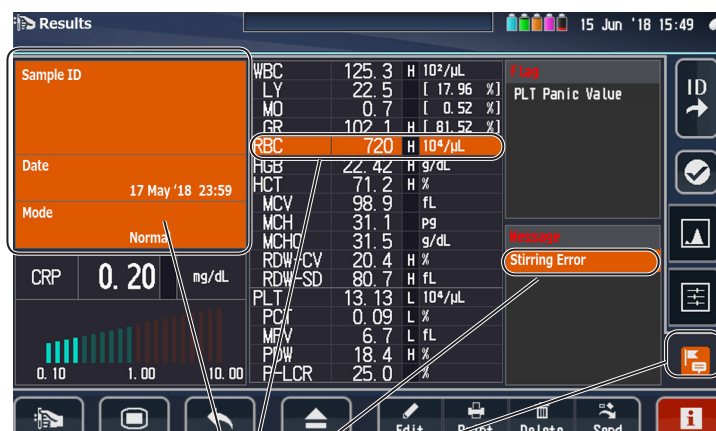
Code	Error	Possible Cause	Action
64410	ESR LED Temperature Error	Temperature sensor error was detected.	Reanalyze the sample where the error was detected.
64411	ESR LED Temperature Rise	The difference between the average temperature of the ESR LED unit that was measured during the measurement process and the average temperature of the front unit in the chassis has exceeded the specified value (higher than 10°C (50°F))	
64412	ESR LED Temperature Drop	The difference between the average temperature of the ESR LED unit that was measured during the measurement process and the average temperature of the front unit in the chassis has exceeded the specified value (lower than 10°C (50°F)).	
64413	Short sample	Blood cannot be detected when blood is drawn into the measurement unit from the ESR cup during measurement.	<p>Reanalyze the sample where the error was detected.</p> <p>If this still fails to resolve the problem, check the status of the ESR cup during measurement.</p> <p>When blood is being dispensed to the ESR cup:</p> <p>Check the state of the ME-130W ESR measuring unit and replace if necessary.</p> <p>When blood is not being dispensed to the ESR cup:</p> <p>Take the following corrective action.</p> <ul style="list-style-type: none"> • Check whether the sampling nozzle is clogged. • Check the dispensing mechanism including the SAMPLER UNIT.
64500	CBC circuit abnormality	CBC circuit is not working properly due to a faulty board	After taking the steps in the analyzer message shown on the Information screen, reanalyze the sample on which the error was detected.
64501	HGB circuit abnormality	HGB circuit is not working properly due to a faulty board	
64502	HGB LED Abnormal Temp.	Temperature sensor abnormality detected.	
64503	HGB LED Temperature Drop	During measurement the upper thermistor of the UT-7289 HGB/SS LED BD was outside the temperature range 10 to 50°C (50 to 122°F) (Low: under 10°C (50°F), High: above 50°C (122°F))	
64504	HGB LED Temperature Rise		
64505	HGB voltage drop	Voltage abnormal during measurement of HGB blanks for each measurement	
64506	HGB voltage increase		
64507	Chassis Bottom Temp. Err.	Abnormal temperature inside chassis confirmed for each measurement	
64508	Chassis Bottom Temp. Fall		
64509	Chassis Bottom Temp. Rise		
64510	Chassis front temp. error		
64511	HGB Fluid Temp. Abnormality	Abnormal HGB diluent temperature confirmed for each measurement	
64512	HGB Fluid Abnormal Low Temp		
64513	HGB Fluid Abnorm. High Temp		

3. Troubleshooting

Code	Error	Possible Cause	Action
64514	Air bubbles in HGB blank	<ul style="list-style-type: none"> • Foam is sticking to the inside of the HGB cartridge due to an air leak • Defective HGB sensor • Defective UT-7290 HGB/SS AMP BD 	<p>Take the following steps.</p> <ul style="list-style-type: none"> • Run cleaning or protein cleaning on the Maintenance screen  <ul style="list-style-type: none"> • 7-2-4-2 (p.7-17) • 7-2-4-3 (p.7-18) <p>If the problem fails to improve from the foregoing countermeasures, replace the following parts as needed.</p> <ul style="list-style-type: none"> • UT-7289 HGB/SS LED BD • MH-130W HGB MEASURING UNIT
64515	Background interference up	Results of background check are outside the specified range	<p>After taking the steps in the analyzer message shown on the Information screen, reanalyze the sample on which the error was detected.</p> <p>The sampling nozzle needs to be inspected or replaced.</p>

3-4. Color Messages

If remeasuring is considered to be necessary due to a particular cause, the analyzer notifies the user with a colored message in the Results screen.



The relevant items are displayed in a colored background.

3-4-1. List of Color Messages

Code	Color	Error	Possible Cause	Action
64900	Red	Reagent Priming Error	ISOTONAC-3 or HEMOLYNAC-310 could not be detected by the sample sensor.	Repeat measurement after restore operation.
64901	Red	Carryover	Possibility of carryover.	A sample with an elevated white cell count was measured immediately previously. Carryover may have occurred. Thoroughly agitate the sample and remeasure.
64902	Red	Short Sample	Possibility of insufficient sample aspiration.	Check for partial coagulation and confirm the blood volume, then remeasure.
64905	Orange	Insufficient Stirring	Agitation may be insufficient.	Stir well and remeasure.
64907	Orange	WBC High	The sample concentration is excessively high, causing the measurement range to be exceeded.	Remeasure in WBC High mode.
64908	Orange	Poor Hemolyzation	Possibility of poor hemolyzation.	Remeasure in WBC High mode.
64909	Orange	Lysis/Chyle/Cold Agglutinin	Possibility of lysis, chyle, or cold agglutinin.	If no abnormality (hemolyzation or chyle) is observed in the plasma, warm the sample to 37°C (98.6°F) and remeasure.
64910	Orange	PLT Clumps	Possibility of PLT clumps	Remeasure the sample. If the values are different, create a blood smear and check for PLT clumps.
64913	Yellow	WBC Panic Value	The WBC value exceeds the upper or falls below the lower panic value threshold.	Panic value detected. Inform physician.
64914	Yellow	HGB Panic Value	The HGB value exceeds the upper or falls below the lower panic value threshold.	Panic value detected. Inform physician.
64915	Yellow	PLT Panic Value	The PLT value exceeds the upper or falls below the lower panic value threshold.	Panic value detected. Inform physician.

3-5. Analyzer Messages

If an error is detected during measurement, the Information window appears and the buzzer sounds.



The volume of the buzzer can be adjusted. For details, refer to “Volume and Brightness” (p. 8-12)

The Information window displays a message about the analyzer error, its countermeasures, currently logged-in operator name and status icons.

Date	No.	Error Name
Displays the date and time of the error.	Displays the error number for the detected error.	Displays the error name for the detected error.
Date	No.	Name
03 Mar '02 01:01:01	00032	RBC pump base position error (MP-132W)
02 Feb '01 01:01:01	00031	RBC pump operation error (MP-132W)

Touch [▲] or [▼] to scroll the list vertically.

Displays a list of messages. To check the details of the message and the countermeasures, touch to select the message then touch [Details].

Displays the details and countermeasures for the selected message.



[Details]: Opens another window to show more detailed information about the selected message.

[RESTORE]: Restores operation depending on the error status. NOTE The restore operation varies according to the error message.

[Close]: Closes the Information window.

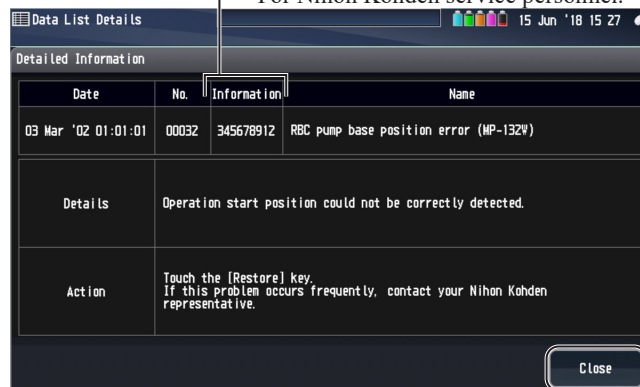


For messages with low priority listed in the “User Information [4xxxx]” (p. 3-57), [i] on the lower left blinks in red without the Information window opening. Touch [i] to open the Information window. [i] lights in red when any of the status indicators (p. 2-7) is in the “red” status.

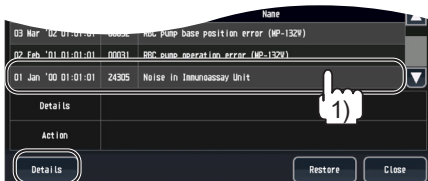
Detailed Information window

Select the message to display the details and touch “Details”.

Information For Nihon Kohden service personnel.



Close: Closes the Detailed Information window



3-5-1. Restoring Operation

Follow the steps below and perform recovery according to the indicated error state to return the analyzer to its normal condition.

NOTE: The restore operation varies according to the error message.

- 1 Select an error message on the Information window and display the details and countermeasures.
- 2 Perform the displayed countermeasure.

3-5-2. Identification Code

The numbers of analyzer messages are classified according severity, as follows.

Example: 23003 CLEANAC• 3 low

Digits 2 to 5 are consecutive numbers.

The 1st digit indicates the severity of the message.

- 0: Serious (unrecoverable) Service Message (0xxxx)
- 1: Serious (recoverable) Service Message (1xxxx)
- 2: Moderately serious (operation stop) User Message (2xxxx)
- 3: None
- 4: Low severity User Information (4xxxx)
- 5: Log

First Digit	Category	Status	Process	Preferred Method	Indicator	Information Screen	Restore Operation
0	Service Message	Unrecoverable	Stop system immediately	Stop system	Red	Open	Not possible
1	Service Message	Recoverable	Stop system immediately	Operate analyzer again after resolving problem	Red	Open	Required
2	User Message	Recoverable	Stop (During measurement, process up to a juncture)	Device operates again after resolving problem	Orange	Open	Required
3	—	—	—	—	—	—	—
4	User Information	Operable	Normal operation	Handle according to user judgment	Green	None	Required
5	Log	Operable	Normal operation	None	No change	None	Unnecessary

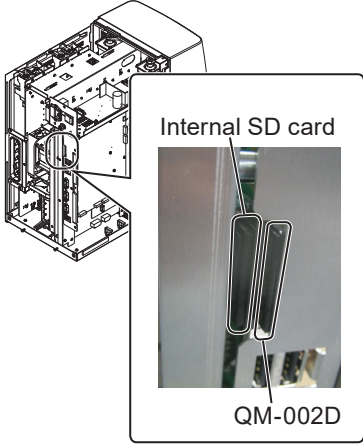
3-6. Service Message [0xxxx]

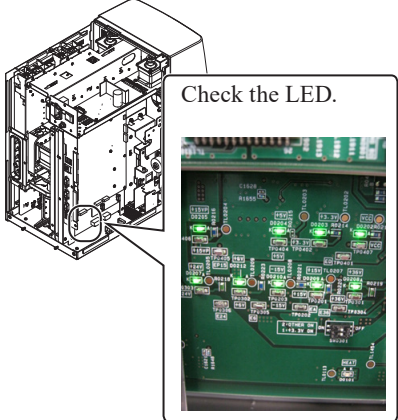
When the service message [0xxxx] is detected, the status indicator lights. Also, the Information screen opens automatically.

NOTE: As the service message [0xxxx] indicates a serious error, it is unrecoverable.

When a memory access error occurs, it may be possible to fix the problem by touching the [Restore] key.

3-6-1. Code: 00001 to 00005 (Power or System)

Code	Error	Possible Cause	Action
00001	Internal memory connection error	<p>Internal memory (internal SD card) cannot be detected via communication on the AMP CONTROL BD (CPU↔SD)</p> <ul style="list-style-type: none"> • Internal SD card not inserted • Internal SD card disconnected • Internal SD card broken • AMP CONTROL BD broken 	<p>When a memory access error occurs, it may be possible to fix the problem by touching the [Restore] key.</p> <p>If touching the [Restore] key does not fix the problem, restart the analyzer.</p> <p>If the problem still is not resolved, perform the steps below in the order listed.</p> <ul style="list-style-type: none"> • After turning the power off, remove the rear panel and remove and reinsert the internal SD card¹ into the AMP CONTROL BD. • Replace the AMP CONTROL BD.
00002	Internal memory access error	<p>The internal memory (internal SD card) is recognized, but cannot be read or written to.</p> <ul style="list-style-type: none"> • Internal SD card fault or broken 	<p>¹ The AMP CONTROL BD has an internal SD card for storing data of 50,000 samples. In addition to storing data, the internal SD card also records device settings, calibration coefficients, logs. This SD card is different from the SD card (QM-002D) that can be inserted into the outside of the analyzer.</p> <div style="text-align: right;">  </div> <p>[Restore] key operation: The internal memory is restored and the message is canceled without requiring any further action.</p>

Code	Error	Possible Cause	Action
00003	Incorrect unit composition	The model of the analyzer and the unit configured do not match.	<p>Touch the [Restore] key and perform the steps below in the order listed.</p> <ul style="list-style-type: none"> Restart the analyzer. Match the model of the analyzer with the AMP CONTROL BD. Make sure the cables connecting the MC-131W CHM MEASURING UNIT, the MS-131W OPEN AIR UNIT and the AMP CONTROL BD are not disconnected, its connectors unplugged or partially inserted. Replace the AMP CONTROL BD. <p>[Restore] key operation: The message is canceled without any action being taken.</p>
00004	Power circuit error	An internal power supply other than the $V_{cc}+3.3\text{ V}$ is interrupted due to a short or the like.	<p>Touch the [Restore] key and perform the steps below in the order listed.</p> <ul style="list-style-type: none"> Restart the analyzer Make sure the power supply LEDs mounted on the UT-7296 POWER BD are lit.  <ul style="list-style-type: none"> Replace the UT-7296 POWER BD Replace the AMP CONTROL BD. <p>[Restore] key operation: The message is canceled without any action being taken.</p>
00005	Touch panel error	Serial communication between the AMP CONTROL BD and touch panel control IC unavailable	<p>Touch the [Restore] key and perform the steps below in the order listed.</p> <ul style="list-style-type: none"> Restart the analyzer. Make sure the cable connecting the AMP CONTROL BD and the front panel unit are not disconnected, its connectors unplugged or partially inserted. Replace the UT-7296 POWER BD Replace the UT-7299 FRONT PANEL BD <p>[Restore] key operation: The message is canceled without any action being taken.</p>


3-6-2. Code: 00010 to 00032 (Pump Unit Actuator)

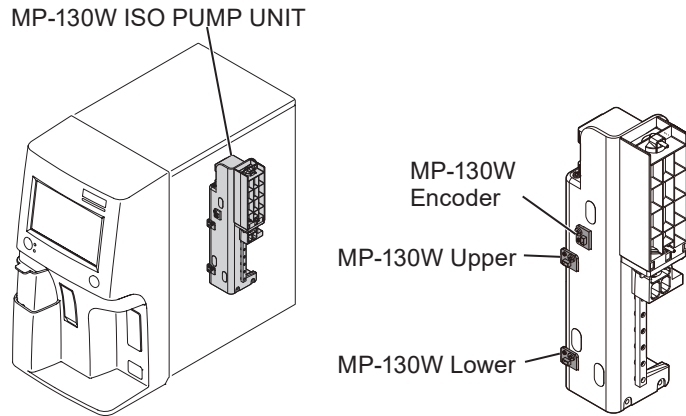
3-6-2-1. Code: 00010 to 00013 (MP-130W ISO PUMP UNIT)

The vertical drive for the piston of the MP-130W ISO PUMP UNIT uses a total of three sensors to detect its position: upper sensor, lower sensor and encoder.

When the sensor plate linked to driving the motor reaches its sensor slit, the light to the sensor is blocked and the unit detects the piston position.

The state of each sensor can be checked from the Sensor Monitor window of the Service window.

 7-3-4-6 (p.7-37)




Code	Error	Possible Cause	Action
00010	Diluter initialize error	<p>During initialization, the encoder or upper sensor of the MP-130W failed to detect the initial position of the diluter pump.</p> <p>(The status on the Sensor Monitor window of the Service window fails to go to IN.)</p>	<p>Touch the [Restore] key.</p> <p>If touching the [Restore] key fails to resolve it, restart the analyzer. If it still fails to improve, take the following steps.</p> <p>If the motor does not run:</p> <p>Check the motor cable.</p> <ul style="list-style-type: none"> • There is no liquid splashed on the motor connector. • The cable is not cut, connected, not pinched, or its connector is partially inserted or disconnected. • Disconnecting and connecting the cable resolve the issue. <p>If the motor does run:</p> <p>Check the photosensors.</p> <ul style="list-style-type: none"> • There is no liquid splashed on the motor connector. • The cable is not cut, connected, not pinched, or its connector is partially inserted or disconnected. • Disconnecting and connecting the cable resolve the issue. <p>If the problem fails to improve from the foregoing countermeasures, replace the following parts as needed.</p> <ul style="list-style-type: none"> • Sensor • Cable • MP-130W ISO PUMP UNIT • UT-7296 POWER BD • AMP CONTROL BD <p>[Restore] key operation:</p> <ul style="list-style-type: none"> • Initializes all drive units • If the message appeared when it was time to rinse, it rinses and restores to a state that allows measuring.

Code	Error	Possible Cause	Action
00011	Diluter operation error	Finish operation not detected during operation	<p>Touch the [Restore] key.</p> <p>If touching the [Restore] key fails to resolve it, restart the analyzer. If it still fails to improve, take the following steps.</p> <ul style="list-style-type: none"> • Replace the AMP CONTROL BD. <p>[Restore] key operation:</p> <ul style="list-style-type: none"> • Initializes all drive units • If the message appeared when it was time to rinse, it rinses and restores to a state that allows measuring.
00012	Diluter base position error	<p>The diluter pump operation start position was incorrect at operation start, or the upper or lower sensor of MP-130W failed to detect the operation start position.</p> <p>(The status of a sensor that should be IN on the Sensor Monitor window of the Service window was OUT.)</p>	<p>Touch the [Restore] key.</p> <p>If touching the [Restore] key fails to resolve it, restart the analyzer. If it still fails to improve, take the following steps.</p> <p>If the motor does not run:</p> <p>Check the motor cable.</p> <ul style="list-style-type: none"> • There is no liquid splashed on the motor connector. • The cable is not cut, connected, not pinched, or its connector is partially inserted or disconnected. • Disconnecting and connecting the cable resolve the issue. <p>If the motor does run:</p> <p>Check the photosensors.</p>
00013	Diluter end position error	<p>The diluter pump operation end position was incorrect at operation end, or the upper or lower sensor of MP-130W failed to detect the operation end position.</p> <p>(The status of a sensor that should be IN on the Sensor Monitor window of the Service window was OUT.)</p>	<ul style="list-style-type: none"> • There is no liquid splashed on the sensor connector. • The cable is not cut, connected, not pinched, or its connector is partially inserted or disconnected. • Disconnecting and connecting the cable resolve the issue. <p>If the problem fails to improve from the foregoing countermeasures, replace the following parts as needed.</p> <ul style="list-style-type: none"> • Sensor • Cable • MP-130W ISO PUMP UNIT • UT-7296 POWER BD • AMP CONTROL BD <p>[Restore] key operation:</p> <ul style="list-style-type: none"> • Initializes all drive units • If the message appeared when it was time to rinse, it rinses and restores to a state that allows measuring.

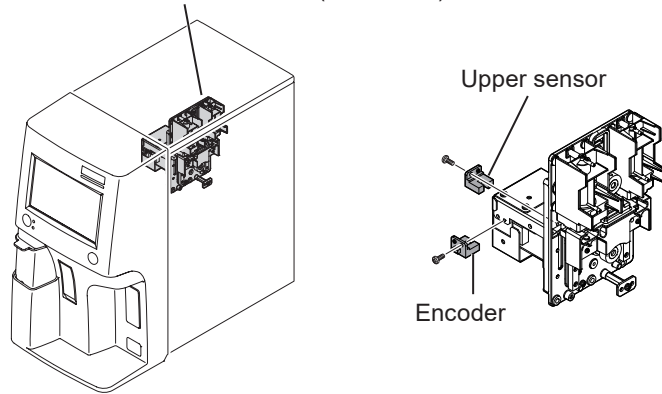
3-6-2-2. Code: 00020 to 00022
(MP-131W SAMPLE PUMP UNIT: MEK-1303)
(MP-134W ESR PUMP UNIT: MEK-1305)

The vertical drive for the piston of the MP-131W SAMPLE PUMP UNIT or MP-134W ESR PUMP UNIT uses a total of two sensors to detect its position: an upper sensor and an encoder. When the sensor plate linked to driving the motor reaches its sensor slit, the light to the sensor is blocked and the unit detects the piston position.

The state of each sensor can be checked from the Sensor Monitor window of the Service window.

 7-3-4-6 (p.7-37)

MP-131W SAMPLE PUMP UNIT (MEK-1303)
 MP-134W ESR PUMP UNIT (MEK-1305)



Code	Error	Possible Cause	Action
00020	Sample pump initialize error	<p>During initialization, the encoder or upper sensor of the MP-131W or MP-134W failed to detect the initial position of the sample pump.</p> <p>(The status on the Sensor Monitor window of the Service window fails to go to IN.)</p>	<p>Touch the [Restore] key.</p> <p>If touching the [Restore] key fails to resolve it, restart the analyzer. If it still fails to improve, take the following steps.</p> <p>If the motor does not run:</p> <p>Check the motor cable.</p> <ul style="list-style-type: none"> • There is no liquid splashed on the motor connector. • The cable is not cut, connected, not pinched, or its connector is partially inserted or disconnected. • Disconnecting and connecting the cable resolve the issue. <p>If the motor does run:</p> <p>Check the photosensors.</p> <ul style="list-style-type: none"> • There is no liquid splashed on the sensor connector. • The cable is not cut, connected, not pinched, or its connector is partially inserted or disconnected. • Disconnecting and connecting the cable resolve the issue. <p>If the problem fails to improve from the foregoing countermeasures, replace the following parts as needed.</p> <ul style="list-style-type: none"> • Sensor • Cable • MP-131W SAMPLE PUMP UNIT (MEK-1303) • MP-134W ESR PUMP UNIT (MEK-1305) • UT-7296 POWER BD • AMP CONTROL BD <p>[Restore] key operation:</p> <ul style="list-style-type: none"> • Initializes all drive units • If the message appeared when it was time to rinse, it rinses and restores to a state that allows measuring.

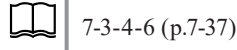
Code	Error	Possible Cause	Action
00021	Sample pump operation error	Finish operation not detected during operation	<p>Touch the [Restore] key.</p> <p>If touching the [Restore] key fails to resolve it, restart the analyzer. If it still fails to improve, take the following steps.</p> <ul style="list-style-type: none"> • Replace the AMP CONTROL BD. <p>[Restore] key operation:</p> <ul style="list-style-type: none"> • Initializes all drive units • If the message appeared when it was time to rinse, it rinses and restores to a state that allows measuring.
00022	Sample pump base position error	<p>The sample pump operation start position was incorrect at operation start, or the upper sensor of MP-131W failed to detect the operation start position.</p> <p>(The status of a sensor that should be IN on the Sensor Monitor window of the Service window was OUT.)</p>	<p>Touch the [Restore] key.</p> <p>If touching the [Restore] key fails to resolve it, restart the analyzer. If it still fails to improve, take the following steps.</p> <p>If the motor does not run:</p> <p>Check the motor cable.</p> <ul style="list-style-type: none"> • There is no liquid splashed on the motor connector. • The cable is not cut, connected, not pinched, or its connector is partially inserted or disconnected. • Disconnecting and connecting the cable resolve the issue. <p>If the motor does run:</p> <p>Check the photosensors.</p> <ul style="list-style-type: none"> • There is no liquid splashed on the sensor connector. • The cable is not cut, connected, not pinched, or its connector is partially inserted or disconnected. • Disconnecting and connecting the cable resolve the issue. <p>If the problem fails to improve from the foregoing countermeasures, replace the following parts as needed.</p> <ul style="list-style-type: none"> • Sensor • Cable • MP-131W SAMPLE PUMP UNIT • UT-7296 POWER BD • AMP CONTROL BD <p>[Restore] key operation:</p> <ul style="list-style-type: none"> • Initializes all drive units • If the message appeared when it was time to rinse, it rinses and restores to a state that allows measuring.

3-6-2-3. Code: 00030 to 00032 (MP-132W RBC PUMP UNIT)

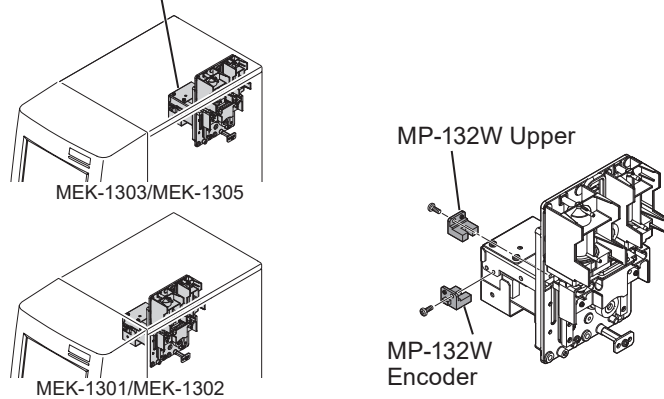
The vertical drive for the piston of the MP-132W RBC PUMP UNIT uses a total of two sensors to detect its position: an upper sensor and an encoder.

When the sensor plate linked to driving the motor reaches its sensor slit, the light to the sensor is blocked and the unit detects the piston position.

The state of each sensor can be checked from the Sensor Monitor window of the Service window.



MP-132W RBC PUMP UNIT



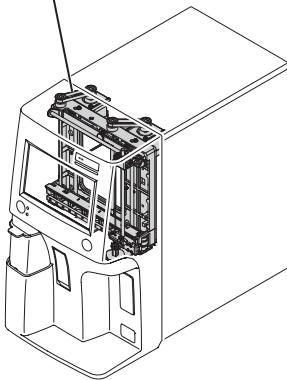
Code	Error	Possible Cause	Action
00030	RBC pump initialize error (MP-132W)	<p>During initialization, the encoder or upper sensor of the MP-132W failed to detect the initial position of the RBC pump.</p> <p>(The status on the Sensor Monitor window of the Service window fails to go to IN.)</p>	<p>Touch the [Restore] key.</p> <p>If touching the [Restore] key fails to resolve it, restart the analyzer. If it still fails to improve, take the following steps.</p> <p>If the motor does not run:</p> <p>Check the motor cable.</p> <ul style="list-style-type: none"> • There is no liquid splashed on the motor connector. • The cable is not cut, connected, not pinched, or its connector is partially inserted or disconnected. • Disconnecting and connecting the cable resolve the issue. <p>If the motor does run:</p> <p>Check the photosensors.</p> <ul style="list-style-type: none"> • There is no liquid splashed on the sensor connector. • The cable is not cut, connected, not pinched, or its connector is partially inserted or disconnected. • Disconnecting and connecting the cable resolve the issue. <p>If the problem fails to improve from the foregoing countermeasures, replace the following parts as needed.</p> <ul style="list-style-type: none"> • Sensor • Cable • MP-132W RBC PUMP UNIT • UT-7296 POWER BD • AMP CONTROL BD <p>[Restore] key operation:</p> <ul style="list-style-type: none"> • Initializes all drive units • If the message appeared when it was time to rinse, it rinses and restores to a state that allows measuring.

Code	Error	Possible Cause	Action
00031	RBC pump operation error (MP-132W)	Finish operation not detected during operation	<p>Touch the [Restore] key.</p> <p>If touching the [Restore] key fails to resolve it, restart the analyzer. If it still fails to improve, take the following steps.</p> <ul style="list-style-type: none"> • Replace the AMP CONTROL BD. <p>[Restore] key operation:</p> <ul style="list-style-type: none"> • Initializes all drive units • If the message appeared when it was time to rinse, it rinses and restores to a state that allows measuring.
00032	RBC pump base position error (MP-132W)	<p>The RBC pump operation start position was incorrect at operation start, or the encoder or upper sensor of MP-132W failed to detect the operation start position.</p> <p>(The status of a sensor that should be IN on the Sensor Monitor window of the Service window was OUT.)</p>	<p>Touch the [Restore] key.</p> <p>If touching the [Restore] key fails to resolve it, restart the analyzer. If it still fails to improve, take the following steps.</p> <p>If the motor does not run:</p> <p>Check the motor cable.</p> <ul style="list-style-type: none"> • There is liquid splashed on the motor connector. • The cable is not cut, connected, not pinched, or its connector is partially inserted or disconnected. • Disconnecting and connecting the cable resolve the issue. <p>If the motor does run:</p> <p>Check the photosensors.</p> <ul style="list-style-type: none"> • There is liquid splashed on the sensor connector. • The cable is not cut, connected, not pinched, or its connector is partially inserted or disconnected. • Disconnecting and connecting the cable resolve the issue. <p>If the problem fails to improve from the foregoing countermeasures, replace the following parts as needed.</p> <ul style="list-style-type: none"> • Sensor • Cable • MP-132W RBC PUMP UNIT • UT-7296 POWER BD • AMP CONTROL BD <p>[Restore] key operation:</p> <ul style="list-style-type: none"> • Initializes all drive units • If the message appeared when it was time to rinse, it rinses and restores to a state that allows measuring.

3-6-3. Code: 00050 to 00073 (Sampler Unit Actuator)

3-6-3-1. Code: 00050 to 00053 (SAMPLER UNIT X Direction)

SAMPLER UNIT



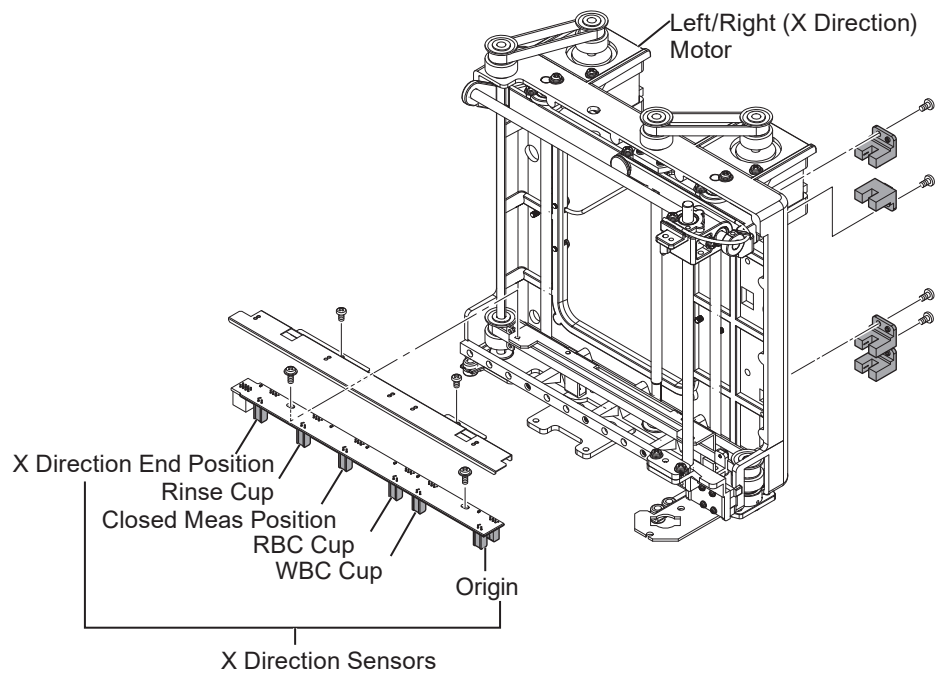
The lateral (X direction) drive of the SAMPLER UNIT sample tube detects its position via six sensors mounted on the UT-7300 SAMPLER SENSOR BD.

When the sensor plate linked to driving the motor reaches its sensor slit, the light to the sensor is blocked and the unit detects the sampling nozzle position.

The state of each sensor can be checked from the Sensor Monitor window of the Service window.



7-3-4-5 (p.7-36)

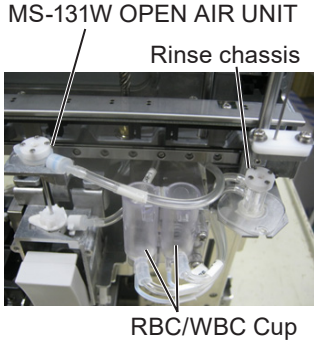


With the MEK-1303, the cartridge piercing and dispensing position of the MEK-1303 CHM MEASURING UNIT is detected by pulse control, not by sensor position.

Cartridge piercing and dispensing is performed between the “X direction end position” and the “rinse cup”, and is determined by “sampling nozzle and cartridge position adjustment (MEK-1303)”.



6-9-1 (p.6-21)

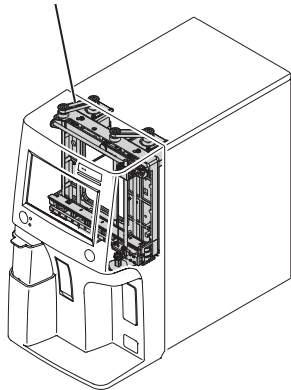
Code	Error	Possible Cause	Action
00050	Sampler X direction initialize error	<p>During initialization, the start point sensor of the SAMPLER UNIT (X direction) failed to detect the initial position of the sampling nozzle.</p> <p>(The status on the Sensor Monitor window of the Service window fails to go to IN.)</p>	<p>Touch the [Restore] key.</p> <p>If touching the [Restore] key fails to resolve it, restart the analyzer. If it still fails to improve, take the following steps.</p> <p>If the motor does not run:</p> <p>Check the motor cable.</p> <ul style="list-style-type: none"> • There is no liquid splashed on the motor connector. • The cable is not cut, connected, not pinched, or its connector is partially inserted or disconnected. • Disconnecting and connecting the cable resolve the issue. <p>If the motor does run:</p> <p>Check the photosensors.</p> <ul style="list-style-type: none"> • There is no liquid splashed on the sensor connector. • The cable is not cut, connected, not pinched, or its connector is partially inserted or disconnected. • Disconnecting and connecting the cable resolve the issue. <p>Also, check whether the following tubes are interfering with it?</p> <ul style="list-style-type: none"> • Rinse chassis tube • MS-131W OPEN AIR UNIT tube • RBC/WBC cup tube <div style="text-align: center;">  <p>MS-131W OPEN AIR UNIT Rinse chassis RBC/WBC Cup</p> </div> <p>If the problem fails to improve from the foregoing countermeasures, replace the following parts as needed.</p> <ul style="list-style-type: none"> • Cable • UT-7300 SAMPLER SENSOR BD • SAMPLER UNIT • UT-7296 POWER BD • AMP CONTROL BD <p>[Restore] key operation:</p> <ul style="list-style-type: none"> • Initializes all drive units • If the message appeared when it was time to rinse, it rinses and restores to a state that allows measuring.
00051	Sampler X direction operation error	Finish operation not detected during operation	<p>Touch the [Restore] key.</p> <p>If touching the [Restore] key fails to resolve it, restart the analyzer. If it still fails to improve, take the following steps.</p> <ul style="list-style-type: none"> • Replace the AMP CONTROL BD. <p>[Restore] key operation:</p> <ul style="list-style-type: none"> • Initializes all drive units • If the message appeared when it was time to rinse, it rinses and restores to a state that allows measuring.

3. Troubleshooting

Code	Error	Possible Cause	Action
00052	Sampler X direction base position error	<p>The sampling nozzle operation start position was incorrect at operation start, or the sensor of SAMPLER UNIT (X direction) failed to detect the operation start position.</p> <p>(The status of a sensor that should be IN on the Sensor Monitor window of the Service window was OUT.)</p>	<p>Touch the [Restore] key.</p> <p>If touching the [Restore] key fails to resolve it, restart the analyzer. If it still fails to improve, take the following steps.</p> <p>If the motor does not run:</p> <p>Check the motor cable.</p> <ul style="list-style-type: none"> • There is no liquid splashed on the motor connector. • The cable is not cut, connected, not pinched, or its connector is partially inserted or disconnected. • Disconnecting and connecting the cable resolve the issue. <p>If the motor does run:</p> <p>Check the photosensors.</p> <ul style="list-style-type: none"> • There is no liquid splashed on the UT-7300 SAMPLER SENSOR BD connector. • The cable is not cut, connected, not pinched, or its connector is partially inserted or disconnected. • Disconnecting and connecting the cable resolve the issue.
00053	Sampler X direction end position error	<p>The sampling nozzle operation end position was incorrect at operation end, or the sensor of SAMPLER UNIT (X direction) failed to detect the operation end position.</p> <p>(The status of a sensor that should be IN on the Sensor Monitor window of the Service window was OUT.)</p>	<p>If the message is a “00053 Sampler X direction end position error”, check whether the following tubes are interfering with it.</p> <ul style="list-style-type: none"> • Rinse chassis tube • MS-131W OPEN AIR UNIT tube • RBC/WBC cup tube <p>If the problem fails to improve from the foregoing countermeasures, replace the following parts as needed.</p> <ul style="list-style-type: none"> • Cable • UT-7300 SAMPLER SENSOR BD • SAMPLER UNIT • UT-7296 POWER BD • AMP CONTROL BD <p>[Restore] key operation:</p> <ul style="list-style-type: none"> • Initializes all drive units • If the message appeared when it was time to rinse, it rinses and restores to a state that allows measuring.

3-6-3-2. Code: 00060 to 00063 (SAMPLER UNIT Y Direction)


SAMPLER UNIT

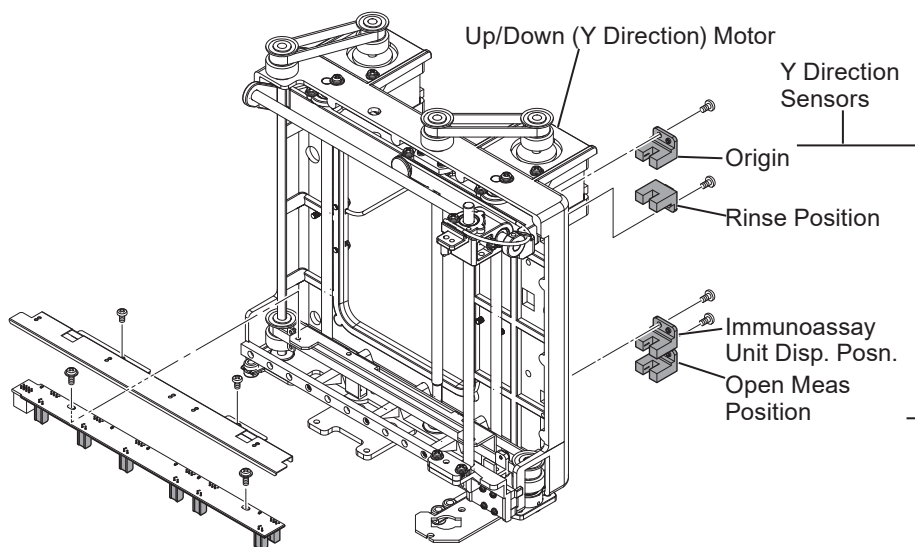


The vertical (Y direction) drive for the sampling nozzle of the SAMPLER UNIT detects positions with four sensors.

When the sensor plate linked to driving the motor reaches its sensor slit, the light to the sensor is blocked and the unit detects the sampling nozzle position.

The state of each sensor can be checked from the Sensor Monitor window of the Service window.

 7-3-4-5 (p.7-36)



With the MEK-1303, the cartridge piercing and dispensing position of the MEK-1303 CHM MEASURING UNIT is detected by pulse control, not by sensor position.

Cartridge piercing and dispensing position is determined by “sampling nozzle and cartridge position adjustment (MEK-1303)”.



6-9-1 (p.6-21)

NOTE: Only the rinse position sensor (2nd from the top) has a different vertical orientation from the other sensors. When replacing it, be careful to install it in the correct orientation.

3. Troubleshooting

Code	Error	Possible Cause	Action
00060	Sampler Y direction initialize error	<p>During initialization, the start point sensor of the SAMPLER UNIT (Y direction) failed to detect the initial position of the sampling nozzle.</p> <p>(The status on the Sensor Monitor window of the Service window fails to go to IN.)</p>	<p>Touch the [Restore] key.</p> <p>If touching the [Restore] key fails to resolve it, restart the analyzer. If it still fails to improve, take the following steps.</p> <p>If the motor does not run:</p> <p>Check the motor cable.</p> <ul style="list-style-type: none"> • There is no liquid splashed on the motor connector. • The cable is not cut, connected, not pinched, or its connector is partially inserted or disconnected. • Disconnecting and connecting the cable resolve the issue. <p>If the motor does run:</p> <p>Check the photosensors.</p> <ul style="list-style-type: none"> • There is no liquid splashed on the sensor connector. • The cable is not cut, connected, not pinched, or its connector is partially inserted or disconnected. • Disconnecting and connecting the cable resolve the issue. <p>If the problem fails to improve from the foregoing countermeasures, replace the following parts as needed.</p> <ul style="list-style-type: none"> • Cable • Sensor • SAMPLER UNIT • UT-7296 POWER BD • AMP CONTROL BD <p>[Restore] key operation:</p> <ul style="list-style-type: none"> • Initializes all drive units • If the message appeared when it was time to rinse, it rinses and restores to a state that allows measuring.
00061	Sampler Y direction operation error	Finish operation not detected during operation	<p>Touch the [Restore] key.</p> <p>If touching the [Restore] key fails to resolve it, restart the analyzer. If it still fails to improve, take the following steps.</p> <ul style="list-style-type: none"> • Replace the AMP CONTROL BD. <p>[Restore] key operation:</p> <ul style="list-style-type: none"> • Initializes all drive units • If the message appeared when it was time to rinse, it rinses and restores to a state that allows measuring.

Code	Error	Possible Cause	Action
00062	Sampler Y direction base position error	<p>The sampling nozzle operation start position was incorrect at operation start, or the sensor of SAMPLER UNIT (Y direction) failed to detect the operation start position.</p> <p>(The status of a sensor that should be IN on the Sensor Monitor window of the Service window was OUT.)</p>	<p>Touch the [Restore] key.</p> <p>If touching the [Restore] key fails to resolve it, restart the analyzer. If it still fails to improve, take the following steps.</p> <p>If the motor does not run:</p> <p>Check the motor cable.</p> <ul style="list-style-type: none"> • There is no liquid splashed on the motor connector. • The cable is not cut, connected, not pinched, or its connector is partially inserted or disconnected. • Disconnecting and connecting the cable resolve the issue. <p>If the motor does run:</p> <p>Check the photosensors.</p> <ul style="list-style-type: none"> • There is no liquid splashed on the sensor connector. • The cable is not cut, connected, not pinched, or its connector is partially inserted or disconnected. • Disconnecting and connecting the cable resolve the issue.
00063	Sampler Y direction end position error	<p>The sampling nozzle operation end position was incorrect at operation end, or the sensor of SAMPLER UNIT (Y direction) failed to detect the operation end position.</p> <p>(The status of a sensor that should be IN on the Sensor Monitor window of the Service window was OUT.)</p>	<ul style="list-style-type: none"> • Cable • Sensor • SAMPLER UNIT • UT-7296 POWER BD • AMP CONTROL BD <p>[Restore] key operation:</p> <ul style="list-style-type: none"> • Initializes all drive units • If the message appeared when it was time to rinse, it rinses and restores to a state that allows measuring. <p>If the problem fails to improve from the foregoing countermeasures, replace the following parts as needed.</p>


3-6-3-3. Code: 00070 to 00073 (MS-131W OPEN AIR UNIT)

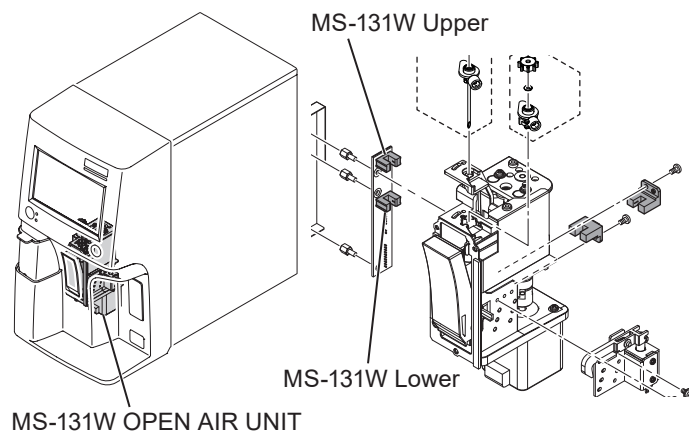
The MS-131W OPEN AIR UNIT drives the release nozzle up/down by motor, pierces vacuum sample tubes, and releases pressure inside the tubes to atmospheric pressure.

The vertical drive for the release nozzle uses a total of two sensors to detect its position: an upper and a lower sensor.

When the sensor plate of each sensor reaches its sensor slit, the light to the sensor is blocked and the unit detects the release nozzle position.

The state of each sensor can be checked from the Sensor Monitor window of the Service window.

 7-3-4-6 (p.7-37)



Code	Error	Possible Cause	Action
00070	Release nozzle initialize error	<p>During initialization, the upper sensor of the MS-131W failed to detect the initial position of the release nozzle.</p> <p>(The status on the Sensor Monitor window of the Service window fails to go to IN.)</p>	<p>Touch the [Restore] key.</p> <p>If touching the [Restore] key fails to resolve it, restart the analyzer. If it still fails to improve, take the following steps.</p> <p>If the motor does not run:</p> <p>Check the motor cable.</p> <ul style="list-style-type: none"> • There is liquid splashed on the motor connector. • The cable is not cut, connected, not pinched, or its connector is partially inserted or disconnected. • Disconnecting and connecting the cable resolve the issue. <p>If the motor does run:</p> <p>Check the photosensors.</p> <ul style="list-style-type: none"> • There is liquid splashed on the sensor connector. • The cable is not cut, connected, not pinched, or its connector is partially inserted or disconnected. • Disconnecting and connecting the cable resolve the issue. <p>If the problem fails to improve from the foregoing countermeasures, replace the following parts as needed.</p> <ul style="list-style-type: none"> • UT-7301 CAP PIERCE BD • Cable • MS-131W OPEN AIR UNIT • UT-7296 POWER BD • AMP CONTROL BD <p>[Restore] key operation:</p> <ul style="list-style-type: none"> • Initializes all drive units • If the message appeared when it was time to rinse, it rinses and restores to a state that allows measuring.

Code	Error	Possible Cause	Action
00071	Release nozzle operation error	Finish operation not detected during operation	<p>Touch the [Restore] key.</p> <p>If touching the [Restore] key fails to resolve it, restart the analyzer. If it still fails to improve, take the following steps.</p> <ul style="list-style-type: none"> • Replace the AMP CONTROL BD. <p>[Restore] key operation:</p> <ul style="list-style-type: none"> • Initializes all drive units • If the message appeared when it was time to rinse, it rinses and restores to a state that allows measuring.
00072	Release nozzle base position error	<p>The release nozzle operation start position was incorrect at operation start, or the upper or lower sensor of MS-131W failed to detect the operation start position.</p> <p>(The status of a sensor that should be IN on the Sensor Monitor window of the Service window was OUT.)</p>	<p>Touch the [Restore] key.</p> <p>If touching the [Restore] key fails to resolve it, restart the analyzer. If it still fails to improve, take the following steps.</p> <p>If the motor does not run:</p> <p>Check the motor cable.</p> <ul style="list-style-type: none"> • There is no liquid splashed on the motor connector. • The cable is not cut, connected, not pinched, or its connector is partially inserted or disconnected. • Disconnecting and connecting the cable resolve the issue. <p>If the motor does run:</p> <p>Check the photosensors.</p> <ul style="list-style-type: none"> • There is no liquid splashed on the sensor connector. • The cable is not cut, connected, not pinched, or its connector is partially inserted or disconnected. • Disconnecting and connecting the cable resolve the issue. <p>If the problem fails to improve from the foregoing countermeasures, replace the following parts as needed.</p> <ul style="list-style-type: none"> • UT-7301 CAP PIERCE BD • Cable • MS-131W OPEN AIR UNIT • UT-7296 POWER BD • AMP CONTROL BD <p>[Restore] key operation:</p> <ul style="list-style-type: none"> • Initializes all drive units • If the message appeared when it was time to rinse, it rinses and restores to a state that allows measuring.
00073	Release nozzle end position error	<p>The release nozzle operation end position was incorrect at operation end, or the upper or lower sensor of MS-131W failed to detect the operation end position.</p> <p>(The status of a sensor that should be IN on the Sensor Monitor window of the Service window was OUT.)</p>	<p>Touch the [Restore] key.</p> <p>If touching the [Restore] key fails to resolve it, restart the analyzer. If it still fails to improve, take the following steps.</p> <p>If the motor does not run:</p> <p>Check the motor cable.</p> <ul style="list-style-type: none"> • There is no liquid splashed on the motor connector. • The cable is not cut, connected, not pinched, or its connector is partially inserted or disconnected. • Disconnecting and connecting the cable resolve the issue. <p>If the motor does run:</p> <p>Check the photosensors.</p> <ul style="list-style-type: none"> • There is no liquid splashed on the sensor connector. • The cable is not cut, connected, not pinched, or its connector is partially inserted or disconnected. • Disconnecting and connecting the cable resolve the issue. <p>If the problem fails to improve from the foregoing countermeasures, replace the following parts as needed.</p> <ul style="list-style-type: none"> • UT-7301 CAP PIERCE BD • Cable • MS-131W OPEN AIR UNIT • UT-7296 POWER BD • AMP CONTROL BD <p>[Restore] key operation:</p> <ul style="list-style-type: none"> • Initializes all drive units • If the message appeared when it was time to rinse, it rinses and restores to a state that allows measuring.

3-6-4. Code: 00080 to 00098 (Other Units)

3-6-4-1. Code: 00080 (MP-133W ROTARY PUMP UNIT)


The MP-133W ROTARY PUMP UNIT is a pump for transporting reagent and samples to various places inside the analyzer and mainly discharges them outside the analyzer (waste fluid tank).

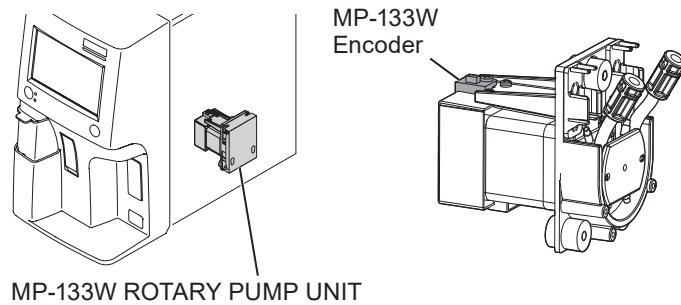
It also has the following functions.

- Pressure source for driving diaphragm pumps
- Discharges rinse fluid
- Backup for WBC measurement pressure

The rotation of its motor is detected with an encoder.

The state of the sensors can be checked from the Sensor Monitor window of the Service window.

 7-3-4-6 (p.7-37)




Code	Error	Possible Cause	Action
00080	Rotary pump initial error	<p>During initialization, the encoder of the MP-133W failed to detect the initial position of the pump.</p> <p>(The status on the Sensor Monitor window of the Service window fails to go to IN.)</p>	<p>Touch the [Restore] key.</p> <p>If touching the [Restore] key fails to resolve it, restart the analyzer. If it still fails to improve, take the following steps.</p> <p>If the motor does not run:</p> <p>Check the motor cable.</p> <ul style="list-style-type: none"> • There is no liquid splashed on the motor connector. • The cable is not cut, connected, not pinched, or its connector is partially inserted or disconnected. • Disconnecting and connecting the cable resolve the issue. <p>If the motor does run:</p> <p>Check the photosensors.</p> <ul style="list-style-type: none"> • There is no liquid splashed on the sensor connector. • The cable is not cut, connected, not pinched, or its connector is partially inserted or disconnected. • Disconnecting and connecting the cable resolve the issue. <p>If the problem fails to improve from the foregoing countermeasures, replace the following parts as needed.</p> <ul style="list-style-type: none"> • Sensor • Cable • MP-133W ROTARY PUMP UNIT • UT-7296 POWER BD • AMP CONTROL BD <p>[Restore] key operation:</p> <ul style="list-style-type: none"> • Initializes all drive units • If the message appeared when it was time to rinse, it rinses and restores to a state that allows measuring.

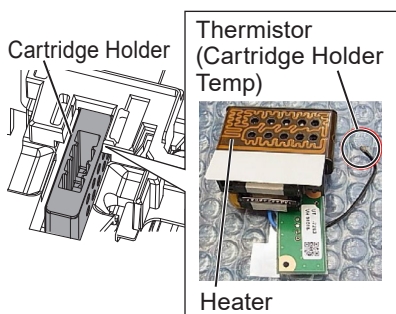
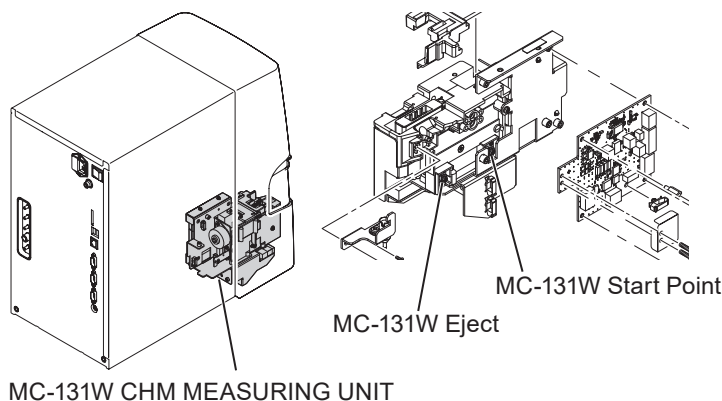
3-6-4-2. Code: 00090 to 00092, 00095 (MC-131W CHM MEASURING UNIT)

The MC-131W CHM MEASURING UNIT moves cartridge holders forward/backward and measures the dispensed samples.


The vertical drive for cartridge holders uses a total of two sensors to detect its position: a start point sensor and an eject sensor.

The state of the sensors can be checked from the Sensor Monitor window of the Service window.

 7-3-4-6 (p.7-37)



It also uses a thermistor to measure the temperature of the cartridge holder. The cartridge holder temperature can be checked from the Sensor Monitor window of the Service window.

 7-3-4-4 (p.7-34)

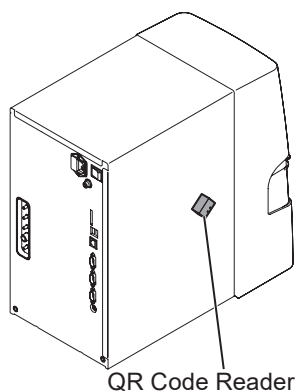
Code	Error	Possible Cause	Action
00090	Expansion unit temperature abnormality	Cartridge holder temperature is outside its specified range.	<p>Touch the [Restore] key.</p> <p>If touching the [Restore] key fails to resolve it, the cartridge holder temperature can be checked from the Sensor Monitor window of the Service window.</p> <p>If temperature is low:</p> <p>The device is cold, so check the ambient temperature and set it to within the operating environment temperature.</p> <p>If temperature is high:</p> <p>Check the following.</p> <ul style="list-style-type: none"> • There is no liquid splashed on the sensor connector. • The cable is not cut, connected, not pinched, or its connector is partially inserted or disconnected. • Disconnecting and connecting the cable resolve the issue. <p>If taking these steps fails to resolve it, restart the analyzer. If it still fails to improve, replace the following parts as needed.</p> <ul style="list-style-type: none"> • MC-131W CHM MEASURING UNIT • UT-7308 CHM MEASURING BD • Cable • UT-7296 POWER BD • AMP CONTROL BD <p>[Restore] key operation:</p> <ul style="list-style-type: none"> • Initializes all drive units • If the message appeared when it was time to rinse, it rinses and restores to a state that allows measuring.

3. Troubleshooting

Code	Error	Possible Cause	Action
00091	Initialization of cartridge holder failed.	<p>During initialization, the start point sensor of the MC-131W failed to detect the initial position of the cartridge holder.</p> <p>(The status on the Sensor Monitor window of the Service window fails to go to IN.)</p>	<p>Touch the [Restore] key.</p> <p>If touching the [Restore] key fails to resolve it, restart the analyzer. If it still fails to improve, take the following steps.</p> <p>If the motor does not run:</p> <p>Check the motor cable.</p> <ul style="list-style-type: none"> • There is no liquid splashed on the motor connector. • The cable is not cut, connected, not pinched, or its connector is partially inserted or disconnected. • Disconnecting and connecting the cable resolve the issue. <p>If the motor does run:</p> <p>Check the photosensors.</p> <ul style="list-style-type: none"> • There is no liquid splashed on the sensor connector. • The cable is not cut, connected, not pinched, or its connector is partially inserted or disconnected. • Disconnecting and connecting the cable resolve the issue.
00092	Cartridge holder failure	<p>During operation, the eject sensor of the MC-131W failed to detect the operation start position of the cartridge holder.</p> <p>(The status on the Sensor Monitor window of the Service window fails to go to IN.)</p>	<p>When the message is “00091 Initialization of cartridge holder failed”, check if something is blocking a moving part or the sensor of the cartridge holder.</p> <p>If the problem fails to improve from the foregoing countermeasures, replace the following parts as needed.</p> <ul style="list-style-type: none"> • Cable • MC-131W CHM MEASURING UNIT • UT-7296 POWER BD • AMP CONTROL BD <p>[Restore] key operation:</p> <ul style="list-style-type: none"> • Initializes all drive units • If the message appeared when it was time to rinse, it rinses and restores to a state that allows measuring.
00095	Expansion unit setting value abnormality	<p>An error occurred in a setting value stored in the MC-131W.</p> <ul style="list-style-type: none"> • SUM value error during loading • Writing failed during the writing process 	<p>Touch the [Restore] key.</p> <p>If error occurred during startup (during loading):</p> <p>Restart analyzer. If the error continues to occur, the data is corrupted. Run automatic calibration.</p> <p>If the error occurred during automatic calibration (during writing):</p> <p>Run automatic calibration again.</p> <p>If the problem continues to occur, writing is failing due to a memory error within the MC-131W.</p> <p>If the above error occurs occasionally:</p> <p>A communication system error may have occurred. Check that no cables are damaged, disconnected, pinched, missing a connector, or partially inserted.</p> <p>If the above error continues to occur:</p> <p>Replace the following parts as needed.</p> <ul style="list-style-type: none"> • Cable • MC-131W

3-6-4-3. Code: 00093 (QR Code Reader SE-3307HD-L100R)

The SE-3307HD-L100R QR code reader reads the QR codes on cartridges.

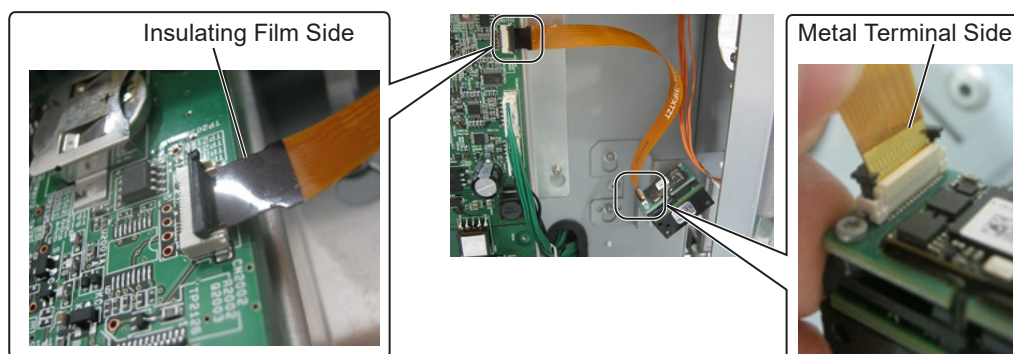


QR Code Reader

3

Code	Error	Possible Cause	Action
00093	QR code reader error	When the analyzer is in standby mode, there is no response from the QR code reader.	<p>Touch the [Restore] key.</p> <p>If touching the [Restore] key fails to resolve it, restart the analyzer.</p> <p>If it still fails to improve, check the following.</p> <ul style="list-style-type: none"> • The cable is not cut, connected, not pinched, or its connector is partially inserted or disconnected. • The cable is plugged in backwards.¹ <p>If the problem fails to improve from the foregoing countermeasures, replace the following parts as needed.</p> <ul style="list-style-type: none"> • Cable • QR barcode reader² • AMP CONTROL BD <p>[Restore] key operation:</p> <ul style="list-style-type: none"> • Initializes all drive units • If the message appeared when it was time to rinse, it rinses and restores to a state that allows measuring.

¹ Check and make sure the probe is connected as shown in the photos.



² QR Code Reader (SE-3307HD-L100R)


When the software version of the analyzer to be replaced is Ver. 02-08 or earlier, upgrade it to Ver. 02-09 or later.

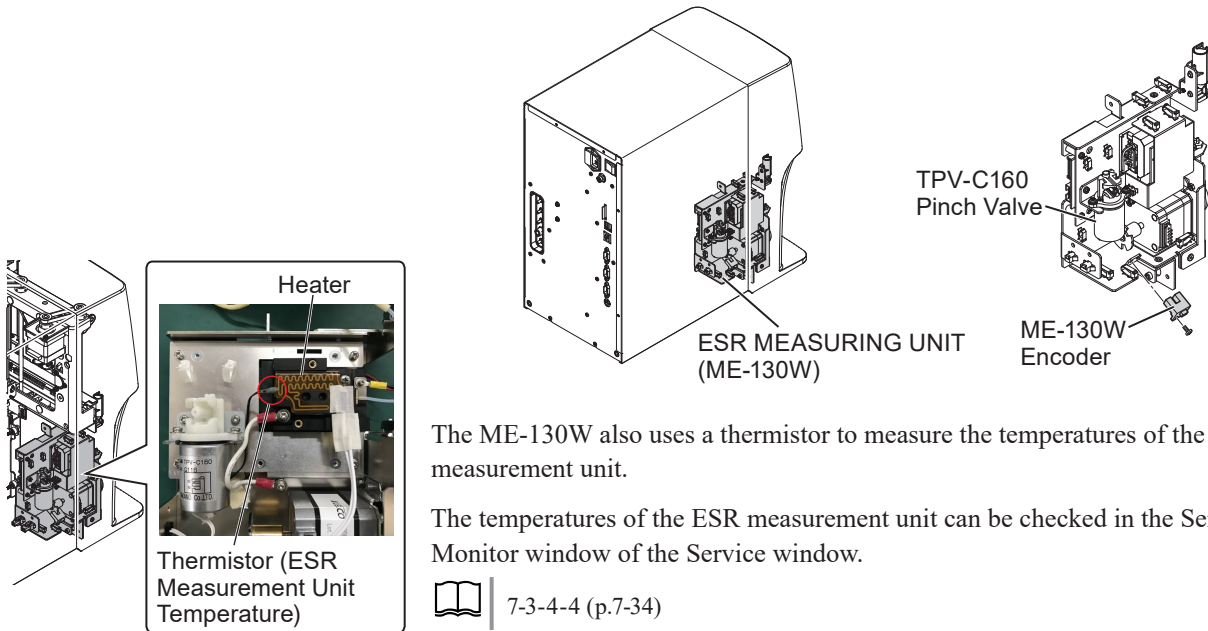
3-6-4-4. Code: 00090, 00096 to 00098 (ME-130W ESR MEASURING UNIT)

The ME-130W ESR MEASURING UNIT measures the changes over time of the optical density of dispensed samples.

The rotation of its motor is detected by an encoder.


The state of the sensors can be checked in the Sensor Monitor window of the Service window.

 7-3-4-6 (p.7-37)



The ME-130W also uses a thermistor to measure the temperatures of the ESR measurement unit.

The temperatures of the ESR measurement unit can be checked in the Sensor Monitor window of the Service window.

 7-3-4-4 (p.7-34)

Code	Error	Possible Cause	Action
00090	Expansion unit temperature abnormality	<p>The temperature of the ESR measurement unit is outside its specified range.</p>	<p>Touch the [Restore] key.</p> <p>If touching the [Restore] key fails to resolve this problem, check the ambient temperature and set it to within the operating environment temperature.</p> <p>If taking above steps fails to resolve it, check the ESR measurement unit temperature in the Sensor Monitor window of the Service window.</p> <p>If temperature is low or high: Check the following points.</p> <ul style="list-style-type: none"> • Check that no liquid has splashed on the connectors of the board • Check that no cables are damaged, disconnected, pinched, missing a connector, or partially inserted. • Check whether removing and reinserting the cables fixes the problem. <p>If the problem fails to improve from the foregoing countermeasures, restart the analyzer.</p> <p>If it still fails to improve, replace the following parts as needed.</p> <ul style="list-style-type: none"> • ME-130W ESR MEASURING UNIT • Cable • UT-7296 POWER BD • AMP CONTROL BD <p>[Restore] key operation:</p> <ul style="list-style-type: none"> • Initialized all drive units. • If the message was generated at a time when cleaning was required, clean the analyzer, and recover to a state where measurement is possible.
00096	ESR fluid path error	<p>An error was detected in the flow route during a self check and during measurement.</p> <ul style="list-style-type: none"> • Flow route clog • Flow route leak • Error in flow route detection device 	<p>Touch the [Restore] key.</p> <p>If touching the [Restore] key fails to resolve it, restart the analyzer. If it still fails to improve, take the following steps.</p> <ul style="list-style-type: none"> • Check that no liquid has splashed on the connectors of the board • Check that no cables are damaged, disconnected, pinched, missing a connector, or partially inserted. • Check whether removing and reinserting the cables fixes the problem. <p>If the problem fails to improve from the foregoing countermeasures, replace the following parts as needed</p> <ul style="list-style-type: none"> • ESR pump tube • Cable • ME-130W ESR MEASURING UNIT • UT-7296 POWER BD • AMP CONTROL BD <p>[Restore] key operation:</p> <ul style="list-style-type: none"> • Clean the analyzer, and recover to a state where measurement is possible

3. Troubleshooting

Code	Error	Possible Cause	Action
00097	ESR pump operation error	During initialization, the encoder of the ESR pump in the ME-130W failed to detect the initial position of the pump (The status in the Sensor Monitor window of the Service window does not change to IN).	<p>Touch the [Restore] key.</p> <p>If touching the [Restore] key fails to resolve it, restart the analyzer. If it still fails to improve, take the following steps.</p> <p>If the motor does not run:</p> <p>Check the motor cable.</p> <ul style="list-style-type: none"> • Check that no liquid has splashed on the connectors of the motor. • Check that no cables are damaged, disconnected, pinched, missing a connector, or partially inserted. • Check whether removing and reinserting the cables fixes the problem. <p>If the motor runs:</p> <p>Check the photo-sensors.</p> <ul style="list-style-type: none"> • Check that no liquid has splashed on the connectors of the sensor. • Check that no cables are damaged, disconnected, pinched, missing a connector, or partially inserted. • Check whether removing and reinserting the cables fixes the problem. <p>If the problem fails to improve from the foregoing countermeasures, replace the following parts as needed</p> <ul style="list-style-type: none"> • Sensor • Cable • ME-130W ESR MEASURING UNIT • UT-7296 POWER BD • AMP CONTROL BD <p>[Restore] key operation:</p> <ul style="list-style-type: none"> • Initialized all drive units. • If the message was generated at a time when cleaning was required, clean the analyzer, and recover to a state where measurement is possible.

Code	Error	Possible Cause	Action
00098	ESR valve operation error	During a self check, the ESR valve in the ME-130W does not operate	<p>Touch the [Restore] key.</p> <p>If touching the [Restore] key fails to resolve it, restart the analyzer. If it still fails to improve, take the following steps.</p> <p>If the ESR valve does not run:</p> <p>Check the ESR valve cable.</p> <ul style="list-style-type: none"> • Check that no liquid has splashed on the connectors of the ESR valve. • Check that no cables are damaged, disconnected, pinched, missing a connector, or partially inserted. • Check whether removing and reinserting the cables fixes the problem. <p>If the ESR valve runs:</p> <p>Check the ESR valve tube.</p> <ul style="list-style-type: none"> • Check that the ESR valve tube is not damaged, disconnected, pinched, or partially connected. • Check whether removing and reinserting the ESR valve tube fixes the problem. <p>If the problem fails to improve from the foregoing countermeasures, replace the following parts as needed</p> <ul style="list-style-type: none"> • TPV-C160 Pinch Valve • Cable • ME-130W ESR MEASURING UNIT • UT-7296 POWER BD • AMP CONTROL BD <p>[Restore] key operation:</p> <ul style="list-style-type: none"> • Initialized all drive units. • If the message was generated when cleaning was required, clean the analyzer, and recover to a state where measurement is possible

3-6-5. Code: 00400 to 00402 (MS-130W Relative Position Adjustment)

This is an analyzer message that appears when performing “Adjusting the Sampling Nozzle and the Cell Position (MEK-1303)” or “Adjusting the Sampling Nozzle and the ME-130W Position (MEK-1305)”.




6-9-1 (p.6-21), 6-9-2 (p.6-27)

Code	Error	Possible Cause	Action
00400	Sampler outside adjust range in X direction	The lateral adjustment value resulting from “Adjusting the Sampling Nozzle and the Cell Position (MEK-1303)” or “Adjusting the Sampling Nozzle and the ME-130W Position (MEK-1305)” is out of range.	<p>Touch the [Restore] key and perform the steps below.</p> <ul style="list-style-type: none"> • MEK-1303 Execute “Adjust Up/Down Left/Right” → “Adjust Forward/Back Left/Right” under “Adjusting the Sampling Nozzle and the Cell Position (MEK-1303)”. • MEK-1305 Execute “Drain Cup” → “Adjust Up/Down Left/Right” under “Adjusting the Sampling Nozzle and the ME-130W Position (MEK-1305)”. <p>[Restore] key operation: The message is canceled without any action being taken.</p>
00401	Sampler outside adjust range in Y direction	The vertical adjustment value resulting from “Adjusting the Sampling Nozzle and the Cell Position (MEK-1303)” or “Adjusting the Sampling Nozzle and the ME-130W Position (MEK-1305)” is out of range.	<p>Touch the [Restore] key and perform the steps below.</p> <ul style="list-style-type: none"> • MEK-1303 Execute “Adjust Up/Down Left/Right” under “Adjusting the Sampling Nozzle and the Cell Position (MEK-1303)”. • MEK-1305 Execute “Drain Cup” → “Adjust Up/Down Left/Right” under “Adjusting the Sampling Nozzle and the ME-130W Position (MEK-1305)”. <p>[Restore] key operation: The message is canceled without any action being taken.</p>
00402	Immunoassay unit outside adjust range in Z direction	The forward/backward adjustment value resulting from “adjustment of sampling nozzle and cartridge positions (MEK-1303)” is out of range.	<p>Touch the [Restore] key and perform the steps below.</p> <ul style="list-style-type: none"> • Execute “Adjust Up/Down Left/Right” → “Adjust Forward/Back Left/Right” under “Adjusting the Sampling Nozzle and the Cell Position (MEK-1303)”. <p>[Restore] key operation: The message is canceled without any action being taken.</p>

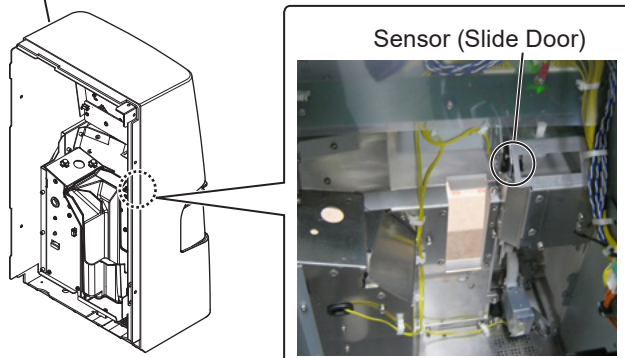
3-6-6. Code: 00700 (Slide Door)

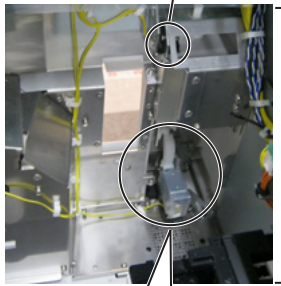
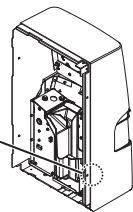
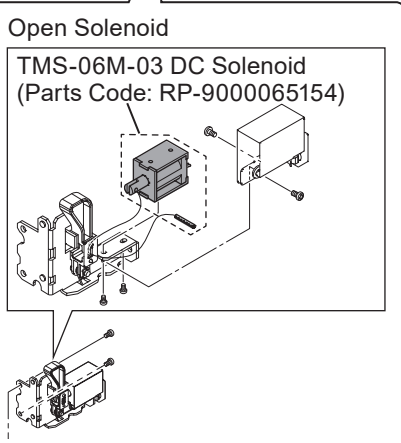
The PV-132W FRONT PANEL UNIT uses sensor (Slide Door) to detect whether the slide door is open or closed.

The state of sensor (Slide Door) can be checked from the Sensor Monitor window of the Service window.

 7-3-4-6 (p.7-37)

PV-132W FRONT PANEL UNIT




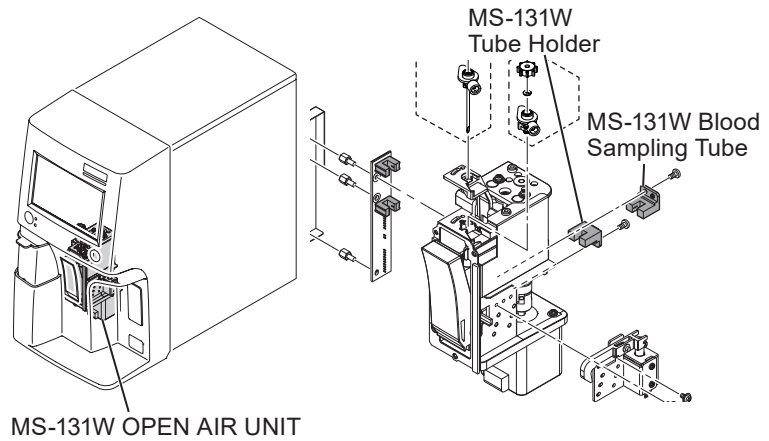
Code	Error	Possible Cause	Action
00700	Slide door open	<p>Slide door open during measurement. Measurement stopped.</p> <p>Sensor (Slide Door)</p>   <p>Open Solenoid</p> <p>TMS-06M-03 DC Solenoid (Parts Code: RP-9000065154)</p> 	<p>Touch the [Restore] key.</p> <p>If touching the [Restore] key fails to resolve it, restart the analyzer.</p> <p>If it still fails to improve, check the following.</p> <ul style="list-style-type: none"> • There is no splashed liquid or corrosion on the sensor connector. • The cable is not cut, connected, not pinched, or its connector is partially inserted or disconnected. • Disconnecting and connecting the cable resolve the issue. <p>If the problem fails to improve from the foregoing countermeasures, replace the following parts as needed.</p> <ul style="list-style-type: none"> • Cable • Sensor • Open solenoid • Front panel unit • UT-7296 POWER BD • AMP CONTROL BD <p>[Restore] key operation:</p> <ul style="list-style-type: none"> • Initializes all drive units • If the message appeared when it was time to rinse, it rinses and restores to a state that allows measuring.

3-6-7. Code: 00701 to 00702 (Tube Holder)

The MS-131W OPEN AIR UNIT uses 2 sensors to detect the presence of vacuum sample tubes and whether the tube holder is open or closed.

The state of each sensor can be checked from the Sensor Monitor window of the Service window.

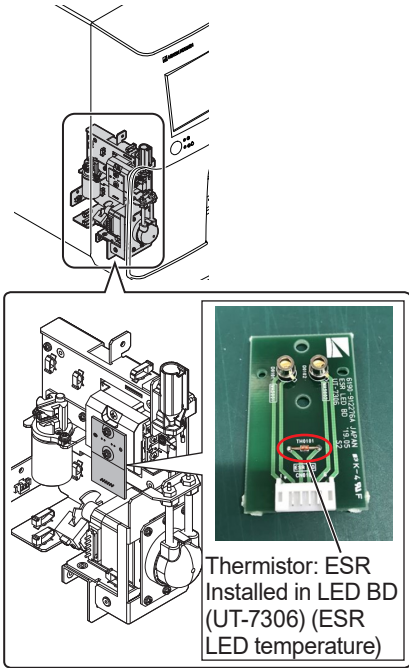
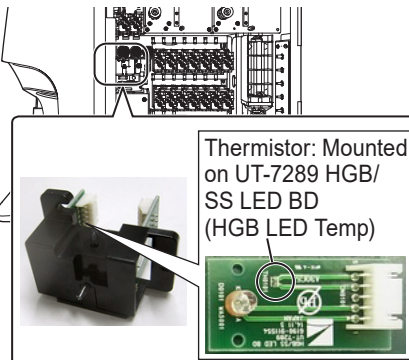
 7-3-4-6 (p.7-37)

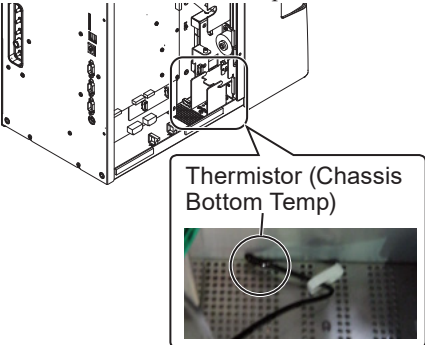
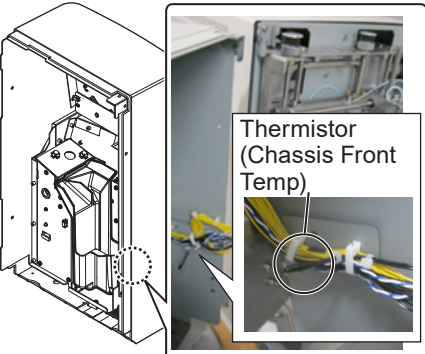
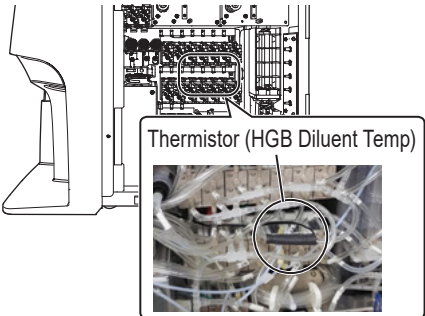


Code	Error	Possible Cause	Action
00701	Tube holder open	When measuring in the closed mode, the tube holder opens before piercing.	<p>Touch the [Restore] key.</p> <p>If touching the [Restore] key fails to resolve it, restart the analyzer.</p> <p>If it still fails to improve, check the following.</p> <ul style="list-style-type: none"> • There is no liquid splashed on the sensor connector. • The cable is not cut, connected, not pinched, or its connector is partially inserted or disconnected. • Disconnecting and connecting the cable resolve the issue. <p>If the problem fails to improve from the foregoing countermeasures, replace the following parts as needed.</p> <ul style="list-style-type: none"> • Cable • Sensor • Open solenoid (TMS-06M-03) and peripheral parts • UT-7301 CAP PIERCE BD • UT-7296 POWER BD • AMP CONTROL BD <p>[Restore] key operation:</p> <ul style="list-style-type: none"> • Initializes all drive units • If the message appeared when it was time to rinse, it rinses and restores to a state that allows measuring.

Code	Error	Possible Cause	Action
00702	Sample tube sensor error	During the MS-131W OPEN AIR UNIT eject operation, detected a contradiction between the tube holder and blood sample tube sensors.	<p>Touch the [Restore] key.</p> <p>If touching the [Restore] key fails to resolve it, restart the analyzer.</p> <p>If it still fails to improve, check the following.</p> <ul style="list-style-type: none"> • There is no liquid splashed on the sensor connector. • The cable is not cut, connected, not pinched, or its connector is partially inserted or disconnected. • Disconnecting and connecting the cable resolve the issue. <p>If the problem fails to improve from the foregoing countermeasures, replace the following parts as needed.</p> <ul style="list-style-type: none"> • Cable • Sensor • UT-7301 CAP PIERCE BD • UT-7296 POWER BD • AMP CONTROL BD <p>[Restore] key operation:</p> <ul style="list-style-type: none"> • Initializes all drive units • If the message appeared when it was time to rinse, it rinses and restores to a state that allows measuring.

3-6-8. Code: 04410 to 04511 (Temperature sensor)

Code	Error	Possible Cause	Action
04410	ESR LED Temperature Error	<p>During the temperature check of a self check, the ESR LED temperature was out of range.</p>  <p>Thermistor: ESR Installed in LED BD (UT-7306) (ESR LED temperature)</p>	<p>Touch the [Restore] key. If touching the [Restore] key fails to resolve it, restart the analyzer. If it still fails to improve, check the following.</p> <ul style="list-style-type: none"> • Check that no liquid has splashed on the connectors of the board • Check that no cables are damaged, disconnected, pinched, missing a connector, or partially inserted. • Check whether removing and reinserting the cables fixes the problem. <p>If the problem fails to improve from the foregoing countermeasures, replace the following parts as needed</p> <ul style="list-style-type: none"> • Cable • UT-7306 ESR LED BD • ME-130W ESR MEASURING UNIT • AMP CONTROL BD <p>[Restore] key operation:</p> <ul style="list-style-type: none"> • Initialized all drive units. • If the message was generated when cleaning was required, clean the analyzer, and recover to a state where measurement is possible
04502	HGB LED temperature error	<p>During the temperature check of a self check, the HGB LED temperature was out of range.</p>  <p>Thermistor: Mounted on UT-7289 HGB/SS LED BD (HGB LED Temp)</p>	<p>Touch the [Restore] key. If touching the [Restore] key fails to resolve it, restart the analyzer. If it still fails to improve, check the following.</p> <ul style="list-style-type: none"> • There is no liquid splashed on the board connector. • The cable is not cut, connected, not pinched, or its connector is partially inserted or disconnected. • Disconnecting and connecting the cable resolve the issue. <p>If the problem fails to improve from the foregoing countermeasures, replace the following parts as needed.</p> <ul style="list-style-type: none"> • Cable • UT-7289 HGB/SS LED BD • MH-130W HGB MEASURING UNIT • AMP CONTROL BD <p>[Restore] key operation:</p> <ul style="list-style-type: none"> • Initializes all drive units • If the message appeared when it was time to rinse, it rinses and restores to a state that allows measuring.

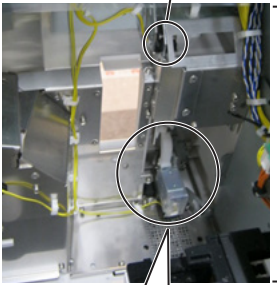
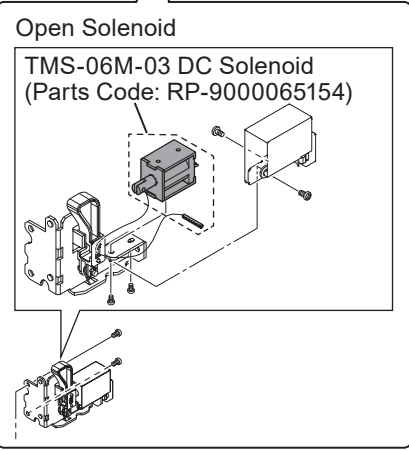
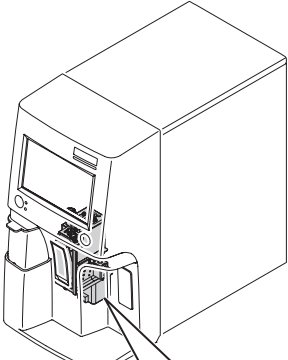
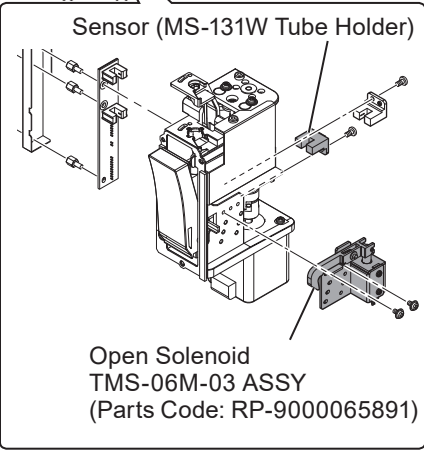
Code	Error	Possible Cause	Action
04507	Chassis Bottom Temp. Err.	<p>Chassis bottom sensor detected temperature out of range.</p>  <p>Thermistor (Chassis Bottom Temp)</p>	<p>Touch the [Restore] key.</p> <p>If touching the [Restore] key fails to resolve it, restart the analyzer.</p> <p>If it still fails to improve, check the following.</p> <ul style="list-style-type: none"> • There is no liquid splashed on the sensor connector. • The cable is not cut, connected, not pinched, or its connector is partially inserted or disconnected.
04510	Chassis front temp. error	<p>Chassis front sensor detected temperature out of range.</p>  <p>Thermistor (Chassis Front Temp)</p>	<ul style="list-style-type: none"> • Disconnecting and connecting the cable resolve the issue. <p>If the problem fails to improve from the foregoing countermeasures, replace the following parts as needed.</p> <ul style="list-style-type: none"> • Cable • AMP CONTROL BD <p>[Restore] key operation:</p> <ul style="list-style-type: none"> • Initializes all drive units • If the message appeared when it was time to rinse, it rinses and restores to a state that allows measuring.
04511	HGB fluid abnormal temperature	<p>HGB diluent temperature sensor detected temperature out of range.</p>  <p>Thermistor (HGB Diluent Temp)</p>	

3-7. Service Message [1xxxx]

When the service message [1xxxx] is detected, the status indicator lights. Also, the Information screen opens automatically.

NOTE: Although the service message [1xxxx] indicates a serious error, it is recoverable.





Code	Error	Possible Cause	Action
10100	Instrument emergency stop	Analyzer made an emergency stop during operation when Reset was pressed.	Touch the [Restore] key. [Restore] key operation: <ul style="list-style-type: none"> • Initializes all drive units • If the message appeared when it was time to rinse, it rinses and restores to a state that allows measuring.
10200	Memory error	Detected data error in settings.	Touch the [Restore] key and perform the steps below. <ul style="list-style-type: none"> • Check the calibration coefficient. • Check the settings of each sensor. • Make sure the sampling nozzle and cartridge positions are adjusted correctly. <p>Note: If the position information for the sampling nozzle and cartridge are corrupted, take care as the sampling nozzle may be damaged during measurement.</p> <p>If the problem fails to improve from the foregoing countermeasures, replace the following parts as needed.</p> <ul style="list-style-type: none"> • AMP CONTROL BD [Restore] key operation: The message is canceled without any action being taken.
10201	Watch dog timer error	<ul style="list-style-type: none"> • CPU runaway • Software is hanging and the analyzer cannot be reset. 	Touch the [Restore] key. If touching the [Restore] key fails to resolve it, restart the analyzer. If the problem fails to improve from the foregoing countermeasures, replace the following parts as needed. <ul style="list-style-type: none"> • AMP CONTROL BD [Restore] key operation: The message is canceled without any action being taken.

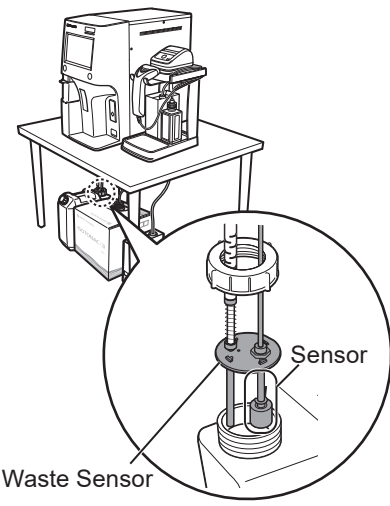


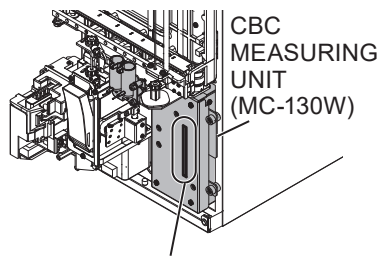

Code	Error	Possible Cause	Action
10300	Slide door operation error	<p>Slide door fails to open.</p> <p>Sensor (Slide Door)</p>  <p>Open Solenoid</p> <p>TMS-06M-03 DC Solenoid (Parts Code: RP-9000065154)</p> 	<p>Touch the [Restore] key and check the following.</p> <ul style="list-style-type: none"> • The slide door is not in physical contact. • There is enough play between the slide door and the front panel. • The open solenoid is working. • The open solenoid→lever→door mechanism is working. • Sensors are working. • There is no splashed liquid or corrosion on the sensor connector. • The cable is not cut, connected, not pinched, or its connector is partially inserted or disconnected. • Disconnecting and connecting the cable resolve the issue. <p>If the problem fails to improve from the foregoing countermeasures, replace the following parts as needed.</p> <ul style="list-style-type: none"> • Sensor • Open solenoid • Front panel unit • UT-7296 POWER BD • AMP CONTROL BD <p>[Restore] key operation:</p> <p>The message is canceled without any action being taken.</p>
10301	Tube holder operation error	<p>Tube holder fails to open</p>  <p>Sensor (MS-131W Tube Holder)</p>  <p>Open Solenoid TMS-06M-03 ASSY (Parts Code: RP-9000065891)</p>	<p>Touch the [Restore] key and check the following.</p> <ul style="list-style-type: none"> • The tube holder is not in physical contact. • There is enough play between the tube holder and the front panel. • The open solenoid is working. • The open solenoid→lever→door mechanism is working. • Sensors are working. • There is no splashed liquid or corrosion on the sensor connector. • The cable is not cut, connected, not pinched, or its connector is partially inserted or disconnected. • Disconnecting and connecting the cable resolve the issue. <p>If the problem fails to improve from the foregoing countermeasures, replace the following parts as needed.</p> <ul style="list-style-type: none"> • Sensor • Open solenoid (TMS-06M-03) and peripheral parts • UT-7301 CAP PIERCE BD • UT-7296 POWER BD • AMP CONTROL BD <p>[Restore] key operation:</p> <p>The message is canceled without any action being taken.</p>

3-8. User Message [2xxxx]




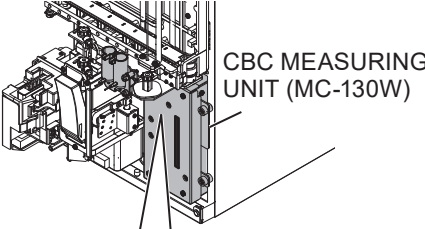
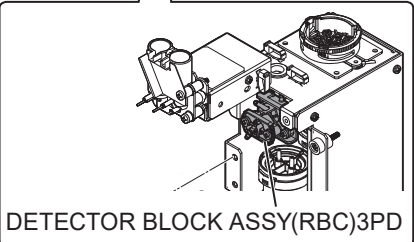

When a user message [2xxxx] is detected, the status indicator lights in orange. Also, the Information screen opens automatically.




NOTE: A user message [2xxxx] indicates an error of moderate severity and it stops operation.

Code	Error	Possible Cause	Action
21000	Unexpected shutdown	<ul style="list-style-type: none"> The correct procedure for turning power OFF was not followed. The main power supply was turned OFF while the sub power supply was not OFF. Power failure 	<p>Touch the [Restore] key.</p> <p>After it recovers, perform a self check on the Maintenance screen and check the analyzer.</p> <p> 7-2-2-2 (p.7-6)</p> <p>[Restore] key operation:</p> <p>It rinses and restores to a state that allows measuring.</p>
21110	Analyzer internal draining in progress	Internal draining executed from the Maintenance screen.	<p>Touch the [Restore] key.</p> <ul style="list-style-type: none"> After it recovers, perform a self check on the Maintenance screen and check the analyzer. <p> 7-2-2-2 (p.7-6)</p> <p>[Restore] key operation:</p> <p>It primes on installation and restores to a state that allows measuring.</p>
21210	Maintenance part replacement in progress	Device went to “Prepare All” in preparation for replacing periodic replacement parts.	<p>Replace periodic replacement parts and touch the [Restore] key.</p> <p>[Restore] key operation:</p> <p>Supplies water to places drained during “Prepare All” and restores to a state that allows measuring.</p>
21500	Tube holder ejection status	<p>When lowering the sampling nozzle during maintenance operation, the tube holder opened.</p> <p>(Does not occur during maintenance at user login.)</p>	<p>Touch the [Restore] key and perform the steps below.</p> <ul style="list-style-type: none"> Close the tube holder and then run maintenance. If the tube holder closed during maintenance, check the sensor (MS-131W tube holder) in the sensor window of the Service window. <p> 7-3-4-6 (p.7-37)</p> <p>[Restore] key operation:</p> <p>The message is canceled without any action being taken.</p>
23000	ISOTONAC-3 priming failed	Failed to prime the diluent (ISOTONAC•3).	<p>Take the following steps.</p> <ol style="list-style-type: none"> 1) Check whether there is enough reagent. 2) For each reagent, check whether the tubes are disconnected or kinked. 3) Check the remaining reagent volume and touch the [Restore] key. 4) Adjust the liquid sensor and/or LIQUID SENSOR BD and replace the sensor if necessary. <p> 6-4 (p.6-7)</p> <p>[Restore] key operation:</p> <ul style="list-style-type: none"> Replenish each of the reagents If the message appeared when it was time to rinse, it rinses and restores to a state that allows measuring.
23001	HEMOLYNAC-310 priming failed	Failed to prime the lysing reagent (HEMOLYNAC•310).	
23002	CLEANAC-710 priming failed	Failed to prime the detergent (CLEANAC•710).	
23003	CLEANAC-3 priming failed	Failed to prime the detergent (CLEANAC•3).	

Code	Error	Possible Cause	Action
23004	Waste container full	<p>The optional waste sensor detected the waste fluid is full.</p> 	<p>Take the following steps.</p> <ol style="list-style-type: none"> 1) Check the remaining capacity in the waste fluid tank and touch the [Restore] key. 2) Check if there is liquid splashed or corrosion on the waste sensor connector. 3) Check whether the waste sensor cable is cut, disconnected, pinched or its connector unplugged or partially inserted. 4) Check whether the sensing part of the waste sensor is stuck. <p>[Restore] key operation:</p> <ul style="list-style-type: none"> • Replenish each of the reagents • If the message appeared when it was time to rinse, it rinses and restores to a state that allows measuring.
23100	Out of ISOTONAC-3	<p>After replacing the reagent, measurements were made without registering the new reagent on the Reagent Management screen.</p>	<p>Touch the [Restore] key and register the reagent. (Read the reagent barcode and touch [Replace].)</p> <p> MEK-1300 Series Operator's Manual</p> <p>[Restore] key operation:</p> <p>Displays the Reagent Management screen</p>
23101	Out of HEMOLYNAC-310		
23102	Out of CLEANAC-710		
23103	Out of CLEANAC-3		
23104	Waste container replacement period	<p>Exceeded the warning amount for waste set up on the Reagent Management screen.</p>	<p>Touch the [Restore] key and replace the waste container. (Select waste fluid and touch [Replace].)</p> <p> MEK-1300 Series Operator's Manual</p> <p>[Restore] key operation:</p> <p>Displays the Reagent Management screen</p>
24104	WBC insufficient volume 1	<p>Insufficient pressure for WBC measurement preparation.</p> <p>(The liquid sensor of the WBC manometer (upper) fails to recognize the surface passing within the specified time from the start of liquid lowering in the manometer.)</p> 	<p>Take the following steps.</p> <ol style="list-style-type: none"> 1) Touch the [Restore] key. 2) Inspect the pump tube. 3) Run protein cleaning on the measuring unit.  7-2-4-5 (p.7-20) 4) Check for a kink or leaks in the flow path inside the MC-130W CBC MEASURING UNIT. <p>If the problem fails to improve from the foregoing countermeasures, replace the following parts as needed.</p> <ul style="list-style-type: none"> • MC-130W CBC MEASURING UNIT <p>[Restore] key operation:</p> <p>It rinses and restores to a state that allows measuring.</p>
24105	WBC insufficient volume 2	<p>Insufficient pressure for WBC measurement preparation.</p> <p>(After the liquid sensor of the WBC manometer (upper) recognized the surface passing, the lower liquid sensor failed to recognize the surface passing within the specified time from the start of liquid lowering in the manometer.)</p>	



3. Troubleshooting

Code	Error	Possible Cause	Action
24106	WBC insufficient volume 3	Blood clot, dirt, or rubber debris clogging the detection hole	<p>Take the following steps.</p> <ol style="list-style-type: none"> 1) Touch the [Restore] key. 2) Run protein cleaning on the measuring unit.  7-2-4-5 (p.7-20) <p>If the problem fails to improve from the foregoing countermeasures, replace the following parts as needed.</p> <ul style="list-style-type: none"> • MC-130W CBC MEASURING UNIT <p>[Restore] key operation: It rinses and restores to a state that allows measuring.</p>
24108	WBC noise	<ul style="list-style-type: none"> • Unstable power supply • External noise • Earth grounded • Reagent contamination • Inside of analyzer dirty • Crack in detection hole • Foam mixed in 	<p>Take the following steps.</p> <ol style="list-style-type: none"> 1) Clean or run protein cleaning on the measuring unit.  • 7-2-4-2 (p.7-17)  • 7-2-4-5 (p.7-20) 2) Check whether there is something on the same power supply as this device that may be a source of noise. 3) Check that the ground is installed properly, such as the connection of the ground wire. 4) Replace the reagent. <p>If the problem fails to improve from the foregoing countermeasures, replace the following parts as needed.</p> <ul style="list-style-type: none"> • MC-130W CBC MEASURING UNIT <p>[Restore] key operation: The message is canceled without any action being taken.</p>
24200	RBC detection hole clog	<p>Blood clot, dirt, or rubber debris clogging the detection hole</p>  <p>CBC MEASURING UNIT (MC-130W)</p>  <p>DETECTOR BLOCK ASSY(RBC)3PD</p>	<p>Take the following steps.</p> <ol style="list-style-type: none"> 1) Touch the [Restore] key. 2) Run protein cleaning on the measuring unit.  7-2-4-5 (p.7-20) <p>If the problem fails to improve from the foregoing countermeasures, replace the following parts as needed.</p> <ul style="list-style-type: none"> • MC-130W CBC MEASURING UNIT • DETECTOR BLOCK ASSY(RBC)3PD <p>[Restore] key operation: It rinses and restores to a state that allows measuring.</p>



Code	Error	Possible Cause	Action
24201	RBC noise	<ul style="list-style-type: none"> • Unstable power supply • External noise • Earth grounded • Reagent contamination • Inside of analyzer dirty • Crack in detection hole • Foam mixed in 	<p>Take the following steps.</p> <ol style="list-style-type: none"> 1) Clean or run protein cleaning on the measuring unit.  • 7-2-4-2 (p.7-17) • 7-2-4-5 (p.7-20) 2) Check whether there is something on the same power supply as this device that may be a source of noise. 3) Check that the ground is installed properly, such as the connection of the ground wire. 4) Replace the reagent. <p>If the problem fails to improve from the foregoing countermeasures, replace the following parts as needed.</p> <ul style="list-style-type: none"> • MC-130W CBC MEASURING UNIT • DETECTOR BLOCK ASSY(RBC)3PD <p>[Restore] key operation: The message is canceled without any action being taken.</p>
24300	Imm. unit abnormal temp.	Temperature of immunoassay unit exceeded 37°C (98.6°F) during measurement	<p>Touch the [Restore] key and bring the room temperature to 15 to 30°C (59 to 86°F) and retry measurement.</p> <p>[Restore] key operation: The message is canceled without any action being taken.</p>
24305	Noise in Immunoassay Unit	<ul style="list-style-type: none"> • Unstable power supply • External noise • Earth grounded • Reagent contamination 	<p>Take the following steps.</p> <ol style="list-style-type: none"> 1) Check whether there is something on the same power supply as this device that may be a source of noise. 2) Check that the ground is installed properly, such as the connection of the ground wire. 3) Replace the reagent. <p>If the problem fails to improve from the foregoing countermeasures, replace the following parts as needed.</p> <ul style="list-style-type: none"> • MC-131W CHM MEASURING UNIT <p>[Restore] key operation: The message is canceled without any action being taken.</p>
24311	Immunoassay unit ct. error	A circuit inside the immunoassay unit is not working properly	<p>Take the following steps.</p> <ol style="list-style-type: none"> 1) Clean the cartridge holder light path.  7-5-2-8 (p.7-94) 2) Adjust the cell block photometric voltage.  6-6 (p.6-12) 3) Check the cables of the MC-131W CHM MEASURING UNIT. <ul style="list-style-type: none"> • There is no splashed liquid, corrosion or broken pins in the connector. • The cable is not cut, connected, not pinched, or its connector is partially inserted or disconnected. • Disconnecting and connecting the cable resolve the issue. <p>If the problem fails to improve from the foregoing countermeasures, replace the following parts as needed.</p> <ul style="list-style-type: none"> • Cable • MC-131W CHM MEASURING UNIT • AMP CONTROL BD <p>[Restore] key operation: The message is canceled without any action being taken.</p>

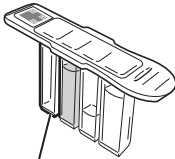




3. Troubleshooting

Code	Error	Possible Cause	Action
24400	ESR blank out of range	In the light receiving value check of Circuit Test and Self Check, one of the CH1 or CH2 values for ESR BLANK ON, OFF, or Diff was out of range.	<p>Touch the [Restore] key.</p> <p>If touching the [Restore] key fails to resolve it, restart the analyzer.</p> <p>If it still fails to improve, check the following.</p> <ul style="list-style-type: none"> • Check that no liquid has splashed on the connectors of the board • Check that no cables are damaged, disconnected, pinched, missing a connector, or partially inserted. • Check whether removing and reinserting the cables fixes the problem. <p>If the problem fails to improve from the foregoing countermeasures, replace the following parts as needed</p> <ul style="list-style-type: none"> • Cable • Pinch Valve • ME-130W ESR MEASURING UNIT • UT-7296 POWER BD • AMP CONTROL BD <p>[Restore] key operation:</p> <ul style="list-style-type: none"> • Initialized all drive units. • It rinses and restores to a state that allows measuring.
24411	ESR LED Temperature Rise	The difference between the average temperature of the ESR LED unit that was measured during the measurement process and the average temperature of the front unit in the chassis has exceeded the specified value (higher than 10°C (50°F)).	<p>Touch the [Restore] key and remeasure.</p> <p>If the message occurs frequently, restart the analyzer.</p> <p>If the problem still fails to be resolved, check the following.</p> <ul style="list-style-type: none"> • Check that no liquid has splashed on the connectors of the board • Check that no cables are damaged, disconnected, pinched, missing a connector, or partially inserted. • Check whether removing and reinserting the cables fixes the problem.
24412	ESR LED Temperature Drop	The difference between the average temperature of the ESR LED unit that was measured during the measurement process and the average temperature of the front unit in the chassis has exceeded the specified value (lower than 10°C (50°F)).	<p>If the problem fails to be resolved by the above corrective actions, replace the following parts as needed.</p> <ul style="list-style-type: none"> • Cable • UT-7306 ESR LED BD • ME-130W ESR MEASURING UNIT • AMP CONTROL BD <p>[Restore] key operation:</p> <p>The message is canceled without any action being taken.</p>

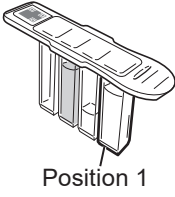
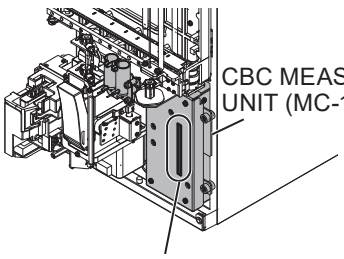


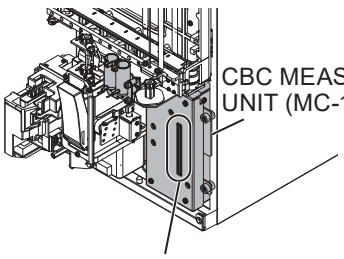

Code	Error	Possible Cause	Action
24500	CBC circuit abnormality	CBC circuit is not working properly due to a faulty board	<p>Take the following steps.</p> <p>1) Check the cables of the MC-130W CBC MEASURING UNIT.</p> <ul style="list-style-type: none"> • There is no splashed liquid, corrosion or broken pins in the connector. • The cable is not cut, connected, not pinched, or its connector is partially inserted or disconnected. • Disconnecting and connecting the cable resolve the issue. <p>2) Make sure the UT-7312 CBC MEASURING BD is correctly installed.</p> <p>If the problem fails to improve from the foregoing countermeasures, replace the following parts as needed.</p> <ul style="list-style-type: none"> • Cable • MC-130W CBC MEASURING UNIT • UT-7312 CBC MEASURING BD • AMP CONTROL BD <p>[Restore] key operation: The message is canceled without any action being taken.</p>
24501	HGB circuit abnormality	HGB circuit is not working properly due to a faulty board	<p>Check the cables of the MH-130W HGB MEASURING UNIT.</p> <ul style="list-style-type: none"> • There is no splashed liquid, corrosion or broken pins in the connector. • The cable is not cut, connected, not pinched, or its connector is partially inserted or disconnected. • Disconnecting and connecting the cable resolve the issue. <p>If the problem fails to improve from the foregoing countermeasures, replace the following parts as needed.</p> <ul style="list-style-type: none"> • Cable • MH-130W HGB MEASURING UNIT • UT-7289 HGB/SS LED BD • UT-7290 HGB/SS AMP BD • AMP CONTROL BD <p>[Restore] key operation: The message is canceled without any action being taken.</p>
		The analyzer has not been filled with diluent (ISOTONAC-3).	<p>Run priming on installation.</p> <p> 7-2-4-7 (p.7-22)</p> <p>[Restore] key operation: The message is canceled without any action being taken.</p>
24514	Air bubbles in HGB blank	HGB unit detected bubbles during measurement.	<p>Remeasure.</p> <p>If the message occurs often, clean and remeasure.</p> <p> 7-2-4-2 (p.7-17)</p> <p>[Restore] key operation: The message is canceled without any action being taken.</p>
24516	Sampling nozzle clog	Even though reagent is in the cartridge, it fails to dispense properly.	<p>Check the flow path from the sampling nozzle to the No.1 valve.</p> <p>[Restore] key operation: The message is canceled without any action being taken.</p>


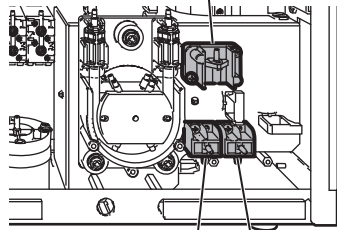
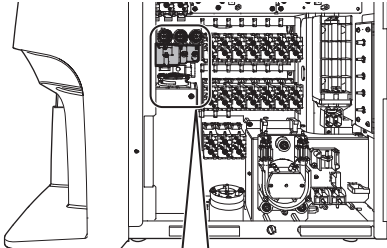
3. Troubleshooting

Code	Error	Possible Cause	Action
25000	Maintenance parts out of date (sampling nozzle)	The use of maintenance parts has exceeded the specified number of measurements.	Replace the periodic maintenance parts to which this applies.  7-4 (p.7-65) [Restore] key operation: The message is canceled without any action being taken.
25001	Maintenance parts out of date (release nozzle)	The use of maintenance parts has exceeded the specified number of measurements.	Replace the periodic maintenance parts to which this applies.  7-4 (p.7-65) [Restore] key operation: The message is canceled without any action being taken.
25002	Maintenance parts out of date (HGB filter (FL1))		
25003	Maintenance parts out of date (Open mode filter (FL2))		
25004	Maintenance parts out of date (Closed mode filter (FL3))		
25005	Maintenance parts out of date (pump tube)		
25006	Maintenance parts out of date (rinse unit)		
25007	Maintenance parts out of date (ESR pump tube)		
25008	Maintenance parts out of date (ESR valve tube)		
26000	Time to perform protein cleaning.		
27000	Test cartridge heating time period exceeded	15 minutes passed since the test cartridge was set.	Set a new test cartridge and remeasure. Note: When more than 15 minutes elapses since a test cartridge is set, its liquid starts concentrating, so an accurate measurement cannot be achieved. [Restore] key operation: Initialized all drive units.


Code	Error	Possible Cause	Action
27001	Abnormal temperature increase during measurement	The cartridge holder and/or room temperature are too high.	Take the following steps. 1) Bring the room temperature to 15 to 30°C (59 to 86°F) and remeasure. 2) Check the cables of the MC-131W CHM MEASURING UNIT. • There is no liquid splashed on the sensor connector. • The cable is not cut, connected, not pinched, or its connector is partially inserted or disconnected. • Disconnecting and connecting the cable resolve the issue.
27002	Abnormal temperature decrease during measurement	The cartridge holder and/or room temperature are too low.	If the problem fails to improve from the foregoing countermeasures, replace the following parts as needed. • MC-131W CHM MEASURING UNIT • UT-7308 CHM MEASURING BD • Cable • UT-7296 POWER BD • AMP CONTROL BD [Restore] key operation: The message is canceled without any action being taken.
27100	Test cartridge lifetime expired	The expiration date of the test cartridge being used has passed.	Remeasure with a new test cartridge that is within its expiration date. [Restore] key operation: The message is canceled without any action being taken.
27101	Test cartridge already used.	Re-set a used test cartridge.	Take the following steps. 1) Check whether the test cartridge is already used or if the position 4 is scratched.  Position 4 2) Check whether the light path of the cartridge holder is dirty; if so, clean it.  7-5-2-8 (p.7-94) 3) Adjust the cell block photometric voltage.  6-6 (p.6-12) [Restore] key operation: The message is canceled without any action being taken.
27102	Test cartridge inverted or volume of fluid is insufficient.	Bubbles detected in the test cartridge.	Take the following steps. 1) Check whether there are bubbles in the test cartridge or if it is scratched. 2) Check whether the light path of the cartridge holder is dirty; if so, clean it.  7-5-2-8 (p.7-94) 3) Adjust the cell block photometric voltage.  6-6 (p.6-12) [Restore] key operation: The message is canceled without any action being taken.

3. Troubleshooting

Code	Error	Possible Cause	Action
27103	Test cartridge is frozen	<ul style="list-style-type: none"> The test cartridge is frozen. Improper photometric adjustment 	Conduct measurement using a new test cartridge.
27104	Condensation on test cartridge	<ul style="list-style-type: none"> Condensation has formed on the test cartridge. Improper photometric adjustment 	Wipe the outside of the test cartridge with a dry cloth, and then load the test cartridge again.
27105	QR code read error	Failed to read the QR code of the test cartridge with the QR code reader.	<p>Take the following steps.</p> <ol style="list-style-type: none"> 1) Check whether the QR code of the test cartridge is dirty or pasted in the wrong position. 2) Check whether there is something between the QR code reader and the QR code. 3) Recheck with a new test cartridge. <p>[Restore] key operation: The message is canceled without any action being taken.</p>
27106	Incorrect parameters	Test cartridge detected whose purpose is other than the parameter.	<p>Take the following steps.</p> <ol style="list-style-type: none"> 1) Check if it is the test cartridge specified by the analyzer. 2) Recheck with a new test cartridge. <p>[Restore] key operation: The message is canceled without any action being taken.</p>
27107	Check test cartridge	<p>Error detected with the test cartridge itself or the reagent.</p> 	<p>Take the following steps.</p> <ol style="list-style-type: none"> 1) Check the following points for the test cartridge. <ul style="list-style-type: none"> • Check whether the test cartridge is already used. • Check whether position 1 is scratched. • There are bubbles in position 1.  <p>CBC MEASURING UNIT (MC-130W)</p> <p>The liquid sensors are inside the slit (2 places, upper & lower).</p> <ol style="list-style-type: none"> 2) Check whether the light path of the cartridge holder is dirty; if so, clean it.  7-5-2-8 (p.7-94) 3) Adjust the cell block photometric voltage.  6-6 (p.6-12) <p>[Restore] key operation: The message is canceled without any action being taken.</p>
28000	WBC manometer upper sensor adjustment error	<p>Error detected in the adjustment of the WBC manometer.</p> 	<p>Check whether or not there is diluent in the manometer; readjust the WBC manometer.  6-3 (p.6-5)</p> <p>[Restore] key operation: The message is canceled without any action being taken.</p>
28001	WBC manometer lower sensor adjustment error	<p>The liquid sensors are inside the slit (2 places, upper & lower).</p>	

Code	Error	Possible Cause	Action
28002	Error in ISOTONAC-3/4 port sensor adjustment	Error detected in the adjustment of the liquid sensor and/or the LIQUID SENSOR BD.	Check whether or not there is reagent at each of the liquid sensors; readjust the liquid sensor and/or the LIQUID SENSOR BD.  6-4 (p.6-7)
28003	HEMOLYNAC-310 port sensor adjustment error	 <p>Diluent Sensor</p> <p>Lysing Reagent Sensor</p> <p>Detergent Sensor</p>	[Restore] key operation: The message is canceled without any action being taken.
28004	Detergent port sensor adjustment error		
28005	HGB sensor adjustment error		<p>Detected an error in HGB voltage during HGB adjustment</p>  <p>HGB MEASURING UNIT (MH-130W)</p>
28006	ESR sensor adjustment error	<p>In automatic adjustment measurement, the adjustment and confirmation measurement value or reference blank value was outside the range.</p> <ul style="list-style-type: none"> • The adjustment and confirmation measurement value was not within the range of adjustment target value ± 15. • There was a difference of 500 or more in the reference blank values CH1 and CH2. 	<p>Touch the [Restore] key.</p> <p>Check that there is no difference from the assay values of MEK-CAL where the target value is being used. This may also be due to deterioration of the sample, and so use a new MEK-CAL.</p> <p>Run protein cleaning.</p> <p>If it still fails to improve, check the following.</p> <ul style="list-style-type: none"> • Check that no liquid has splashed on the connectors of the board • Check that no cables are damaged, disconnected, pinched, missing a connector, or partially inserted. • Check whether removing and reinserting the cables fixes the problem. <p>If the problem fails to improve from the foregoing countermeasures, replace the following parts as needed</p> <ul style="list-style-type: none"> • Cable • ME-130W ESR MEASURING UNIT • UT-7296 POWER BD • AMP CONTROL BD <p>[Restore] key operation: The message is canceled without any action being taken.</p>

3. Troubleshooting

Code	Error	Possible Cause	Action
29800	Time error detected	The device's clock was reset.	<p>Check the voltage of the internal battery from the Circuit Test window (P.7-9) of Self Check Results and replace the battery.</p> <p> 7-4-1-12 (p.7-87)</p> <p>[Restore] key operation:</p> <p>The message is canceled without any action being taken.</p>
29901	Internal memory read error	SD card could not be detected.	<p>Restart the analyzer and check the following.</p> <ul style="list-style-type: none"> • The SD card was removed after start up. • Disconnecting and connecting the SD card resolve the issue. <p>If the problem fails to improve from the foregoing countermeasures, replace the following part as needed.</p> <ul style="list-style-type: none"> • AMP CONTROL BD <p>[Restore] key operation:</p> <p>The message is canceled without any action being taken.</p>
29902	Could not access SD card	Failed to access to the SD card.	<p>Take the following steps.</p> <ol style="list-style-type: none"> 1) Check the following. <ul style="list-style-type: none"> • The SD card was removed after start up. • The SD card is full. • The SD card has been write protected. 2) Restart the analyzer and check the following. <ul style="list-style-type: none"> • Disconnecting and connecting the SD card resolve the issue. <p>If the problem fails to improve from the foregoing countermeasures, replace the following part as needed.</p> <ul style="list-style-type: none"> • AMP CONTROL BD <p>[Restore] key operation:</p> <p>The message is canceled without any action being taken.</p>









3-9. User Information [4xxxx]

The Information key [**i**] starts blinking when user information is detected.







The Information screen does not open automatically.


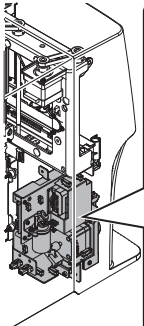
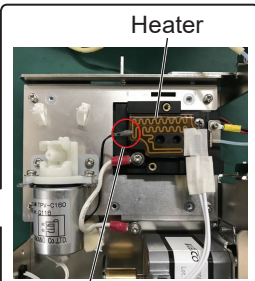
NOTE: User information [4xxxx] indicates a message of low severity and the same content is available in Measurement messages [6xxxx].

3

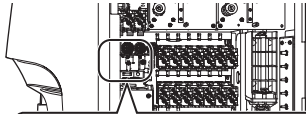
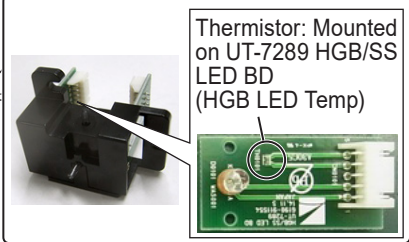


Code	Error	Possible Cause	Action
41000	Time to perform self check	<ul style="list-style-type: none"> Failed to run a self check after login. 25 hours have elapsed since the last self check. 	Touch the [Restore] key and run Self Check on the Maintenance screen.  7-2-2-2 (p.7-6) [Restore] key operation: The message is canceled without any action being taken.
41001	QC implementation period	More than 25 hours since last quality control measurement.	Touch the [Restore] key and run quality control.  MEK-1300 Series Operator's Manual [Restore] key operation: The message is canceled without any action being taken.
42100	WBC upper manometer dirty	Due to the WBC manometer being dirty, the voltage (voltage that detects the presence of liquid) of the upper LED in the manometer changed from the adjusted value during measurement.	Touch the [Restore] key and run Clean WBC Manometer on the Maintenance screen.  7-2-4-4 (p.7-19) If taking these steps fails to resolve it, adjust the WBC manometer and adjust the voltage of "WBC manometer, upper".  6-3 (p.6-5) [Restore] key operation: The message is canceled without any action being taken.
42101	WBC lower manometer dirty	Due to the WBC manometer being dirty, the voltage (voltage that detects the presence of liquid) of the lower LED in the manometer changed from the adjusted value during measurement.	Touch the [Restore] key and run Clean WBC Manometer on the Maintenance screen.  7-2-4-4 (p.7-19) If taking these steps fails to resolve it, adjust the WBC manometer and adjust the voltage of "WBC manometer, lower".  6-3 (p.6-5) [Restore] key operation: The message is canceled without any action being taken.
43010	ISOTONAC-3 lifetime expired	<ul style="list-style-type: none"> Exceeded the expiration date of the reagent. Exceeded the expiration date after opening the reagent. 	Touch the [Restore] key and register a new reagent.  MEK-1300 Series Operator's Manual [Restore] key operation: Displays the Reagent Management screen
43011	HEMOLYNAC-310 lifetime expired		
43012	CLEANAC-710 lifetime expired		
43013	CLEANAC-3 lifetime expired		
43020	ISOTONAC-3 low levels remaining	Below the warning amount in remaining reagent volume.	Touch the [Restore] key and register a new reagent.  MEK-1300 Series Operator's Manual [Restore] key operation: The message is canceled without any action being taken.
43021	HEMOLYNAC-310 low levels remaining		
43022	CLEANAC-710 low levels remaining		
43023	CLEANAC-3 low levels remaining		

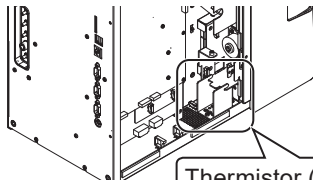

3. Troubleshooting

Code	Error	Possible Cause	Action
44100	WBC air bubble 1	When the liquid of the WBC manometer started to lower, the sensor that had previously detected the liquid as full detected air (bubbles).	Touch the [Restore] key and remeasure. If the message appears frequently, run Clean WBC Manometer on the Maintenance screen.  7-2-4-4 (p.7-19)
44101	WBC air bubble 2	While the liquid of the WBC manometer was lowering, the upper sensor of the manometer, which had previously detected air (no liquid), detected liquid.	If the problem fails to improve from the foregoing countermeasures, check the following. • Check operation of valves • Check for air leaks and/or kinks in the flow path.
44102	WBC air bubble 3	When the liquid of the WBC manometer started to rise while measuring the pulse, the lower sensor that had previously detected the liquid as full detected air (bubbles).	[Restore] key operation: The message is canceled without any action being taken.
44103	WBC air bubble 4	As the measurement time of blood cell pulse was too fast, the analyzer may have detected either bubbles mixed in or a leak.	
44107	WBC Aperture Clog	As the measurement time of blood cell pulse was too slow, the analyzer detected that the detection hole may be clogged.	Touch the [Restore] key and remeasure. If the message appears frequently, take the following steps. 1) Run Clean Protein of the measuring unit from the Maintenance screen.  7-2-4-5 (p.7-20) 2) Run Remove Clog on the Maintenance screen.  7-2-4-6 (p.7-21) If the problem fails to improve from the foregoing countermeasures, check the following. • Check operation of valves • Check for air leaks and/or kinks in the flow path. [Restore] key operation: Performs cleaning.
44111	Air bubble in WBC unit	Blood cell pulse containing bubbles detected during WBC measurement	Touch the [Restore] key and remeasure. If the message appears frequently, take the following steps. 1) Run Clean Protein of the measuring unit from the Maintenance screen.  7-2-4-5 (p.7-20) 2) Run Remove Clog on the Maintenance screen.  7-2-4-6 (p.7-21) If the problem fails to improve from the foregoing countermeasures, check the following. • Check operation of valves • Check for air leaks and/or kinks in the flow path. [Restore] key operation: The message is canceled without any action being taken.
44401	ESR Air Bubble	An error was detected in the light receiving value during measurement. • External noise • Bubbles mixed into measurement unit	Touch the [Restore] key and remeasure. If the problem is not resolved after remeasuring, run measuring unit protein cleaning from the Maintenance screen.  7-2-4-5 (p.7-20) If the problem fails to be resolved by the above corrective actions, check the following. • Check operation of the solenoid valves • Check for air leaks and kinks in flow path [Restore] key operation: The message is canceled without any action being taken.

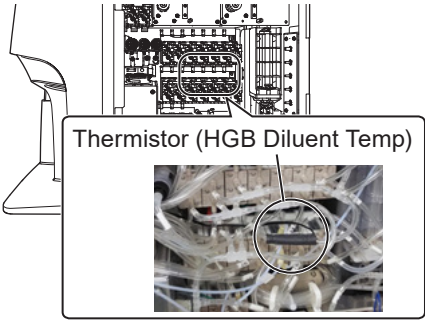



Code	Error	Possible Cause	Action
44402	ESR Analyze Impossible	An error was detected in the light receiving value during measurement. <ul style="list-style-type: none"> • Bubbles mixed into measurement unit • Short Sample • Sampling nozzle clog 	Touch the [Restore] key and remeasure. If the message occurs frequently, run measuring unit protein cleaning on the Maintenance screen.  7-2-4-5 (p.7-20) If the problem fails to be resolved by the above corrective actions, check the following. <ul style="list-style-type: none"> • Check operation of the solenoid valves • Check for air leaks and kinks in flow path [Restore] key operation: The message is canceled without any action being taken.
44403	RBC Aggrgtn Cannot Detect	An error was detected in the light receiving value during measurement. <ul style="list-style-type: none"> • Short Sample • Problem originating from sample 	Touch the [Restore] key. In the hematology controls (MEK-3DL/3DN), no aggregation reaction could be detected, and so remeasure in QC mode. If the problem is not resolved after remeasuring, check that the sampling nozzle is not clogged and that the sample flow route is not leaking. [Restore] key operation: The message is canceled without any action being taken.
44407	No liquid in ESR Meas Unit	An empty liquid state was detected by the impedance sensor linked to the ESR cup during measurement. <ul style="list-style-type: none"> • The liquid in the ESR cup evaporated because it was left for an extended period of time. • The analyzer is out of liquid. 	Touch the [Restore] key, and remeasure after checking that there is enough remaining diluent. If the problem is not resolved after remeasuring, check the there is enough liquid in the ESR cup. [Restore] key operation: The message is canceled without any action being taken.
44408	ESR Meas Unit Temp Rise	During measurement, the thermistor of the ESR measuring unit was outside the temperature range of 36.7°C to 37.3°C (98.06° to 99.14°F). (Low: Under 36.7°C (98.06°F), High: Above 37.3°C (99.14°F))	Bring the room temperature to a range of 15°C to 30°C (59 to 86°F), and remeasure. If the problem is not resolved after remeasuring, check the following. <ul style="list-style-type: none"> • Check that no liquid has splashed on the connectors of the board • Check that no cables are damaged, disconnected, pinched, missing a connector, or partially inserted. • Check whether removing and reinserting the cables fixes the problem.
44409	ESR LED Temperature Drop	  <p>Heater</p> <p>Thermistor (ESR measurement unit temperature)</p>	If the problem fails to improve from the foregoing countermeasures, replace the following parts as needed. <ul style="list-style-type: none"> • Cable • ME-130W ESR MEASURING UNIT • UT-7296 POWER BD • AMP CONTROL BD [Restore] key operation: The message is canceled without any action being taken.

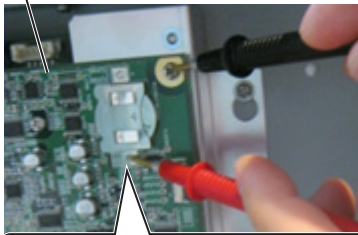
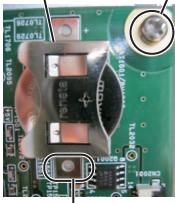





3. Troubleshooting

Code	Error	Possible Cause	Action
44503	HGB LED Temperature Drop	<p>During measurement the upper thermistor of the UT-7289 HGB/SS LED BD was outside the temperature range 10 to 50°C (50 to 122°F)</p> <p>(Low: under 10°C (50°F), High: above 50°C (122°F))</p> 	<p>Bring the room temperature to 15 to 30°C (59 to 86°F) and remeasure.</p> <p>If it is not resolved after remeasuring, check the following.</p> <ul style="list-style-type: none"> • There is no liquid splashed on the board connector. • The cable is not cut, connected, not pinched, or its connector is partially inserted or disconnected. • Disconnecting and connecting the cable resolve the issue.
44504	HGB LED Temperature Rise	 <p>Thermistor: Mounted on UT-7289 HGB/SS LED BD (HGB LED Temp)</p>	<p>If the problem fails to improve from the foregoing countermeasures, replace the following parts as needed.</p> <ul style="list-style-type: none"> • Cable • UT-7289 HGB/SS LED BD • MH-130W HGB MEASURING UNIT • AMP CONTROL BD <p>[Restore] key operation: The message is canceled without any action being taken.</p>
44505	HGB voltage drop	<p>Voltage abnormal during measurement of HGB blanks for each measurement</p>	<p>Touch the [Restore] key.</p> <p>If it occurs frequently, restart the analyzer and run Self Check on the Maintenance screen.</p> <p> 7-2-2-2 (p.7-6)</p> <p>If it still fails to improve, take the following steps.</p> <ul style="list-style-type: none"> • Adjust the HGB. <ul style="list-style-type: none">  6-5 (p.6-10) • Check the cables of the MH-130W HGB MEASURING UNIT. <ul style="list-style-type: none"> - There is no splashed liquid, corrosion or broken pins in the connector. - The cable is not cut, connected, not pinched, or its connector is partially inserted or disconnected. - Disconnecting and connecting the cable resolve the issue. <p>If the problem fails to improve from the foregoing countermeasures, replace the following parts as needed.</p> <ul style="list-style-type: none"> • Cable • MH-130W HGB MEASURING UNIT • UT-7289 HGB/SS LED BD • UT-7290 HGB/SS AMP BD • AMP CONTROL BD <p>[Restore] key operation: The message is canceled without any action being taken.</p>



Code	Error	Possible Cause	Action
44506	HGB voltage increase	Voltage abnormal during measurement of HGB blanks for each measurement	<p>Touch the [Restore] key, and run Clean Protein or Measuring Unit Protein Cleaning.</p> <ul style="list-style-type: none"> • 7-2-4-3 (p.7-18) • 7-2-4-5 (p.7-20) <p>If it still fails to improve, take the following steps.</p> <ul style="list-style-type: none"> • Adjust the HGB. <ul style="list-style-type: none"> • 6-5 (p.6-10) • Check the cables of the MH-130W HGB MEASURING UNIT. <ul style="list-style-type: none"> - There is no splashed liquid, corrosion or broken pins in the connector. - The cable is not cut, connected, not pinched, or its connector is partially inserted or disconnected. - Disconnecting and connecting the cable resolve the issue. <p>If the problem fails to improve from the foregoing countermeasures, replace the following parts as needed.</p> <ul style="list-style-type: none"> • Cable • MH-130W HGB MEASURING UNIT • UT-7289 HGB/SS LED BD • UT-7290 HGB/SS AMP BD • AMP CONTROL BD <p>[Restore] key operation: The message is canceled without any action being taken.</p>
44508	Chassis internal temperature decrease (bottom)	Abnormal temperature inside chassis confirmed for each measurement	<p>Bring the room temperature to 15 to 30°C (59 to 86°F) and remeasure.</p> <p>If it is not resolved after remeasuring, check the following.</p> <ul style="list-style-type: none"> • There is no liquid splashed on the sensor connector. • The cable is not cut, connected, not pinched, or its connector is partially inserted or disconnected. • Disconnecting and connecting the cable resolve the issue. <p>If the problem fails to improve from the foregoing countermeasures, replace the following parts as needed.</p> <ul style="list-style-type: none"> • Cable • AMP CONTROL BD
44509	Chassis internal temperature increase (bottom)	 <p>Thermistor (Chassis Bottom Temp)</p> 	

3. Troubleshooting

Code	Error	Possible Cause	Action
44512	HGB diluent temperature decrease	<p>Abnormal HGB diluent temperature confirmed for each measurement</p> 	<p>Bring the temperature of the connected ISOTONAC• 3 to 15 to 30°C (59 to 86°F) and remeasure.</p> <p>If it is not resolved after remeasuring, check the following.</p> <ul style="list-style-type: none"> • The room temperature is 15 to 30°C (59 to 86°F). • There is no liquid splashed on the sensor connector. • The cable is not cut, connected, not pinched, or its connector is partially inserted or disconnected. • Disconnecting and connecting the cable resolve the issue. <p>If the problem fails to improve from the foregoing countermeasures, replace the following parts as needed.</p> <ul style="list-style-type: none"> • Cable • AMP CONTROL BD <p>[Restore] key operation: The message is canceled without any action being taken.</p>
44513	HGB diluent temperature increase	<p>Results of background check are outside the designed range.</p>	<p>Touch the [Restore] key, take the following steps and run Self Check on the Maintenance screen.</p> <p> 7-2-2-2 (p.7-6)</p> <ul style="list-style-type: none"> • As it may be caused by bubbles still in the analyzer, or from being dirty, run either Clean Protein or Clean from the Maintenance screen. <ul style="list-style-type: none"> •  7-2-4-3 (p.7-18) •  7-2-4-2 (p.7-17) • Check each reagent for contamination and replace with new ones if needed. • Check the expiration date of each reagent (if past the expiration date, the reagent deteriorates and may affect the background). • Check whether each reagent has been added to. • Check whether the diluent has been divided into small portions (the bottle may be contaminated). • If the tubing connected the reagent and the analyzer is old, replace with new tubing. • Check whether the analyzer (board or components) is faulty. • Check the external environment (grounding or the like) • Check the expiration date and number of uses of periodic replacement parts. <p>[Restore] key operation: The message is canceled without any action being taken.</p>
44515	Background interference up		

Code	Error	Possible Cause	Action
45000	Internal battery voltage drop	<p>Drop detected in the voltage of the internal battery.</p> <p>AMP CONTROL BD</p>  <p>Internal Battery Screw (GND)</p>  <p>Metal Part (Voltage)</p> <p>Test the voltage (voltage between screw of AMP CONTROL BD and metal part).</p> <ul style="list-style-type: none"> • Under 2.75 V: Replace the internal battery. • 2.75 V or higher: Replace the AMP CONTROL BD. 	<p>Confirm that the voltage (voltage between screw of AMP CONTROL BD and metal part) of the internal battery has dropped below 2.75 V and replace it.</p> <p> 7-4-1-12 (p.7-87)</p> <p>If the battery voltage is 2.75 or higher, replace the AMP CONTROL BD. (The internal battery is normal.)</p> <p>[Restore] key operation: The message is canceled without any action being taken.</p>
45100	Abnormal temperature during self check	Abnormal temperature of parts detected during self check.	<p>Check the results of the self check and take the relevant measures.</p> <p> 7-2-2-3 (p.7-7)</p> <p>[Restore] key operation: The message is canceled without any action being taken.</p>
46000	Protein cleaning not done	Although the number at which protein cleaning is prompted has been reached since the last protein cleaning, since then it has not been done after shutting the power OFF (or it was interrupted).	<p>Take one of the following steps.</p> <ul style="list-style-type: none"> • Run protein cleaning on the Maintenance screen. <p> 7-2-4-3 (p.7-18)</p> <ul style="list-style-type: none"> • Run protein cleaning when the power is shut OFF. <p>[Restore] key operation: The message is canceled without any action being taken.</p>
46001	Protein cleaning period	The number at which protein cleaning is prompted since the last protein cleaning has been reached.	<p>The number of measurements prescribed before prompting protein cleaning is set in the Advanced window of System Settings.</p>
47000	Maintenance parts replacement period (sample tube)	<p>The safe range for the sampling nozzle usage count (80% of the usage limit) has been reached.</p> <p>(If use continues, this is displayed after that point at 85%, 90%, 95% and 100%.)</p>	<p>Check and replace the sampling nozzle and then reset the usage count.</p> <p> 7-4-1-7 (p.7-79)</p> <p>[Restore] key operation: The message is canceled without any action being taken.</p>
47001	Maintenance parts replacement period (release nozzle)	<p>The safe range for the release nozzle usage count (80% of the usage limit) has been reached.</p> <p>(If use continues, this is displayed after that point at 85%, 90%, 95% and 100%.)</p>	<p>Check and replace the release nozzle and then reset the usage count.</p> <p> 7-4-1-5 (p.7-73)</p> <p>[Restore] key operation: The message is canceled without any action being taken.</p>

3. Troubleshooting

Code	Error	Possible Cause	Action
47002	maintenance parts replacement period (HGB filter (FL1))	The safe range for the filter usage count (80% of the usage limit) has been reached. (If use continues, this is displayed after that point at 85%, 90%, 95% and 100%.)	Check and replace relevant filters and then reset the usage count.  7-4-1-3 (p.7-66)
47003	maintenance parts replacement period (Open mode filter (FL2))		[Restore] key operation: The message is canceled without any action being taken.
47004	Maintenance parts replacement period (Closed mode filter (FL3) usage count)		
47005	Maintenance parts replacement period (pump tube)		
47006	Maintenance parts replacement period (rinse unit)	The safe range for the rinse unit usage count (80% of the usage limit) has been reached. (If use continues, this is displayed after that point at 85%, 90%, 95% and 100%.)	Check and replace the rinse unit and then reset the usage count.  7-4-1-6 (p.7-77)
47007	Maintenance parts replacement period (ESR pump tube)	The safe range for the ESR pump tube usage count (80% of the usage limit) has been exceeded. (If usage is continued, this is displayed when reaching 85%, 90%, 95%, and 100%.)	Check and replace the ESR pump tube, and then reset the usage count. [Restore] key operation: The message is canceled without any action being taken.
47008	Maintenance parts replacement period (ESR valve tube)	The safe range for the ESR valve tube usage count (80% of the usage limit) has been exceeded. (If usage is continued, this is displayed when reaching 85%, 90%, 95%, and 100%.)	Check and replace the ESR valve tube, and then reset the usage count. [Restore] key operation: The message is canceled without any action being taken.
48000	Compact printer error	Error detected with the compact printer.	Check the following items. <ul style="list-style-type: none"> • Printer is not out of recording paper • Paper tray cover is closed • Printer is turned on If the problem fails to improve from the foregoing countermeasures, replace the following part as needed. <ul style="list-style-type: none"> • Compact printer [Restore] key operation: The message is canceled without any action being taken.
48001	Compact printer not connected	Printer cable not connected.	Check the printer cable. <ul style="list-style-type: none"> • There is no liquid splashed on the cable connector. • The cable is not cut, connected, not pinched, or its connector is partially inserted or disconnected. • Disconnecting and connecting the cable resolve the issue. If the problem fails to improve from the foregoing countermeasures, replace the following parts as needed. <ul style="list-style-type: none"> • Compact printer [Restore] key operation: The message is canceled without any action being taken.

Code	Error	Possible Cause	Action
48100	ASTM data abnormality	Invalid data was received (time synchronization)	<p>Check the following.</p> <ul style="list-style-type: none"> • Check whether removing and reinserting the cables fixes the problem. • Check that no cables are damaged, disconnected, pinched, missing a connector, or partially inserted. • Check whether restarting the connected PC fixes the problem. • Check whether restarting the analyzer fixes the problem <p>[Restore] key operation: The message is canceled without any action being taken.</p>
48101	ASTM timeout	<ul style="list-style-type: none"> • A cable is disconnected. • Communication settings do not match. • NACK response from other communication device • No response from other communication device 	<p>Check the following.</p> <ul style="list-style-type: none"> • Check the communication settings for the analyzer and connection destination • Check whether removing and reinserting the cables fixes the problem. • Check that no liquid has splashed on the connectors of the cable • Check that no cables are damaged, disconnected, pinched, missing a connector, or partially inserted • Check whether restarting the connected PC fixes the problem. • Check whether restarting the analyzer fixes the problem <p>[Restore] key operation: The message is canceled without any action being taken.</p>
48200	Order data abnormality	Invalid data was received (order information).	<p>Check the following.</p> <ul style="list-style-type: none"> • Check the PC application version, target analyzer, and connected COM port. • Check that no cables are damaged, disconnected, pinched, missing a connector, or partially inserted • Check whether removing and reinserting the cables fixes the problem • Check whether restarting the connected PC fixes the problem. • Check whether restarting the analyzer fixes the problem <p>[Restore] key operation: The message is canceled without any action being taken.</p>

3. Troubleshooting









Code	Error	Possible Cause	Action
48201	Order timeout	<ul style="list-style-type: none"> • A cable is disconnected. • Communication settings do not match. • No response from other communication device 	<p>Check the following.</p> <ul style="list-style-type: none"> • Check the communication settings for the analyzer and connection destination • Check whether removing and reinserting the cables fixes the problem • Check that no liquid has splashed on the connectors of the cable • Check that no cables are damaged, disconnected, pinched, missing a connector, or partially inserted • Check whether restarting the connected PC fixes the problem • Check whether restarting the analyzer fixes the problem <p>[Restore] key operation: The message is canceled without any action being taken.</p>
48300	PCL printer error	Error detected in the PCL printer.	<p>Check the following.</p> <ul style="list-style-type: none"> • Printer is not out of recording paper • Printer is not out of ink • Printer cover is closed • Paper tray is closed <p>[Restore] key operation: The message is canceled without any action being taken.</p>
48301	PCL printer not connected	<ul style="list-style-type: none"> • The printer is turned off. • A cable is disconnected. 	<p>Check the following.</p> <ul style="list-style-type: none"> • Printer is turned on • Printer is correctly connected to the analyzer by the connection cable <p>[Restore] key operation: The message is canceled without any action being taken.</p>
48900	Abnormal data received	Invalid data received. (Example: CHM-4100)	<p>Check the following.</p> <ul style="list-style-type: none"> • Check that the printer version is compatible with the MEK-1300 series analyzer. • Check that no cables are damaged • Check whether restarting the analyzer fixes the problem <p>[Restore] key operation: The message is canceled without any action being taken.</p>

3-10. Troubleshooting







This is a list of problems, their causes and how to resolve them.

After taking the countermeasures, check and make sure the problem has disappeared and the analyzer is working normally before starting to use it again.

NOTE: If the problem cannot be solved, stop using the analyzer, attach a "Do not use" or "To be repaired" label on it and contact your Nihon Kohden representative.

	Problem	Cause	Countermeasures
1	<ul style="list-style-type: none"> • The power fails to come on • Power turned OFF during operation (Main power supply lamp is off) 	The main power supply on the back of the analyzer is OFF.	Turn the main power supply on the back of the analyzer ON. After the main power supply lamp turns on, press the Power switch on the front of the analyzer. When the power turns OFF during operation, the previous blood sample may still be in the analyzer, so clean the inside after turning the power back ON.  7-2-4-2 (p.7-17)
		The power cord is unplugged.	Plug the power cord in securely, and then turn it ON. When the power turns OFF during operation, the previous blood sample may still be in the analyzer, so clean the inside after turning the power back ON.  7-2-4-2 (p.7-17)
2	<ul style="list-style-type: none"> • Noise during measurement • Excessive background noise 	The ground is not properly connected.	Connect the ground wire securely.
		Nearby device is producing noise.	Isolate the analyzer from the power supply of other devices.
		Noise from a commercial power supply.	Change to another power outlet.
		The front cover was open, allowing noise to affect the measuring unit.	Close the front cover.
		Diluent is dirty.	Replace with new diluent.
		Filter is dirty.	Replace the filter.  7-4-1-3 (p.7-66)
		Sample cup is dirty.	Run protein cleaning.  7-2-4-3 (p.7-18)
		Detection hole is dirty.	Unclog the flow path.  7-2-4-6 (p.7-21) Run protein cleaning.  7-2-4-3 (p.7-18)
		Poor contact with external electrode.	Replace the MC-130W CBC MEASURING UNIT.
		Flow path is dirty.	Run cleaning.  7-2-4-2 (p.7-17)
			Run protein cleaning.  7-2-4-3 (p.7-18)

3. Troubleshooting

Problem		Cause	Countermeasures
3	Blood cell count reproducibility is poor.	Insufficient mixing of samples.	Mix samples thoroughly via inversion mixing at least 20 times, being careful that it does not foam.
		Sample cup is dirty.	Run protein cleaning.  7-2-4-3 (p.7-18)
		Detection hole is dirty.	Unclog the flow path.  7-2-4-6 (p.7-21) Run protein cleaning.  7-2-4-3 (p.7-18)
		Excessive background noise	See item 2 above.
4	There is a water leak.	Valve clogged.	Replace the valve.
		Filter clogged.	Replace the filter.  7-4-1-3 (p.7-66)
5	Poor HGB reproducibility.	HGB cartridge is dirty.	Run protein cleaning.  7-2-4-3 (p.7-18)
6	Cannot print from printer.	No recording paper is set.	Set recording paper.
		Paper jam.	Clear the paper jam.
		Problem in electrical circuit.	Turn the printer OFF and leave it for several minutes; turn the printer back ON.
7	Where the touch panel is touched and where it indicates are different. Screen fails to respond when a touch panel key is pressed.	Touch panel is poorly adjusted.	Touch the [Restore] key and perform the steps below in the order listed. <ul style="list-style-type: none"> • Restart the analyzer. • Make sure the cable connecting the AMP CONTROL BD and the front panel unit are not disconnected, its connectors unplugged or partially inserted. • Replace the UT-7296 POWER BD • Replace the UT-7299 FRONT PANEL BD [Restore] key operation: The message is canceled without any action being taken.
8	Date and/or time setting is incorrect.	Clock error.	Reset the date and time.
9	During the circuit test of the self check, the Battery Volt was judged "FAIL".	Lifetime of backup internal battery.	Replace the internal battery.  7-4-1-12 (p.7-87)

4


Disassembly and Assembly

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4-1. Disassembly Preparation


The following procedures absolutely must be performed prior to disassembling the analyzer.

- 1 Run protein cleaning.

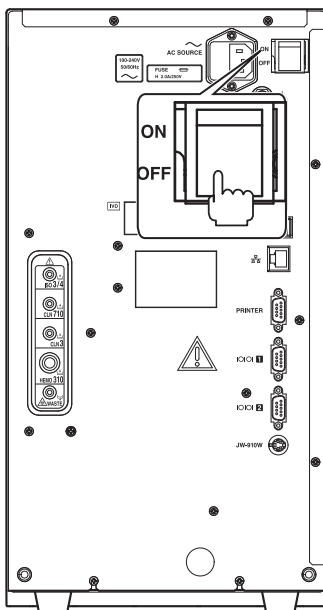
 7-2-4-3 (p.7-18)

- 2 Execute internal draining.

Once internal draining is complete the machine powers OFF automatically.

 7-2-4-8 (p.7-23)

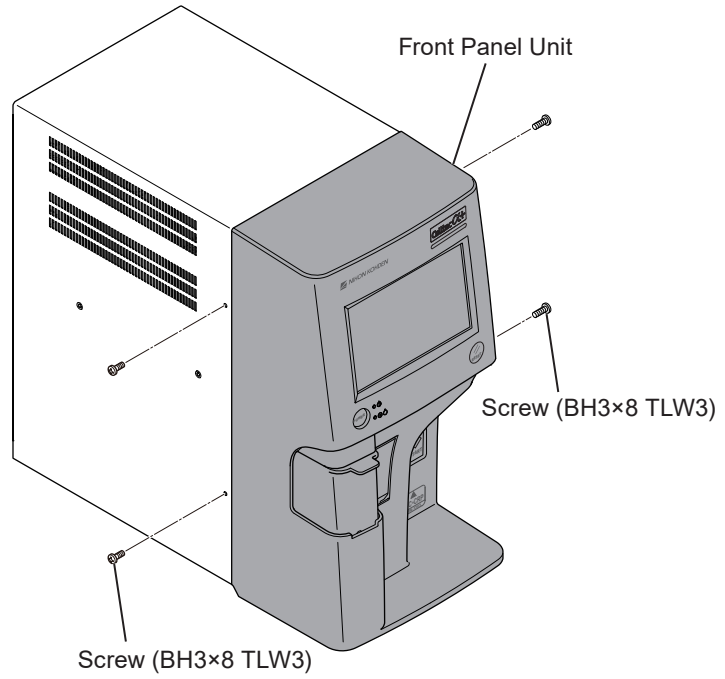
- 3 Turn the sub power switch on the back panel OFF and unplug the power cord from the wall outlet.



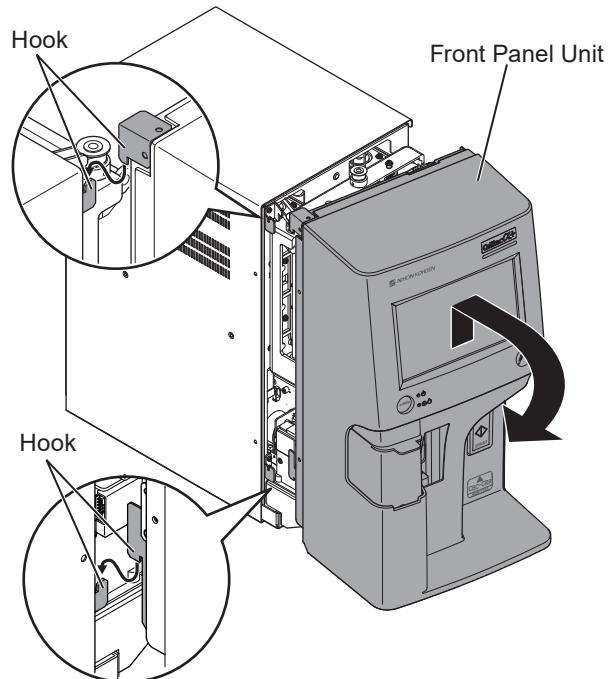
4-2. Opening the FRONT PANEL UNIT

NOTE: Before opening the front panel, make sure the sampling nozzle is stored inside the analyzer.

- 1 Remove the four screws (BH3×8 TLW3) and slightly pull the front panel unit forward.

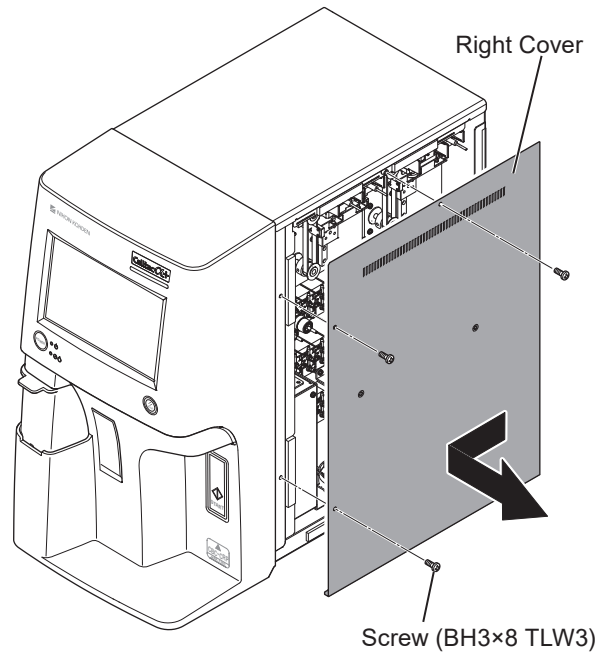


- 2 As shown in the diagram, the front panel unit hooks (2 places, top & bottom) onto the body of the analyzer.



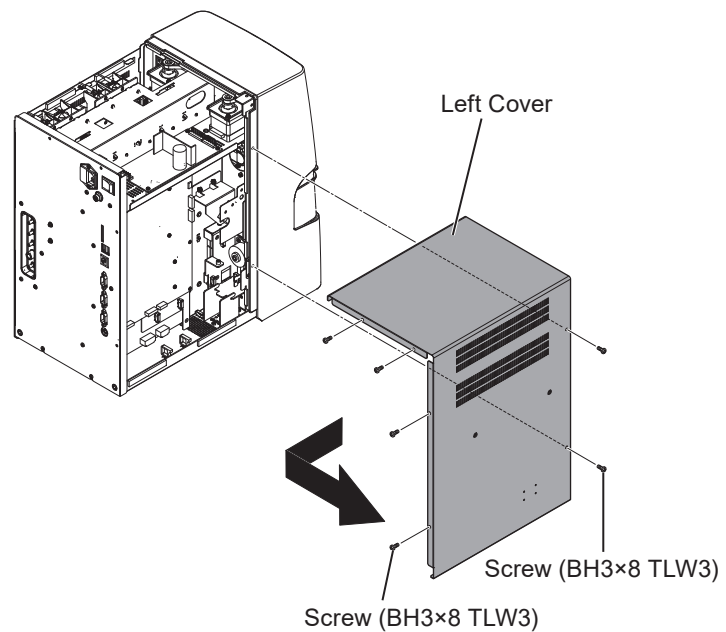
4-3. Removing the Right Cover

- 1 Remove the three screws (BH3×8 TLW3), shift the right cover forward slightly and remove it.



4-4. Removing the Left Cover

- 1 Remove the six screws (BH3×8 TLW3), shift the left cover to the back slightly and remove it.



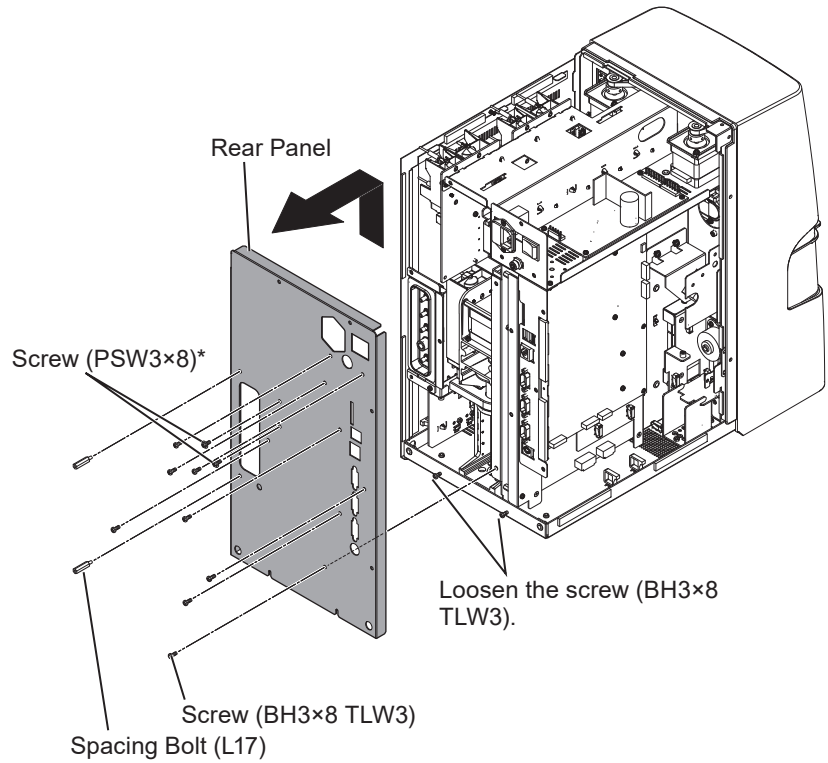
4-5. Removing the Rear Panel

- 1 Remove the left cover.



- 2 Loosen the two BH3×8 TLW3 screws at the bottom of the rear panel.


- 3 Remove the eight screws (BH3×8 TLW3) and two L17 spacing bolts and two screws (PSW3×8), then lift the rear panel up slightly and remove it.



4-6. Removing the Units

4-6-1. Removing the MC-130W CBC MEASURING UNIT

When removing the MC-130W CBC MEASURING UNIT, open the MC-130W window of the Service window and run Clean MC.

 7-3-10-1 (p.7-46)

Refer to Section 6 and adjust as follows.

- “Adjusting the WBC Manometer” (p.6-5)


1 Open the front panel unit.

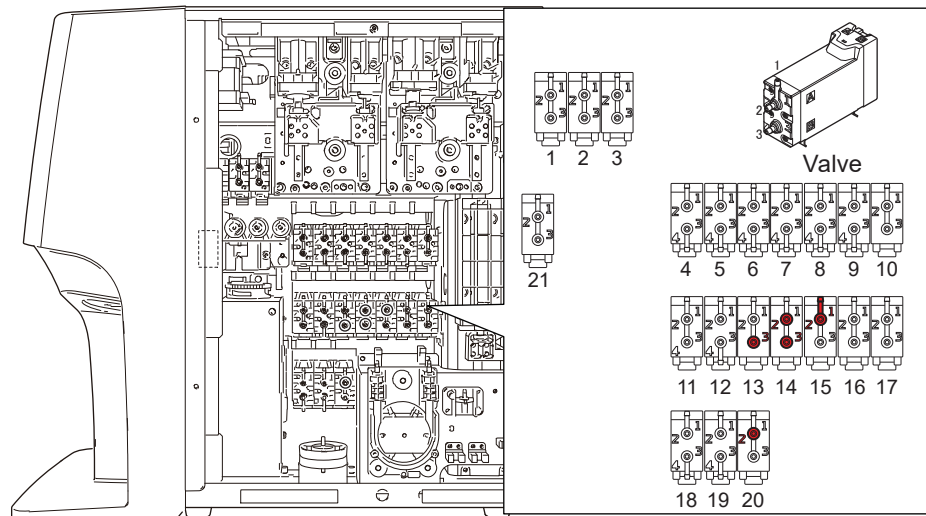
 4-2 (p.4-3)

2 Remove the right cover.

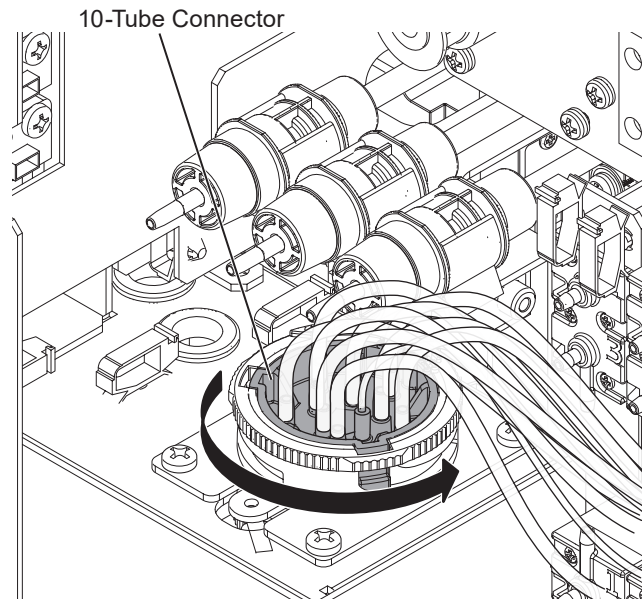
 4-3 (p.4-4)

3 Use a tube removal tool to remove tubes (14-2, 13-3, 14-3, 15-1, 15-2 and 20-2) from the valves.

 4-8-1 (p.4-51)

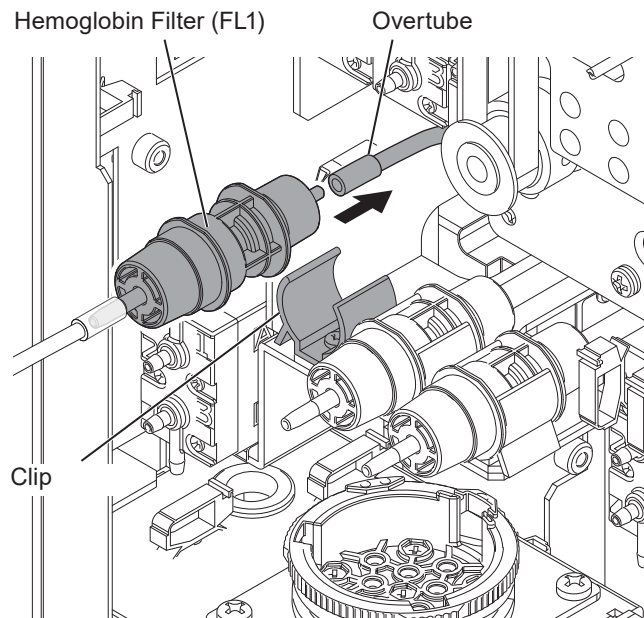


- 4** Rotate the 10-tube connector until it clicks, then lift it up and off.

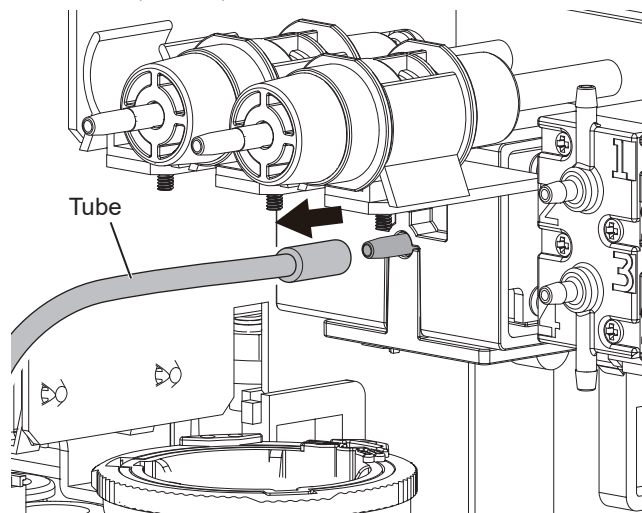


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- 5** Remove the hemoglobin filter (FL1) from its clip and remove the tube (FL1-I) from the rear.

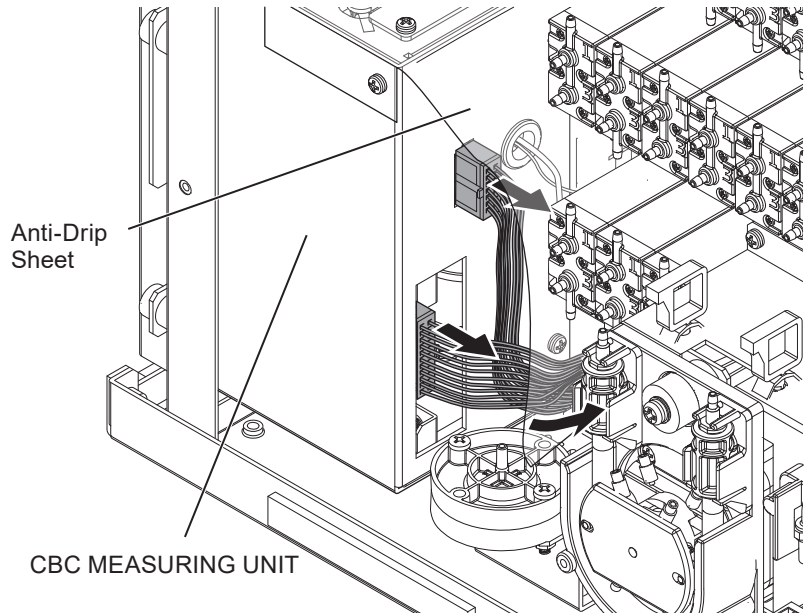


- 6** Pull off the tube (MH-IN) in the back.

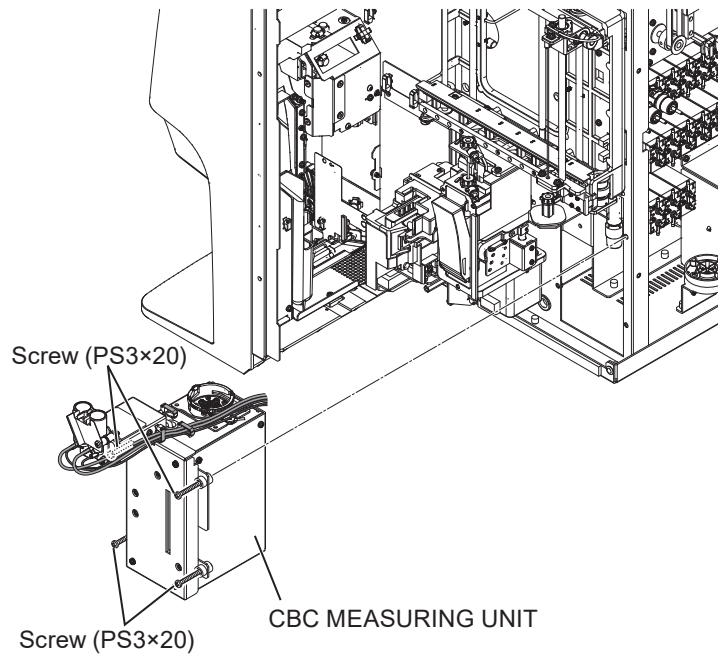


- 7** While holding the anti-drip sheet, remove the two connectors from the CBC MEASURING UNIT.

NOTE: Be careful to disconnect or connect the connector on the lower side of the CBC MEASURING UNIT. The connector has a lock mechanism.



- 8** Gradually loosen the four PS3×20 screws and remove them; pull the CBC MEASURING UNIT forward and remove it.



Notes on Assembly

When installing the CBC MEASURING UNIT, tighten the four screws evenly while the unit is hanging by its own weight (pressing down).

4-6-2. Removing the MC-131W CHM MEASURING UNIT

When replacing the MC-131W CHM MEASURING UNIT, refer to Section 6 and adjust as follows.

- “Adjusting the Sampling Nozzle and the Cell Position (MEK-1303)” (p.6-21)

1 Open the front panel unit.



2 Remove the right cover.



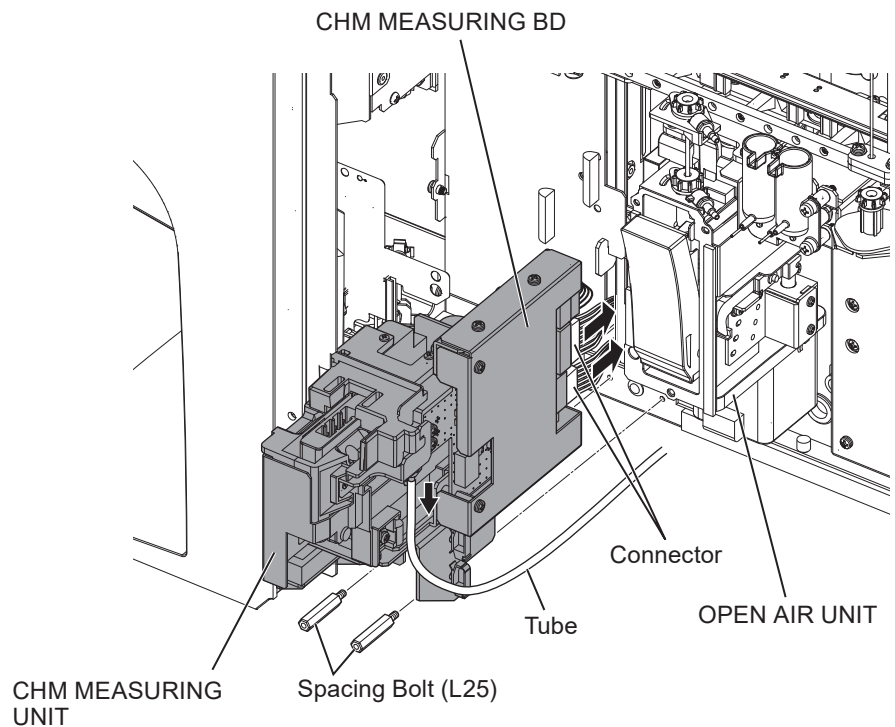
3 Remove the left cover.



4 Remove the two spacing bolts (L25) and disconnect the one tube from the CHM MEASURING UNIT.

5 Remove the two connectors from the CHM MEASURING BD and pull out the CHM MEASURING UNIT.

NOTE: Take care not to touch the OPEN AIR UNIT when removing the CHM MEASURING UNIT.

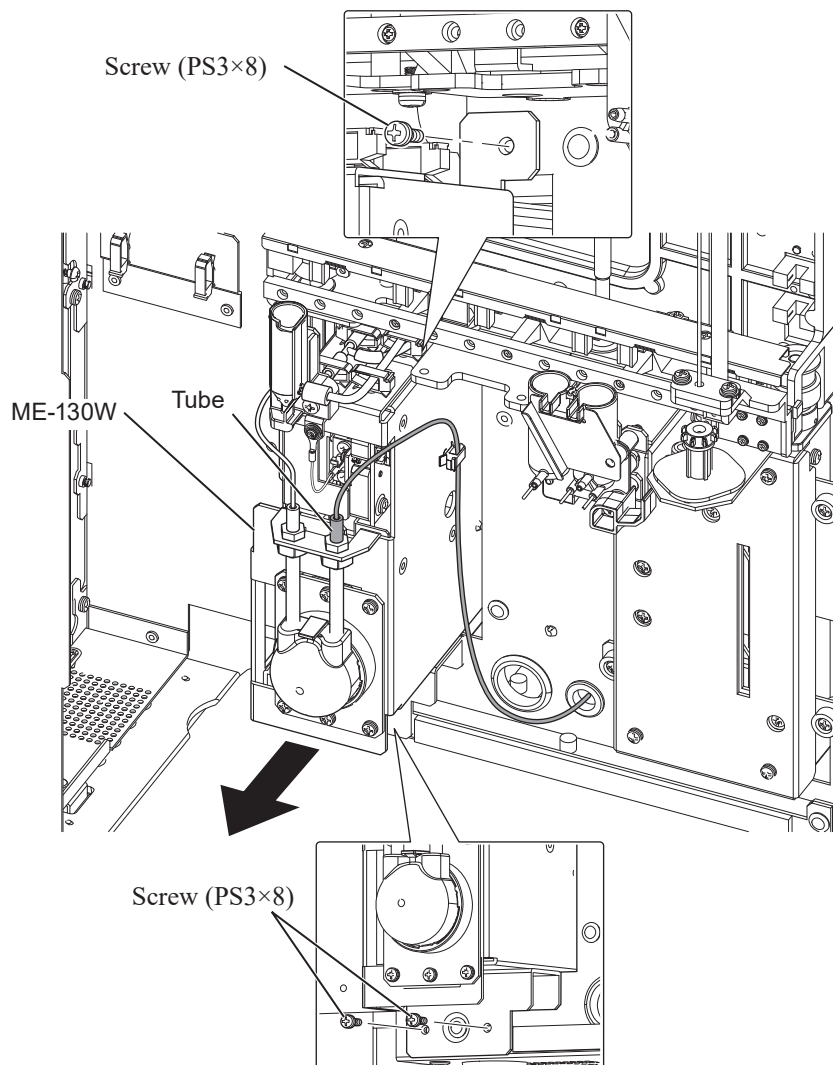


4-6-3. Removing the ME-130W ESR MEASURING UNIT

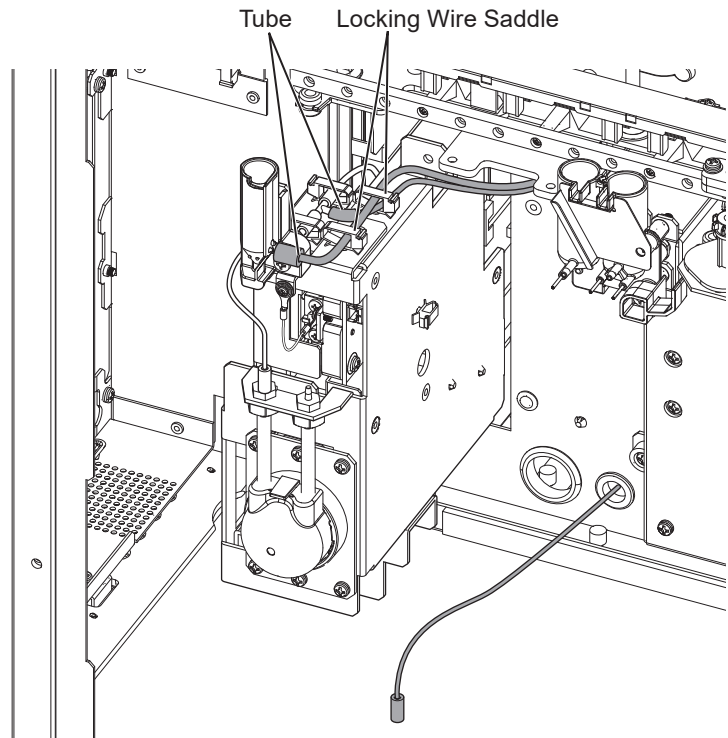
- 1 Open the front panel unit.



- 2 Remove the tube, remove the three screws (PS3×8), and pull out the ESR measuring unit in the forward direction.

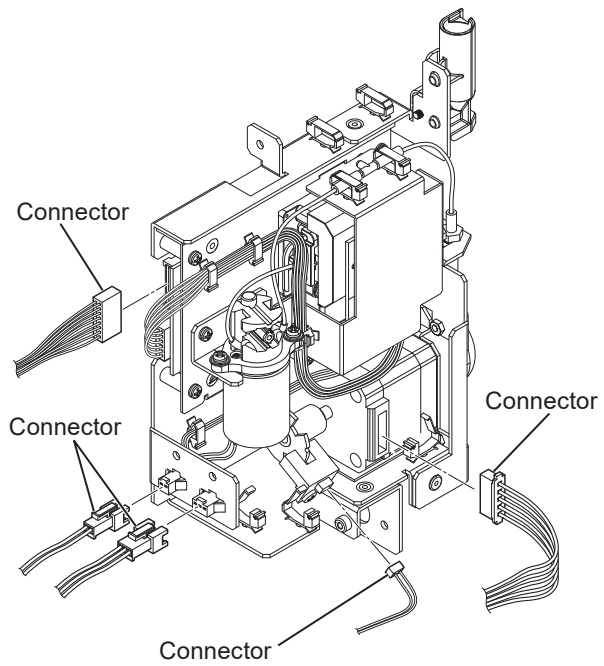


- 3** Remove the locking wire saddle, and remove the two tubes.



4

- 4** Pull out the ESR measuring unit, and remove the connectors (5 locations).



4-6-4. Removing the MH-130W HGB MEASURING UNIT

When replacing the MH-130W HGB MEASURING UNIT, refer to Section 6 and adjust as follows.

- “Adjusting the Sampling Nozzle and the Cell Position (MEK-1303)” (p.6-21)

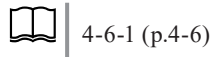
- 1 Remove the right cover.



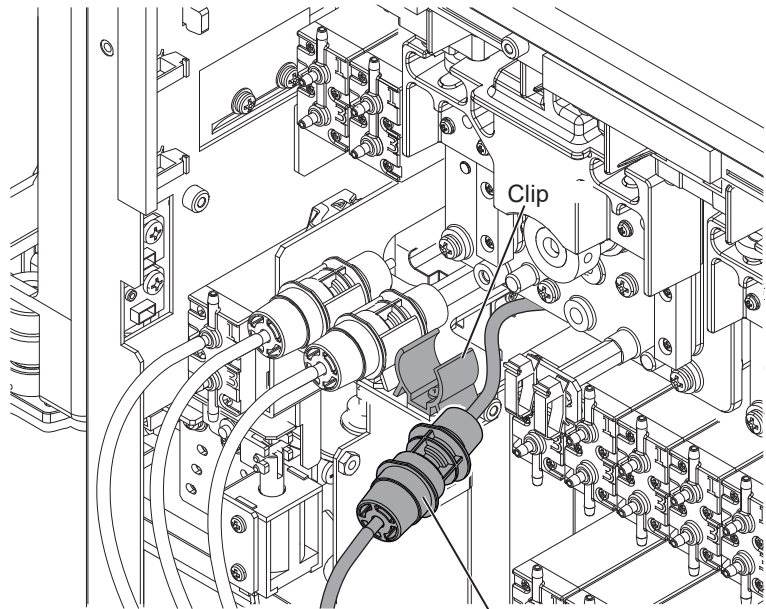
- 2 Open the front panel unit.



- 3 Remove the CBC MEASURING UNIT.



- 4 For the MEK-1302 and MEK-1303, remove the closed filter (FL3), which is the furthest to the right, from its clip.

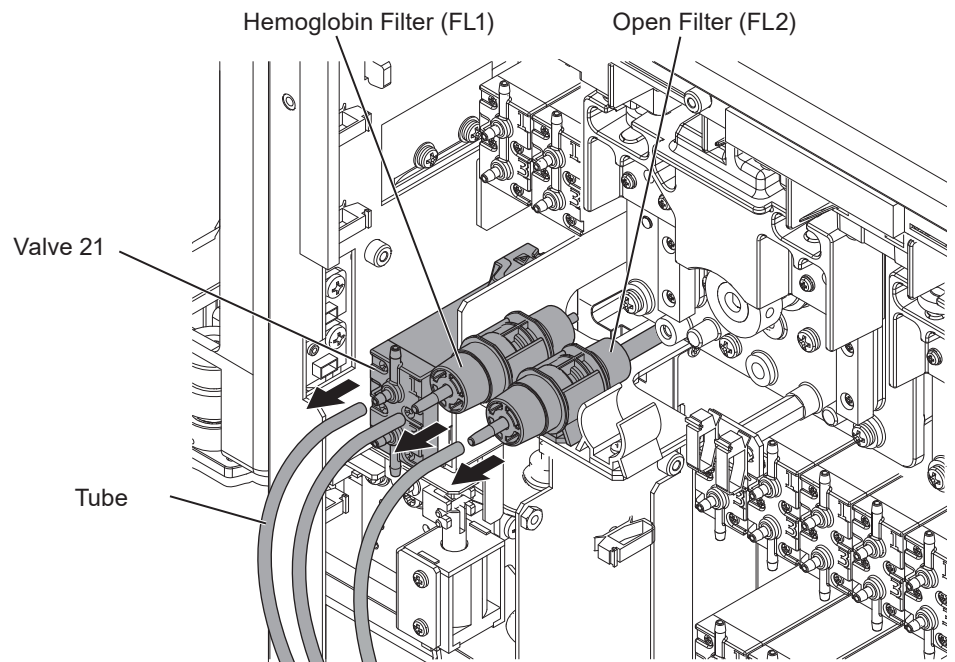


Closed Filter (FL3)

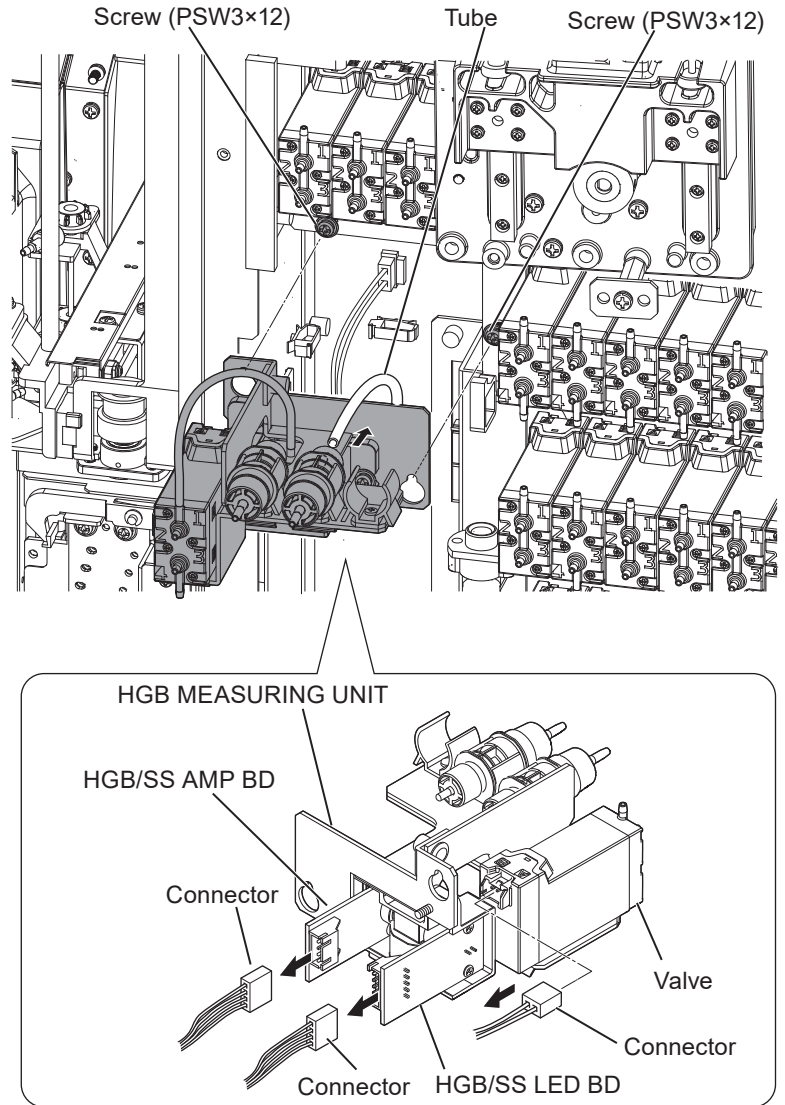
- 5** Remove the two tubes from the hemoglobin filter (FL1) and the open filter (FL2).

Use a tube removal tool to remove the one tube from the valve (21-2).

 4-8-1 (p.4-51)



- 6 Loosen the two screws (PSW3×12) and lift the HGB MEASURING UNIT up and then forward to remove it.
- 7 Disconnect the one tube from the HGB MEASURING UNIT.
- 8 Disconnect the three connectors from the HGB/SS AMP BD, HGB/SS LED BD and the body of the analyzer, then disconnect the one connector to the valve and remove the HGB MEASURING UNIT.



4-6-5. Removing the MP-130W ISO PUMP UNIT

- 1 Remove the right cover.



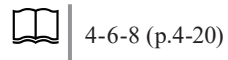
- 2 Remove the left cover.



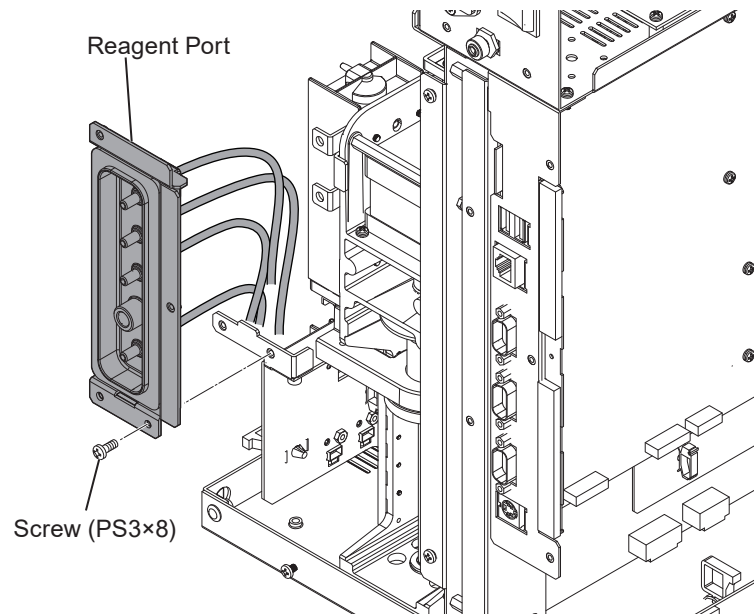
- 3 Remove the rear panel.



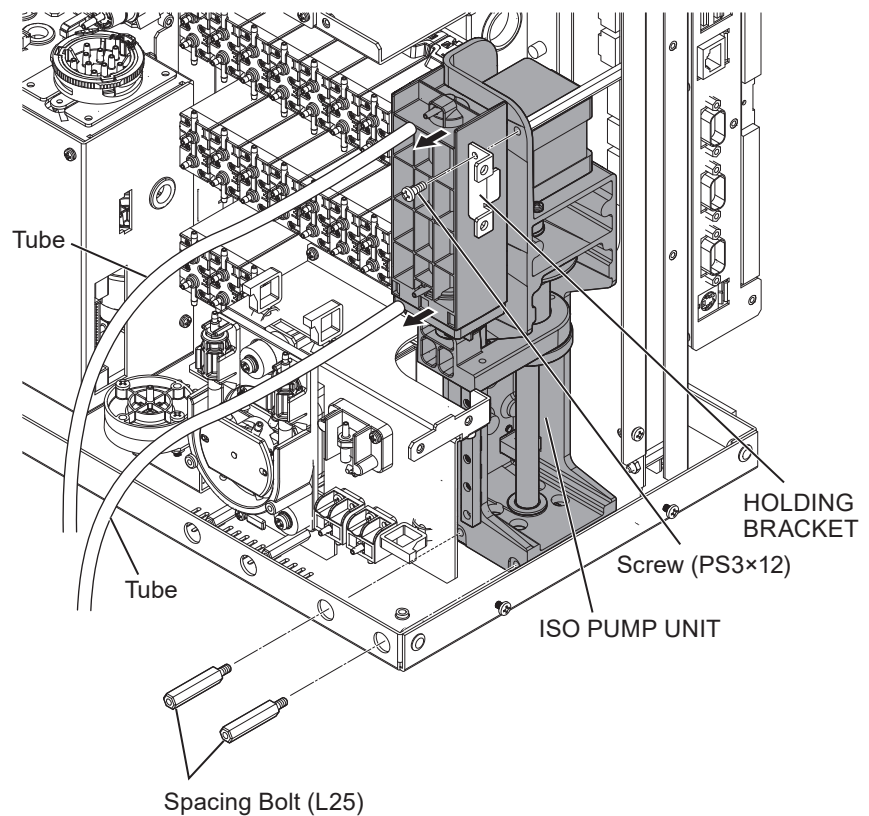
Only for the 1303, remove the MP-132W RBC PUMP UNIT.



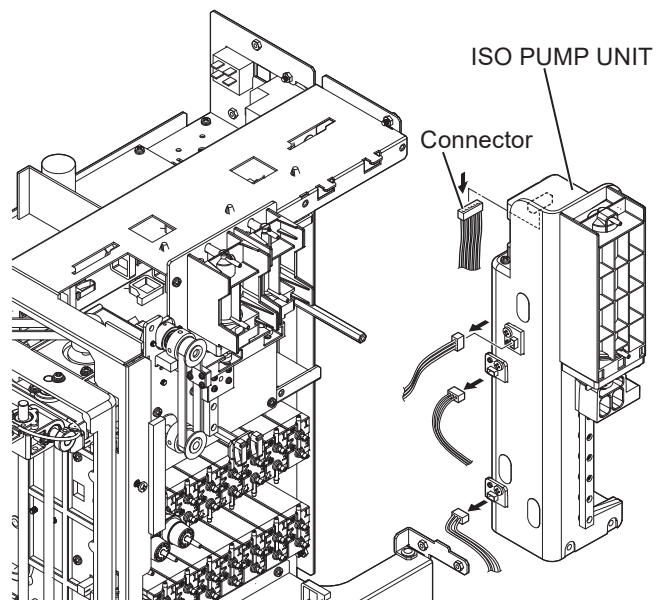
- 4 Remove the one screw (PS3×8) and remove the reagent port with the tubes attached.



- 5 Remove the two tubes from the ISO PUMP UNIT.
- 6 Remove the two spacing bolts (L25), the one screw (PS3×12) and the HOLDING BRACKET.

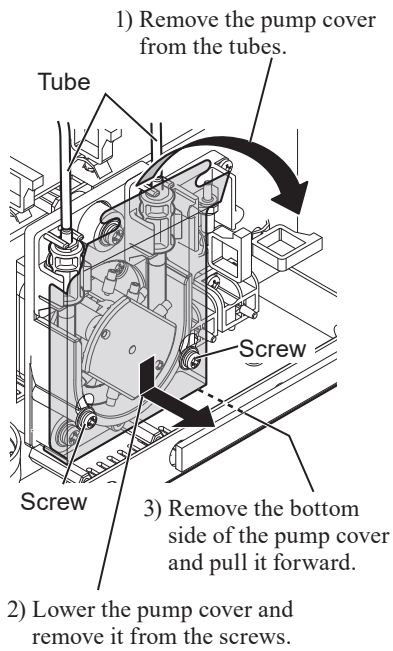


- 7 Shift the ISO PUMP UNIT forward on the rear panel side and remove the four connectors.



4-6-6. Removing the MP-133W ROTARY PUMP UNIT

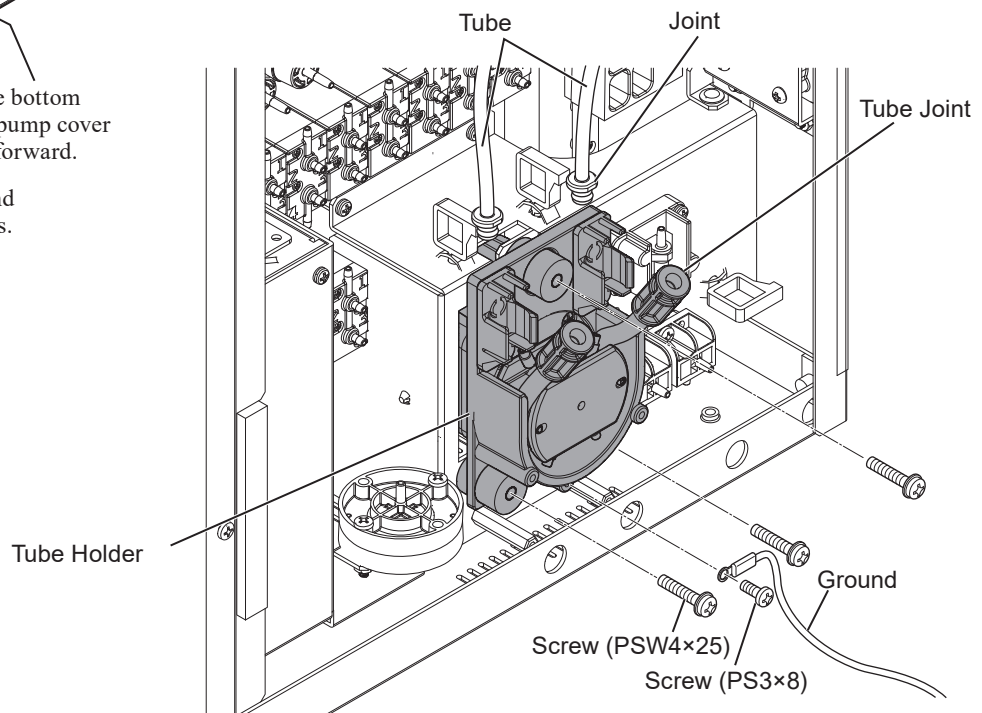
4



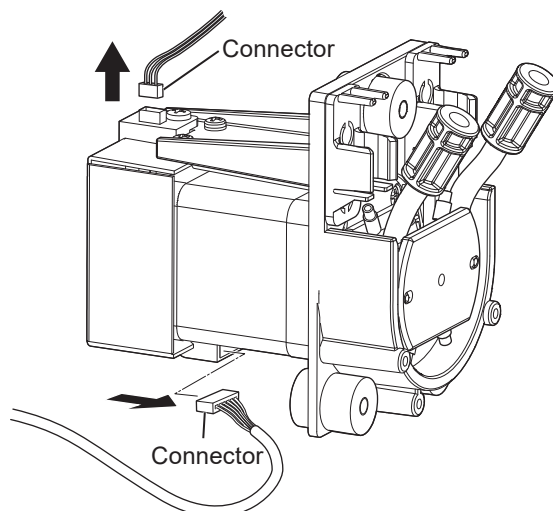
- 1 Remove the right cover.



- 2 Remove the pump cover as shown in the diagram at left.
- 3 Remove the one screw (PS3×8) and the ground wire.
- 4 Remove the tube joints from the left and right tube holder.
- 5 Remove the two joints from the left and right tube joints and then remove the three screws (PSW4×25).



- 6 Pull the ISO PUMP UNIT forward and remove the two connectors.



4-6-7. Removing the MP-131W SAMPLE PUMP UNIT

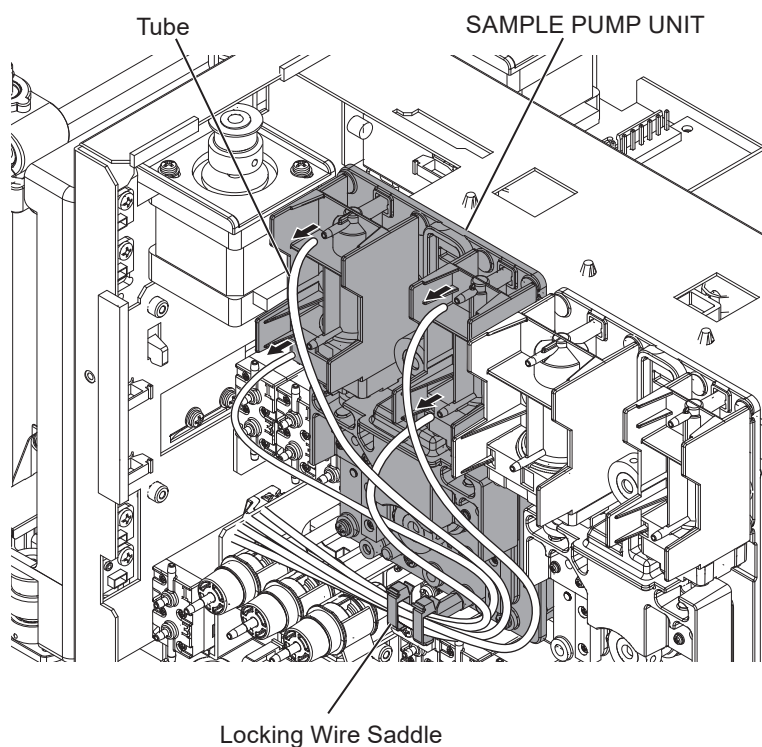
- 1 Remove the right cover.



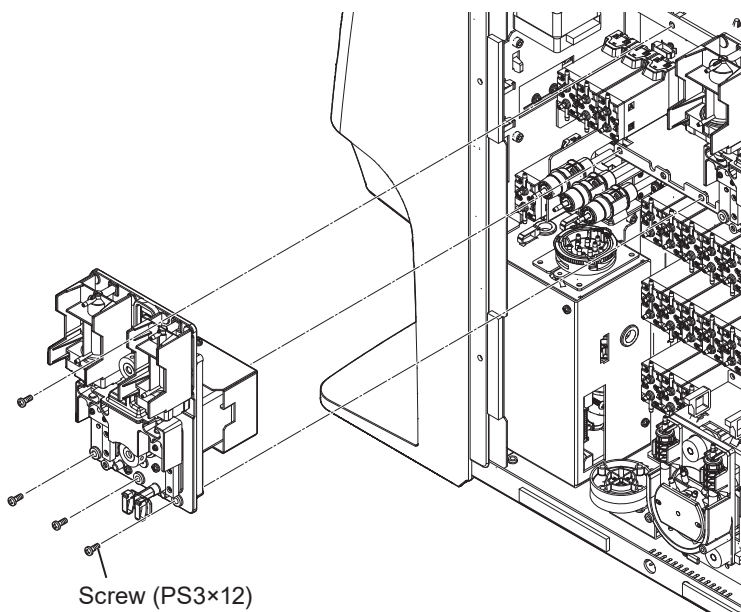
- 2 Remove the left cover.



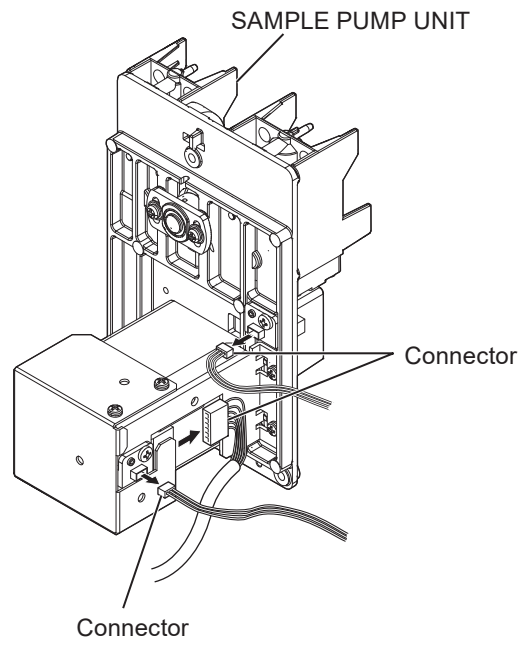
- 3 Remove the four tubes from the SAMPLE PUMP UNIT and take them out of the locking wire saddle.



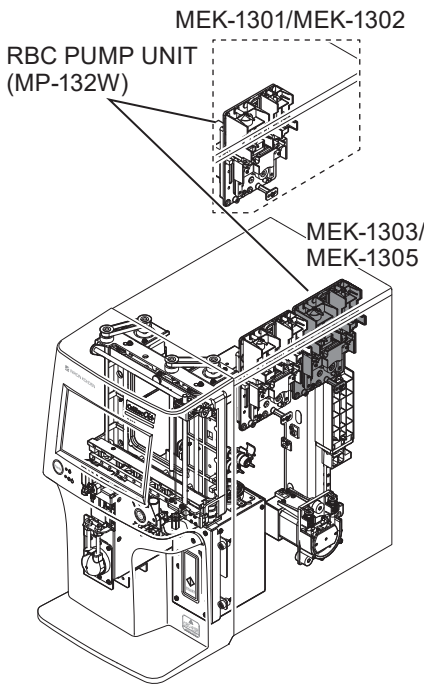
- 4 Remove the four screws (PS3×12) and pull the SAMPLE PUMP UNIT out.



- 5 Remove the three connectors from the SAMPLE PUMP UNIT.



4-6-8. Removing the MP-132W RBC PUMP UNIT



NOTE: The installation position (right/left) and number of mounting screws for the MP-132W RBC pump unit may vary by model, but the removal procedure is the same.

- MEK-1301/MEK-1302 installation position:
Left-side mounting screw × 4
- MEK-1303/MEK-1305 installation position:
Right-side mounting screw × 3

* This explains the procedure for the MEK-1303/MEK-1305. For details on the MEK-1301/MEK-1302 procedure, see MP-131W.

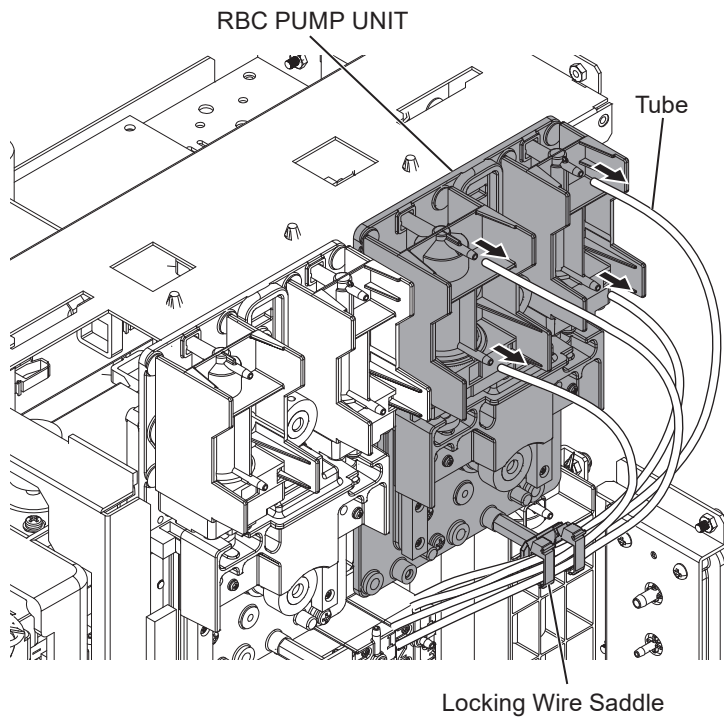
1 Remove the right cover.



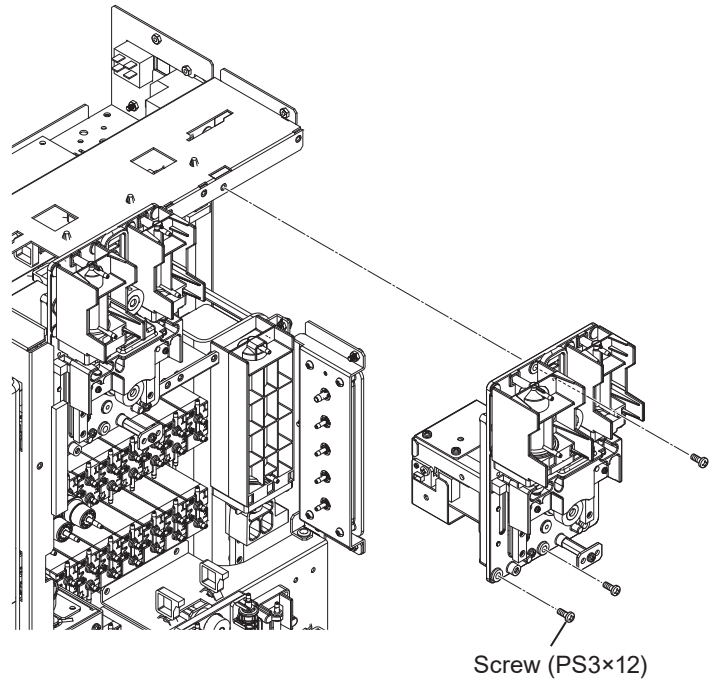
2 Remove the left cover.



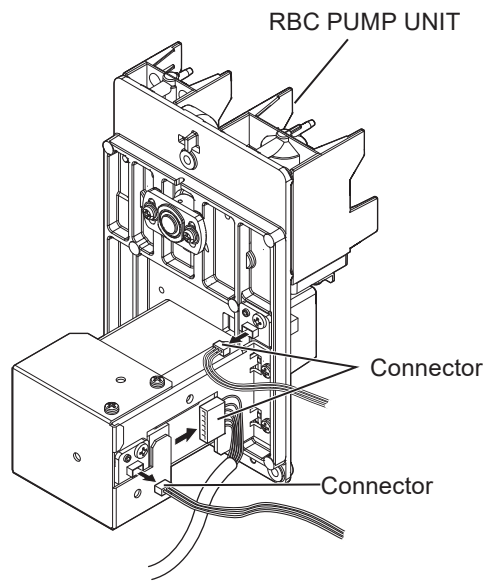
3 Remove the four tubes from the RBC PUMP UNIT and take them out of the locking wire saddle.



- 4** Remove the three screws (PS3×12) and pull the RBC PUMP UNIT out.



- 5** Remove the three connectors from the RBC PUMP UNIT.



4-6-9. Removing the MP-134W ESR PUMP UNIT

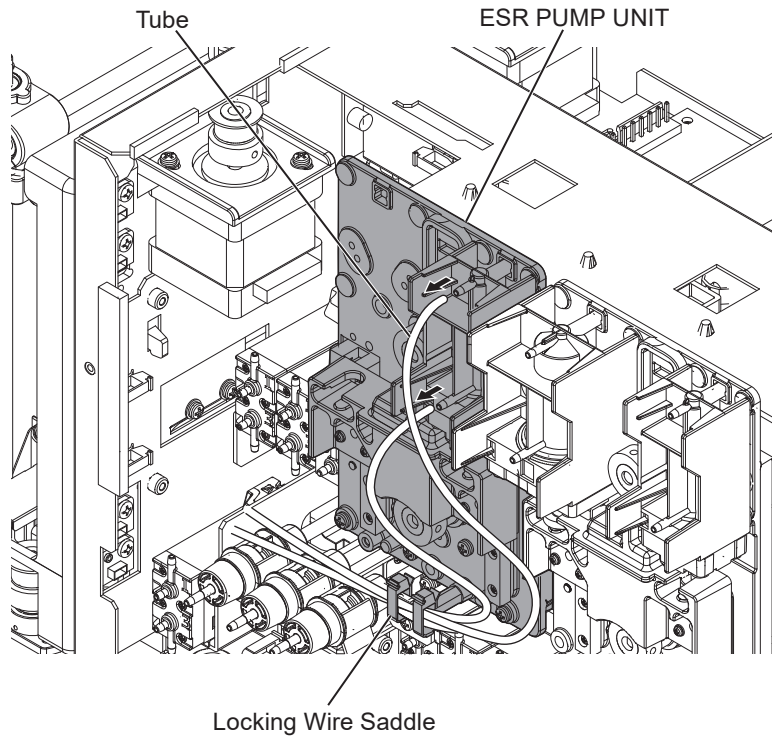
- 1 Remove the right cover.



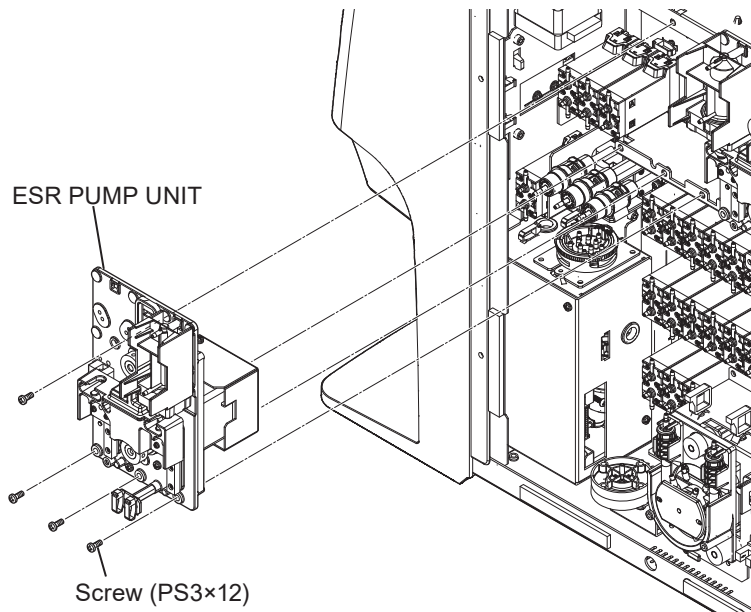
- 2 Remove the left cover.



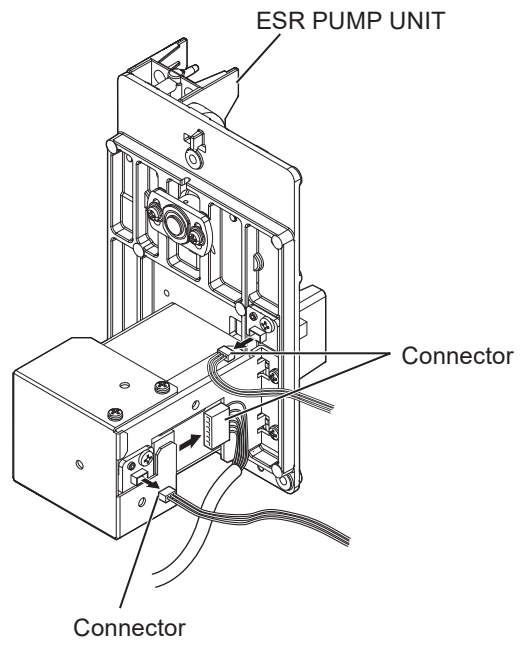
- 3 Remove the two tubes from the ESR pump unit, and take them out of the locking wire saddle.



- 4 Remove the four screws (PS3×12), and pull out the ESR pump unit towards the front.



- 5 Remove the three connectors from the ESR PUMP UNIT.



4-6-10. Removing the MS-130W/MS-130W-01 SAMPLER UNIT

When replacing the SAMPLER UNIT, refer to Section 6 and adjust as follows.

- “Adjusting the Sampling Nozzle and the Cell Position (MEK-1303)” (p.6-21)

- 1 Remove the CBC MEASURING UNIT.

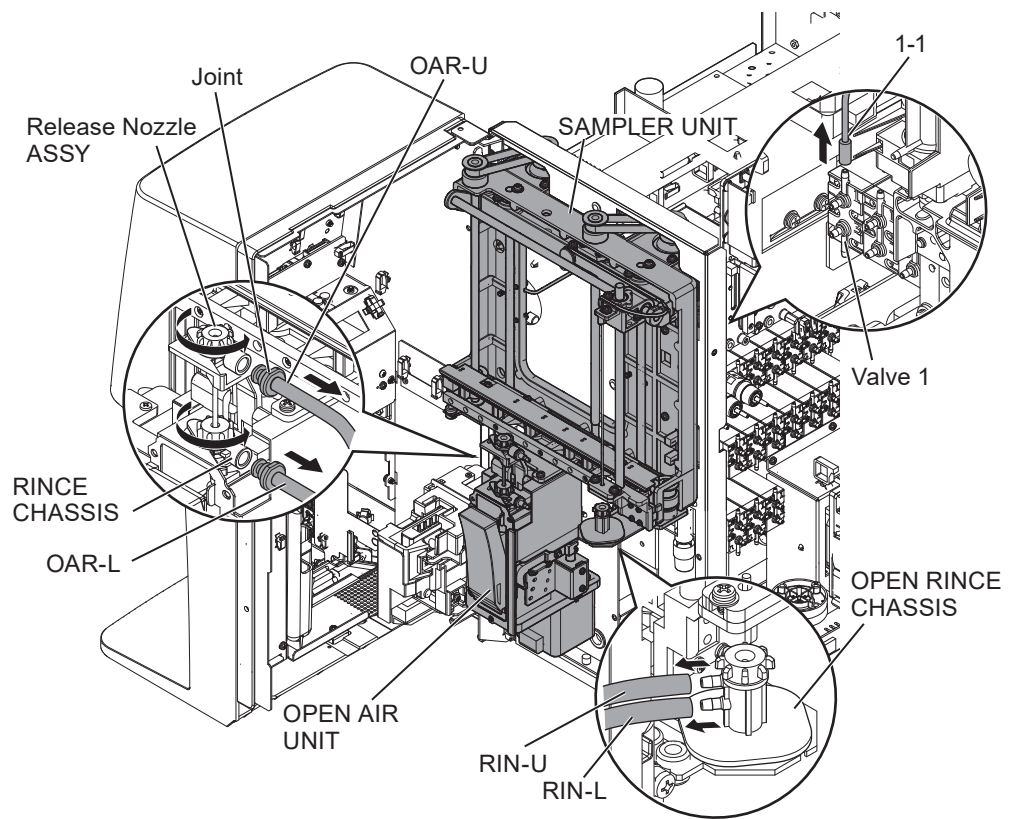


- 2 Remove the left cover.

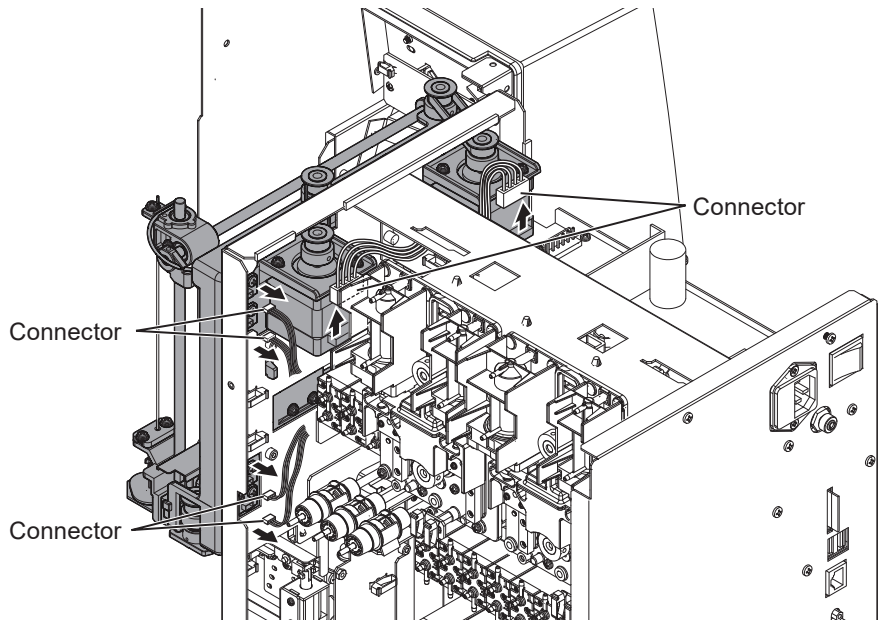


- 3 Remove the two tubes (RIN-U) and (RIN-L) from the OPEN RINCE CHASSIS of the SAMPLER UNIT, then remove the one tube (1-1) from valve 1.

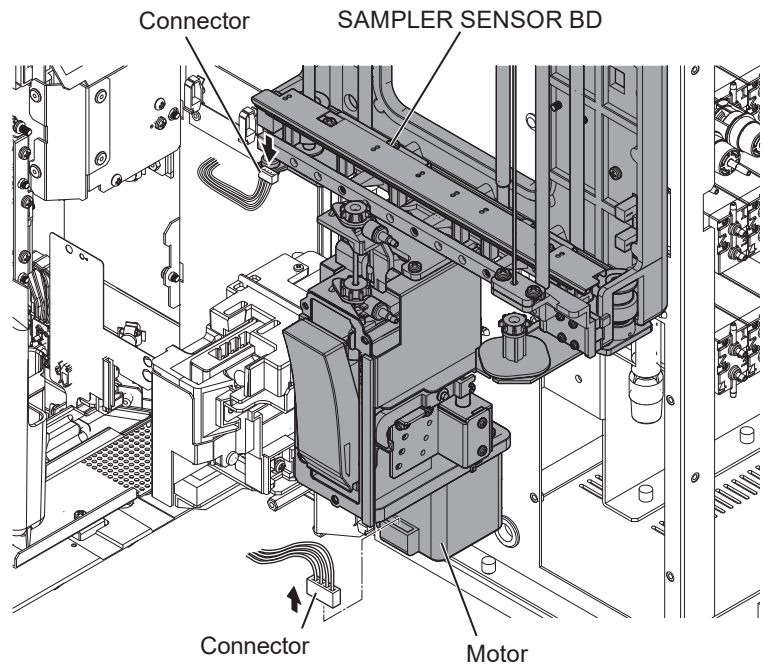
- 4 Turn the Release Nozzle ASSY of the OPEN AIR UNIT and the RINCE CHASSIS counterclockwise and remove the joints of the two tubes (OAR-U) and (OAR-L).



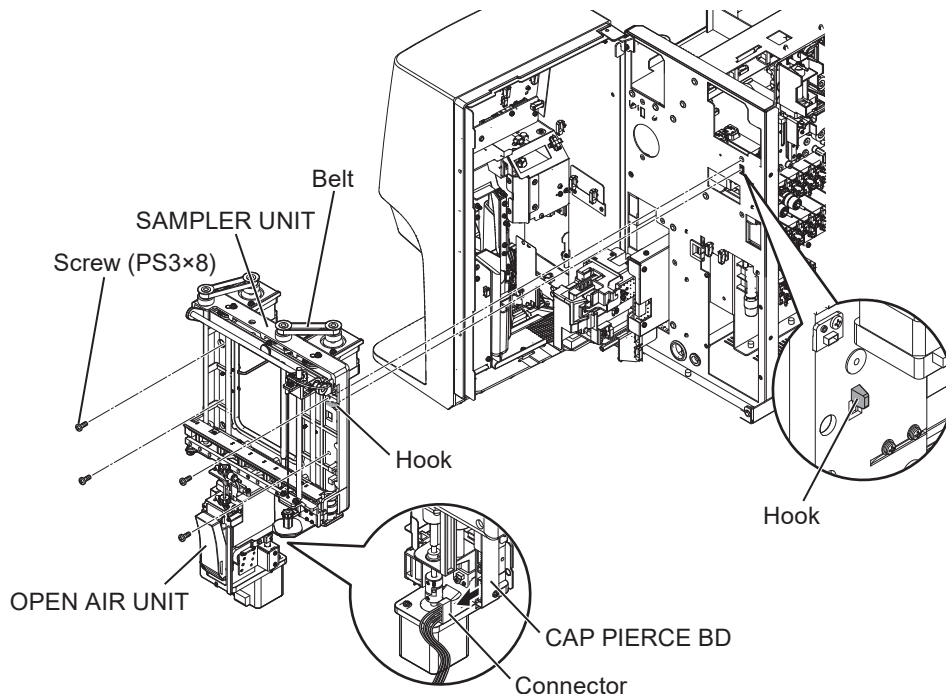
- 5** Remove the two connectors to the motor and the four sensor connectors.



- 6** Remove the one motor connector and the one connector to the SAMPLER SENSOR BD.



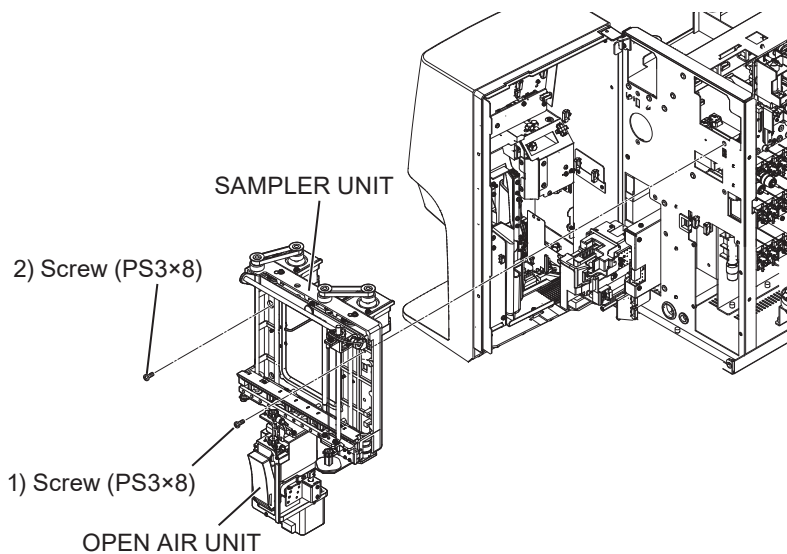
- 7 Remove the four PS3×8 screws.
- 8 Lift the SAMPLER UNIT and release the hooks from the body of the analyzer.
NOTE: When releasing the hooks of the SAMPLER UNIT from the body, take care not to scratch the belt with the chassis.
- 9 Pull the SAMPLER UNIT forward and remove the one connector to the CAP PIERCE BD.




Notes on Assembly

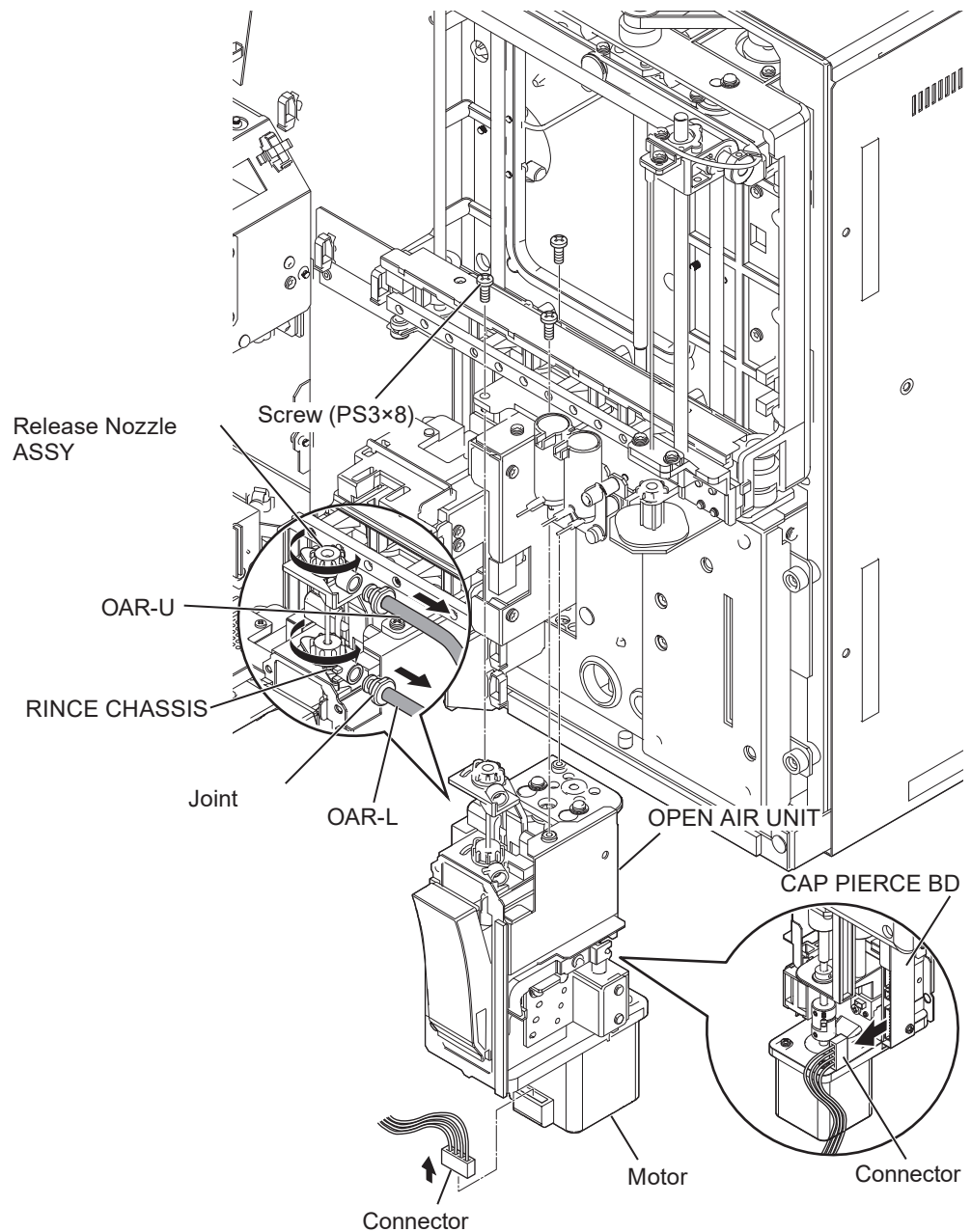
When installing the SAMPLER UNIT, first tighten the screw indicated by 1) as a reference point.

Then, tighten the screw indicated by 2).




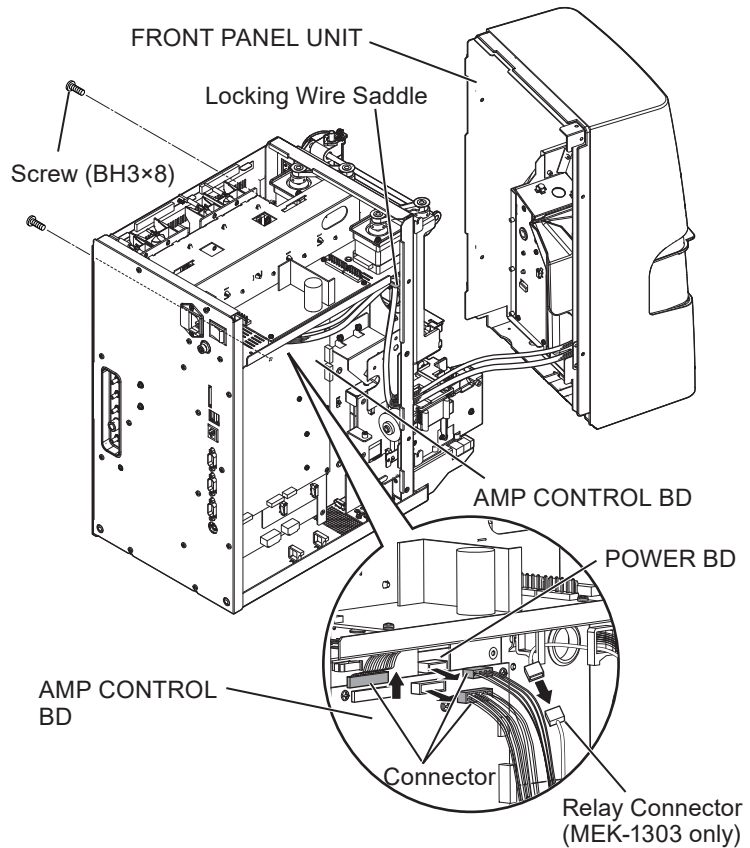
4-6-11. Removing the MS-131W OPEN AIR UNIT

- 1 Open the front panel unit.
 4-2 (p.4-3)
- 2 Turn the Release Nozzle ASSY of the OPEN AIR UNIT and the RINCE CHASSIS counterclockwise and remove the joints of the two tubes (OAR-U) and (OAR-L).
- 3 Remove the one motor connector and the one connector to the CAP PIERCE BD.
- 4 Remove the one screw (PS3×8) and then the OPEN AIR UNIT.



4-6-12. Removing the PV-13xW FRONT PANEL UNIT

- 1 Remove the left cover.
 4-4 (p.4-4)
- 2 Remove the two screws (BH3×8).
- 3 Remove the two connectors of the AMP CONTROL BD, the one connector to the POWER BD and the one relay connector (MEK-1303 only).
- 4 Remove the cable from the locking wire saddle and remove the FRONT PANEL UNIT.

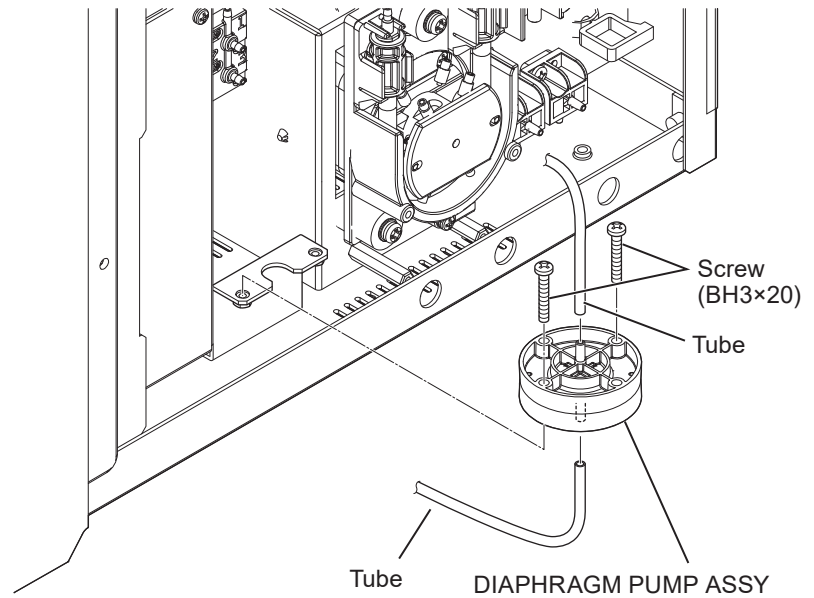


4-6-13. Removing the DIAPHRAGM PUMP ASSY (250UL)

- 1 Remove the right cover.



- 2 Remove the two screws (BH3×20) and remove the two tubes from the DIAPHRAGM PUMP ASSY.



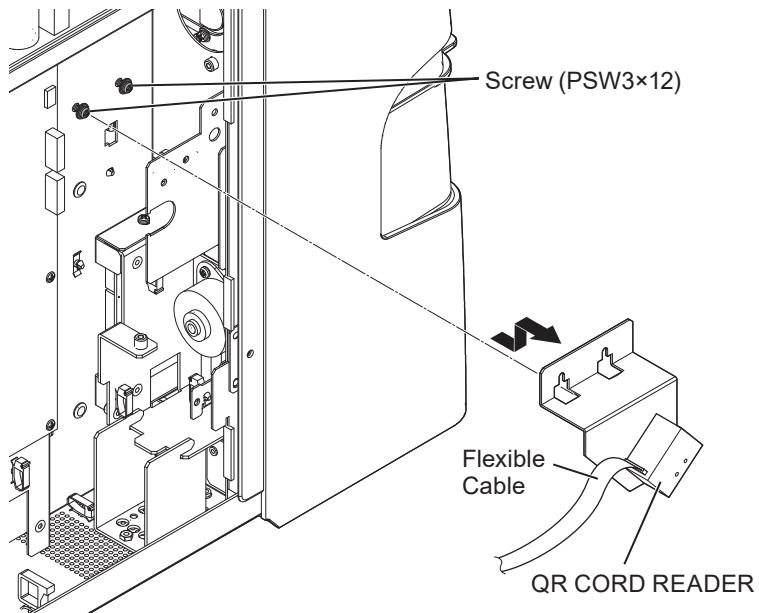
4-6-14. Removing the QR CODE ASSY

- 1 Remove the left cover.



- 2 Disconnect the one flexible cable from the QR CODE READER.

- 3 Loosen the two screws (PSW3×12) and remove the QR CODE READER.



Notes on Assembly

Make sure the flexible cable is facing the right way when connecting it.

4-6-15. Removing the LIQUID SENSOR Kit

When replacing the LIQUID SENSOR KIT, refer to Section 6 and adjust as follows.

- “Adjusting the Liquid Sensor/LIQUID SENSOR BD” (p.6-7)

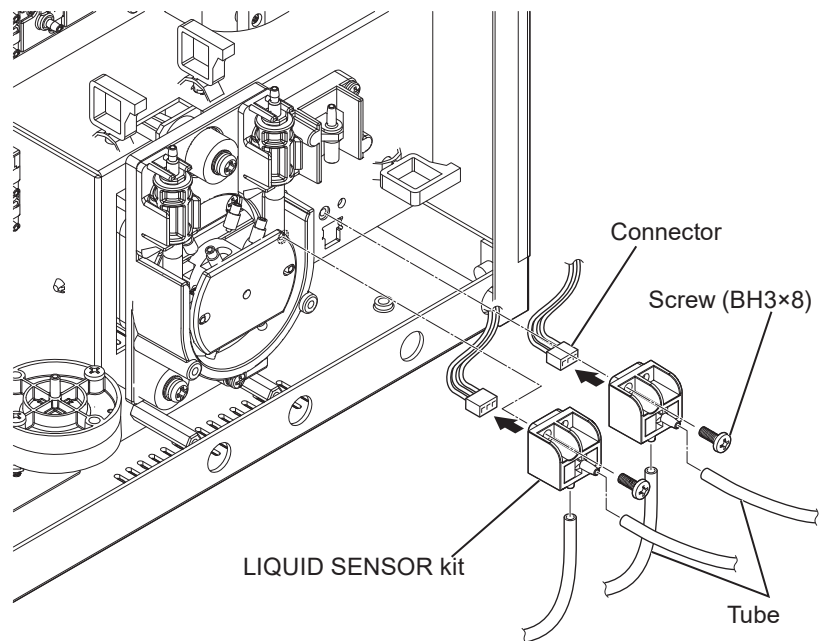
NOTE: Take care not to touch the optical surface (triangular part) of the sensor when removing and installing the LIQUID SENSOR KIT.

- 1 Remove the right cover.



- 2 Remove the two tubes from the LIQUID SENSOR KIT and then the one screw (BH3×8).

- 3 Pull the LIQUID SENSOR KIT out and remove the one connector.



4-6-16. Removing the LIQUID SENSOR ISO Kit

When replacing the LIQUID SENSOR ISO KIT, refer to Section 6 and adjust as follows.

- “Adjusting the Liquid Sensor/LIQUID SENSOR BD” (p.6-7)

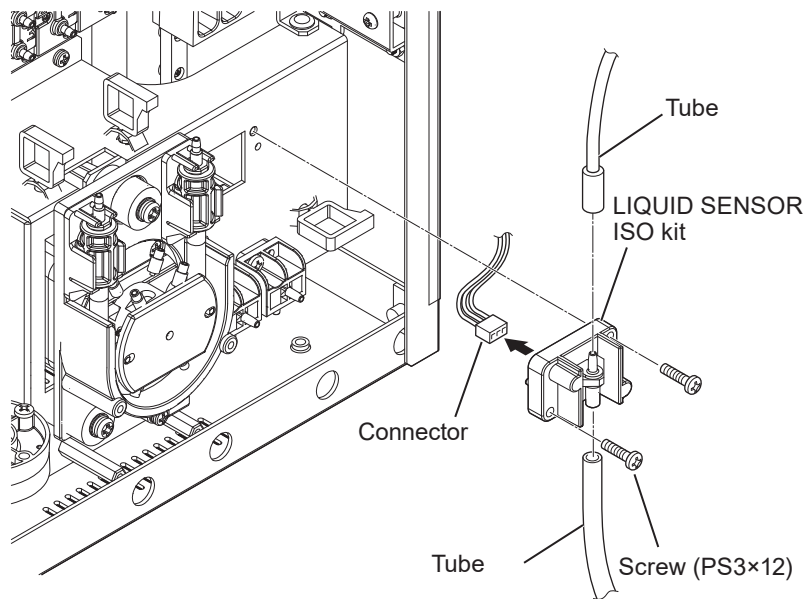
NOTE: Take care not to touch the optical surface (triangular part) when handling the sensor.

- 1 Remove the right cover.






- 2 Remove the two tubes from the LIQUID ISO SENSOR KIT and then the two screws (PS3×12).

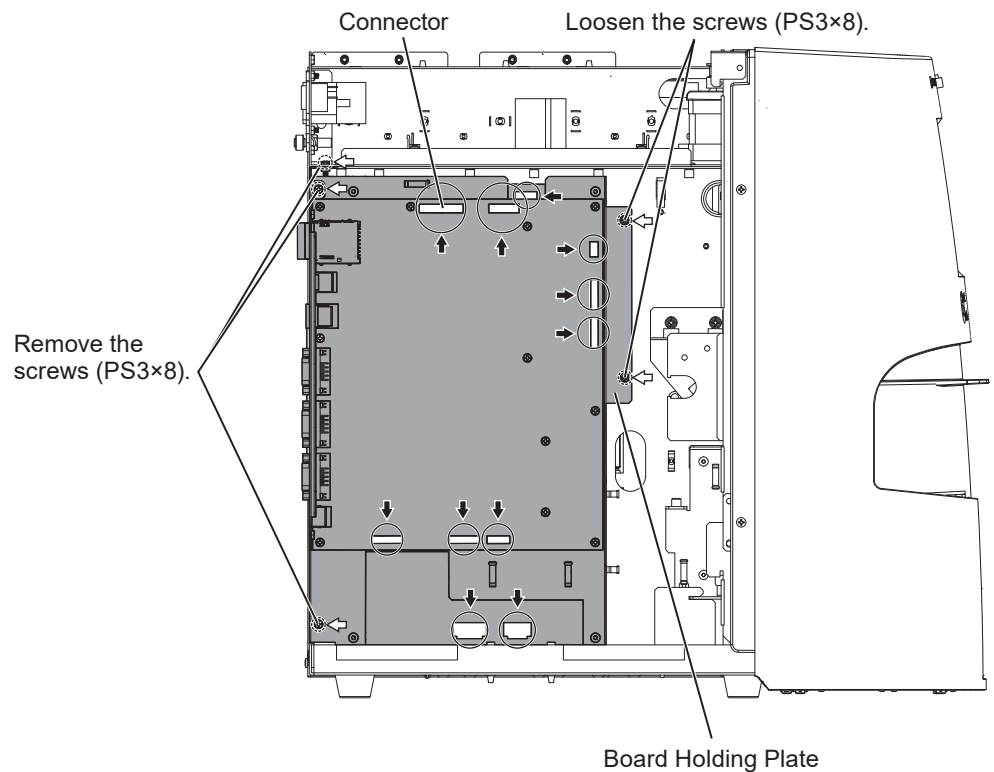
- 3 Pull the LIQUID SENSOR KIT forward and out and remove the one connector.



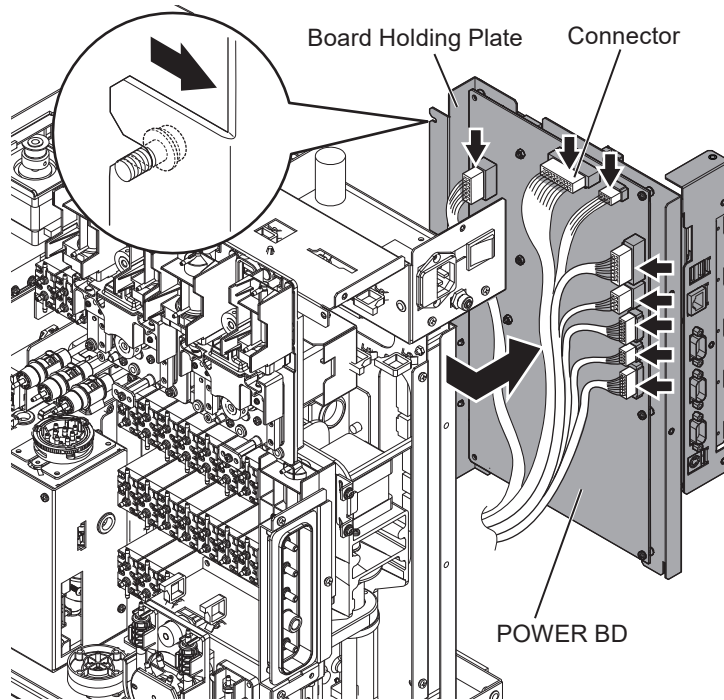
4-7. Removing the Boards

4-7-1. Removing the UT-7296 POWER BD

- 1 Remove the right cover.
 4-3 (p.4-4)
- 2 Remove the left cover.
 4-4 (p.4-4)
- 3 Remove the rear panel.
 4-5 (p.4-5)
- 4 Remove the eleven connectors to the AMP CONTROL BD and POWER BD.
- 5 Loosen the front two screws of the four screws (PS3×8) that fasten the board holding plate, then remove the two rear screws and the one on top.

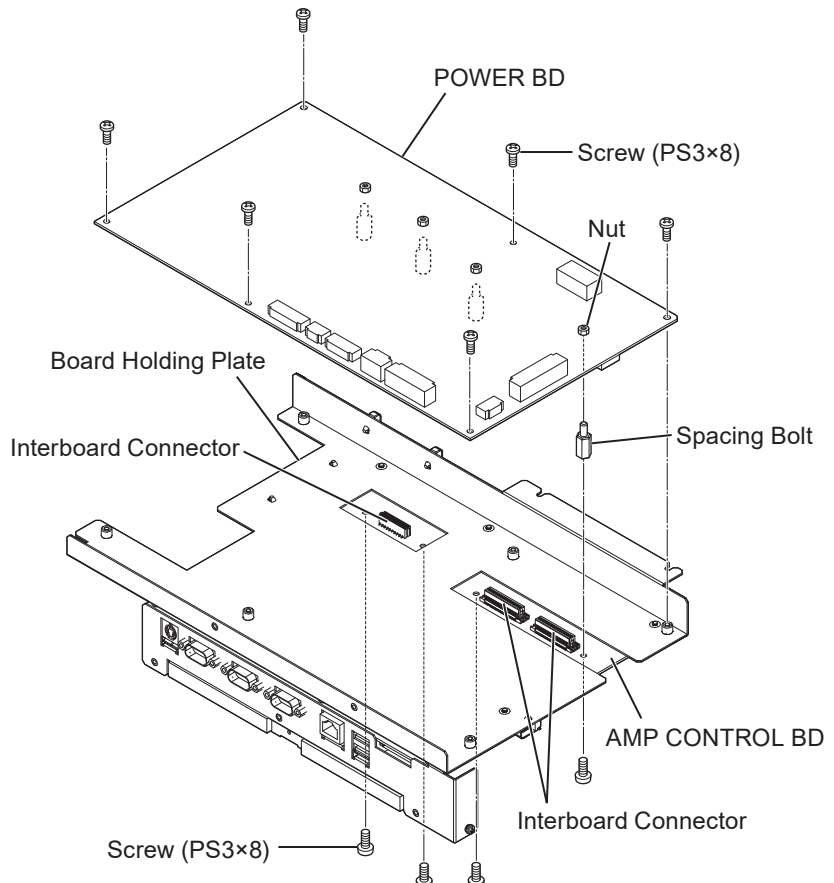


- 6** Pull the board holding plate out as shown in the diagram and disconnect the eight POWER BD connectors.



- 7** Remove the ten screws (PS3×8) and then the POWER BD.

- NOTE**
- The AMP CONTROL BD and POWER BD are connected by interboard connectors. Lift the POWER BD straight up to remove it.
 - When the four screws (PS3×8) are removed from the AMP control board side, the nuts and spacing bolts on the power board side also come free at the same time, and so be careful not to lose these nuts and bolts.




4-7-2. Removing the AMP CONTROL BD

After the AMP control board is replaced, the QS-025W software kit must be used to install the same version of the software used on the old AMP control board to the new AMP control board.

When replacement becomes necessary, obtain a QS-025W software kit that is the same version used in the board before replacement.

After replacement, perform “Procedure after Replacing the AMP CONTROL BD”.

 4-7-2-1 (p.4-36)

NOTE: For details on how to obtain the QS-025W software kit that is the same version used in the board before replacement, contact your Nihon Kohden representative.

- 1 Remove the right cover.

 4-3 (p.4-4)

- 2 Remove the left cover.

 4-4 (p.4-4)

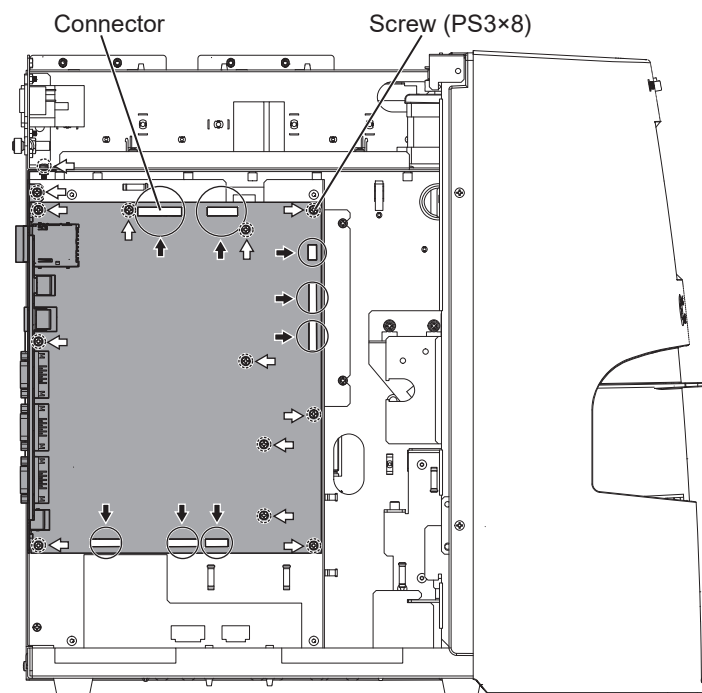
- 3 Remove the rear panel.

 4-5 (p.4-5)

- 4 Remove the eight connectors of the AMP CONTROL BD.

- 5 Remove the twelve screws (PS3×8) and then the AMP CONTROL BD.

NOTE: The AMP CONTROL BD and POWER BD are connected by interboard connectors. Pull the AMP CONTROL BD straight forward when removing it.



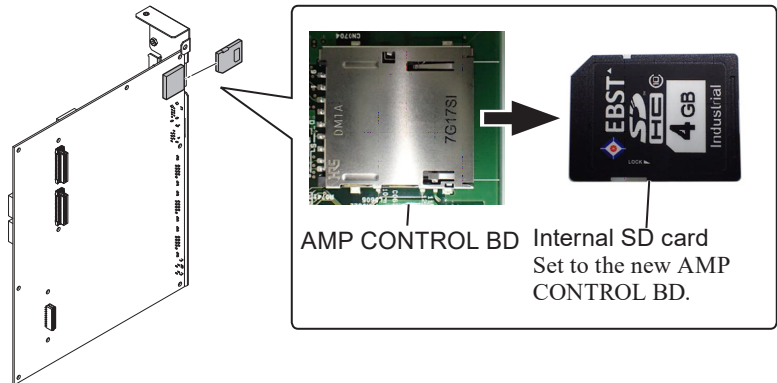
- When replacing the AMP control board, the internal SD card in the old AMP control board is removed and switched with the internal SD card in the new AMP control board.

NOTE: After taking out the internal SD card, copy all the folders stored in the card to your PC.

You can use this copied data for recovery if the data is unable to be recovered using the recovery operation after board replacement.

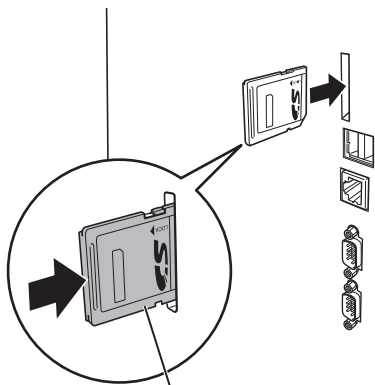


- When a general-purpose Windows PC has an SD card drive, it will recognize the internal SD card so that the data can be easily copied.
- When all of the operations after replacement are completed, delete the data that was copied.



4-7-2-1. Procedure after Replacing the AMP CONTROL BD

After the AMP control board is replaced, use the following procedure to install the same version of the software before starting the analyzer.



Same version of software used in old AMP control board

- Insert the SD card containing the same version of the software as the old AMP control board into the SD memory card slot of the analyzer, and perform the installation process.

NOTE: Do not start the analyzer unless the SD card is inserted.



Installation guide of the QS-025W software kit
“Upgrading the FPGA and SYSTEM Programs”

- Check that the system program (MAIN Software) version and FPGA program (FPGA) version are identical to the versions used in the old AMP control board.



Installation guide of the QS-025W software kit
“Confirming and Changing Settings After Upgrade”

- Open the Serial Number window and enter the serial number of the analyzer.



7-3-7 (p.7-43)


- Perform the inspection and write the results in the “Maintenance Check Sheet” (p.9-14).



Section 9 “Maintenance Procedure”

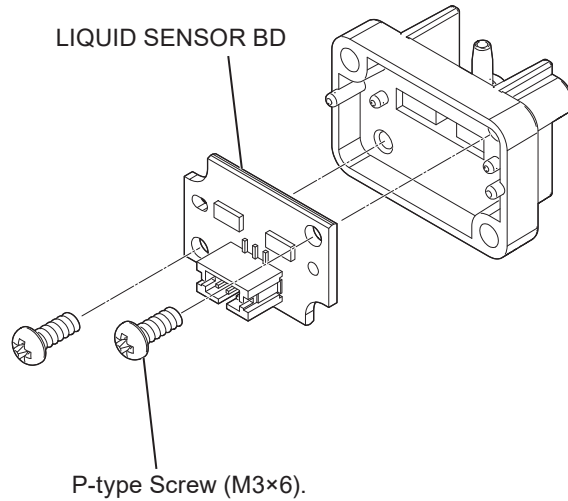
4-7-3. Removing the UT-7314 LIQUID SENSOR BD

- 1 Remove the LIQUID SENSOR ISO KIT.

 4-6-16 (p.4-32)

- 2 Remove the two screws (P-type M3×6) and then the LIQUID SENSOR BD.

NOTE: Take care not to touch the optical surface (triangular part) when handling the sensor.



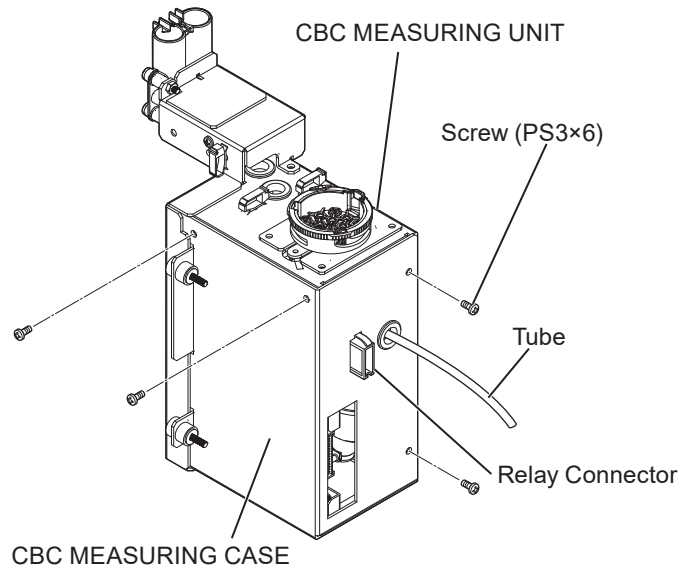
4-7-4. Removing the UT-7312 CBC MEASURING BD

- 1 Remove the CBC MEASURING UNIT.



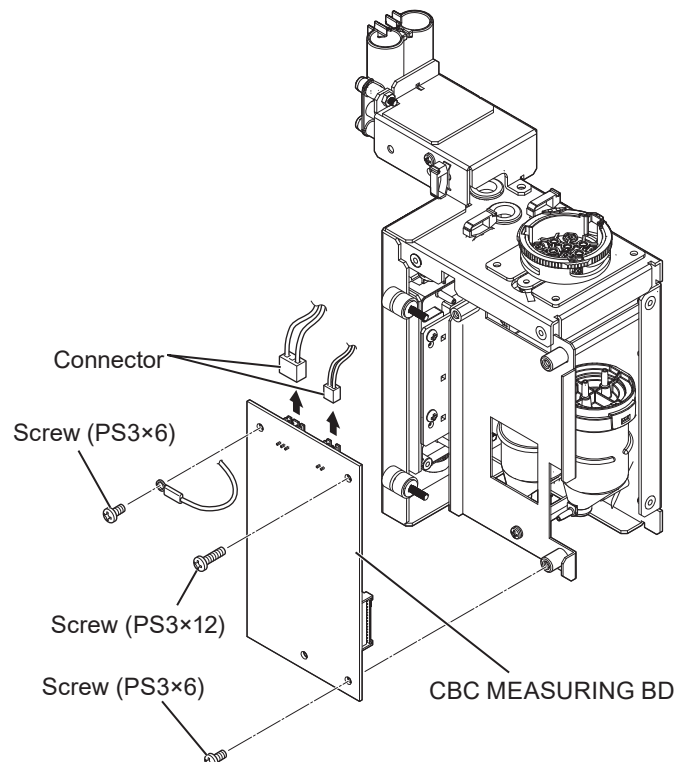
- 2 Remove the one relay connector fixed to the CBC MEASURING CASE and then the four screws (PS3×6), then remove the CBC MEASURING CASE.

NOTE: Be careful not to apply too much force on the tube when removing the CBC MEASURING CASE.



- 3 Remove the two screws (PS3×6) and one screw (PS3×12), then remove the CBC MEASURING BD.

- 4 Disconnect the two CBC MEASURING BD connectors.



4-7-5. Removing the UT-7302 MANOMETER BD

When replacing the UT-7302 MANOMETER BD, refer to Section 6 and adjust as follows.

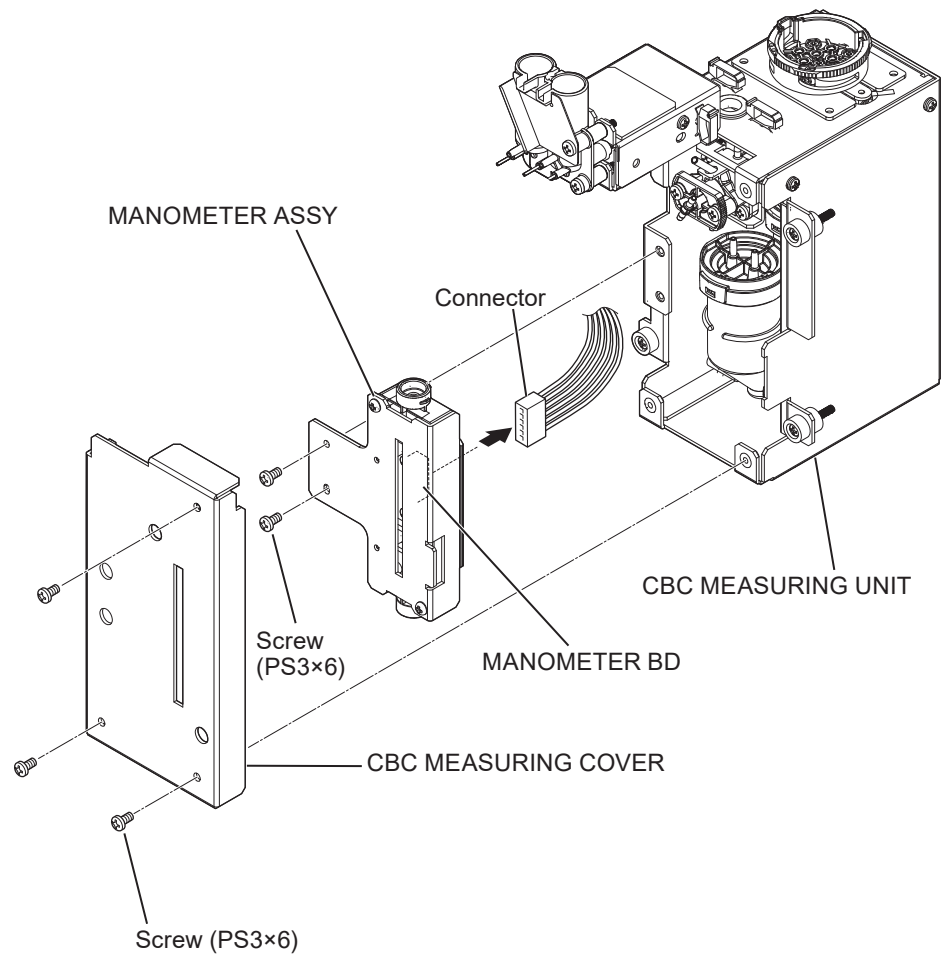
- “Adjusting the WBC Manometer” (p.6-5)

- 1 Remove the CBC MEASURING UNIT.



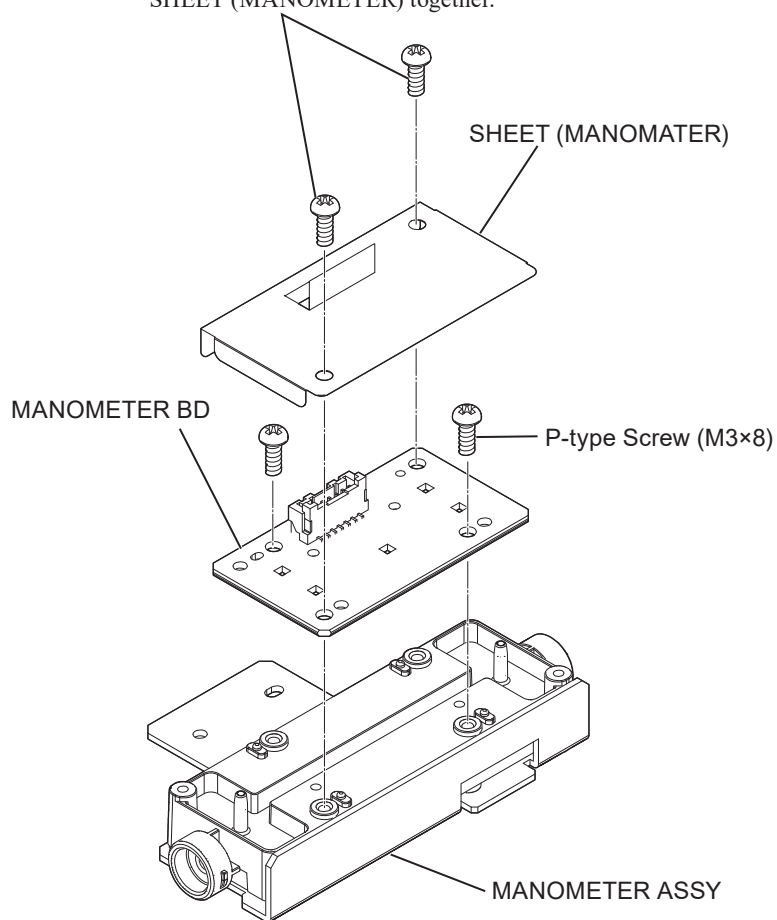
- 2 Remove the three screws (PS3×6) and then the CBC MEASURING COVER.

- 3 Remove the two screws (PS3×6), then the MANOMETER ASSY and then the one connector to the MANOMETER BD.




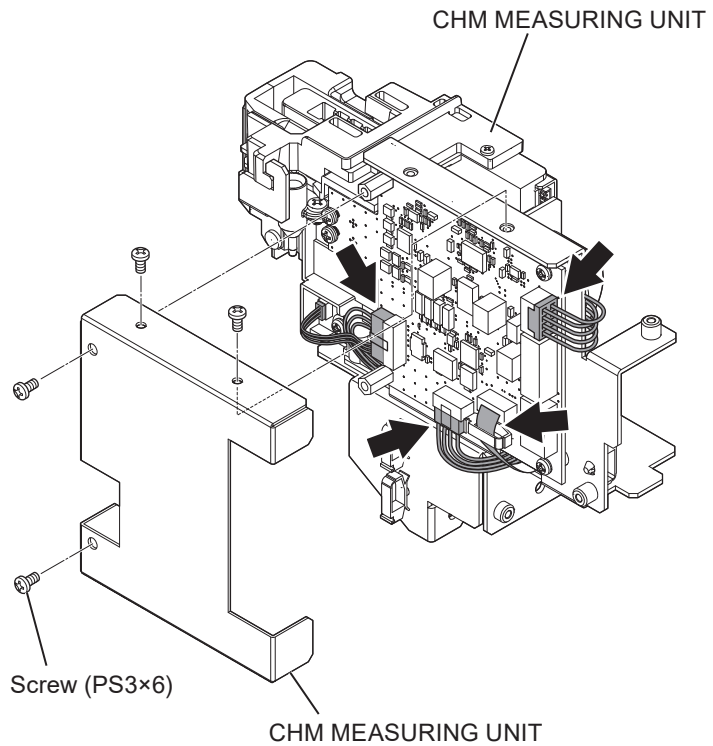
- 4 Remove the two screws (P-type M3×8) and then remove the SHEET (MANOMETER) from the MANOMETER ASSY.

Use these screws to fasten the SHEET (MANOMETER) together.

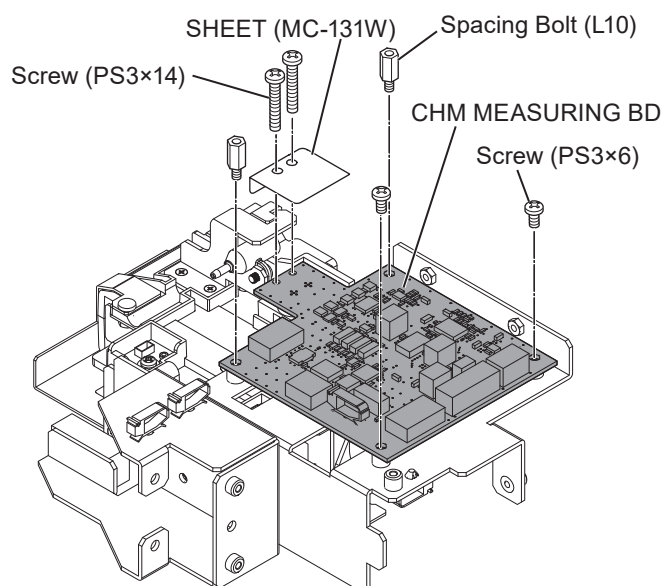


4-7-6. Removing the UT-7308 CHM MEASURING BD

- 1 Remove the CHM MEASURING UNIT.
 4-6-2 (p.4-9)
- 2 Remove the four screws (PS3×6) and then the CHM SHIELD PLATE.
- 3 Disconnect the four connectors.



- 4 Remove the two spacing bolts (L10), two screws (PS3×14) and two screws (PS3×6), then remove the MC-131W SHEET and the CHM MEASURING BD.

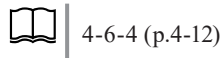


4-7-7. Removing the UT-7289 HGB/SS LED BD

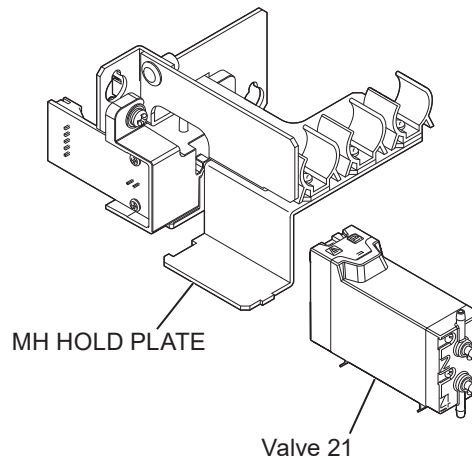
When replacing the UT-7289 HGB/SS LED BD, refer to Section 6 and adjust as follows.

- “Adjusting the HGB” (p.6-10)

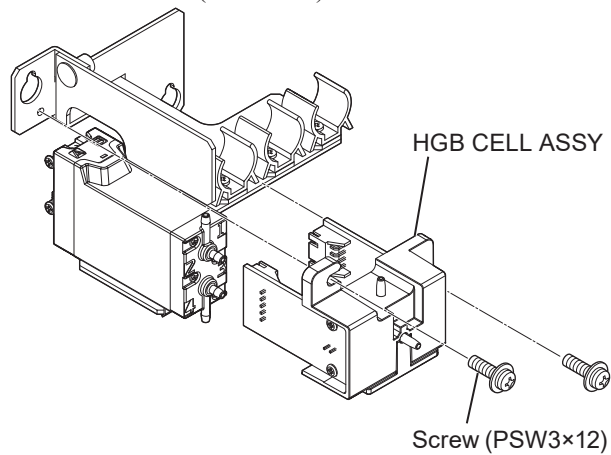
1 Remove the HGB MEASURING UNIT.



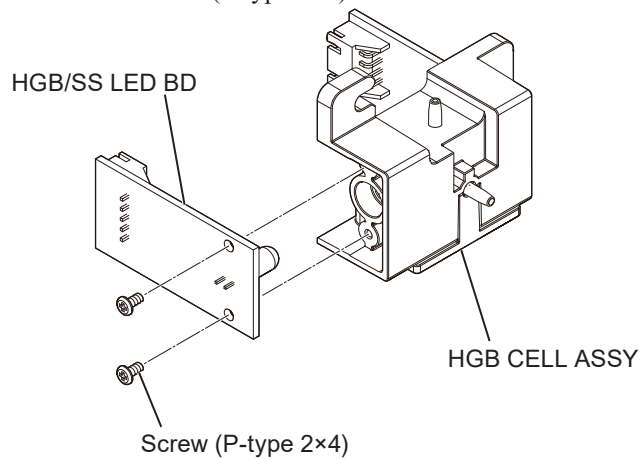
2 Remove valve 21 from the NM HOLD PLATE.



3 Remove the two screws (PSW3×12) and then the HGB CELL ASSY.



4 Remove the two screws (P-type 2×4) and then the HGB/SS LED BD.

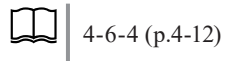


4-7-8. Removing the UT-7290 HGB/SS AMP BD

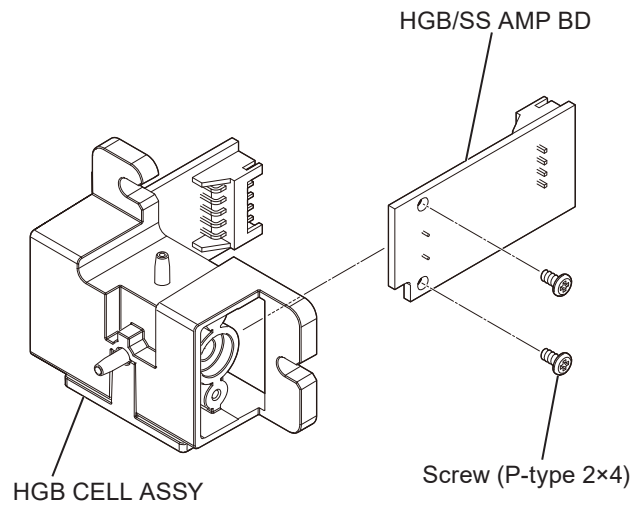
When replacing the UT-7290 HGB/SS AMP BD, refer to Section 6 and adjust as follows.

- “Adjusting the HGB” (p.6-10)

- 1 Remove the HGB MEASURING UNIT.



- 2 Remove the two screws (P-type 2×4) and then the HGB/SS AMP BD.



4-7-9. Removing the UT-7300 SAMPLER SENSOR BD

When replacing the UT-7300 SAMPLER SENSOR BD, refer to Section 6 and adjust as follows.

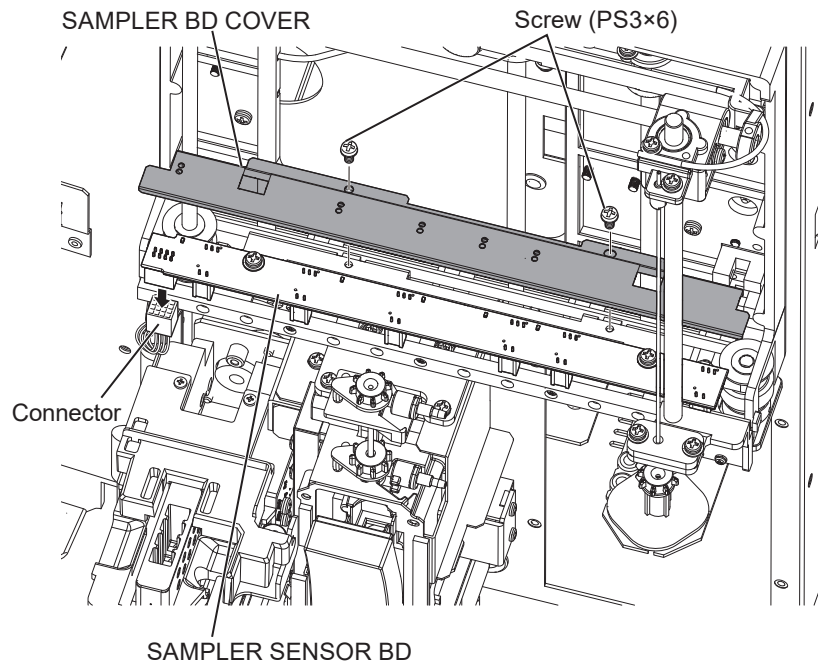
- “Adjusting the Sampling Nozzle Position” (p.6-31)

1 Open the front panel unit.



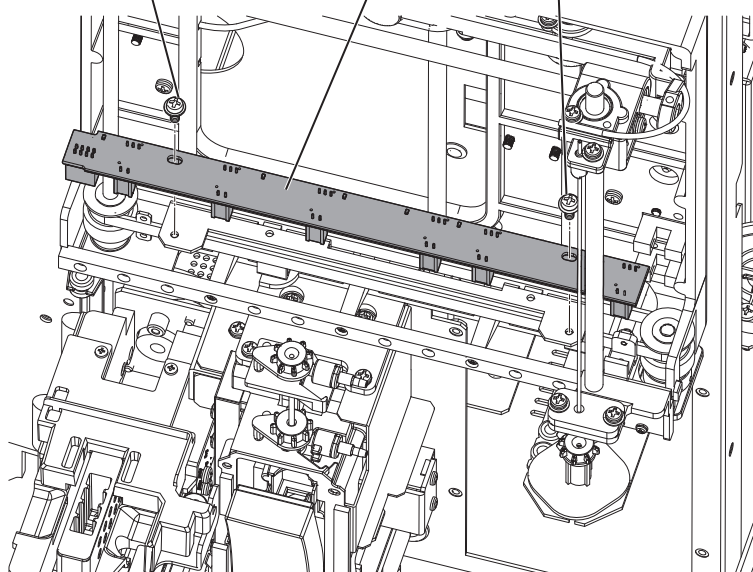
2 Remove the two screws (PS3×6) and then the SAMPLER BD COVER.

3 Disconnect the two SAMPLER SENSOR BD connectors.




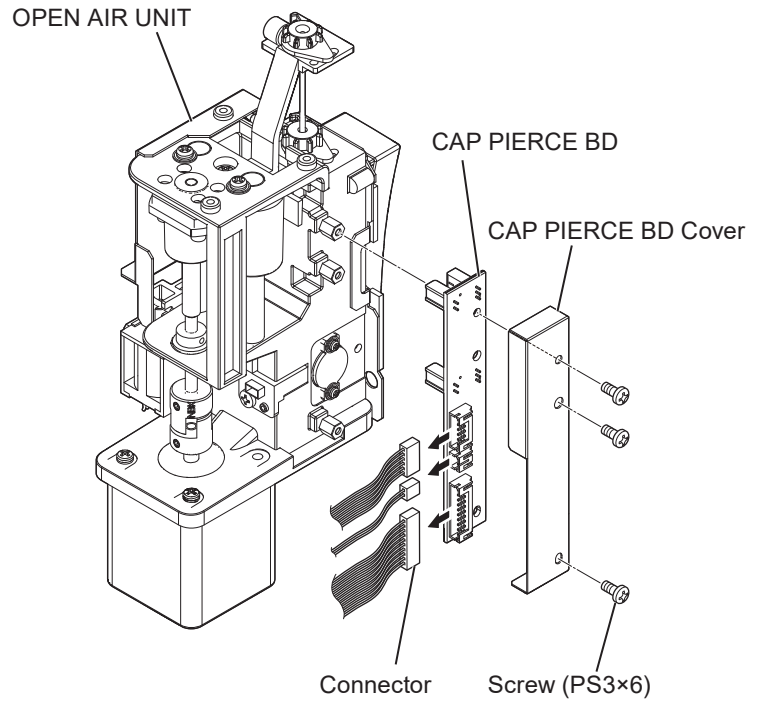
4 Remove the two screws (PSW3×8) and then the SAMPLER SENSOR BD.

Screw (PSW3×8) SAMPLER SENSOR BD Screw (PSW3×8)



4-7-10. Removing the UT-7301 CAP PIERCE BD

- 1 Remove the OPEN AIR UNIT.
 4-6-11 (p.4-27)
- 2 Disconnect the three CAP PIERCE BD connectors.
- 3 Remove the three screws (PS3×6) and then the CAP PIERCE BD.



4-7-11. Removing the UT-7299 FRONT PANEL BD

 The FRONT PANEL BD consists of several boards. They are FRONT PANEL BDs (A), (B) and (C).

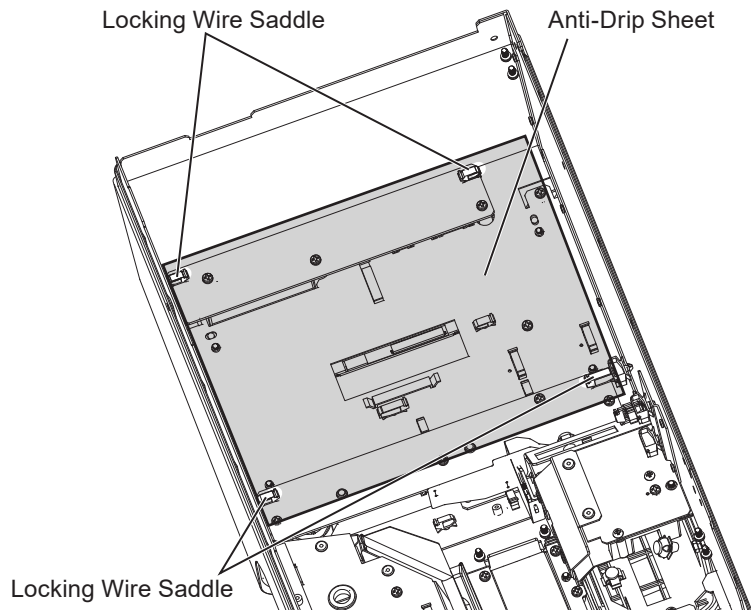
- 1** Remove the left cover.

 4-4 (p.4-4)

- 2** Open the front panel unit.

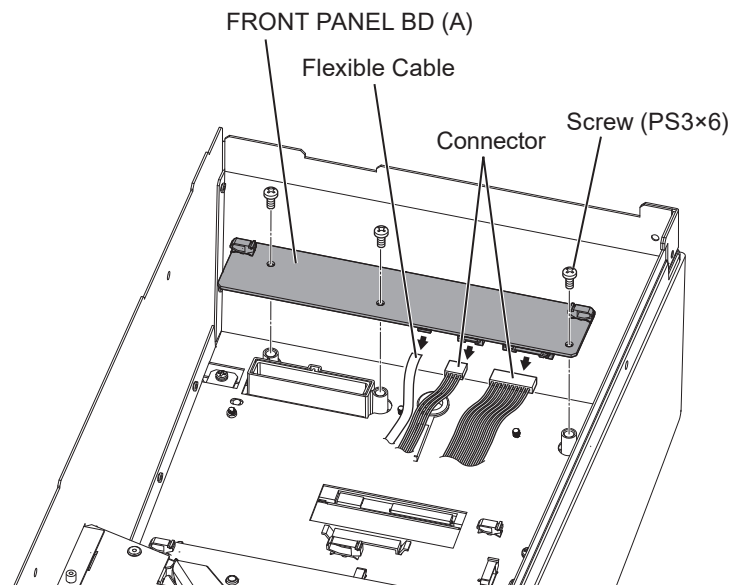
 4-2 (p.4-3)

- 3** Remove the anti-drip sheet from the locking wire saddle.



- 4** Remove the three screws (PS3×6) and then FRONT PANEL BD (A).

- 5** Disconnect the two connectors and the flexible cable from FRONT PANEL BD (A).



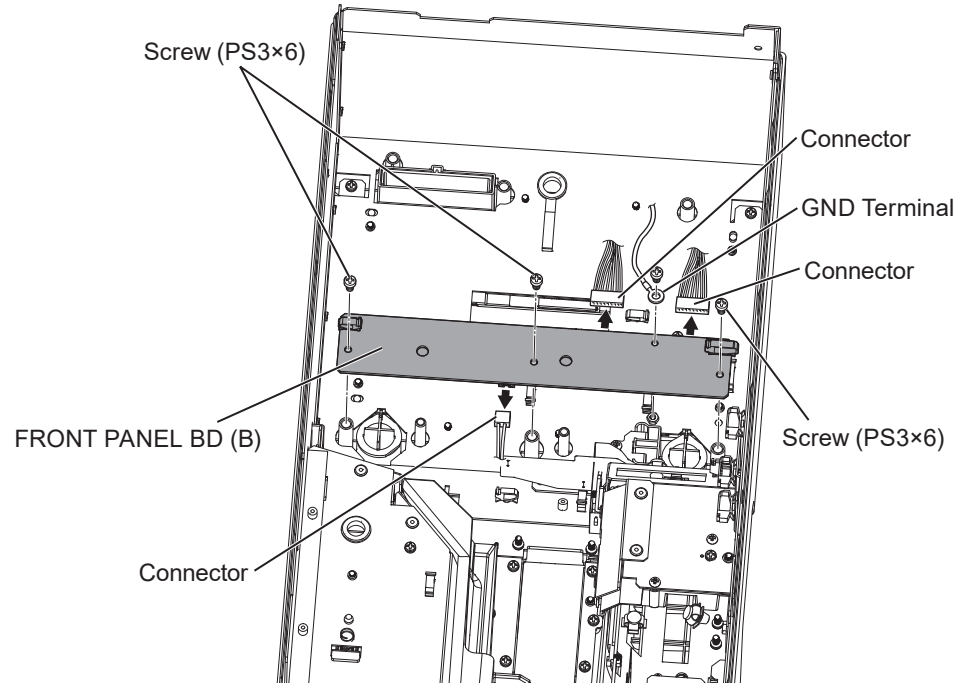
Notes on Assembly

Make sure the flexible cable is facing the right way when connecting it.

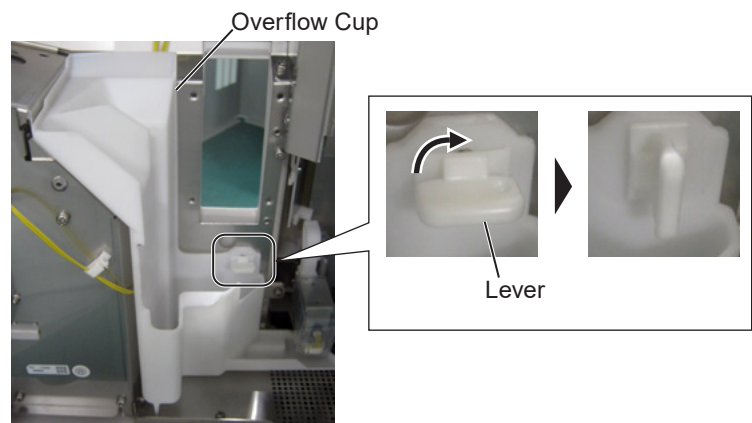
- 6** Remove the four screws (PS3×6) and then FRONT PANEL BD (B) along with the ground terminal that is fixed to it.

NOTE: When the screws (PS3×6) holding the GND terminal are removed, the nuts on the rear side also come free at the same time, and so be careful that the nuts do not drop inside the analyzer.

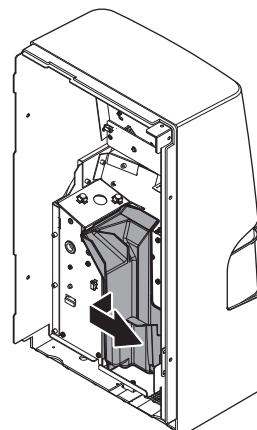
- 7** Disconnect the three FRONT PANEL BD (B) connectors.



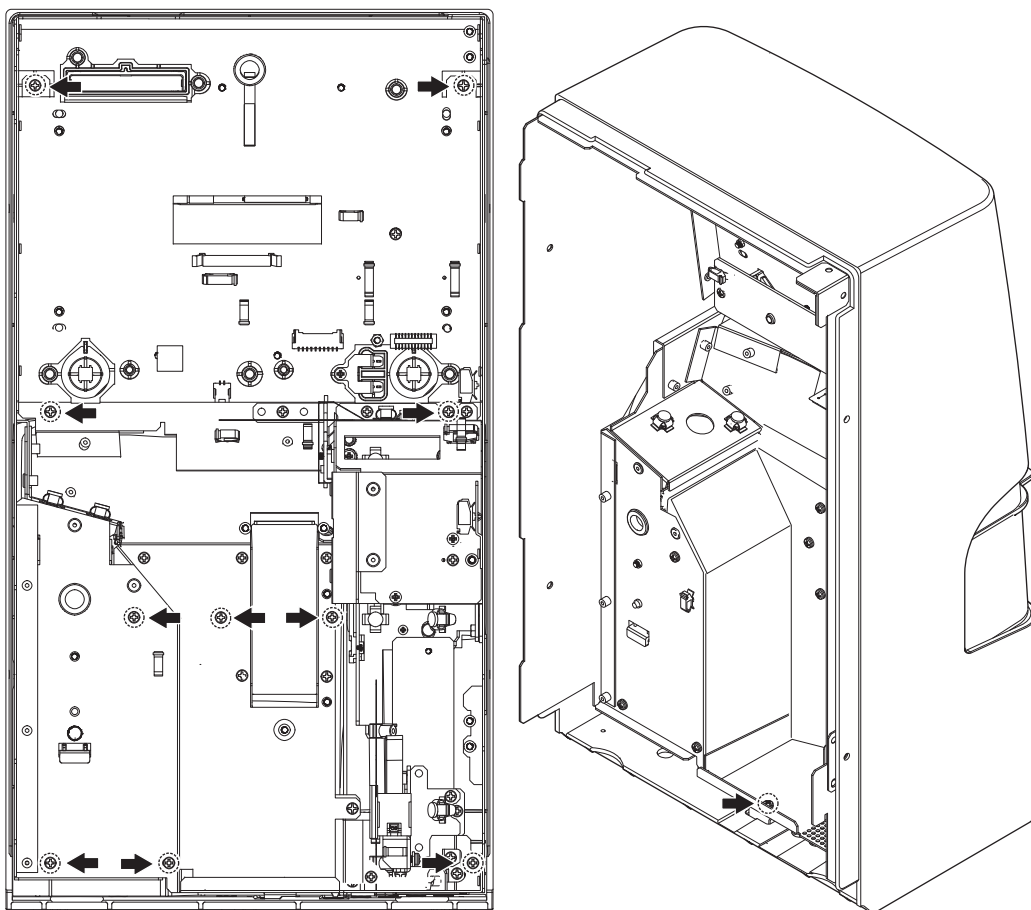
- 8** Turn the lever of the overflow cup 90°.



- 9** Pull the overflow cup forward slightly and slide it sideways to remove it.

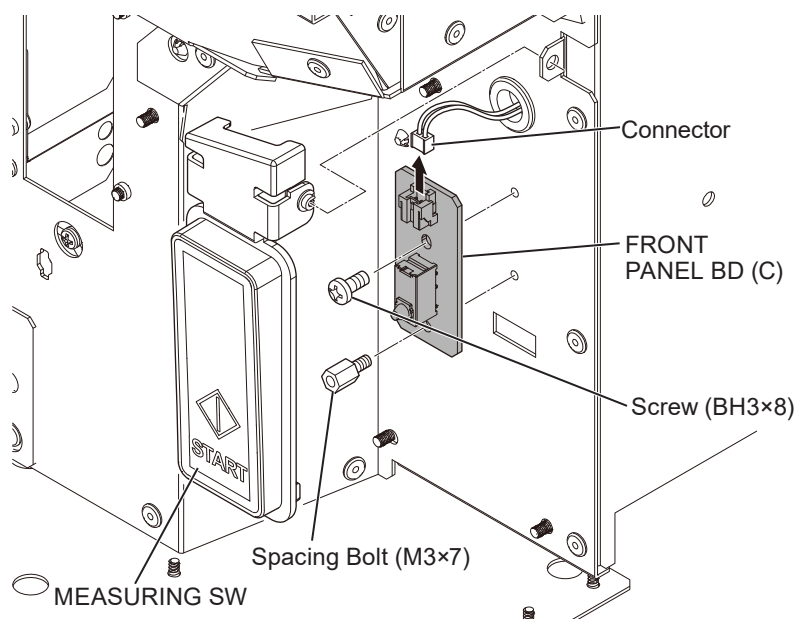


10 Remove the eleven screws (PS3×6) and then the FRONT PANEL.




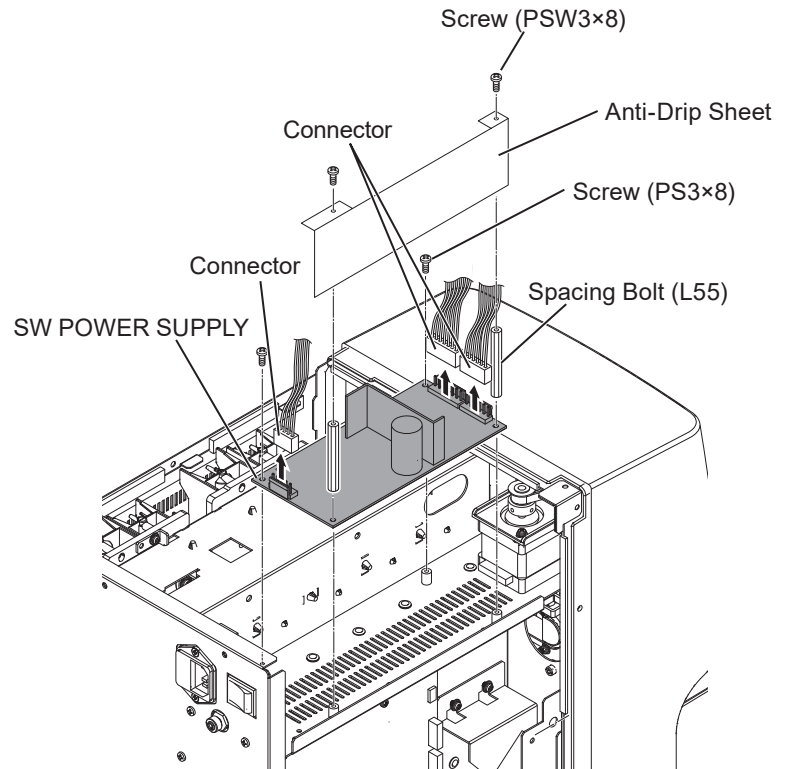
11 Remove the MEASURING SW and disconnect the one FRONT PANEL BD (C) connector.

12 Remove the one screw (BH3×8) and one spacing bolt (M3×7), then remove FRONT PANEL BD (C).



4-7-12. Removing the SWITCHING POWER SUPPLY

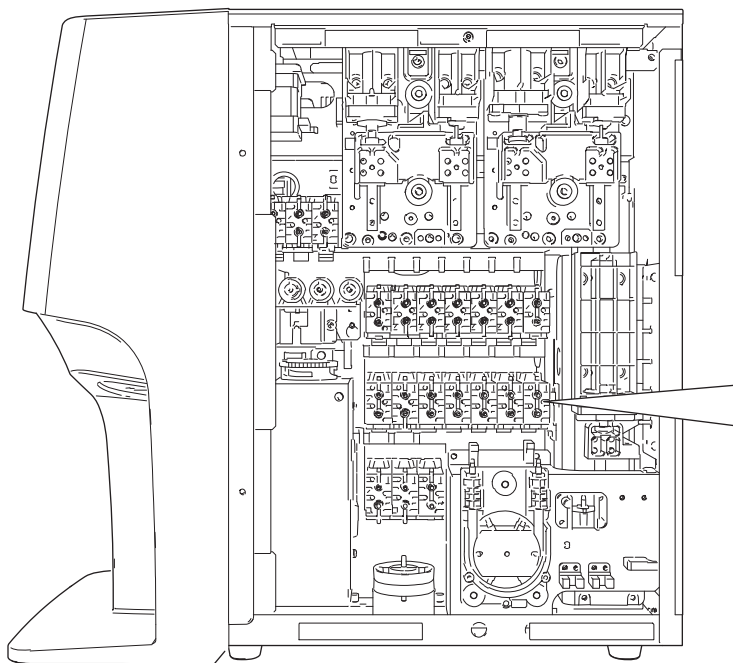
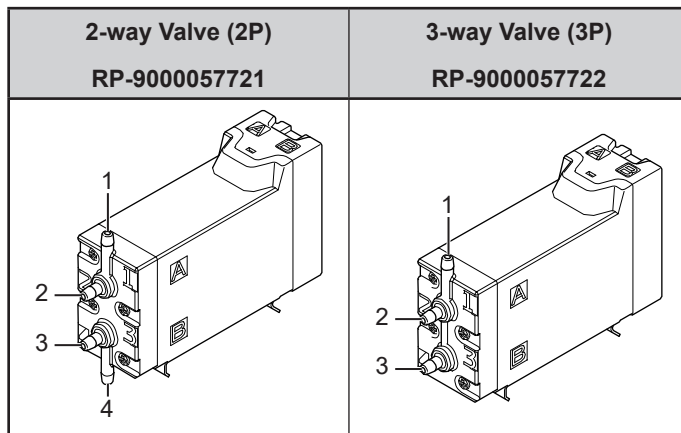
- 1 Remove the left cover.
 4-4 (p.4-4)
- 2 Disconnect the three SW POWER SUPPLY connectors.
- 3 Remove the two screws (PSW3×6) and then the anti-drip sheet.
- 4 Remove the two screws (PSW3×8), two L55 spacing bolts and then the SWITCHING POWER SUPPLY.



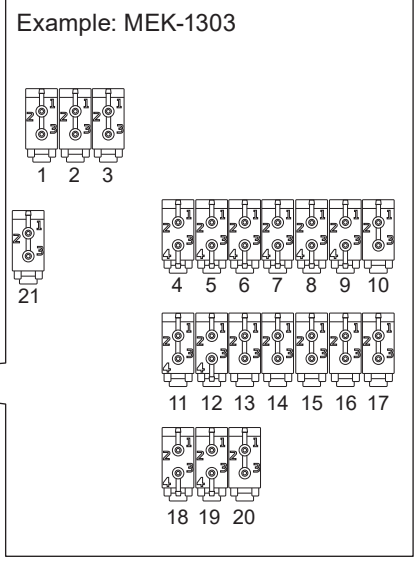
4-8. Electromagnetic Valves

The following electromagnetic valves are used by the analyzer.

The total number of valves varies by model.




Right Side of Instrument

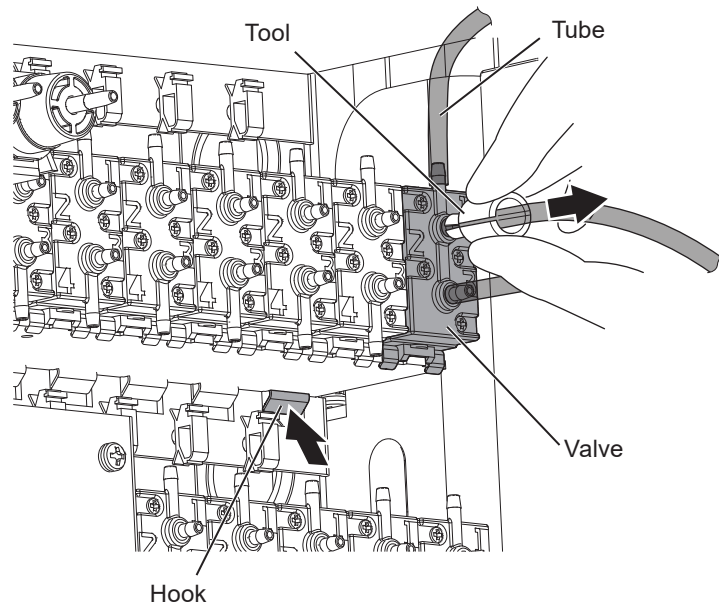


Valve No.	Valve Type			
	MEK-1301	MEK-1302	MEK-1303	MEK-1305
1	2-way Valve		3-way Valve	2-way Valve
2	3-way Valve			—
3	—	—	3-way Valve	
4	—	—	2-way Valve	3-way Valve
5	—	2-way Valve	2-way Valve	—
6	2-way Valve			
7				
8				
9				
10	3-way Valve			
11	3-way Valve			

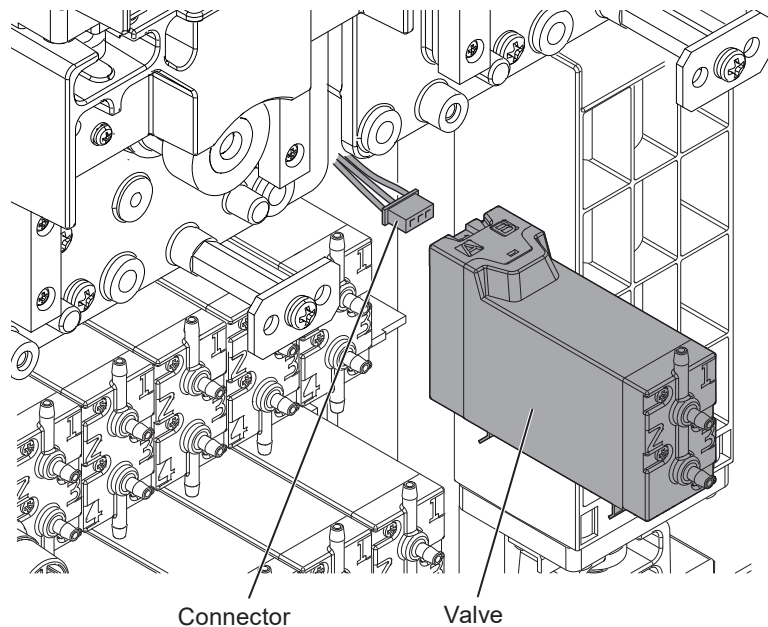
Valve No.	Valve Type			
	MEK-1301	MEK-1302	MEK-1303	MEK-1305
12	2-way Valve			
13	2-way Valve			
14	2-way Valve			
15	3-way Valve			
16	3-way Valve			
17	3-way Valve			
18	2-way Valve			
19	2-way Valve			
20	3-way Valve			
21	2-way Valve			

4-8-1. Removing the Electromagnetic Valves

- 1 Remove the right cover.
 4-3 (p.4-4)
- 2 Use the special tool to disconnect tubes.
- 3 Electromagnetic valves are fastened to the housing of the analyzer with hooks. Lift up on the hook with something like a slotted screwdriver to remove an electromagnetic valve.



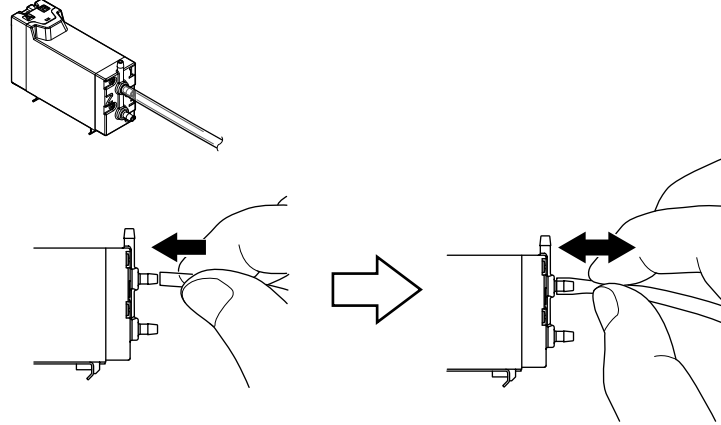
- 4 Pull the valve forward and remove its one connector on the back.



4-8-2. Reconnecting the TOALON Tube

NOTE: Push tubes firmly all the way in when connecting them. Failure to connect them properly may result in problems like fluid leaks, contamination, pressure loss or the like.

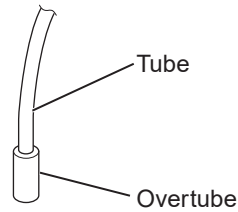
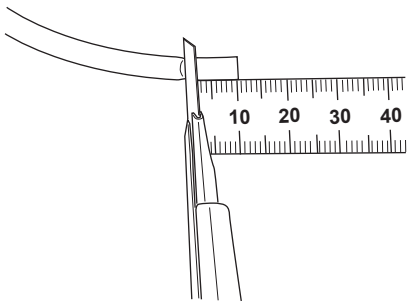
After connecting a tube, pull on it several times as shown in the diagram to check whether it comes off easily.



If it does come off easily, the tube may be deteriorating.

Cut 10 mm or so off the tip with a box cutter or the like and try connecting it again.

NOTE: If it has an overtube, take care not to cut them together.



5

Calibration

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5-1. Calibrating the Analyzer

When an unacceptable error is found in a measurement value as a result of quality control, the analyzer needs to be calibrated so that measurements are closer to the true values.

Calibration is necessary for each measurement mode.

The analyzer calibrates CBC, CRP and HbA1c. (CRP and HbA1c can be calibrated on only the MEK-1303.) When calibrating CBC, use MEK-CAL hematology calibrator. When calibrating CRP, use CR-CAL calibrator for CRP. When calibrating HbA1c, use YZ-005B1 calibrator for HbA1c.



“High-precision Calibration with Fresh Blood (Hemoglobin, Hematocrit, Platelet)” (p. 5-20)

- NOTE**
- When calibrating with a reference method that uses a calibrator other than the one recommended by Nihon Kohden, measure 10 or more samples collected within the past 8 hours (past 4 hours for WBC differential) and which were stored at room temperature after collection, then adjust the calibration coefficient according to the comparison between the measurement values and the reference method values. Do not use a sample that is suspected to be abnormal as the calibrator.
 - The MEK-3DN (for MEK-1301, MEK-1302 and MEK-1305), MEK-3CN (for MEK-1303) hematology control or YZ-004B8 (for MEK-1303) HbA1c control cannot be used as a calibrator. They are can only be used for quality control.
 - Do not use the calibrator after the expiration date below.
 - Unopened: Expiration date on the label or package
 - Opened
 - MEK-CAL: 7 days after opening
 - CR-CAL/YZ-005B1:
 - 1 day after opening
 - Store the control within the specified temperature range (MEK-CAL: 2 to 8°C (36 to 46°F), CR-CAL/YZ-005B1: 2 to 10°C (36 to 50°F).
 - Do not freeze the control.
 - Use the control once it has returned to room temperature.
 - Mix the hematology control by gently turning it upside down several times before measurement.
 - Read the calibrator manual thoroughly and follow its precautions.
 - Re-calibrate when there is difference from the reference method. Decide the calibration coefficient from the average of the measured data then enter the coefficient.

5-1-1. Opening the Calibration Screen



1 Touch [Main Menu] at the lower left to open the Main Menu screen.



2 Touch [Calibration] on the Main Menu screen to show the Calibration screen.



[Edit]: Opens the Edit Calibration Value window (p. 5-22).

[History]: Shows calibration history (p. 5-19).

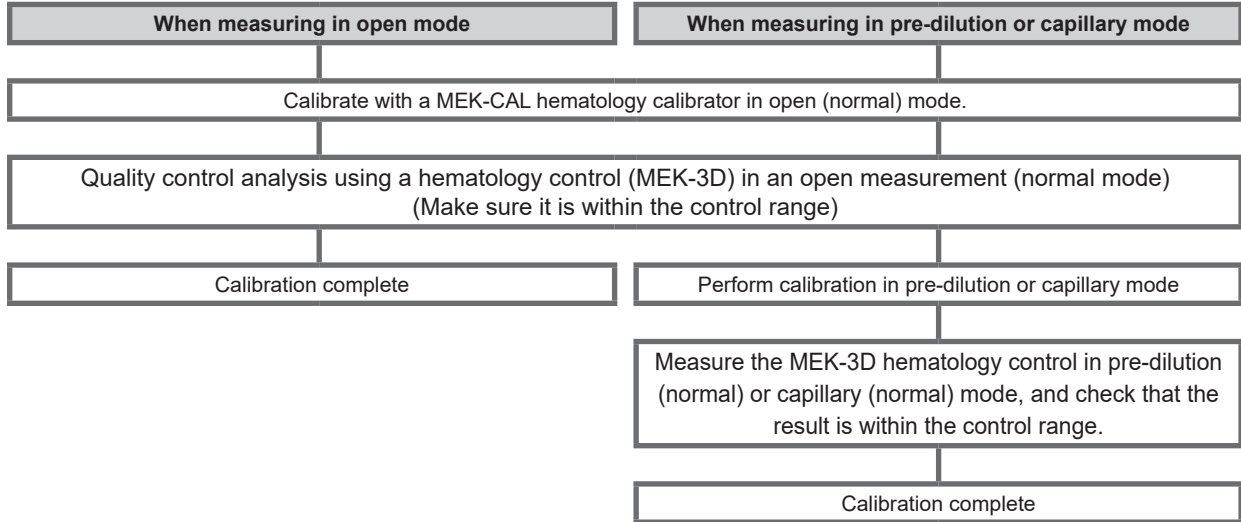
[Manual Entry]: Opens the Enter Calibration Target window (p. 5-2).

5-1-2. Calibrating the CBC

5-1-2-1. CBC Calibration Process

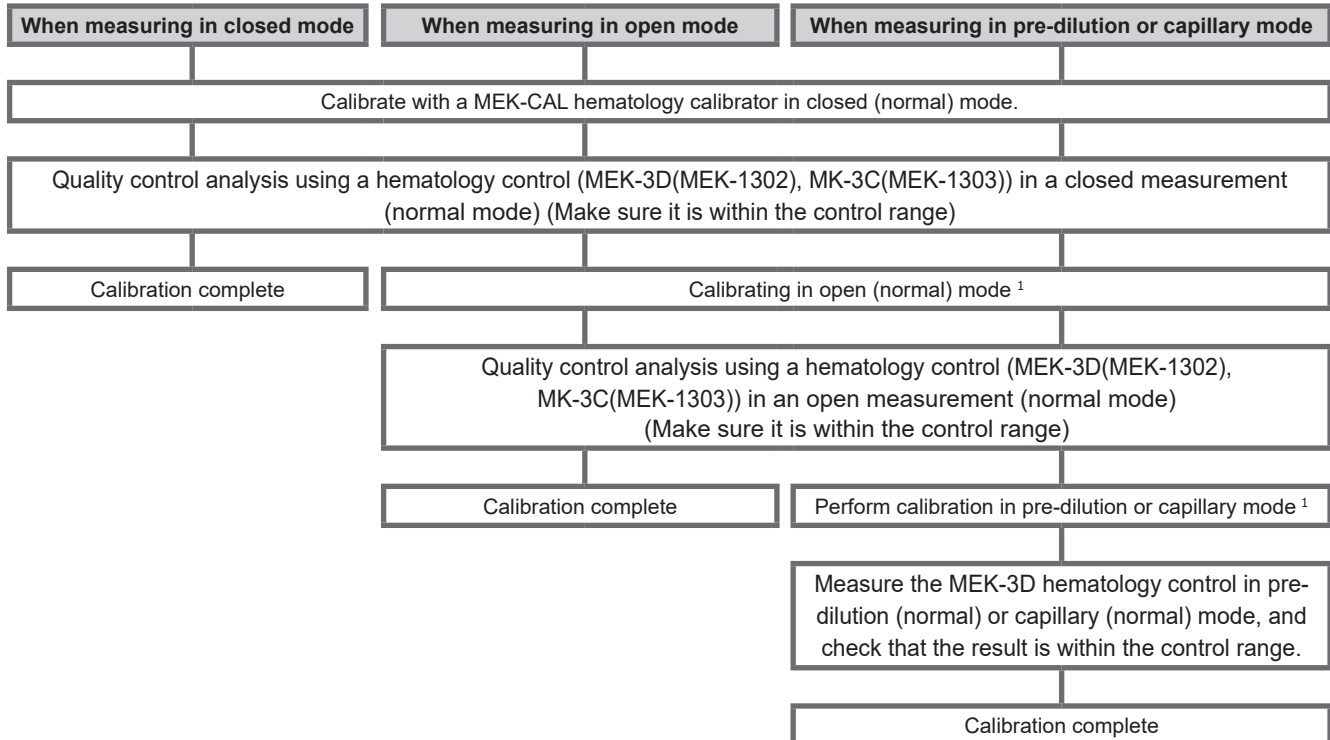
MEK-1301, MEK-1305

Perform calibration in “open” mode to set the basic calibration coefficient. If the measurement data from pre-dilution mode or capillary mode does not match the calibration data, conduct calibration for each mode to correct the calibration value.



MEK-1302, MEK-1303

Perform calibration in “closed” mode to set the basic calibration coefficient. If the measurement data from any of open mode measurements does not match the calibration data, conduct calibration for each open mode measurement to correct the calibration value.

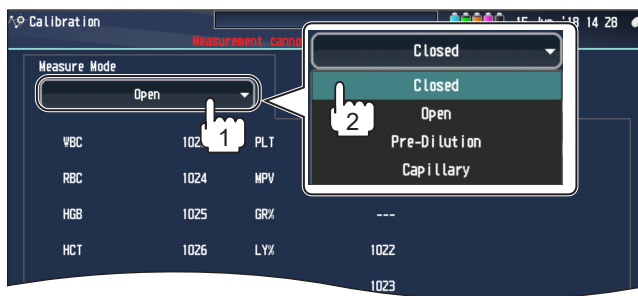


¹ Perform this when the measurement data and closed mode calibration value does not match.

5-1-2-2. Calibration Procedure for Closed Mode

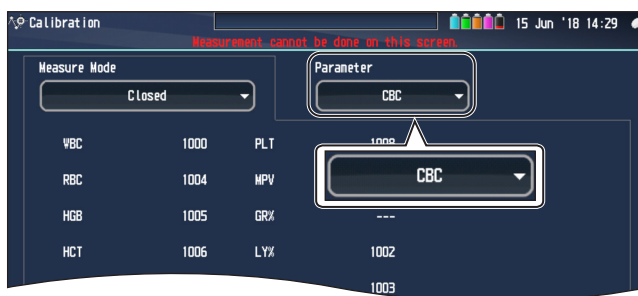
1 Enter the calibration settings

1) Touch “Measurement Mode” and select “Closed” from the pull-down list.

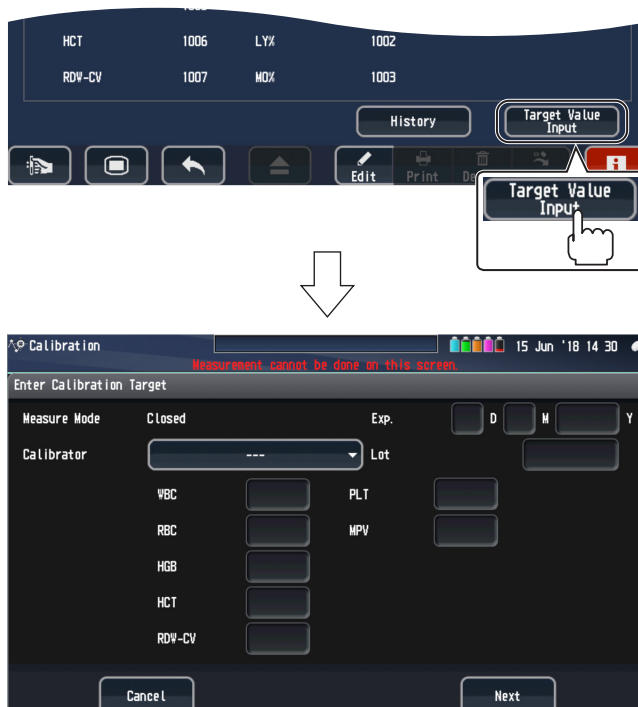


5

2) Check that the measurement parameter is “CBC”.

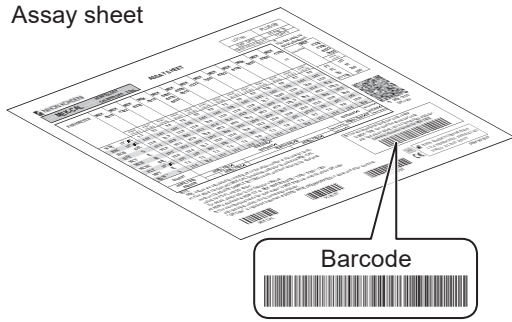


3) Touch [Manual Entry]. The Enter Calibration Target window opens.



2 Enter the calibration target value

Assay sheet



1) Use the ZK-130W handy bar code reader to enter the calibration information of the MEK-CAL.



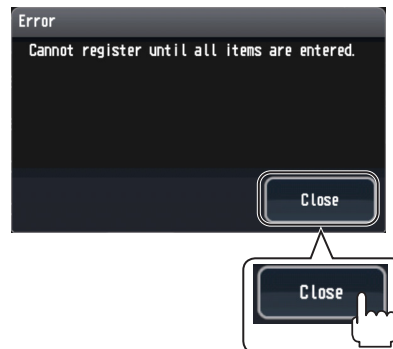
- The barcode is printed on the assay sheet included in the MEK-CAL package.
- The calibration information can also be entered manually.

2) Confirm that the entered data is correct.

3) Touch [Next]. The Calibration Measurement window opens.

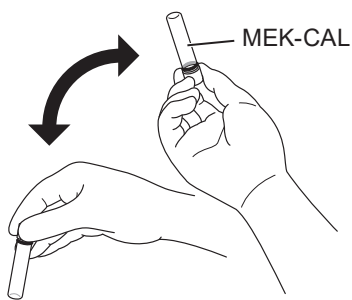


If an incorrect value is entered, the following window appears. Touch [Close] and enter the calibration target value again.



3 Prepare the MEK-CAL

Agitate the MEK-CAL gently by turning it upside down at least 20 times.



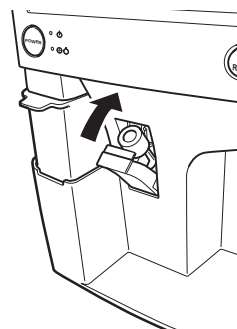
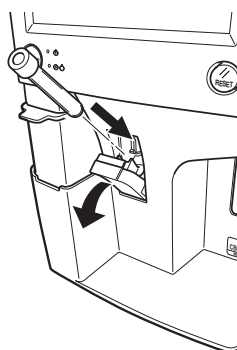
4 Set the MEK-CAL

1) Load the MEK-CAL into the tube holder.

The analyzer does not operate unless an MEK-CAL is loaded, even if the tube holder is closed.



When manually opening the tube holder, touch the eject key ([▲]).



2) Close the tube holder.

Measurement starts automatically.

5 Measure the MEK-CAL

1) The tube holder opens automatically after aspiration of the MEK-CAL. Repeat steps **3** and **4** to make ten data measurements.

2) Select the measurement data to use for calibration, and touch [Apply].

ALL	Date	WBC	RBC	HGB	HCT	RDW-CV	PLT	MPV	
<input checked="" type="checkbox"/>	2018/05/11 17:35	83.4	423	12.48	37.6	16.5	24.29	8.4	
<input checked="" type="checkbox"/>	2018/05/11 17:36	83.3	425	12.50	37.8	16.6	24.09	8.5	
<input checked="" type="checkbox"/>	2018/05/11 17:38	83.6	423	12.42	37.8	16.5	24.26	8.4	
N = 10		Assay Value	89.0	447	13.95	47.3	15.6	26.76	9.7
		Average	82.92	423.1	12.491	37.61	16.49	24.436	8.44
		CV	1.4%	0.9%	0.4%	1.0%	0.7%	1.1%	1.0%
Cal Value		Now	1000	1000	1000	1000	1000	1000	1000
		Target	1073	1056	1117	1258	946	1095	1149
Select		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

5-1-2-3. Calibration Procedure for Open Mode

The measurement data in open mode, pre-dilution mode, or capillary mode and the closed mode calibration value may not match in the following cases:

- Calibration was performed in open mode on the MEK-1301 or MEK-1305
- Calibration was performed in closed mode on the MEK-1302 or MEK-1303

This is due to variation in the dilution ratio or inappropriate calibration procedure.

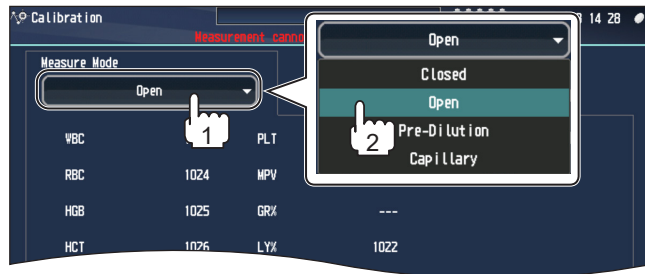
If this happens, perform calibration using the procedure described below.

$$\text{Measurement value of pre-dilution mode or capillary mode after calibration} = \text{Measurement value in pre-dilution mode or capillary mode} \times \frac{\text{Calibration coefficient of closed mode}}{1,000} \times \frac{\text{Calibration coefficient of open mode}}{1,000} \times \frac{\text{Calibration coefficient of pre-dilution mode or capillary mode}}{1,000}$$

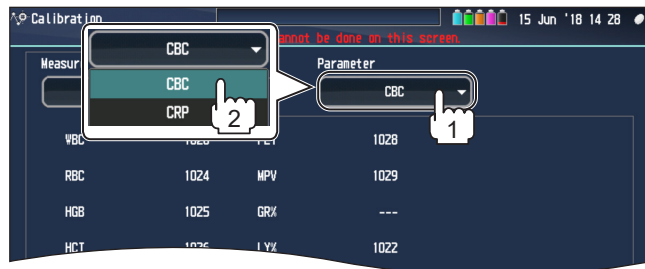
- NOTE
- Confirm that the analyzer has been calibrated in closed mode before performing open mode, pre-dilution mode, or capillary mode calibration (MEK-1302 and MEK-1303 only).
 - Changing the calibration coefficient in closed mode also changes the calibration coefficient for open mode, pre-dilution mode, and capillary mode. It is therefore not necessary to perform open mode or pre-dilution mode calibration every time closed mode calibration is performed (MEK-1302 and MEK-1303 only).

1 Enter the calibration settings

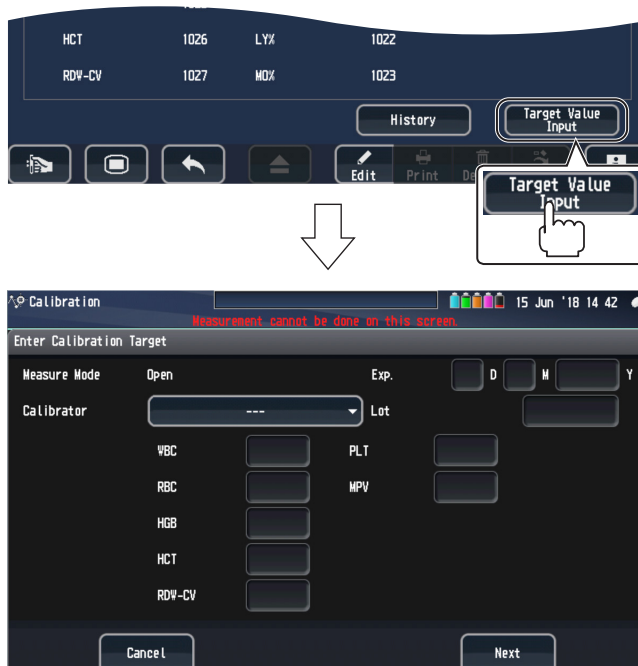
- 1) Touch “Measurement Mode” and select either “Open”, “Pre-Dilution” or “Capillary” from the pull-down list.



- 2) Touch “Parameter” and select “CBC” from the pull-down list.



3) Touch [Manual Entry]. The Enter Calibration Target window opens.



5

2 Enter the calibration target value

Perform the same procedure as for closed mode measurement (“Calibrating the CBC” (p. 5-4)).

3 Measure the MEK-CAL

- 1) Aspirate the MEK-CAL. The aspiration procedure differs depending on the measuring mode.
- 2) Press the measurement button to start measurement. Measurement is performed for 10 times.

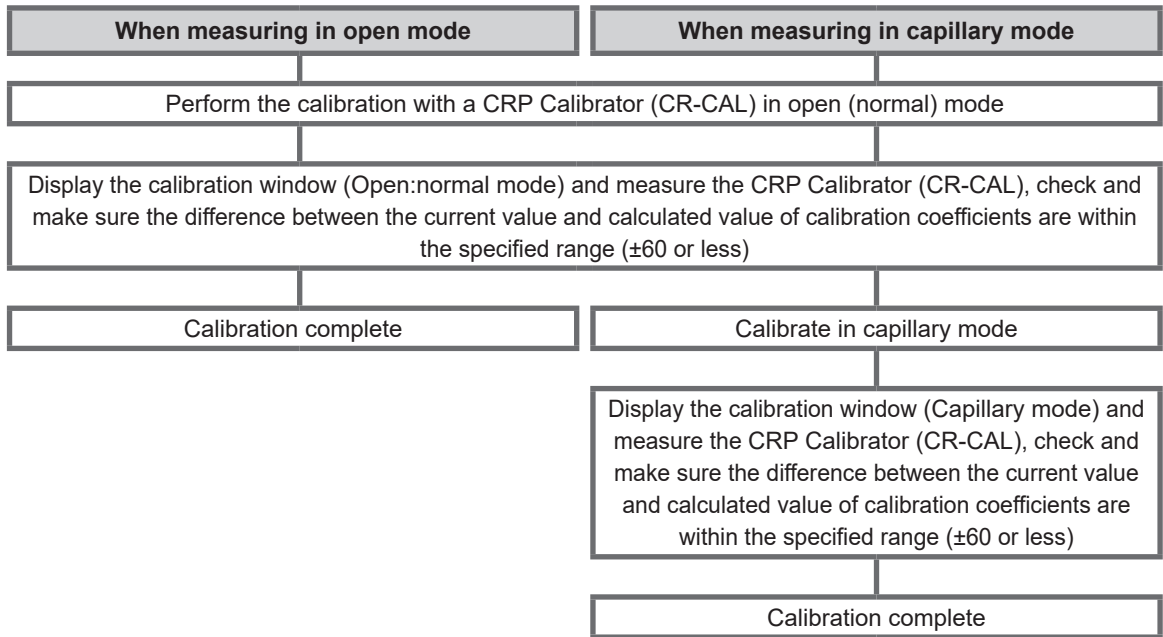
NOTE: During aspiration, a sound indicating measurement in progress is produced. Do not lower the sample from the sampling nozzle while sound is heard.

3) Select the measurement data to use for calibration, and touch [Apply].



5-1-3. Calibration of the CRP (MEK-1303 Only)

5-1-3-1. CRP Calibration Process



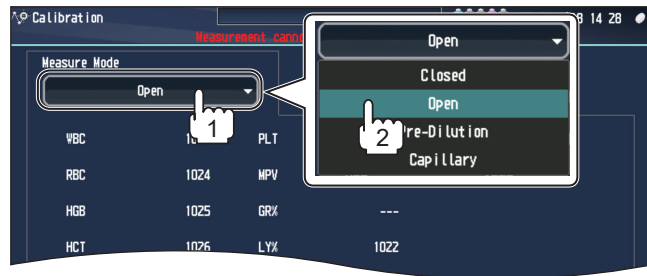
CRP can not be calibrated with closed mode.

CRP cannot be measured in pre-dilution mode.

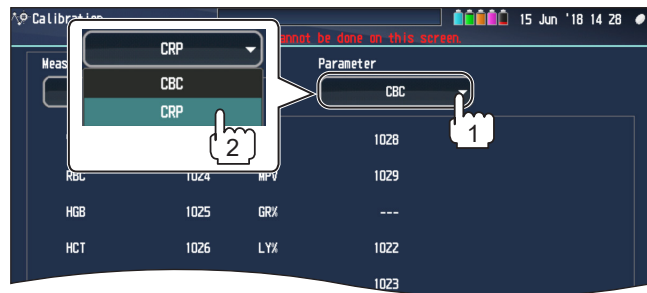
5-1-3-2. Calibration Procedure

1 Enter the calibration settings

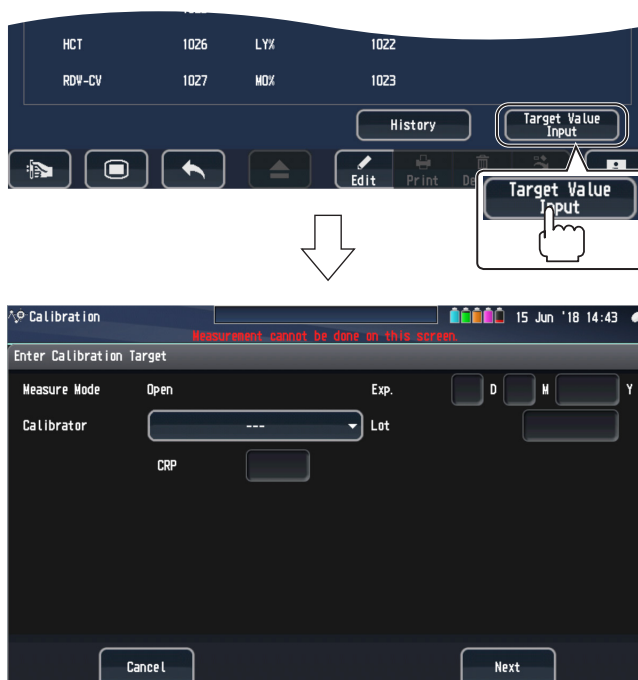
1) Touch "Measurement Mode" and select "Open" from the pull-down list.



2) Touch "Parameter" and select "CRP" from the pull-down list.



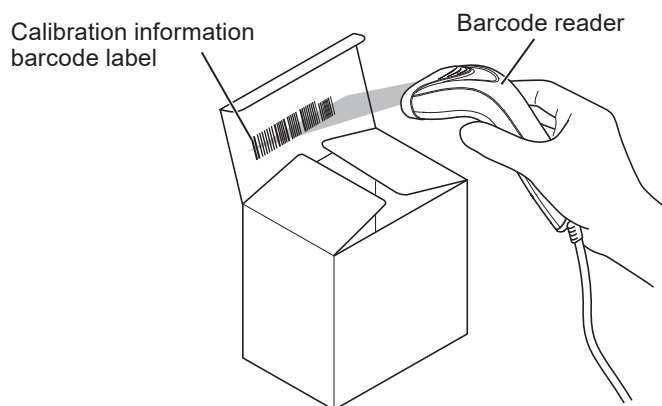
3) Touch [Manual Entry]. The Enter Calibration Target window opens.



5

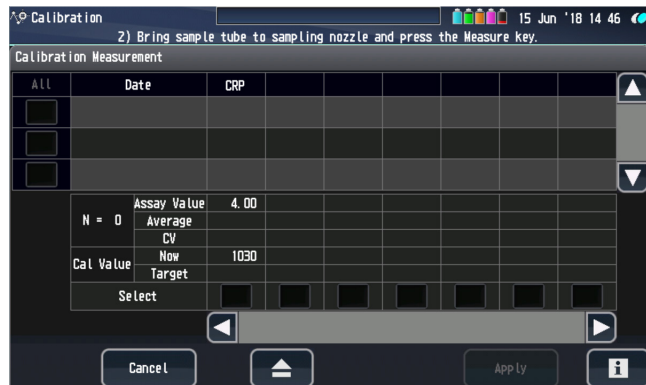
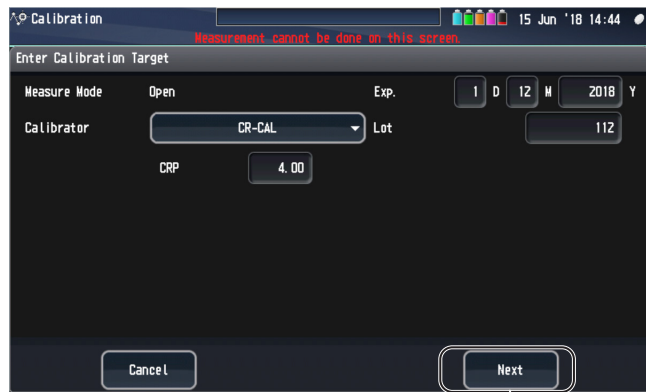
2 Enter the calibration target value

1) Use the ZK-130W handy barcode reader to enter the calibration information of the CR-CAL.

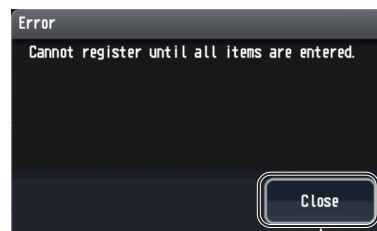


- The barcode label is affixed to the inside of the upper lid.
- The calibration information can also be entered manually.


2) Check that the correct value is entered. Touch [Next]. The Calibration Measurement window opens.



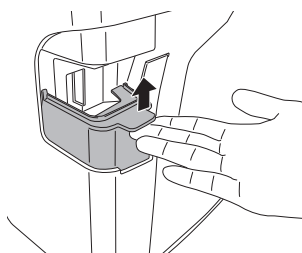
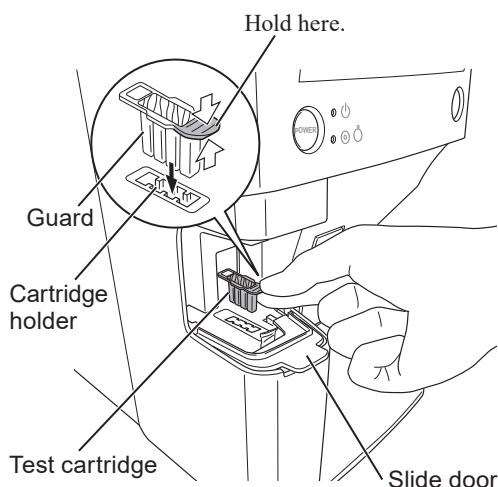
If an incorrect value is entered, the following window appears. Touch [Close] and enter the correct value.



3 Measure the calibrator.

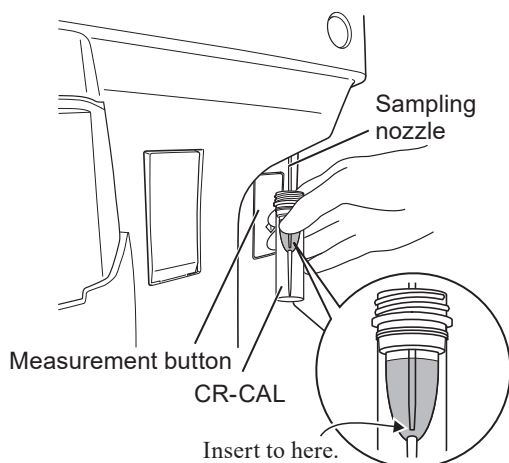
 If the test cartridge is already prepared, see p. 5-14.

- 1) Prepare a test cartridge. Mix the cell by inversion and hold such that the mixture is at the bottom of the cell.
- 2) Orientate the test cartridge guard downwards and push firmly down, deep into the cartridge holder.



- 3) Close the slide door.

After determining the possibility of using cartridges and conducting the pre-processing operations, the sampling nozzle lowers.



- 4) Hold the CR-CAL and insert the end of the sampling nozzle to the lower wall of the bottle, as shown in the figure on the left.

NOTE: Touching the end of the sampling nozzle against the bottom of the sample tube obstructs the opening for aspiration, and may prevent aspiration. Leave a slight gap between the end of the sampling nozzle and the bottom of the vessel during aspiration of the sample.

- 5) Press the measurement button to start measurement. Measurement is performed for 5 times.

NOTE: During aspiration, a sound indicating measurement in progress is produced. Do not lower the sample from the sampling nozzle while sound is heard.

- 6) Repeat steps 1) to 5) five times.
- 7) Select the measurement data to use for calibration, and touch [Apply].



If a test cartridge is in place and the measurement preparation is complete, perform calibration using the procedure described below. The calibration procedure differs depending on the measuring method.

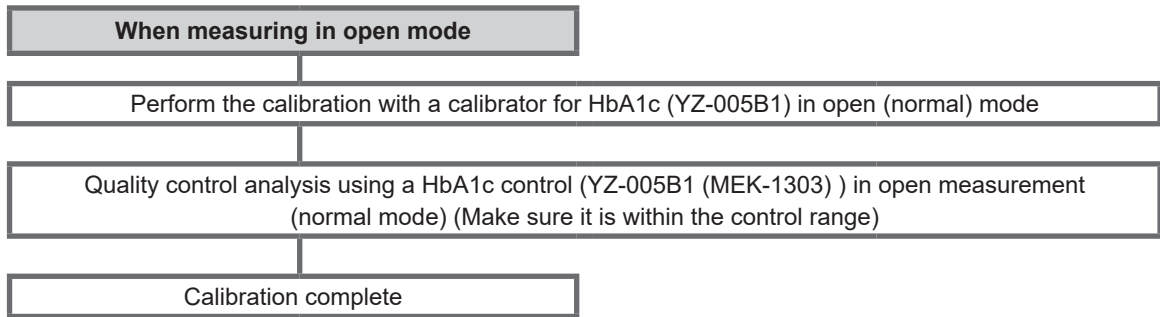
When measuring in open mode

The set test cartridge can be used.

1. Hold the CR-CAL and insert the end of the sampling nozzle to the lower wall of the bottle.
2. Press the measurement button to start measurement. Measurement is performed for 5 times.
3. Select the measurement data to use for calibration, and touch [Apply].

5-1-4. Calibration of the HbA1c (MEK-1303 Only)

5-1-4-1. HbA1c Calibration Process



The calibrating HbA1c is not required for normal delivery installation.

HbA1c can not be calibrated with closed mode.

HbA1c cannot be measured in pre-dilution mode.

Calibration by the capillary is not required.

5-1-4-2. Preparation of HbA1c Calibrator

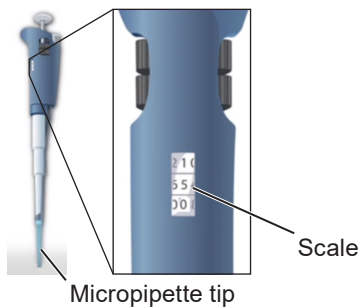
To perform HbA1c calibration, in addition to the HbA1c calibrator (YZ-005B1), the following equipment and distilled water is required. Be sure to obtain the item beforehand.



For details on the usage procedures and expiration dates of the calibrator, see the documentation supplied with the calibrator.

Name and Model	Packing Unit	Supply Code
Micropipette (Commercially-available product: Item capable of fixed amounts of 1.5 mL)	1	—

- 1 Remove the calibrator from the refrigerator, and return it to room temperature by leaving it for 10 minutes.
- 2 Open the lid of the calibrator.

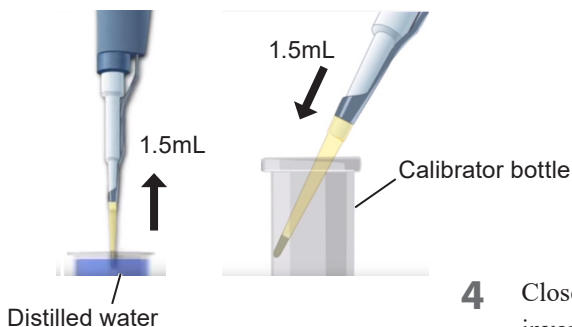


3 Use the micropipette to obtain a fixed amount of 1.5 mL distilled water, and add it to the calibrator.

1) Set the scale of the micropipette to 1.5 mL and attach the micropipette tip.


Aspirate

Dispense




2) Aspirate 1.5 mL of distilled water and dispense into the calibrator bottle.

4 Close the lid of the calibrator, leave the calibrator 10 minutes, then gently invert it 20 times.

 If necessary, use a disposable dropper or other tool to dispense it into a micro tube or other container. Once thawed, use calibrators within a day.

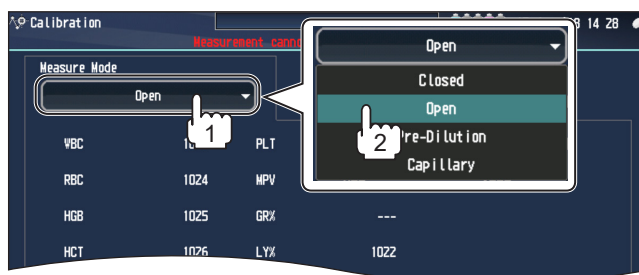
5-1-4-3. Calibration Procedure

1 Switch the operator to Technical User.

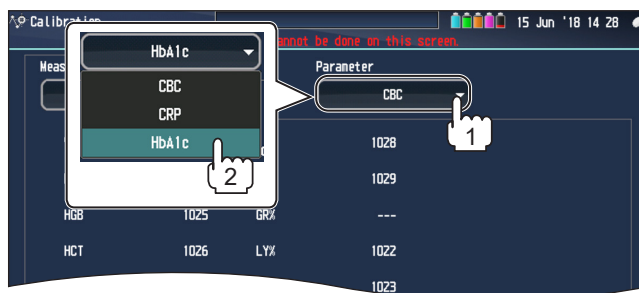
 7-3-1 (p.7-29)

2 Enter the calibration settings

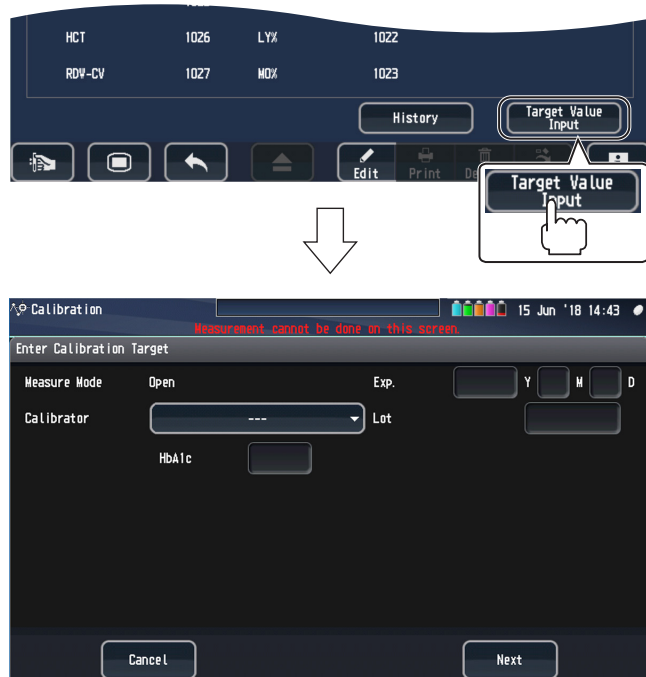
1) Touch “Measurement Mode” and select “Open” from the pull-down list.



2) Touch “Parameter” and select “HbA1c” from the pull-down list.

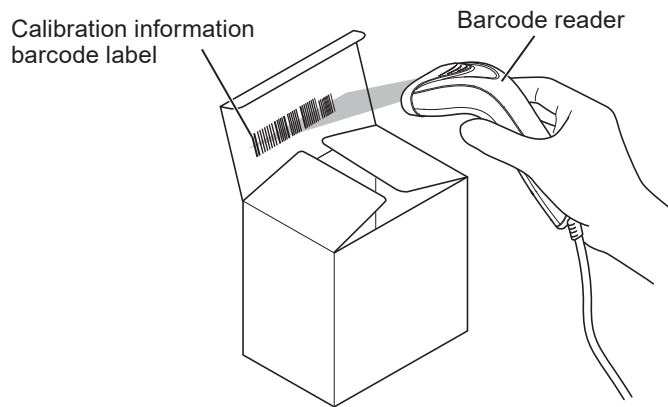


3) Touch [Target Value Input]. The Enter Calibration Target window opens.



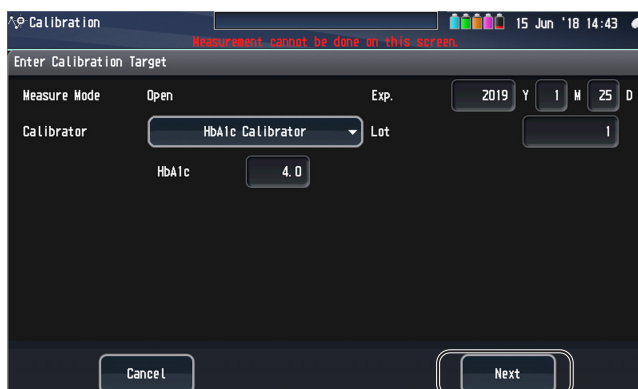
3 Enter the calibration target value

1) Use the ZK-130W handy barcode reader to enter the calibration information of the YZ-005B1.

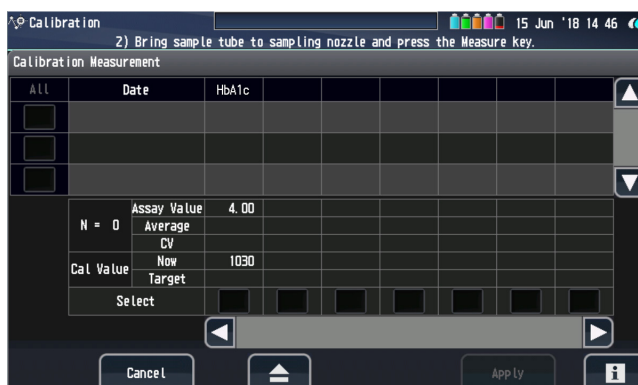


- 💡 • The barcode label is affixed to the inside of the upper lid.
- The calibration information can also be entered manually.

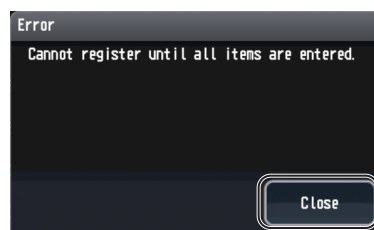
2) Check that the correct value is entered. Touch [Next]. The Calibration Measurement window opens.



5

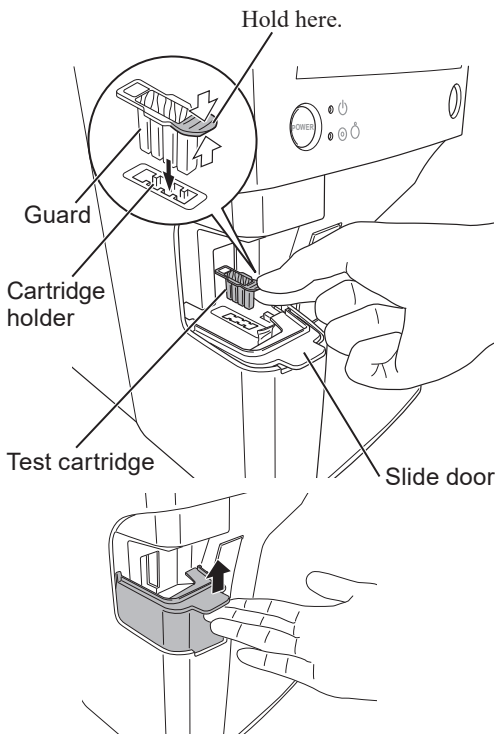


If an incorrect value is entered, the following window appears. Touch [Close] and enter the correct value.



4 Measure the calibrator.

- 1) Prepare a test cartridge. Mix the cell by inversion and hold such that the mixture is at the bottom of the cell.
- 2) Orientate the test cartridge guard downwards and push firmly down, deep into the cartridge holder.

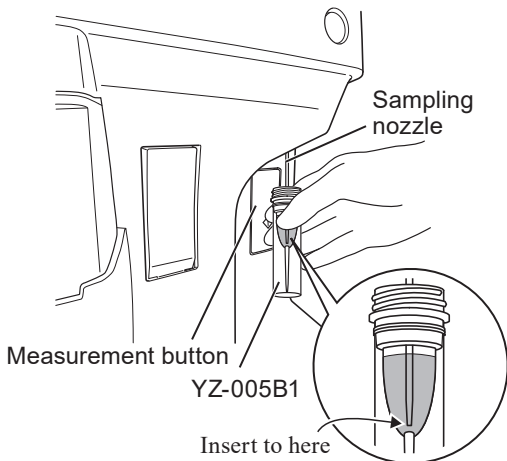


- 3) Close the slide door.

After determining the possibility of using cartridges and conducting the pre-processing operations, the sampling nozzle lowers.

- 4) Hold the YZ-005B1 and insert the end of the sampling nozzle to the lower wall of the bottle, as shown in the figure on the left.

NOTE: Touching the end of the sampling nozzle against the bottom of the sample tube obstructs the opening for aspiration, and may prevent aspiration. Leave a slight gap between the end of the sampling nozzle and the bottom of the vessel during aspiration of the sample.



- 5) Press the measurement button to start measurement. Measurement is performed for 5 times.

NOTE: During aspiration, a sound indicating measurement in progress is produced. Do not lower the sample from the sampling nozzle while sound is heard.

- 6) Repeat steps 1) to 5) five times.

- 7) Select the measurement data to use for calibration, and touch [Apply].



If a test cartridge is in place and the measurement preparation is complete, perform calibration using the procedure described below. The calibration procedure differs depending on the measuring method.

When measuring in open mode

The set test cartridge can be used.

1. Hold the YZ-005B1 and insert the end of the sampling nozzle to the lower wall of the bottle.
2. Press the measurement button to start measurement. Measurement is performed for 5 times.
3. Select the measurement data to use for calibration, and touch [Apply].

5-1-5. Checking the Calibration Results

- 1 Touch [History].



- 2 Check the calibration history.



Touch [▲], [▼], [◀] or [▶] to scroll the list vertically or horizontally.

5-2. High-precision Calibration with Fresh Blood (Hemoglobin, Hematocrit, Platelet)

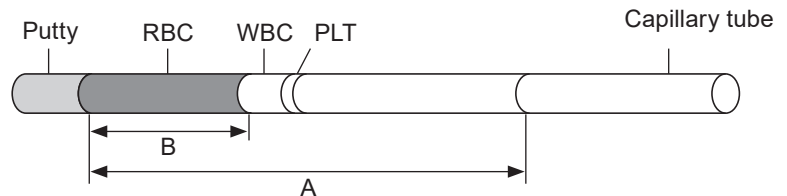
Measure 10 human blood samples of healthy persons using the analyzer as well as a spectrophotometer and microhematocrit centrifuge. Calculate the calibration coefficient using the HGB, HCT and PLT values obtained from a spectrophotometer and microhematocrit centrifuge.

- 1 Prepare 10 human blood samples collected from the veins of 10 different healthy persons.
- 2 Measure each sample twice with the analyzer.
- 3 Measure with a spectrophotometer and microhematocrit centrifuge.

NOTE: Measurement accuracy with the spectrophotometer and microhematocrit centrifuge depends on how skillfully the measurements are conducted, so perform them with care.

HCT Measurement

- 1) Aspirate the whole blood sample into 2/3 of the pre-dilution tube, wipe away any blood from the outside of the tube, and seal the lower end of the tube with putty.
- 2) Set the microhematocrit centrifuge to 11,000 rpm for 5 minutes and centrifuge the tube.
- 3) Immediately after rotation stops, remove the tube and measure the length of Layers A and B as measured by a microscope. Then calculate each HCT.



$$\text{HCT} = \frac{\text{B (Red blood cell volume)}}{\text{A (Blood volume)}} \times 100 (\%)$$

- 4) Measure two tubes for each sample and treat the mean of the measurements as the HCT values with the spectrophotometer and microhematocrit centrifuge method.

HGB Measurement

- 1) Prepare a hemolysing reagent in accordance with the International Committee for Standardization in Hematology (ICSH) and use it as a diluent.
- 2) Make a pair of two 200:1 diluted samples from each sample.
- 3) Set up the spectrophotometer as follows to measure the 200:1 diluted samples, and calculate HGB values.
 - Wavelength: approx. 540 nm
 - Mode: ABS (absorbance) mode

Multiply each measured absorbance by 29.3 to obtain the HGB value.

$$\text{HGB} = \text{Measured absorbance} \times 29.3 \text{ (g/dL)}$$

$$29.3 = \frac{64458 \times 200}{44 \times 1000 \times 1 \times 10}$$

64458: HGB molecular weight
 200: Dilution ratio
 44: Millimolar extinction coefficient
 1000: from mg to g
 1: Cell thickness (cm)
 10: from g/L to g/dL

- 4) For each sample, measure the two 200:1 diluted samples and treat the average of the measurements as the HGB value as measured by the spectrophotometer and microhematocrit centrifuge method.

5

PLT Measurement

Measure the platelet count according to the following international standard.

ICSH/ISLH 2001:

International Council for Standardization in Hematology Expert Panel on Cytometry and International Society of Laboratory Hematology Task Force on Platelet Counting. Platelet Counting by the RBC/platelet Ratio method: A Reference Method. American Journal of Clinical Pathology 115:460-464 2001

- 4 Calculate the new HGB, HCT and PLT calibration coefficients.

- 1) By filling the following table with the HGB, HCT and PLT values, calculate the mean (A) among the 8 data, excluding the single highest and lowest data.
- 2) By applying the calculated mean (A) and calibration coefficient (B) to the following formula, calculate the revised calibration coefficient (C).

Sample No.	Measurement Value		Data Analyzer measurement data – Spectrophotometer and microhematocrit centrifuge measurement data ----- Spectrophotometer and microhematocrit centrifuge measurement data × 100 (%)
	Spectrophotometer and Microhematocrit Centrifuge	Analyzer	
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
Mean of the eight data excluding the highest and lowest data points (A)			(%)
Current calibration coefficient (B)			
Revised calibration coefficient (C) $(C) = (B) \times \left(1 - \frac{(A)}{100}\right)$			

5. Calibration



- 5 Touch [Edit] on the Calibration screen to show the Edit Calibration Value screen.

Set the calibration coefficient and touch [OK].



6

Adjustment

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6-1. General

This device uses parts that require adjustments when they are replaced or removed. Make the following adjustments when replacing or removing such parts.

Also note that adjustments may be required as a result of self checks.





The cell block photometric voltage adjustment (MEK-1303) must be made as a result of self checks.

Adjustment Items		Replacement Parts
Adjusting the WBC Manometer		Adjust when any of the following parts is replaced. <ul style="list-style-type: none"> • AMP CONTROL BD • CBC MEASURING UNIT (MC-130W) • MANOMETER BD (UT-7302)
Adjusting the Liquid Sensor/LIQUID SENSOR BD		Adjust when any of the following parts is replaced. <ul style="list-style-type: none"> • AMP CONTROL BD • LIQUID SENSOR KIT (liquid sensor) • LIQUID SENSOR ISO kit
Adjusting the HGB		Adjust when any of the following parts is replaced. <ul style="list-style-type: none"> • AMP CONTROL BD • HGB MEASURING UNIT (MH-130W) • HGB/SS AMP BD (UT-7290) • HGB/SS LED BD (UT-7289)
Adjusting the Cell Block Photometric Voltage (MEK-1303)		Adjust when the judgment value of “Immune Photodiode Voltage” under “Circuit Test” is out of range after running self check.
Adjusting the Immunoassay Unit with Blood (Synchronizing CBC & HGB)		Adjust when any of the following messages occur frequently. 3-3-1 (p.3-6) <ul style="list-style-type: none"> • 64303 Short Sample • 60309 Immunoassay Unit HGB Limit • 64310 Immunoassay Unit HGB Out of Range
Adjusting the ESR Measuring Unit Photometric Sensitivity (MEK-1305)		Adjust when the judgment value of “ESR Unit Light Reception Level” under “Circuit Test” is out of range after running self check.
Adjusting the Sampling Nozzle Position	Adjusting the Sampling Nozzle and the Cell Position (MEK-1303)	Adjust when any of the following is performed. <ul style="list-style-type: none"> • SAMPLER UNIT or sampling nozzle is removed • Any of the following parts is replaced: <ul style="list-style-type: none"> - Sampling Nozzle - SAMPLER UNIT - CHM MEASURING UNIT (MC-131W) • Adjustment of positions of sampling nozzle (Adjustment of Sampler Sensor BD position) • Positions of sampling nozzle and tube guide plate
	Adjusting the Sampling Nozzle and ME-130W Position (MEK-1305)	Adjust when any of the following is performed. <ul style="list-style-type: none"> • SAMPLER UNIT or sampling nozzle is removed • Any of the following parts is replaced: <ul style="list-style-type: none"> - Sampling Nozzle - SAMPLER UNIT - ESR MEASURING UNIT (ME-130W) • Adjustment of positions of sampling nozzle (Adjustment of Sampler Sensor BD position) • Positions of sampling nozzle and tube guide plate

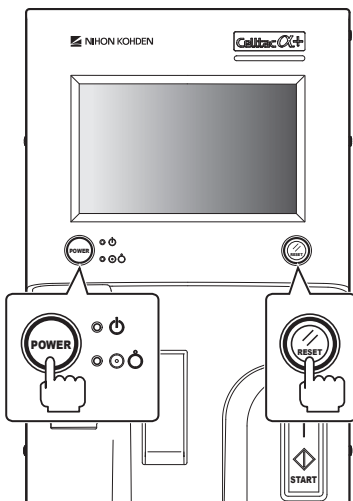
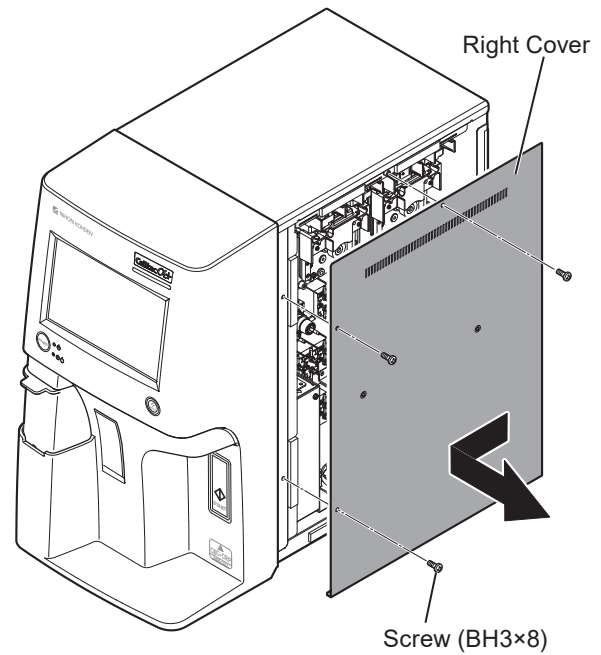
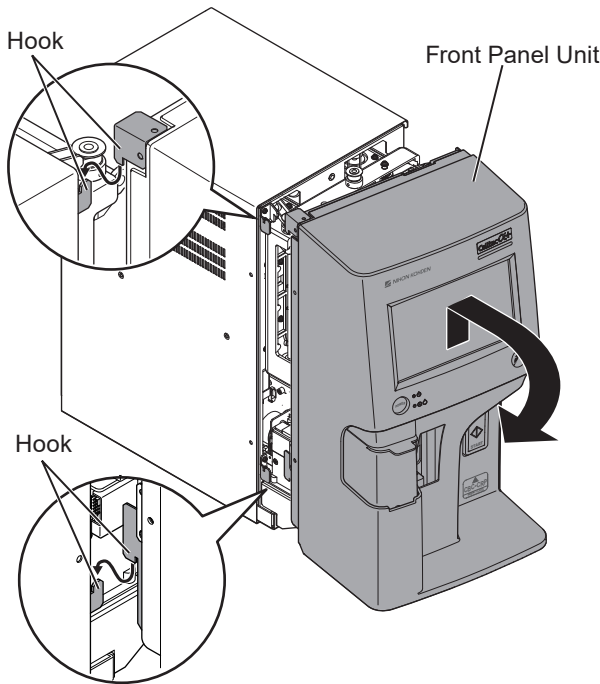
Adjustment Items		Replacement Parts
Adjusting the Sampling Nozzle Position	Adjusting the Sampling Nozzle Position (Adjustment of Sampler Sensor BD position)	Adjust when the UT-7300 SAMPLER SENSOR BD is replaced, or when it is removed.
Adjusting the Sampling Nozzle Position	Adjusting the Sampling Nozzle and the Tube Guide Plate Position	Adjust when the tube guide plate is removed. NOTE: The tube guide plate is not normally removed during maintenance or inspections.

6-2. Adjustment Preparation

- 1 Remove the front panel unit or the right cover, depending on the adjustment to be done.

 4-2 (p.4-3)
 4-3 (p.4-4)

Adjustment Items	Preparation
Adjusting the WBC Manometer	Open the front panel unit
Adjusting the Liquid Sensor/LIQUID SENSOR BD	Remove the right cover.
Adjusting the HGB	
Adjusting the Cell Block Photometric Voltage (MEK-1303)	—
Adjusting the ESR Measuring Unit Photometric Sensitivity (MEK-1305)	—
Adjusting the Sampling Nozzle Position	Open the front panel unit




- 2 While pressing the Reset switch, press the Power switch and turn the analyzer ON.

- 3 Touch [No] when the following confirmation dialog appears.



- 4 Switch the operator to Technical User.

 7-3-1 (p.7-29)

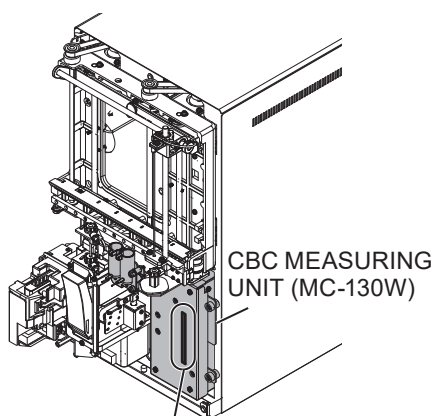
6-3. Adjusting the WBC Manometer

This adjusts the sensors of the WBC manometer.




These sensors determine whether or not there is fluid in the WBC manometer inside the CBC MEASURING UNIT (MC-130W).

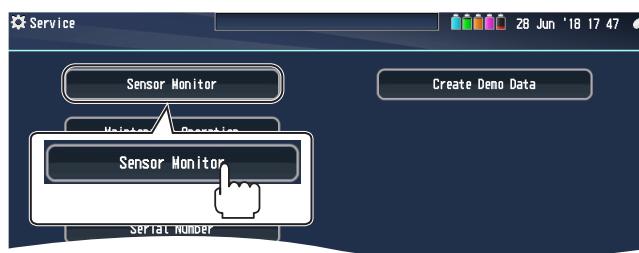
Perform this adjustment when any of the following parts is replaced.

Replacement Parts	Remarks
AMP CONTROL BD	This board remembers the adjustment values of sensors.
CBC MEASURING UNIT (MC-130W)	Necessary for reading the coefficient of new parts to the AMP CONTROL BD.
MANOMETER BD (UT-7302)	

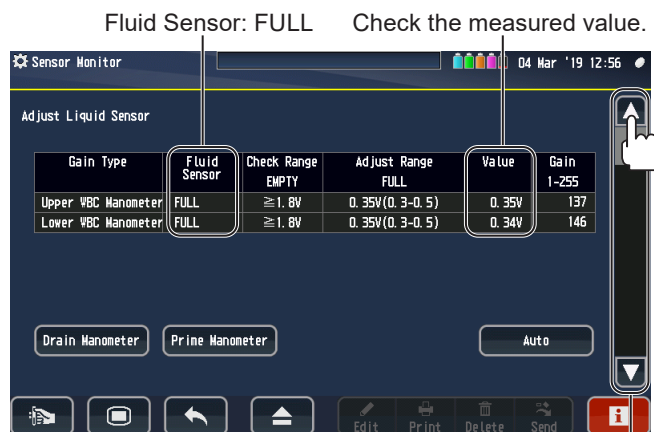


Check and make sure the two LEDs inside the slit light up, or visually check that the flow path is full of fluid.

- 1 Prepare for making adjustments.
 6-2 (p.6-4)
- 2 From the Menu screen, touch [Maintenance] → [Maintenance Operation] to open the Maintenance Operation screen and then run Clean WBC Manometer.
 7-2-4-4 (p.7-19)
- 3 Check and make sure the two LEDs inside the slit of the CBC MEASURING UNIT (MC-130W) light up, or visually check that the flow path is full of fluid.
- 4 Open the Service window and touch [Sensor Monitor].
 7-3-3 (p.7-30)



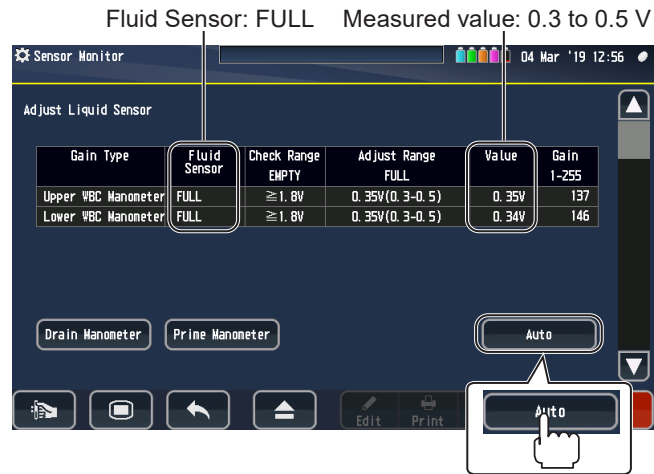
- 5 Touch [▲] or [▼] in the sensor monitor window and display Upper WBC Manometer or Lower WBC Manometer under Adjust Liquid Sensor, then check the following.
 - That the Fluid Sensors indicate “FULL”.
 - That the measured value of the Adjust Range is within the adjustment range (0.3 to 0.5 V).



[▲] or [▼]
Switches the screen up or down.

If the measured value is not within the adjustment range (0.3 to 0.5 V), follow the procedure below to adjust the sensor gain value of the WBC manometer.

- 6 Touch [Auto] to automatically adjust the sensor gain value.
- 7 After adjustment is complete, make sure the measured value is within 0.3 to 0.5 V.

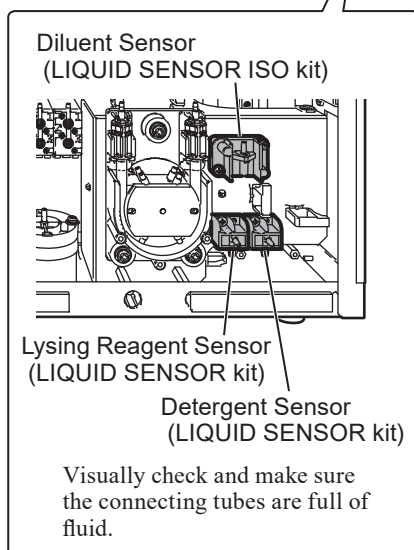
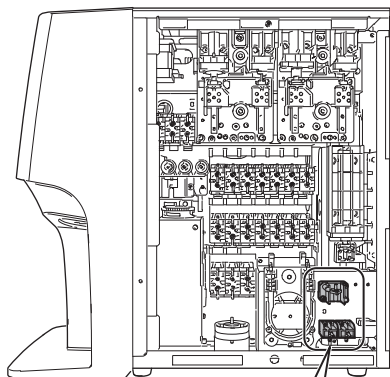


To enter the gain value manually, follow steps 1 to 3.

- 1) Touch the sensor to adjust to open an input window.
- 2) Enter the desired value and touch [OK].
- 3) Repeat steps 1 and 2 so the measured value comes within 0.3 to 0.5 V.



6-4. Adjusting the Liquid Sensor/LIQUID SENSOR BD



This adjusts the liquid sensors that determine whether or not diluent, lysing reagent or detergent are in the flow path of the analyzer. Perform this adjustment when any of the following parts is replaced.

Replacement Parts	Remarks
AMP CONTROL BD	This board remembers the adjustment values of sensors.
LIQUID SENSOR kit	Necessary for reading the coefficient of new parts to the AMP CONTROL BD.
LIQUID SENSOR ISO kit	

- 1 Prepare for making adjustments.

6-2 (p.6-4)

- 2 Visually check and make sure the tubes connected to the LIQUID SENSOR ISO KIT and LIQUID SENSOR KIT are full of fluid.

If fluid is not present, go to the Main Menu screen and touch [Maintenance] → [Maintenance Operation] to open the Maintenance Operation screen and then run Prime All.

7-2-3-2 (p.7-16)

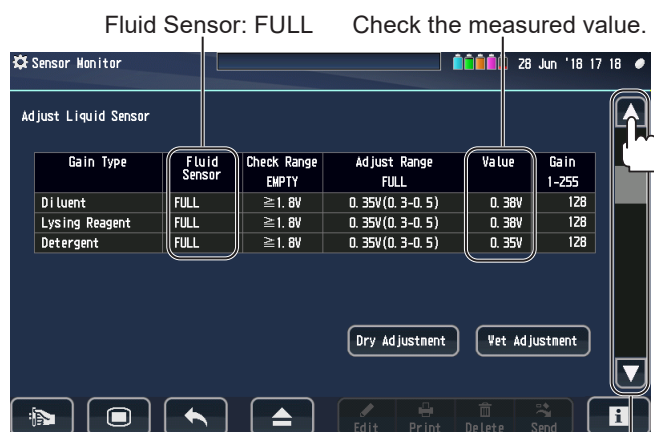
- 3 Open the Service window and touch [Sensor Monitor].

7-3-3 (p.7-30)



- 4 Touch [▲] or [▼] in the sensor monitor window and display Diluent, Lysing Reagent and Detergent under Adjust Liquid Sensor, then check the following.

- That the Fluid Sensors indicate “FULL”.
- That the measured value of the Adjust Range is within the adjustment range (0.3 to 0.5 V).




[▲] or [▼]
Switches the screen up or down.

6. Adjustment

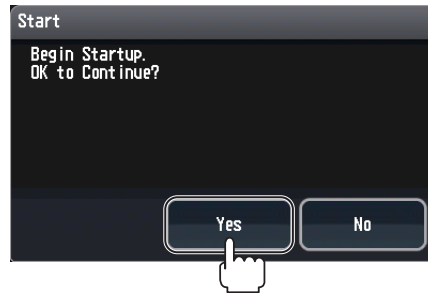
If the measured value is not within the adjustment range (0.3 to 0.5 V), follow the procedure below to adjust the sensor gain value.

- From the Main Menu screen, touch [Maintenance] → [Maintenance Operation] to open the Maintenance Operation screen and then run Drain All.

 7-2-4-8 (p.7-23)

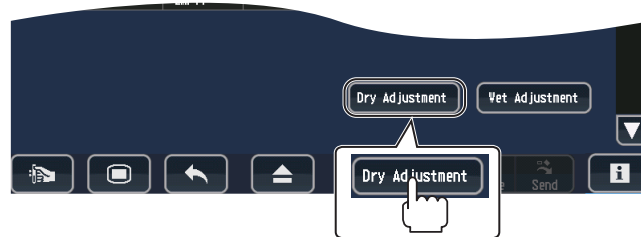
- While pressing the Reset switch, press the Power switch and turn the analyzer ON.

- Touch [Yes] when the following confirmation dialog appears.



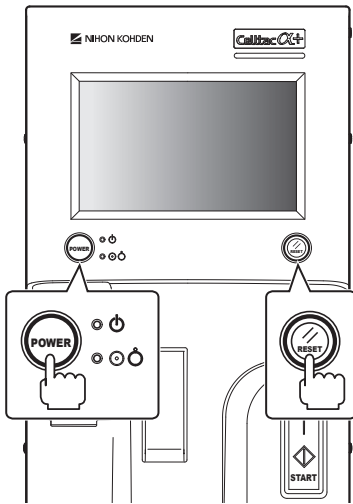
- Visually check and make sure the tubes connected to the LIQUID SENSOR ISO KIT and LIQUID SENSOR KIT do not have fluid in them and then open Adjust Liquid Sensor in the Sensor Monitor window.

- Touch [Dry Adjustment] to automatically adjust the sensor gain values.

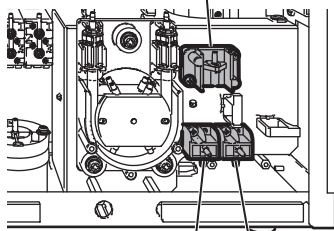


- Touch [Restore] on the Information screen so the status of liquid sensors goes to FULL. Visually check and make sure the tubes connected to the LIQUID SENSOR ISO KIT and LIQUID SENSOR KIT are full of fluid.

NOTE: Do not turn off the power while going from [Dry Adjustment] to [Wet Adjustment]. If the power is turned off, the [Dry] adjustment value is lost.



Diluent Sensor (LIQUID SENSOR ISO kit)

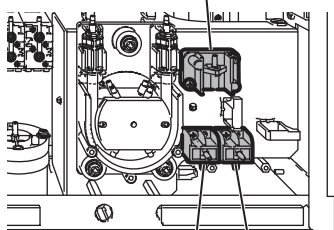


Lysing Reagent Sensor (LIQUID SENSOR kit)

Detergent Sensor (LIQUID SENSOR kit)

Visually check and make sure the connecting tubes do not have fluid in them.

Diluent Sensor (LIQUID SENSOR ISO kit)

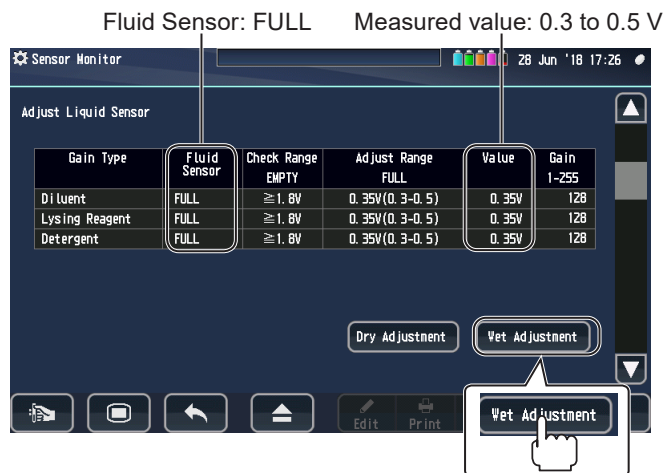


Lysing Reagent Sensor (LIQUID SENSOR kit)

Detergent Sensor (LIQUID SENSOR kit)

Visually check and make sure the connecting tubes are full of fluid.

- 11** Touch [Wet Adjustment] to automatically adjust the sensor gain values.
- 12** After adjustment is complete, check the following.
- That the Fluid Sensors indicate “FULL”.
 - The measured values are within 0.3 to 0.5 V.



NOTE: If the measured values are not within 0.3 to 0.5 V, check whether the [Wet Adjustment] was run with the tubes dry.



To enter the gain value manually, follow steps 1 to 3 below with the tubes in a wet state.

Note After entering values in a wet state, check and make sure the measured values are at least [1.8 V].

- 1) Touch the sensor to adjust to open an input window.
- 2) Enter the desired value and touch [OK].
- 3) Repeat steps 1 and 2 so the measured value becomes 0.4 V.



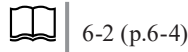
6-5. Adjusting the HGB

This Adjusts the HGB voltage converted from the light of the LED inside the HGB MEASURING UNIT (MH-130W).

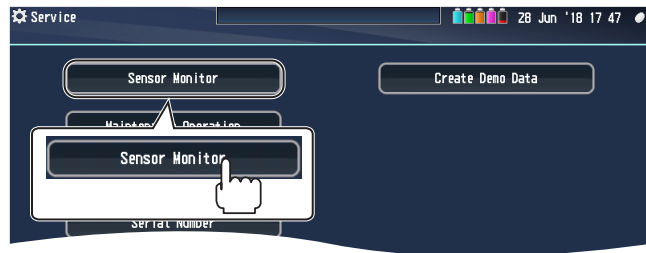
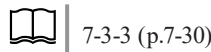
Perform this adjustment when any of the following parts is replaced.

Replacement Parts	Remarks
AMP CONTROL BD	This board remembers the adjustment values of sensors.
HGB MEASURING UNIT (MH-130W)	Necessary for reading the coefficient of new parts to the AMP CONTROL BD.
HGB/SS AMP BD (UT-7290)	
HGB/SS LED BD (UT-7289)	

1 Prepare for making adjustments.



2 Open the Service window and touch [Sensor Monitor].

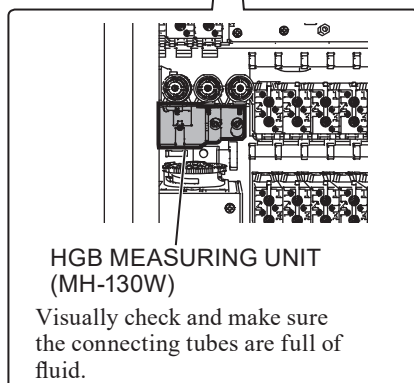
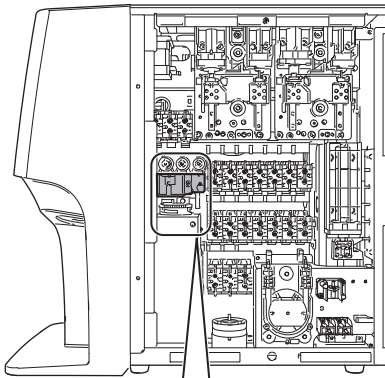


3 Touch [▲] or [▼] in the sensor monitor window and display Adjust LED, then touch [Prime HGB].

4 Visually check and make sure the tubes connected to the HGB MEASURING UNIT (MH-130W) are full of fluid.

5 Check the following.

- That the measured value of the Adjust Range is within the adjustment range (3.9 to 4.1 V).



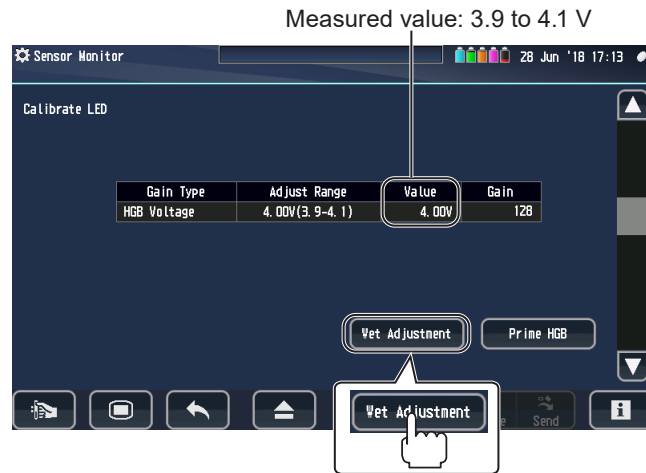
Check the measured value.



[▲] or [▼]
Switches the screen up or down.

If the measured value is not within the adjustment range (3.9 to 4.1 V), follow the procedure below to adjust the HGB voltage gain value.

- 6 Touch [Wet Adjustment] to automatically adjust the HGB voltage gain value.
- 7 After adjustment is complete, make sure the measured value is within 3.9 to 4.1 V.



6



To enter the gain value manually, follow steps 1 to 3.

- 1) Touch HGB Voltage to open an input window.
- 2) Enter the desired value and touch [OK].
- 3) Repeat steps 1 and 2 so the measured value comes within 3.9 to 4.1 V.





- 8 Touch [Maintenance] → [Self Check] from the Main Menu screen and run a self check.




7-2-2-2 (p.7-6)

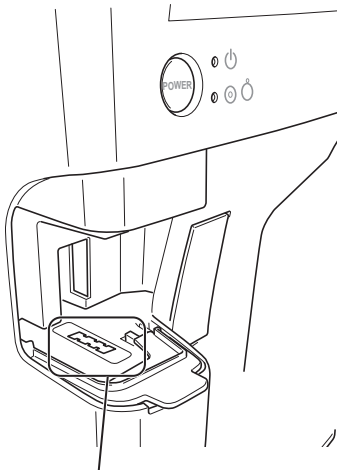
6-6. Adjusting the Cell Block Photometric Voltage (MEK-1303)

Adjust this if the judgment value from a self check of a Circuit Test or of Immune Photodiode Voltage is out of range and the problem is not resolved by running a clean of the cell block.

-  • 7-2-2-3 (p.7-7)
-  • 7-5-2-8 (p.7-94)

 The values from adjusting the cell block photometric voltage is stored not in the AMP CONTROL BD (MC-131W), but in the CHM MEASURING BD (UT-7308).

NOTE: Adjustment must be performed without a test cartridge set in the cartridge holder and with the slide door closed.




Adjust without a test cartridge and after closing the slide door.

1 Prepare for making adjustments.

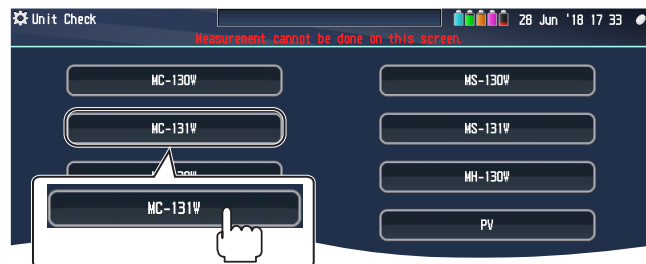
-  6-2 (p.6-4)

2 Open the Service window and touch [Unit Check].

-  7-3-3 (p.7-30)



3 Touch [MC-131W] in the Unit Check window.



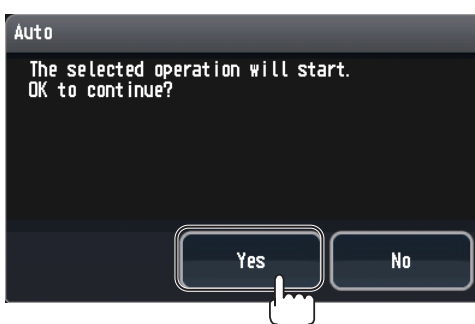
- 4 Touch [Auto] in the MC-131W window.



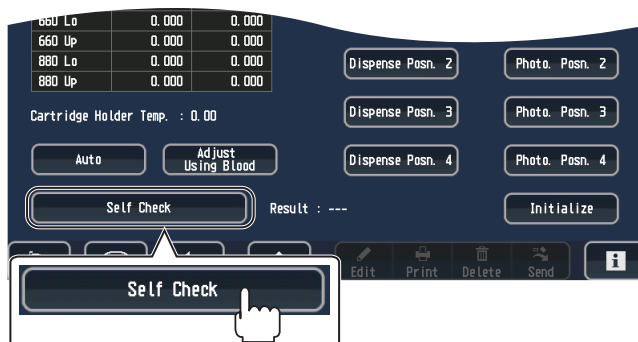
6

- 5 Touch [Yes] when the confirmation dialog appears.

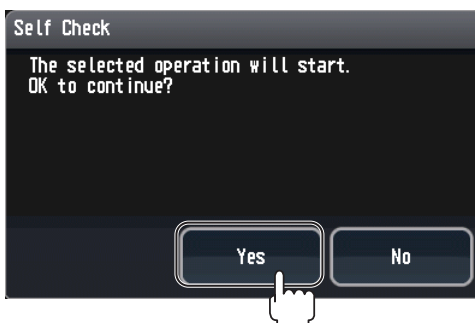
 Adjustment is complete after about two minutes.



- 6 Touch [Self Check] in the MC-131W window.



- 7 Touch [Yes] when the confirmation dialog appears.




6-7. Adjusting the Immunoassay Unit with Blood (MEK-1303)

Synchronize the HGB value measured by the immunoassay unit and the HGB value obtained from CBC measurement.

Perform this when any of the following messages occur frequently.


- 64303 Short Sample
- 60309 Immunoassay Unit HGB Limit
- 64310 Immunoassay Unit HGB Out of Range

 3-3-1 (p.3-6)

1 Prepare for making adjustments.

 6-2 (p.6-4)


2 Perform a self check to ensure that the CBC+CRP measurements can be properly performed.

 7-2-2 (p.7-5)

3 Perform CBC+CRP measurement in normal mode (open or closed) at least twice using MK-3CN hematology control+CRP or fresh blood.

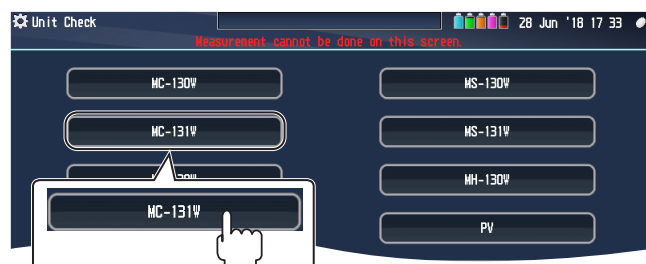
NOTE: Only perform this when CBC measurement (HGB value) is calibrated.

4 Open the Service window and touch [Unit Check].

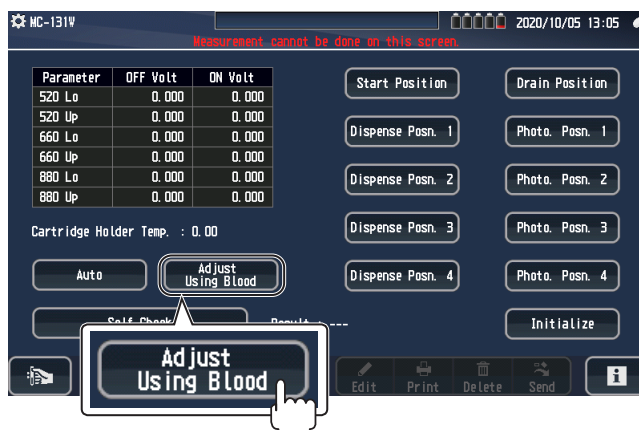
 7-3-3 (p.7-30)



5 Touch [MC-131W] on the Unit Check window.



6 Touch [Adjst Using Blood] on the MC-131W window.



7 The measurement data is displayed.

NOTE: Only the data measured by the Technical User is displayed.

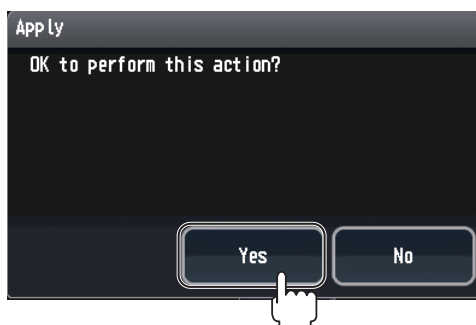


8 Select the data to use and touch [Apply].

NOTE: Touching [Apply] and changing the calibration coefficient erases the measurement data.




- 9 When the confirmation window appears, touch [Yes].



- 10 After adjustment is finished, perform CBC+CRP measurement in normal mode (open or closed) using the MK-3CN hematology control+CRP or fresh blood. After measurement, check that the message does not appear.

6-8. Adjusting the ESR Measuring Unit Photometric Sensitivity (MEK-1305)


Adjust this if the judgment value from a self check for Circuit Test or ESR Unit Light Reception Level is out of range, and the problem is not resolved by running a protein clean.

 | • 7-2-2-3 (p.7-7)
• 7-2-4-3 (p.7-18)

- 1 Prepare for making adjustments.

 | 6-2 (p.6-4)

- 2 Open the Service window, and touch [Unit Check].

 | 7-3-3 (p.7-30)



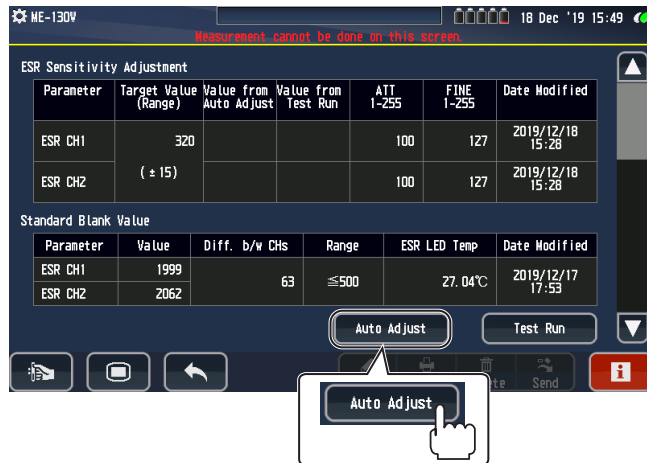
- 3 Touch [ME-130W] in the Unit Check window.



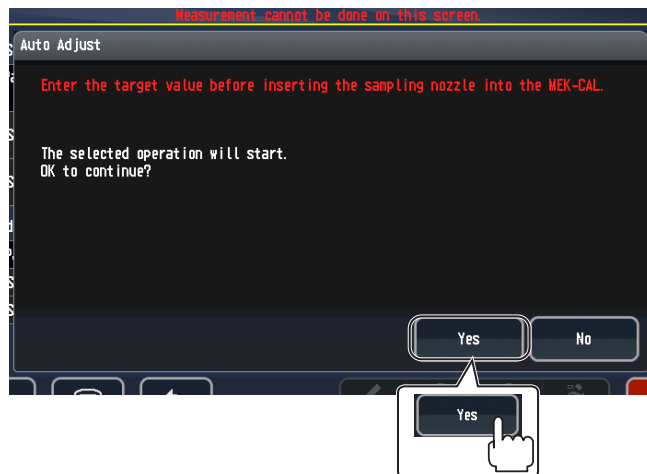
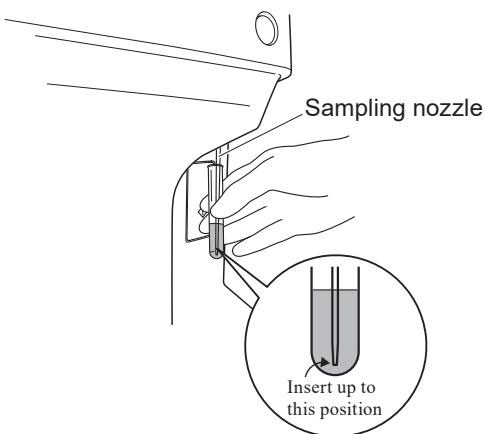
- 4 Enter the assay value of the light receiving value of MEK-CAL to the target value in the ME-130W window.
 - 1) Touch the number area for the target value to open the input screen.
 - 2) Enter the assay value of the light receiving value for MEK-CAL.
 - 3) Touch [Set].



- 5 Touch [Auto Adjust] in the ME-130W window.



- 6 When the confirmation dialog box appears, load MEK-CAL to the sampling nozzle, and touch [Yes].



Measurement is started when [Yes] is pressed. Load MEK-CAL to the sampling nozzle as shown in the illustration, and then run.

7 Automatic adjustment is run, and the measurement value is updated.

The adjustimet value is updated.

MEK-130V 18 Dec '19 15:54

Measurement cannot be done on this screen.

ESR Sensitivity Adjustment

Parameter	Target Value (Range)	Value from Auto Adjust	Value from Test Run	ATT 1-255	FINE 1-255	Date Modified
ESR CH1	320	320		54	129	2019/12/18 15:49
ESR CH2	(± 15)	320		76	125	2019/12/18 15:49

Standard Blank Value

Parameter	Value	Diff. b/w CHs	Range	ESR LED Temp	Date Modified
ESR CH1	1946				
ESR CH2	1998	50	≤500	28.43°C	2019/12/18 15:49

Auto Adjust Test Run

6

8 Touch [Test Run].

MEK-130V 18 Dec '19 15:54

Measurement cannot be done on this screen.

ESR Sensitivity Adjustment

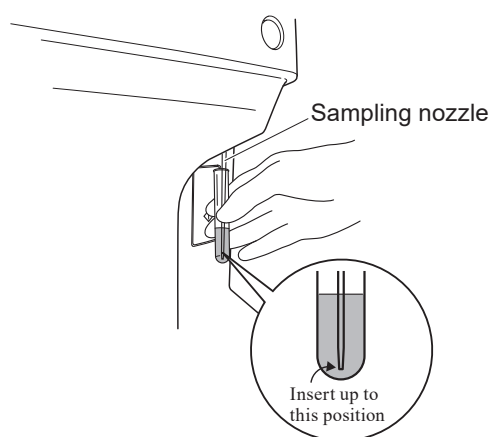
Parameter	Target Value (Range)	Value from Auto Adjust	Value from Test Run	ATT 1-255	FINE 1-255	Date Modified
ESR CH1	320	320		54	129	2019/12/18 15:49
ESR CH2	(± 15)	320		76	125	2019/12/18 15:49

Standard Blank Value

Parameter	Value	Diff. b/w CHs	Range	ESR LED Temp	Date Modified
ESR CH1	1946				
ESR CH2	1998	50	≤500	28.43°C	2019/12/18 15:49

Auto Adjust Test Run

9 When the confirmation dialog box appears, load MEK-CAL to the sampling nozzle, and touch [Yes].



MEK-130V 18 Dec '19 15:54

Measurement cannot be done on this screen.

Test Run

Enter the target value before inserting the sampling nozzle into the MEK-CAL.

The selected operation will start.
OK to continue?

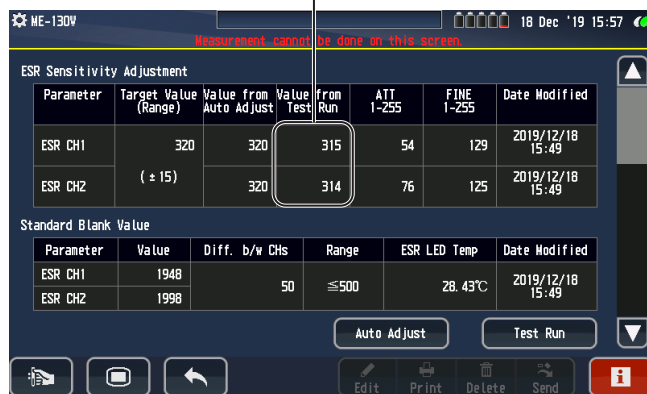
Yes No

Measurement is started when [Yes] is pressed.

Load MEK-CAL to the sampling nozzle as shown in the illustration, and then run.

10 Confirmation measurement is performed, and the confirmation measurement value is updated.

The confirmation measurement value is updated.

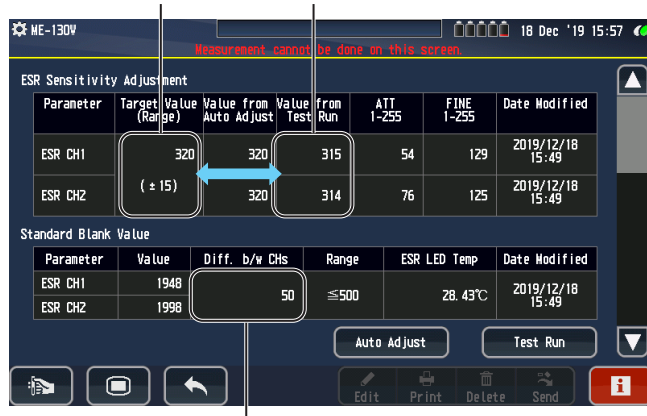


11 After confirmation measurement is completed, check the following items.

- The difference between the target value and confirmation measurement value is within the range (-15 to +15).
- The difference between the channels for the reference blank light receiving value is within the range (≤500).

If the difference is not within the range, perform again from automatic adjustment.

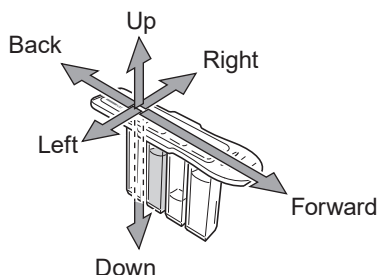
Check the difference between the target value and confirmation measurement value.



Check the difference between the channels.

6-9. Adjusting the Sampling Nozzle Position

6-9-1. Adjusting the Sampling Nozzle and the Cell Position (MEK-1303)



This adjusts the relative positioning of the sampling nozzle and the three directions of the cartridge (up/down, left/right & forward/backward).

NOTE: The positional relationship between the sampling nozzle and the cartridge is extremely important for making accurate immunoassay measurements. If not adjusted correctly, solutions may foam in the cartridge or be insufficiently stirred.

Adjust the positioning when any of the following are performed.

- Sampling nozzle is removed
- SAMPLER UNIT is removed
- Any of the following parts are replaced:


Replacement Parts	Remarks
Sampling nozzle	Periodic maintenance parts
SAMPLER UNIT	Necessary for reading the coefficient of new parts to the AMP CONTROL BD.
CHM MEASURING UNIT (MC-131W)	

- When “6-9-3. Adjusting the Sampling Nozzle Position” is performed.
- When “6-9-4. Adjusting the Sampling Nozzle and the Tube Guide Plate Position” is performed.

- 1 Prepare for making adjustments.

 6-2 (p.6-4)

- 2 Open the Service window and touch [Unit Check].

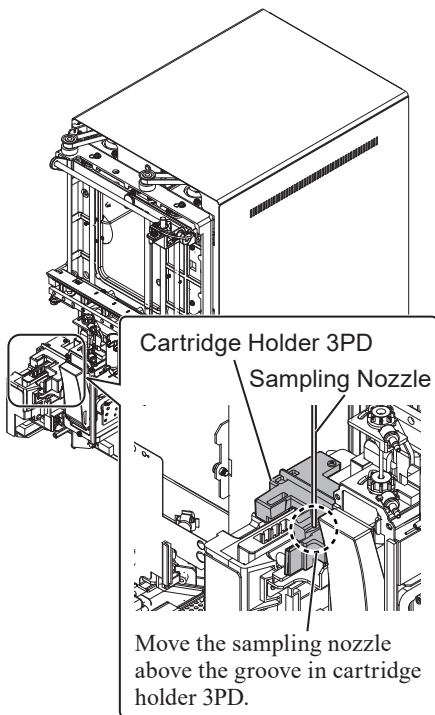
 7-3-3 (p.7-30)



3 Touch [Adjust Rel. Posn. of MS-130W] in the Unit Check window.



4 Touch [Start Position] in the Adjust Rel. Posn. of MS-130W window and initialize it.



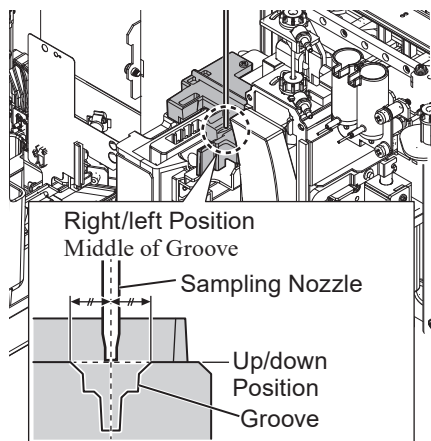
5 Adjust the up/down direction.

1) Touch [Adjust Up/Down Left/Right] in the Adjust Rel. Posn. of MS-130W window and move the sampling nozzle to the position of the groove in the cartridge holder 3PD of the CHM MEASURING UNIT (MC-131W).

💡 Touch [Yes] when the confirmation dialog appears.

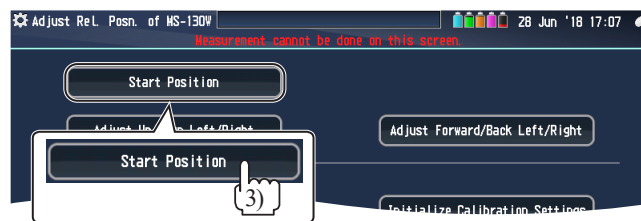


2) Touch the arrows as needed to align the sampling nozzle to the position in the figure.



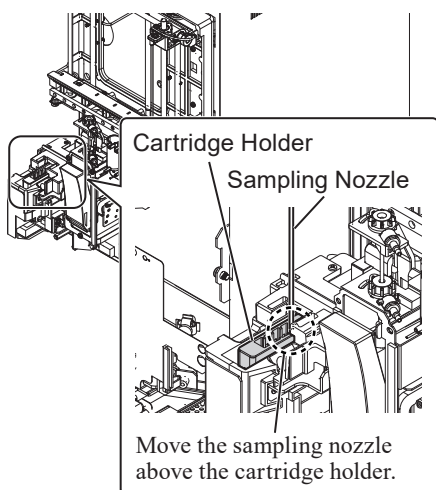
6

3) Touch [Start Position] and initialize it.



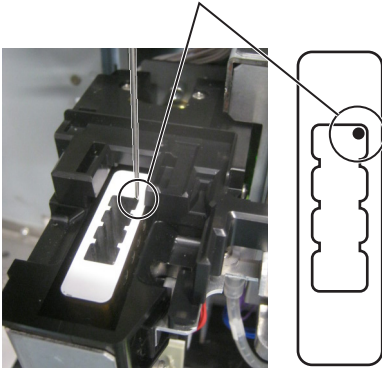
4) Touch [Adjust Forward/Back Left/Right] and move the sampling nozzle over the cartridge holder.

💡 Touch [Yes] when the confirmation dialog appears.



6. Adjustment

Make sure it is in the hole.



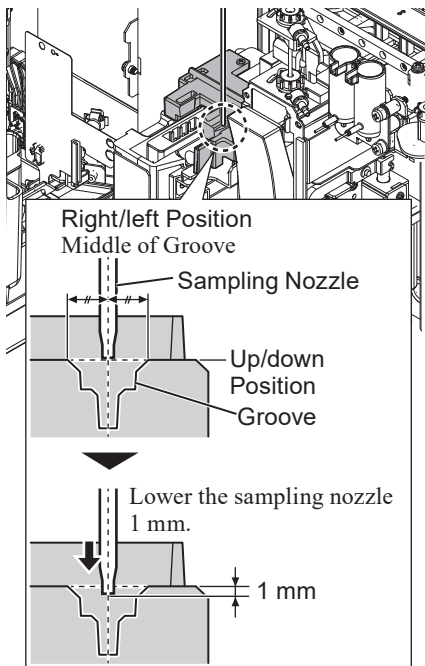
- 5) Make sure the sampling nozzle is in the hole in the cartridge holder and not riding up on the cartridge holder.
- 6) Touch [Start Position] and initialize it.



- 7) Touch [Adjust Up/Down Left/Right] and move the sampling nozzle to the position adjusted in step 2).



Touch [Yes] when the confirmation dialog appears.



- 8) Touch [↓] five times, lowering the sampling nozzle 1 mm.



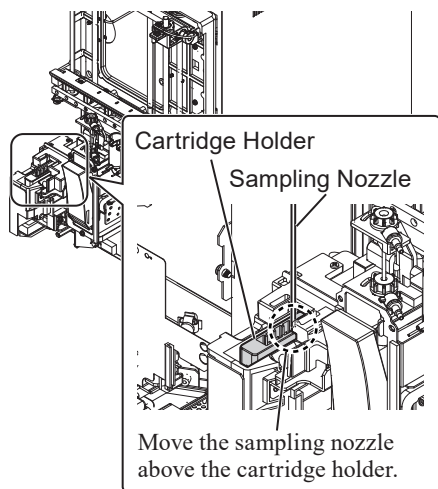
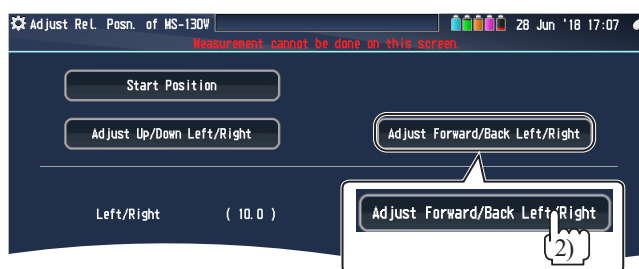
6 Adjust the Left/Right direction.

1) Touch [Start Position] and initialize it.



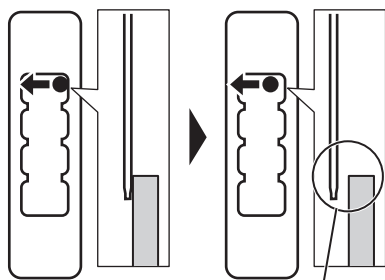
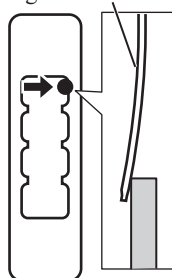
2) Touch [Adjust Forward/Back Left/Right] and move the sampling nozzle over the cartridge holder.

Touch [Yes] when the confirmation dialog appears.



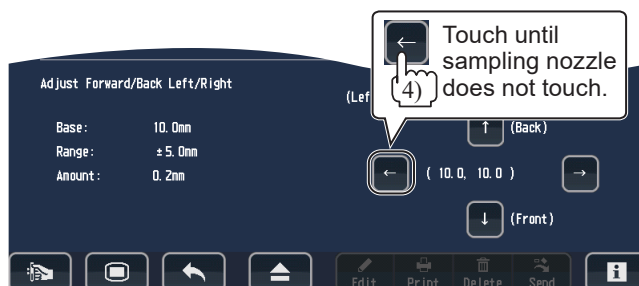
3) Touch [→] until the sampling nozzle touches the cartridge holder and bends.

Sampling nozzle bends.

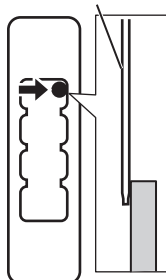


Sampling nozzle not touching.

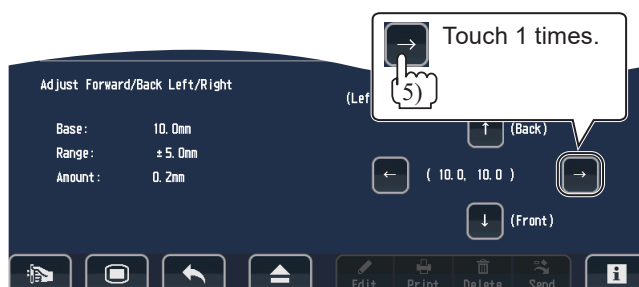
4) Touch [←] until the sampling nozzle is no longer bent and not touching the cartridge holder.




Make sure it is not bent.



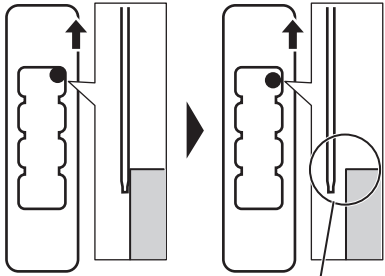
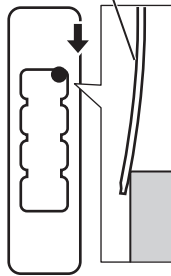
5) Press [→] once and make sure the sampling nozzle does not bend.



7 Adjust the forward/back direction.

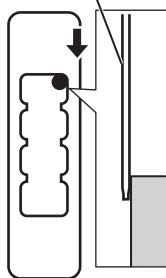
 The adjustment of the forward/back direction involves moving the cartridge holder forward/back.

Sampling nozzle bends.

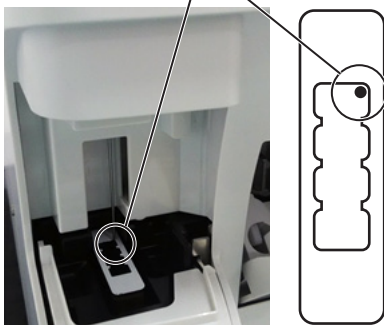


Sampling nozzle not touching.

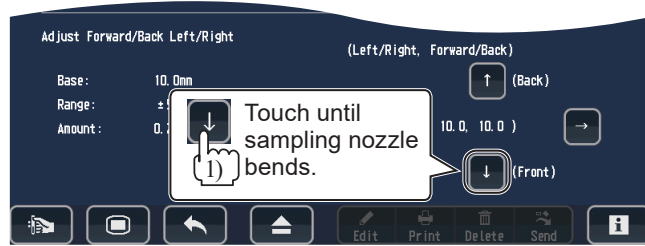
Make sure it is not bent.



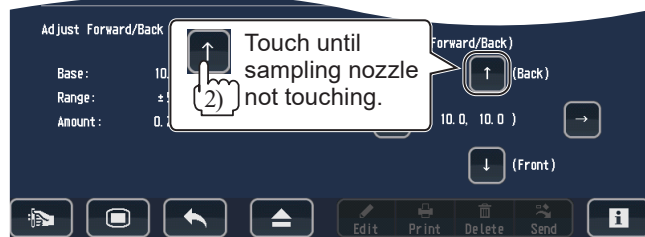
Make sure it is in the hole.



1) Touch [↓] until the sampling nozzle touches the cartridge holder and bends.



2) Touch [↑] until the sampling nozzle is no longer bent and not touching the cartridge holder.



3) Press [↓] once and make sure the sampling nozzle does not bend.



8 After mounting the front panel unit, touch [Adjust Forward/Back Left/Right] again on the Adjust Rel. Posn. of MS-130W window and make sure the sampling nozzle is in the hole in the cartridge holder and not riding up on the cartridge holder.

9 After confirmation, touch [Start Position] on the MS-130W relative position adjustment screen to perform the initialization process.

NOTE: Be sure to always run the initialization process. If the front panel unit is opened without running the initialization process, the sampling nozzle will be damaged.



6-9-2. Adjusting the Sampling Nozzle and the ME-130W Position (MEK-1305)

This adjusts the relative positioning of the sampling nozzle and the two directions of the ME-130W (up/down, left/right).

NOTE: The positional relationship between the sampling nozzle and the MD-130W is extremely important for making accurate measurements.

If the adjustment is not performed correctly, air bubbles will be mixed into the blood when dispensing, and measurement may be unable to be performed correctly.

Adjust the positioning when any of the following actions are performed.

- After the sampling nozzle is removed
- After the SAMPLER UNIT is removed
- After any of the following parts are replaced


Replacement Parts	Remarks
Sampling nozzle	This is a periodic maintenance part.
SAMPLER UNIT	It is necessary to enable reading of the coefficients of new parts by the AMP CONTROL BD
ESR MEASURING UNIT (ME-130W)	

- “6-9-3. Adjusting the Sampling Nozzle Position” was performed
- “6-9-4. Adjusting the Sampling Nozzle and the Tube Guide Plate Position” was performed

- 1 Prepare for making adjustments.

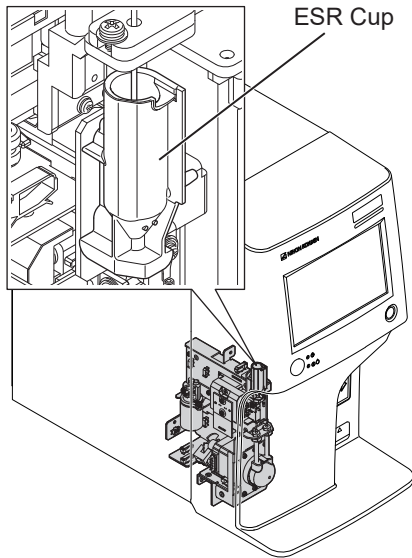
 6-2 (p.6-4)

- 2 Open the Service window, and touch [Unit Check].

 7-3-3 (p.7-30)



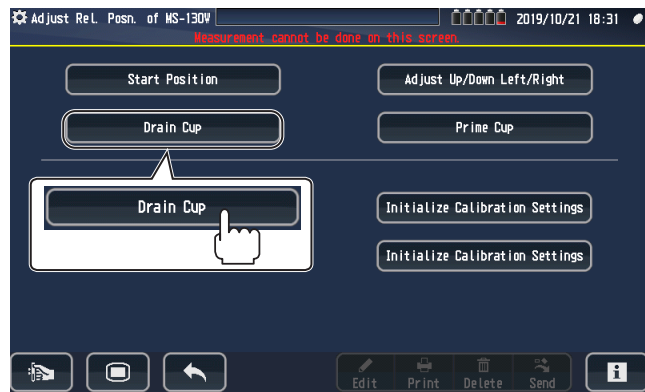
3 Touch [Adjust Rel. Posn. of MS-130W] in the Unit Check window.



4 Touch [Drain Cup] on the MS-130W relative position adjustment screen to perform the drain cup process.

Touch [Yes] when the confirmation dialog box appears.

NOTE: Be aware that, if adjustment is performed while reagent is in the cup, the proper adjustment cannot be performed due to differences in how it appears.



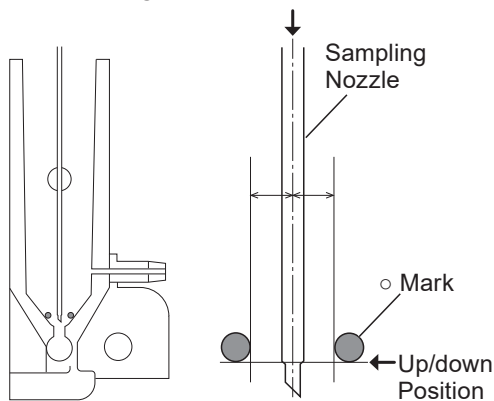
5 Adjust the up/down and left/right directions.

1) Touch [Adjust Up/Down Left/Right] on the MS-130W relative position adjustment screen, and move the sampling nozzle to the position of the ESR cup of the ESR measuring unit (ME-130W).

Touch [Yes] when the confirmation dialog box appears.



Right/left Position
Centered Between the ○ Mark.



Up/Down

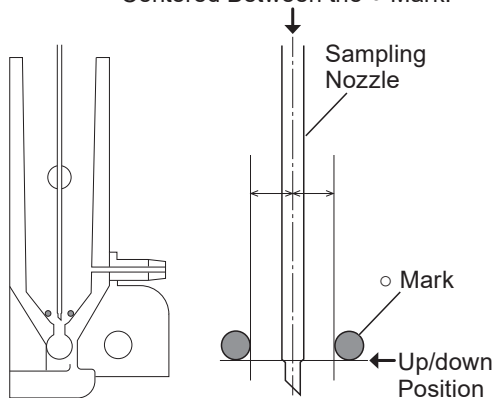
Adjust so that the narrow section of the sampling nozzle tip comes under the ○ mark.

2) Adjust the up/down direction. Touch [←], [→], [↑], [↓], and align the sampling nozzle with the position in the figure.



6

Right/left Position
Centered Between the ○ Mark.



Left/Right

Adjust so that the narrow section of the sampling nozzle tip is aligned with the center of the ○ mark.

3) Adjust the left/right direction. Touch [←], [→], [↑], [↓], and align the sampling nozzle with the position in the figure.



4) After adjustment, touch [Start Position] to perform the initialization process.



Touch [Yes] when the confirmation dialog box appears.

6 Check that the left/right and up/down adjustment values have been updated.



Check that the adjustment values have been updated.

6-9-3. Adjusting the Sampling Nozzle Position

This makes fine adjustments to the installation position of the UT-7300 (SAMPLER SENSOR BD) and adjusts the sampling nozzle and open rinse positions.

Adjust when replacing the UT-7300 (SAMPLER SENSOR BD), or when it is removed.

6-9-3-1. MEK-1301/MEK-1305

- 1 Prepare for making adjustments.



6-2 (p.6-4)

- 2 Open the Service window and touch [Unit Check].



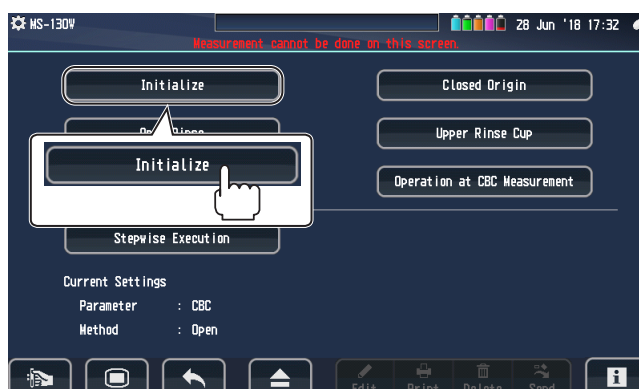
7-3-3 (p.7-30)



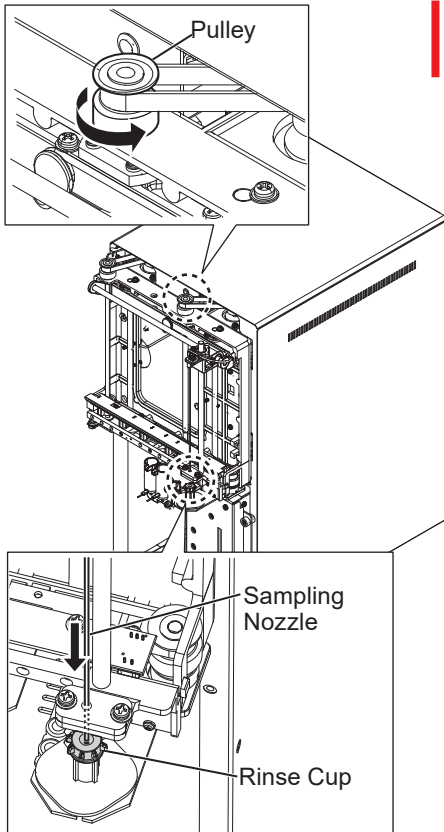
- 3 Touch [MS-130W] in the Unit Check window.



- 4 Touch [Initialize] in the MS-130W window and initialize it.



6. Adjustment



5 Turn the pulley on the right of the SAMPLER UNIT and lower the sampling nozzle.

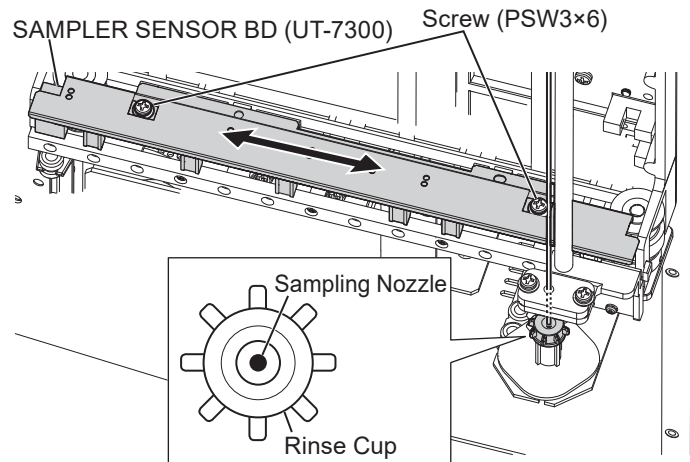
NOTE • Be careful not to touch the belt when turning the pulley.

- When the power is turned on, perform the following steps while paying careful attention to safety.

6 Make sure the position of the sampling nozzle is in the middle of the rinse cup.

If it is out of position, loosen the two screws (PSW3×6) and adjust the position of the SAMPLER SENSOR BD (UT-7300) slightly, then repeat steps **4** to **6**.

NOTE: When tightening the screws, be careful that the sampler sensor board (UT-7300) is not shifted.

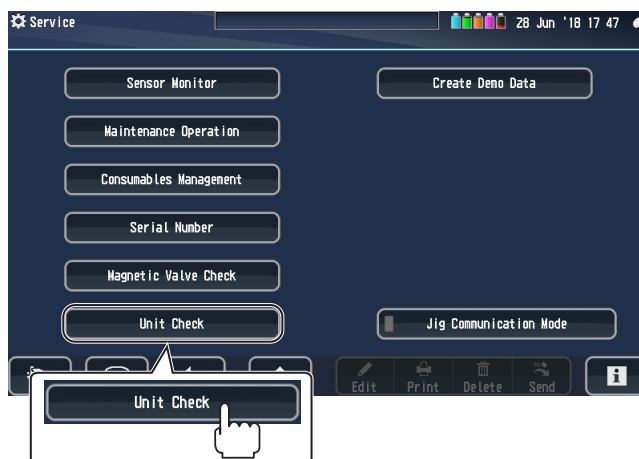
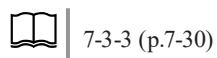


6-9-3-2. MEK-1302/MEK-1303

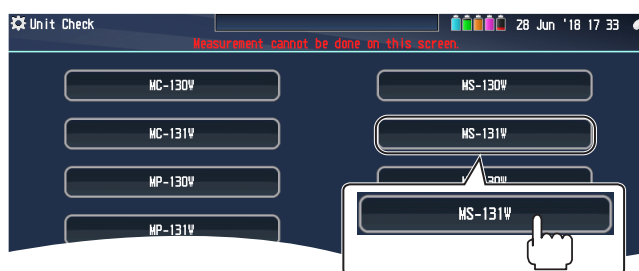
- 1 Prepare for making adjustments.



- 2 Open the Service window and touch [Unit Check].

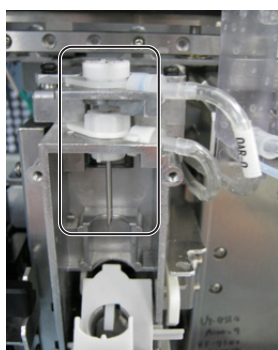


- 3 Touch [MS-131W] in the Unit Check window.



- 4 Touch [Full Stroke] in the MS-131W window and move the release nozzle to its full stroke position.

< Full Stroke >



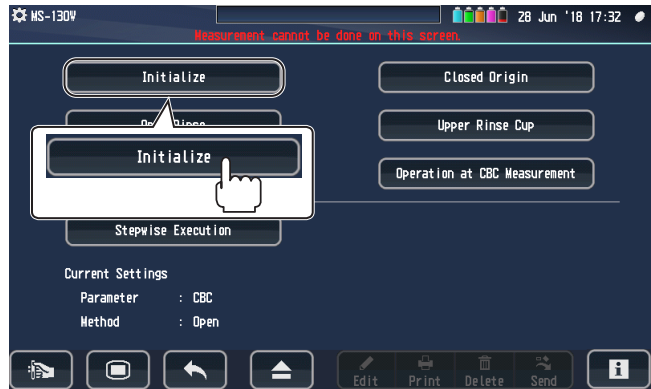
- 5 Touch [←] and return to the Unit Check window.



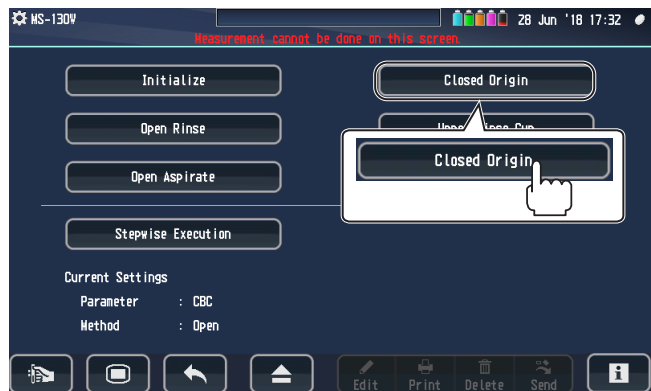
6 Touch [MS-130W] in the Unit Check window.



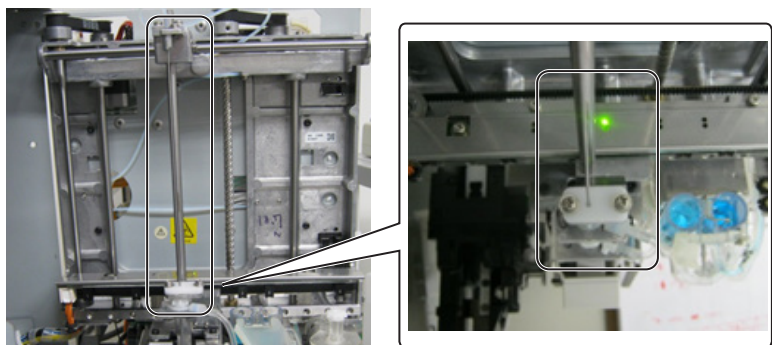
7 Touch [Initialize] in the MS-130W window and initialize it.

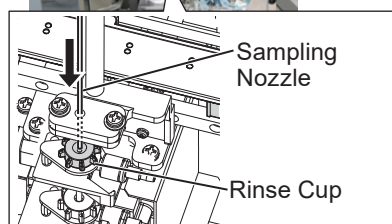
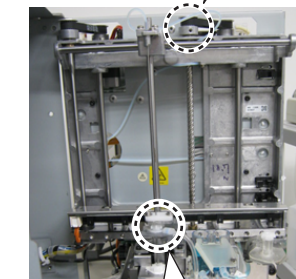
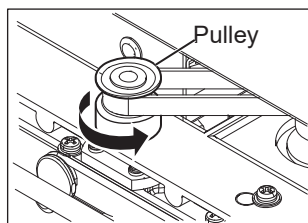


8 Touch [Closed Origin] in the MS-130W window and move the sampling nozzle to the origin position for closed measurement.



< Closed Origin >





- 9** Turn the pulley on the right of the SAMPLER UNIT and lower the sampling nozzle.

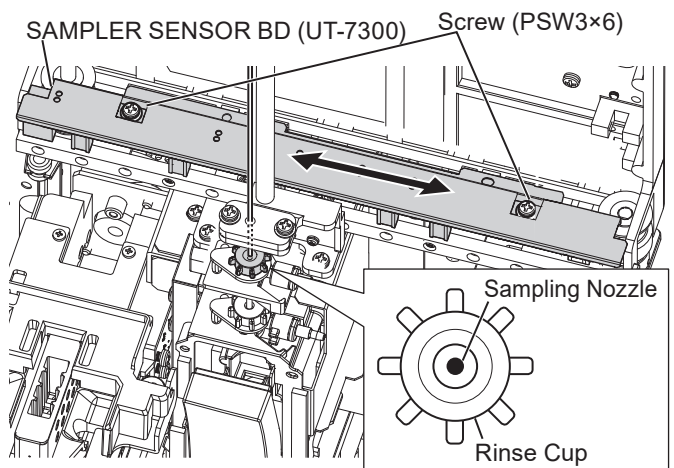
NOTE • Be careful not to touch the belt when turning the pulley.

- When the power is turned on, perform the following steps while paying careful attention to safety.

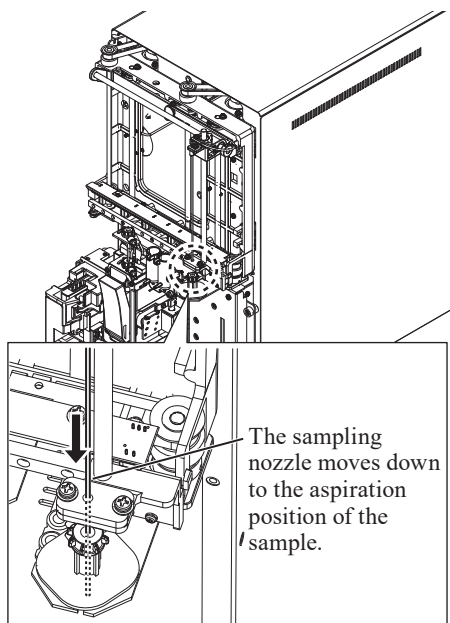
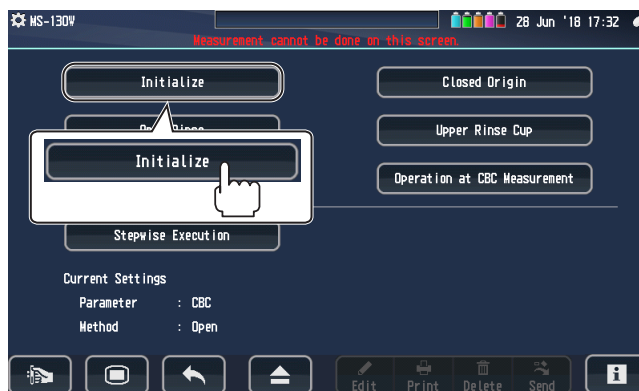
- 10** Make sure the position of the sampling nozzle is in the middle of the rinse cup on the release nozzle rinse unit.

If it is out of position, loosen the two screws (PSW3×6) and adjust the position of the SAMPLER SENSOR BD (UT-7300) slightly.

NOTE: When tightening the screws, be careful that the sampler sensor board (UT-7300) is not shifted.

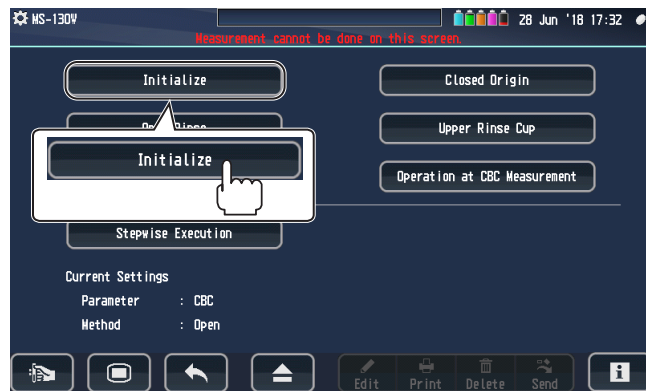


- 11** Touch [Initialize] in the MS-130W window and initialize it.



- 12** Touch [Open Aspirate] on the MS-130W screen, and check that the sampling nozzle moves normally to the aspiration position of the sample. If the sampling nozzle operates abnormally, repeat steps 8 to 12.



13 Touch [Initialize] in the MS-130W window and initialize it.**14** With the MEK-1303, perform “9-7-1. Adjusting the Sampling Nozzle and the Cartridge Position (MEK-1303)”.

NOTE: When fine adjustment is performed for the position of the sampler sensor board (UT-7300), the initialization position of the sampling nozzle is changed, and so be sure to always adjust the positions of the sampling nozzle and cell.

6-9-4. Adjusting the Sampling Nozzle and the Tube Guide Plate Position

NOTE: The tube guide plate is not normally removed during maintenance or inspections. When the position of the sampling nozzle was adjusted using the tube guide plate, in addition to the positional relationship with the open rinse release nozzle assembly, the position must also be adjusted with respect to the cell. Adjustment is difficult for cells where the sampling nozzle was moved down to a position by a long stroke, and so adjustment in this state is not recommended. Perform this adjustment only when the tube guide plate must be replaced due to breakage or other reasons.

This makes fine adjustments to the installation position of the tube guide plate and adjusts the sampling nozzle position.

Adjust when the tube guide plate is removed.

6

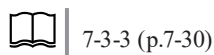
6-9-4-1. MEK-1301/MEK-1305

- 1 Prepare for making adjustments.

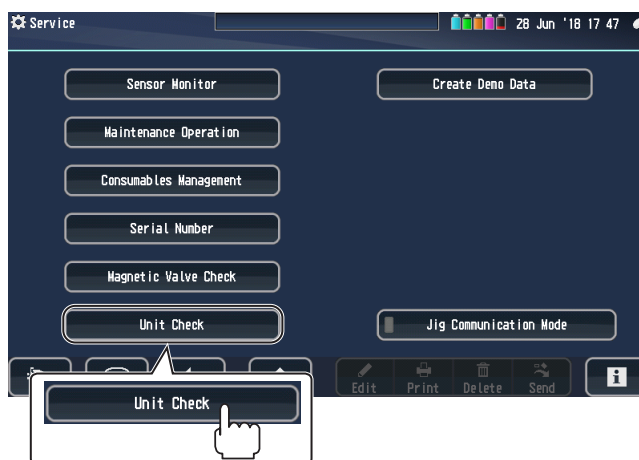


6-2 (p.6-4)

- 2 Open the Service window and touch [Unit Check].



7-3-3 (p.7-30)



- 3 Touch [MS-130W] in the Unit Check window.



4 Touch [Initialize] in the MS-130W window and initialize it.

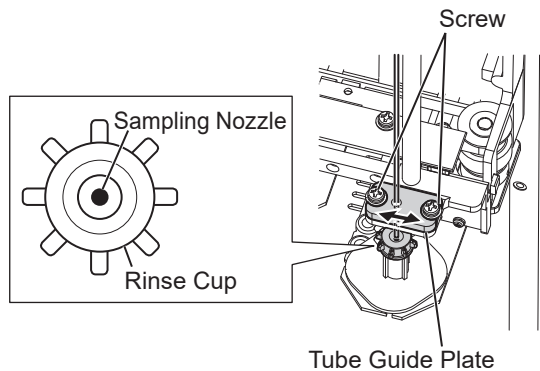
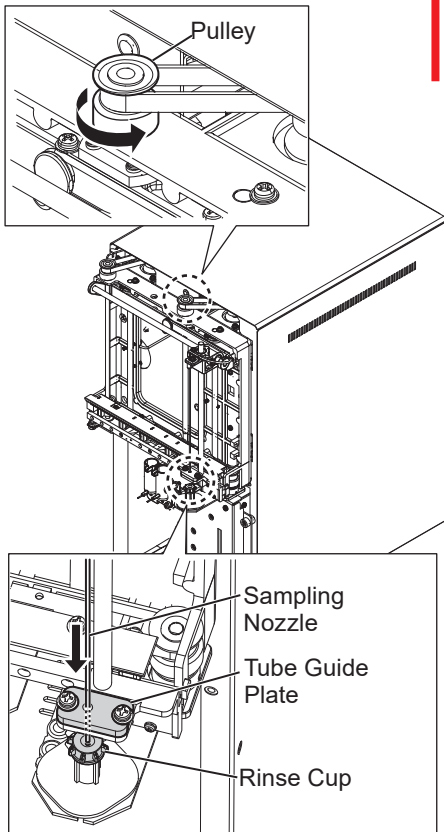


5 Turn the pulley on the right of the SAMPLER UNIT and lower the sampling nozzle.

- NOTE**
- Be careful not to touch the belt when turning the pulley.
 - When the power is turned on, perform the following steps while paying careful attention to safety.

6 Make sure the position of the sampling nozzle is in the middle of the rinse cup.

If it is out of position, loosen the two screws, adjust the position of the tube guide plate slightly and align the position of the sampling nozzle to the center of the rinse cup.



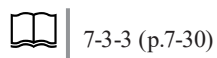
6-9-4-2. MEK-1302/MEK-1303

- 1 Prepare for making adjustments.



6-2 (p.6-4)

- 2 Open the Service window and touch [Unit Check].



7-3-3 (p.7-30)

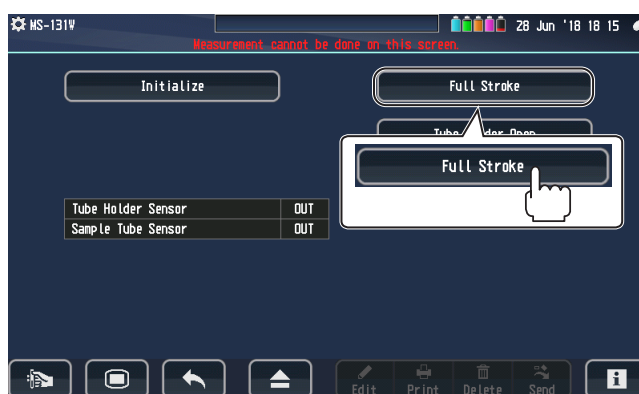
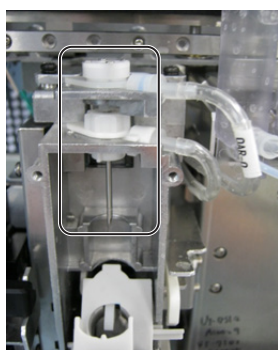


- 3 Touch [MS-131W] in the Unit Check window.



- 4 Touch [Full Stroke] in the MS-131W window and move the release nozzle to its full stroke position.

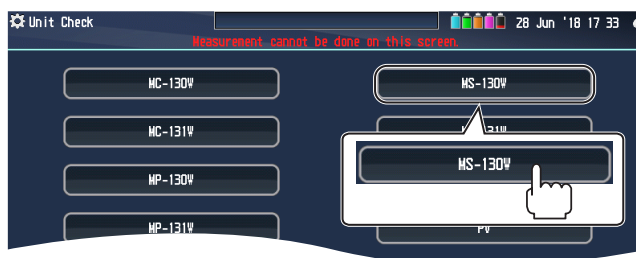
< Full Stroke >



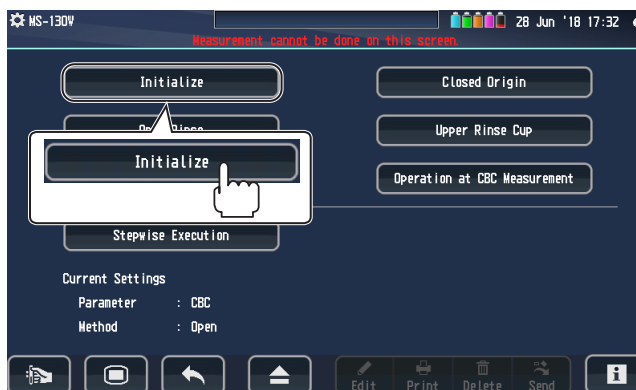
- 5 Touch [←] and return to the Unit Check window.



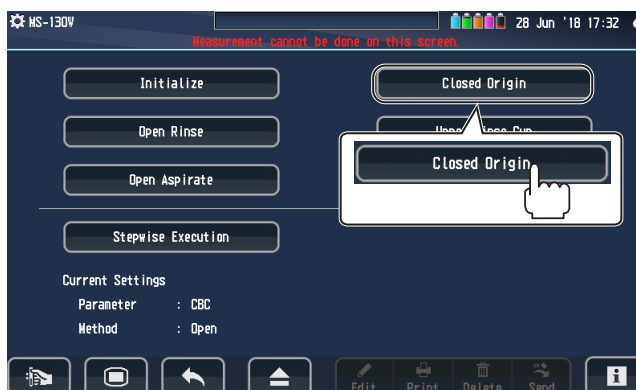
6 Touch [MS-130W] in the Unit Check window.



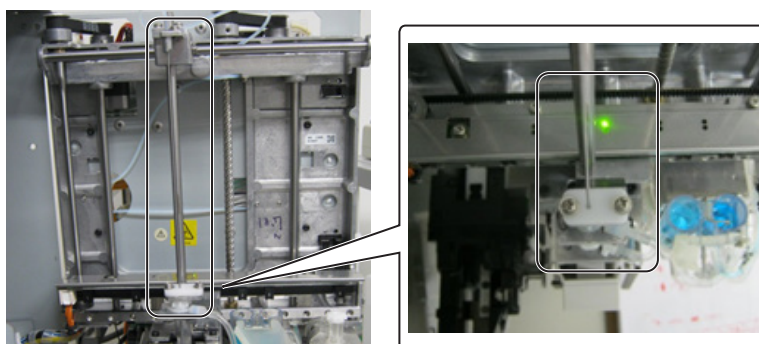
7 Touch [Initialize] in the MS-130W window and initialize it.

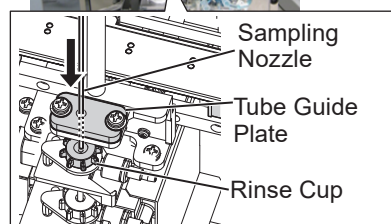
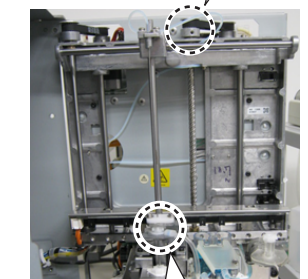
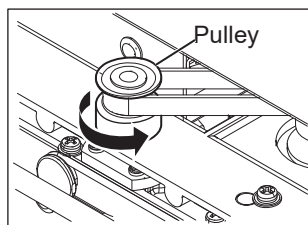


8 Touch [Closed Origin] in the MS-130W window and move the sampling nozzle to the origin position for closed measurement.



< Closed Origin >





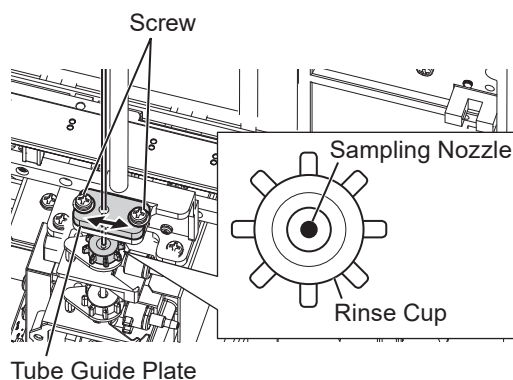
- 9** Turn the pulley on the right of the SAMPLER UNIT and lower the sampling nozzle.

NOTE • Be careful not to touch the belt when turning the pulley.

- When the power is turned on, perform the following steps while paying careful attention to safety.

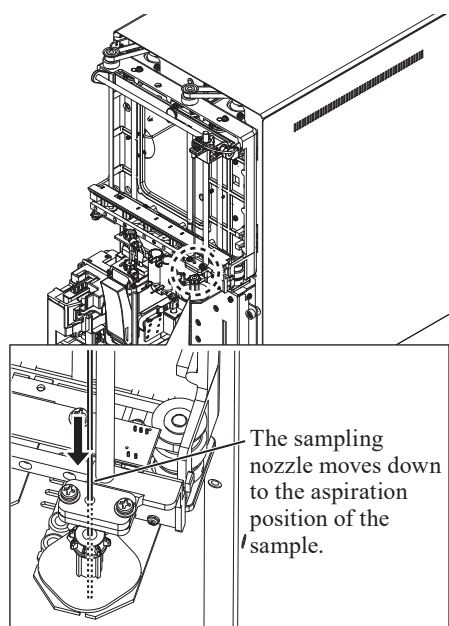
- 10** Make sure the position of the sampling nozzle is in the middle of the rinse cup on the release nozzle rinse unit.

If it is out of position, loosen the two screws, adjust the position of the tube guide plate slightly and align the position of the sampling nozzle to the center of the rinse cup.

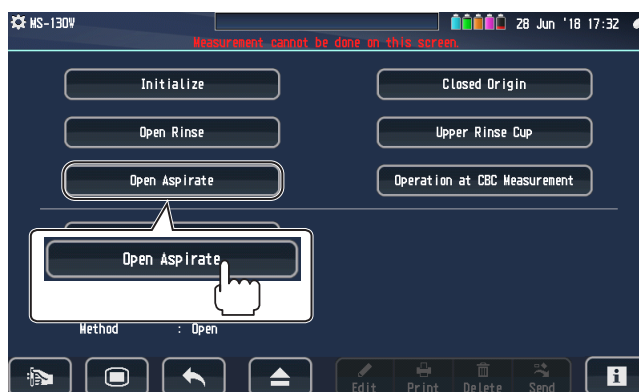


6

- 11** Touch [Initialize] in the MS-130W window and initialize it.



- 12** Touch [Open Aspirate] on the MS-130W screen, and check that the sampling nozzle moves normally to the aspiration position of the sample. When the sampling nozzle operates abnormally, repeat steps 8 to 12.



13 Touch [Initialize] in the MS-130W window and initialize it.



14 With the MEK-1303, perform “9-7-1. Adjusting the Sampling Nozzle and the Cartridge Position (MEK-1303)”.

NOTE: When fine adjustment is performed for the position of the tube guide plate, the position of the sampling nozzle is changed, and so be sure to always adjust the positions of the sampling nozzle and cell.

7

Maintenance

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7-1. Periodic Inspection

Perform a periodic inspection at least once every six months, make sure that the analyzer operates properly and replace any consumables.



Section 9 “Maintenance Procedure”

7-1-1. Repair Parts Availability Policy

Nihon Kohden Corporation (NKC) shall stock repair parts (parts necessary to maintain the performance of the instrument) for a period of seven years from the date of delivery. In that period NKC or its authorized agents will repair the instrument.

This period may be shorter than above mentioned period if the board or part necessary for the faulty section is not available.

7-2. User Maintenance Operations


Open the Maintenance screen and run functions like self check cleaning and priming.

Further, check the background and the effect of noise if needed.

Item	Description	Reference
Self Check	Checks the operation and results of self checks.	p.7-5
Prime Reagent	Primes each of the reagents.	p.7-15
Prime ISOTONAC-3/4	Primes the ISOTONAC•3 or ISOTONAC•4.	
Prime HEMOLYNAC•310	Primes HEMOLYNAC•310.	
Prime CLEANAC•710	Primes CLEANAC•710.	
Prime CLEANAC•3	Primes CLEANAC•3.	
Prime All	Primes all of the reagents.	
Maintenance Operations	Performs maintenance operations such as cleaning and priming and draining liquids.	p.7-17
Clean	Cleans the flow paths inside the analyzer with detergent (CLEANAC•710) and ISOTONAC•3.	p.7-17
Clean Protein	Cleans the flow paths inside the analyzer with detergent (CLEANAC•3 and CLEANAC•710) and ISOTONAC•3.	p.7-18
Clean WBC Manometer	Removes dirt and bubbles from the WBC manometer.	p.7-19
Measuring Unit Protein Cleaning	Cleans the flow paths inside the measuring unit with detergent (CLEANAC•3 and CLEANAC•710) and ISOTONAC•3.	p.7-20
Remove Clog	Removes clogs from detection holes inside the analyzer.	p.7-21
Prime on Installation	Primes the reagent inside the analyzer.	p.7-22
Drain All	Drains all reagent and waste fluid from the flow paths inside the analyzer.	p.7-23
Background Check	Measures the background and the effect of noise.	p.7-24
Periodic Maintenance	Checks the operation history, replacement of periodic replacement parts and measurement counts.	p.7-24
Operation History	Checks the operation history of the analyzer.	p.7-26
Analyzer Information	Checks information on the analyzer.	p.7-27

7-2-1. Opening the Maintenance Screen



- 1 Open the Main Menu screen.
If a different screen is open, touch  at the bottom left of the screen.



- 2 Touch [Maintenance] on the Main Menu screen to open the Maintenance screen.



7-2-2. Self Check

7-2-2-1. Opening the Screen or Window



On the Maintenance screen, touch [Self Check].



7-2-2-2. Running Self Checks

The following checks are performed in the self check to check the analyzer.

- Reagent Check: Checks that there is some remaining amount of each reagent and that it is within the expiration date.
- Circuit Test: Checks the internal circuit.
- Thermistor Check: Checks that the temperature of each part of the analyzer is within the specified range.
- Background Check: Measures the background noise and checks whether the measured value is within the specified range. This is carried out only when Background Check during Self Check is set to “On”.
- Periodic Replacement Parts: Checks that the usage count of each periodic replacement part is less than the specified number of times.
- Remaining Message Check: Checks if there are unconfirmed messages.

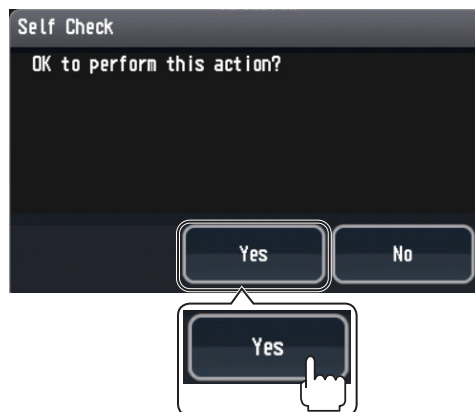
1 Touch [Self Check].



2 A confirmation window appears.

Touch [Yes].

NOTE: Make sure the slide door is closed when running a self check (MEK-1303 only).



3 The Self Check Results screen opens.

Check the results.



7-2-2-3. Viewing the Detailed Information of the Self-check Results

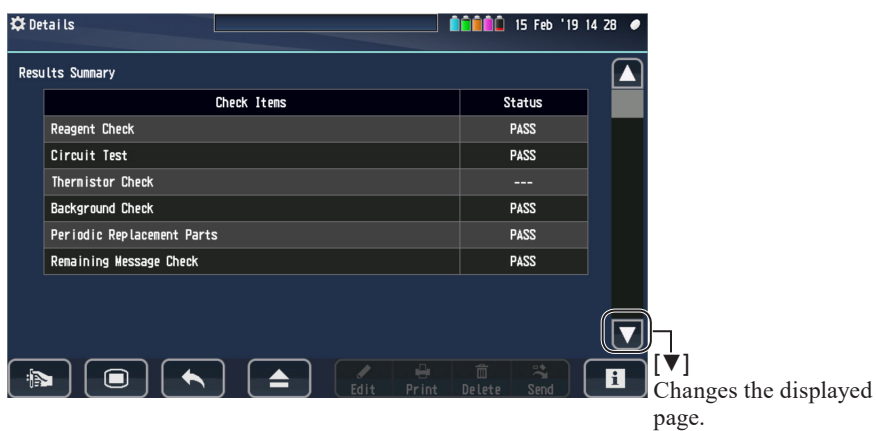


On the Self Check Results screen, touch [Detail] to open the Result Summary page.

Result Summary

Confirm that the status of each check item is “PASS”.

To check detailed information, touch [▼].



Reagent Check

This function checks whether a reagent outside the analyzer has primed the analyzer correctly via its sensors and displays the results.

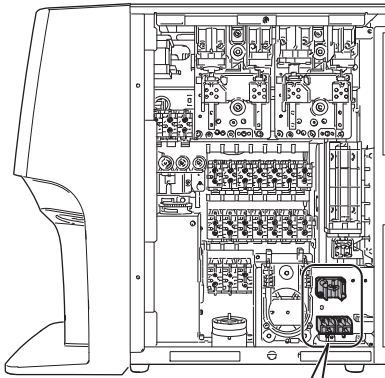
If the status of any item is “FAIL”, check the corresponding sensor and the expiration of the reagent.



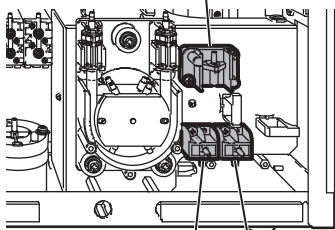
The expiration check is not performed if Reagent Management of the system settings is OFF.



“Reagent Management” (p. 8-15)



Diluent Sensor
(LIQUID SENSOR ISO kit)



Lysing Reagent Sensor
(LIQUID SENSOR kit)

Detergent Sensor
(LIQUID SENSOR kit)

Displays reagent names.

Indicates status of reagents.

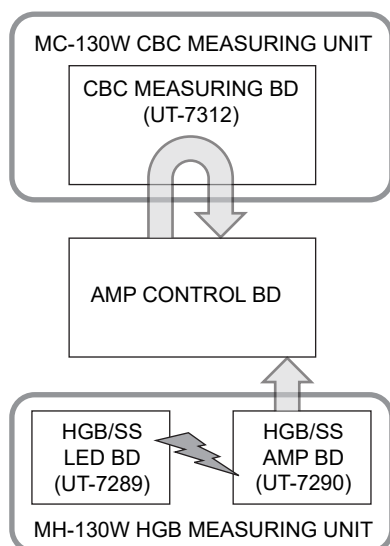
Reagent	Status	Fluid Status	Exp.
ISOTONAC-3/4	PASS	FULL	2018/12/01
CLEANAC-710	PASS	FULL	2018/11/30
CLEANAC-3	PASS	---	2018/12/31
HEMOLYNAC-310	PASS	FULL	2018/12/31

Indicates status.

Indicates expiration dates of reagents.

Check Parameters	Description
ISOTONAC-3/4	Primes the diluent and uses the diluent liquid sensor to detect whether the diluent is present or not. It also checks whether the diluent is within its expiration date.
CLEANAC-710	Does not prime the detergent, but uses the detergent sensor to detect whether detergent is present or not.
CLEANAC-3	It only checks whether the detergent is within its expiration date.
HEMOLYNAC-310	Primes the lysing reagent and uses the lysing reagent sensor to detect whether the lysing reagent is present or not. It also checks whether the lysing reagent is within its expiration date.

Circuit Test



Performs a self-check of the electrical circuits inside the analyzer and displays the results.



- In addition to the normal circuit tests, the MEK-1303 also checks the immune photodiode voltage circuit.
- In addition to the normal circuit tests, the MEK-1305 also checks the ESR photodiode voltage circuit.
- When the status of all parameters is “PASS”, the status on the Results Summary window is “PASS”.
- The test results are saved in the data list as “CIRCUIT CHECK”.

If the status of any parameter is “FAIL”, check the related unit and board; replace if necessary.

Indicates check parameters. Indicates judgment values.

Parameter	Status	Judgment Value	Range
WBC	PASS	91.5	86.9~96.1 10 ⁹ /μL
RBC	PASS	57	54~60 10 ⁴ /μL
MCV	PASS	36.8	35.0~38.7 fL
WBC Volt	PASS	17.80	17.50~18.70 V
RBC Volt	PASS	17.86	17.50~18.70 V
HGB ON Volt	PASS	3.97	3.50~4.50 V
HGB OFF Volt	PASS	0.11	0.05~0.15 V
Battery Volt	PASS	3.14	2.75~3.60 V

Indicates status. Displays the normal ranges.

Check Parameters	Description
WBC, RBC, MCV, WBC Volt, RBC Volt	Loops back and analyzes the pulses generated by the AMP CONTROL BD with the UT-7312 CBC MEASURING BD and checks that the value of each parameter is within its normal range.
HGB ON Volt, HGB OFF Volt	Measures the ON/OFF voltage of the LED on the MH-130W HGB MEASURING UNIT and checks that it is in the normal value range.
Battery Volt	Checks that the voltage of the internal battery is within the normal range. If the status is “FAIL”, refer to “Replacing the Internal battery” (p. 7-87) and replace the internal battery.

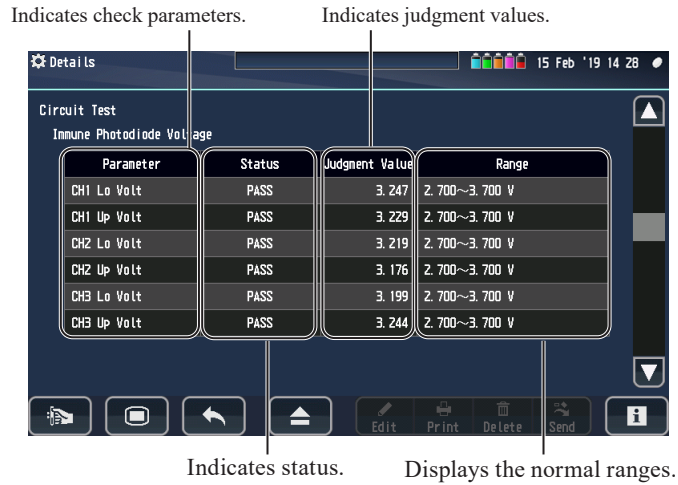
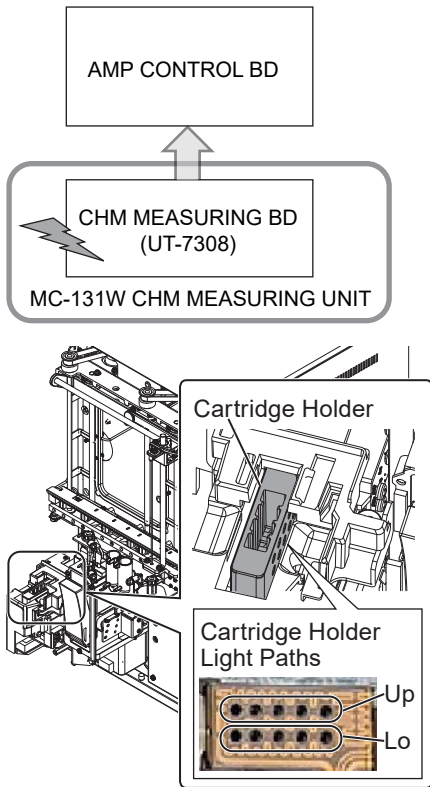
Immune Photodiode Voltage (MEK-1303 only)

Performs a self-check of the immune photodiode voltage circuit inside the analyzer and displays the results.

If the status is “FAIL”, clean the cartridge holder light path.



“Cleaning the Cell Block Optical Path (MEK-1303)” (p. 7-94)



Check Parameters	Description
CH1 to CH3 Lo Volt & CH1 to CH3 Up Volt	Checks the photodiode voltage in each wavelength in the light path of the cartridge holder (position 4). (CH1: 520 nm, CH2: 660 nm, CH3: 880 nm)

ESR Unit Light Reception Level (MEK-1305 only)

This performs a self-check of the photodiode voltage circuit of the ESR measurement unit inside the analyzer and displays the results.

If the status of any parameter is “FAIL”, check the related unit and board, and replace if necessary.

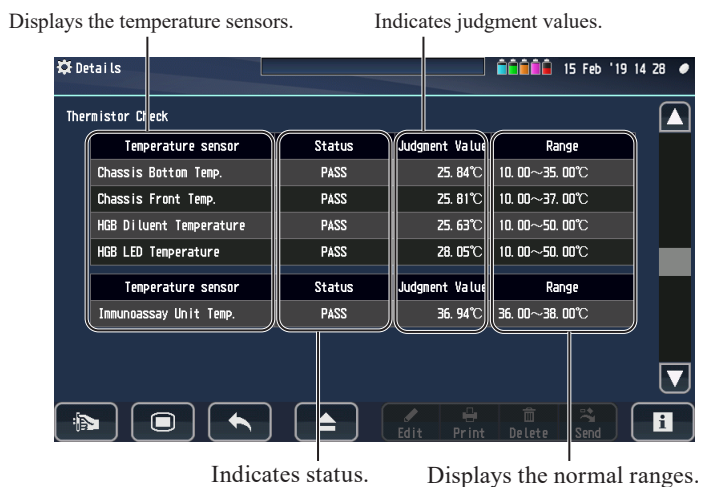


Check Parameters	Description
CH1 to CH2 Blank ON CH1 to CH2 Blank OFF CH1 to CH2 Blank Diff	During the self check, the above information is recorded so that it can be viewed later. During the circuit tests for individual operations, the PASS/FAIL determination only is performed.

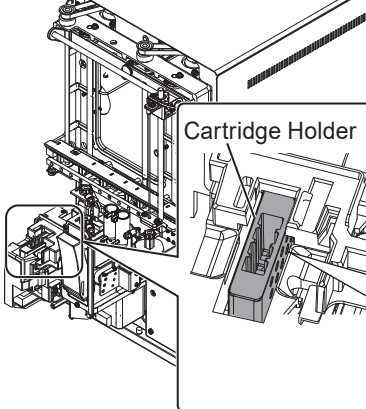

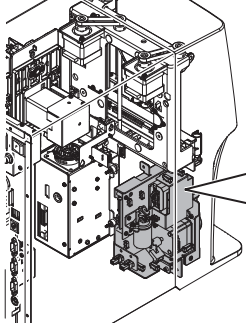
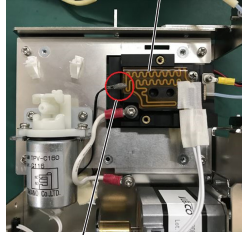
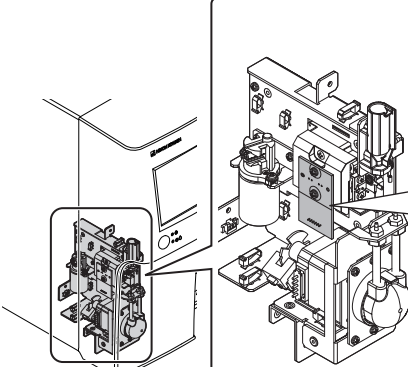
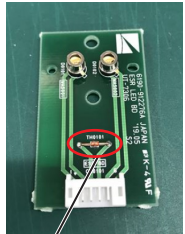
Thermistor Check

Uses the thermistors arrayed inside the analyzer to check whether the surrounding temperature is within the normal range and displays the results.

If the status is “FAIL”, check the status around the measurement unit and take measures as necessary.



Check Parameters	Thermistor Location
Chassis bottom temperature	<p>Thermistor (Chassis Bottom Temp)</p>
Chassis front temperature (MEK-1303/MEK-1305 only)	<p>Thermistor (Chassis Front Temp)</p>
HGB Diluent Temperature	<p>Thermistor (HGB Diluent Temp)</p>
HGB LED Temperature	<p>Thermistor: Mounted on UT-7289 HGB/SS LED BD (HGB LED Temp)</p>

Check Parameters	Thermistor Location
<p>Immunoassay unit temperature (MEK-1303 only)</p>	 <p>Cartridge Holder</p>  <p>Thermistor (Immunoassay Unit Temp)</p> <p>Heater</p>
<p>ESR measuring unit temperature (MEK-1305 only)</p>	  <p>Heater</p> <p>Thermistor (ESR measurement unit temperature)</p>
<p>ESR LED temperature (MEK-1305 only)</p>	  <p>Thermistor: Installed in ESR LED BD (UT-7306) (ESR LED temperature)</p>


Background Check

Measures the background and checks whether the measured value is within the specified range.

Checks the reliability of measurement results and displays the results.

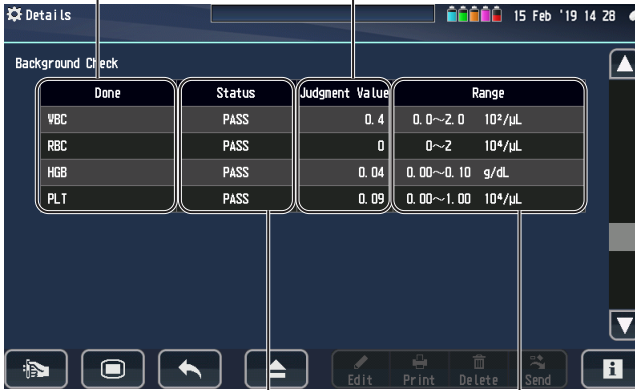
If the status is “FAIL”, take appropriate measures, such as cleaning the tube guide plate.

 “Cleaning the Tube Guide Plate” (p. 7-91)

 The background check is not performed if “Background Check during Self Check” is OFF in the system setting under “Operation.”

 “Opening the Settings Screen” (p. 8-2)

Indicates check parameters. Indicates judgment values.



Indicates status. Displays the normal ranges.

Done	Status	Judgment Value	Range
VBC	PASS	0.4	0.0~2.0 10 ² /μL
RBC	PASS	0	0~2 10 ⁴ /μL
HGB	PASS	0.04	0.00~0.10 g/dL
PLT	PASS	0.09	0.00~1.00 10 ⁴ /μL

Periodic Replacement Parts


Checks whether the usage counts of periodic replacement parts have exceeded their limits and displays the results.

If any are “FAIL”, replace the part (for the rinse chassis, clean it).

 Closed Mode Filter and Release Nozzle are only displayed for the MEK-1302 and MEK-1303.

ESR pump tube and ESR valve tube are only displayed for the MEK-1305.

Displays periodic replacement parts. Indicates judgment values.



Indicates status. Indicates the usage counts.

Parts	Status	Judgment Value	Upper Limit
HGB Filter (FL1)	PASS	17	6000times
Open Mode Filter (FL2)	PASS	14	6000times
Rinse Unit	PASS	14	6000times
Pump Tube	PASS	18	6000times
Sampling Nozzle	PASS	18	24000times
Closed Mode Filter (FL3)	PASS	4	6000times
Release Nozzle	PASS	4	6000times

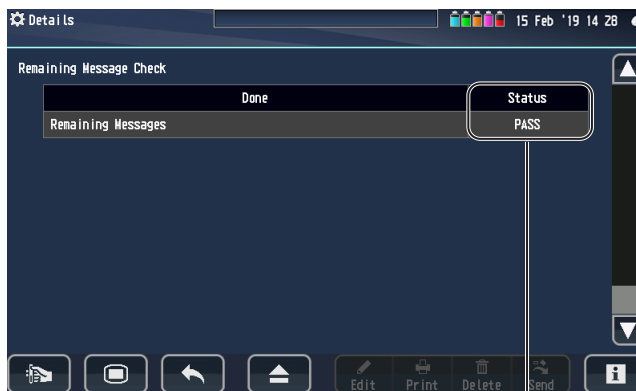
Remaining Message Check

Checks whether there are any unread messages and displays the results.

If “FAIL”, check the analyzer messages on the Information screen, delete the messages and then run self check again.

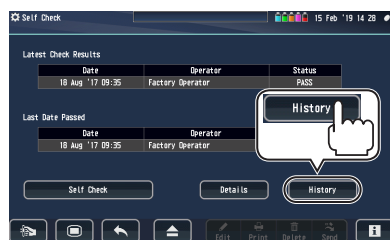
 “Analyzer Messages” (p. 3-12)

 If “FAIL”, a self check will not start.



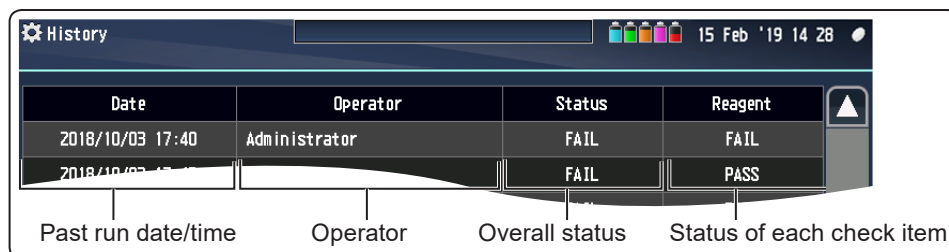
Indicates status.

7-2-2-4. Viewing the Self-check Result History



On the Self Check screen, touch [History] to open the History screen.

You can view a history of the past self-checks run on the History screen. A list of check results (which was displayed in the Result Summary window) is also displayed on this screen.



7-2-3. Prime Reagent

Primes the inside of the analyzer with the reagent being used. The Prime Reagent function is for aspirating reagent into the analyzer without registering the reagent information.

Use it at times like when there is remaining reagent and bubbles are accidentally aspirated.



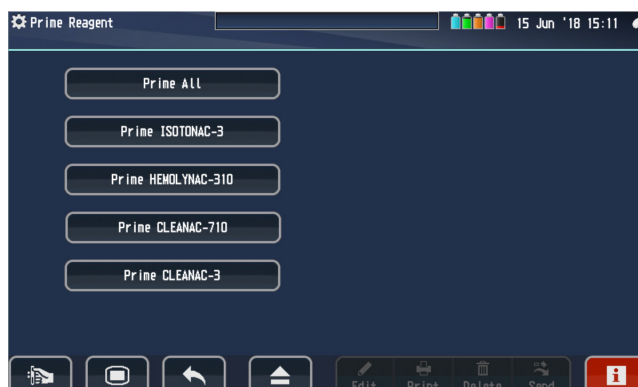
Replace the reagent as follows if “Reagent Management” in system settings is set to OFF.

If it is ON, run Replace Reagent on the Reagent Management screen.

7-2-3-1. Opening the Prime Reagent screen



Touch [Prime Reagent] on the Maintenance screen to open the Prime Reagent screen.



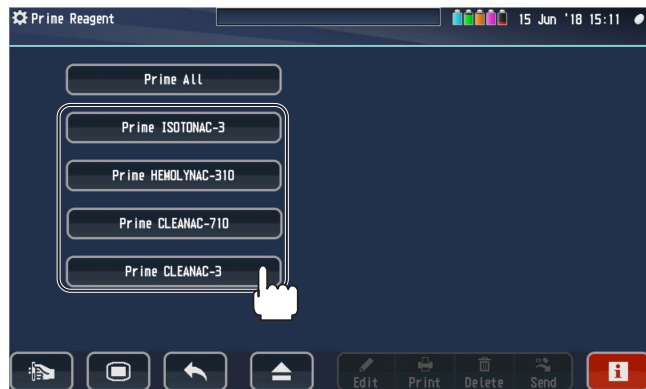
7-2-3-2. Priming In-Use Reagents

The individual reagents in use (ISOTONAC•3, HEMOLYNAC•310, CLEANAC•710 or CLEANAC•3) or Prime All can be used.

NOTE: Do not run “Prime All” during installation. Run “Prime on Installation”.

Parameter (Operating Time)	Description
Prime All About 9 minutes	Prime all of the reagents and draws them up to the cups.
Prime ISOTONAC•3 About 2 minutes	Draws diluent inside the analyzer.
Prime HEMOLYNAC•310 About 3 minutes	Draws lysing reagent inside the analyzer and rinse the flow path inside with diluent.
Prime CLEANAC•710 About 2 minutes	Draws detergent inside the analyzer and rinse the flow path inside with diluent.
Prime CLEANAC•3 About 4 minutes	

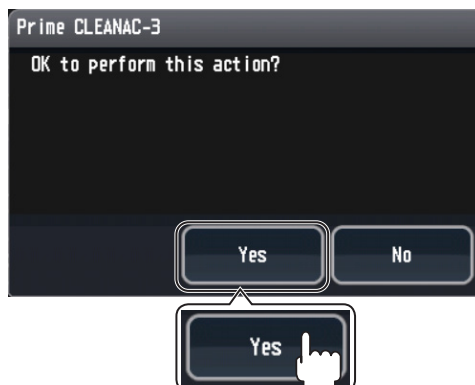
1 Touch [Prime] for the desired reagent.



Touch [Prime All] to prime all the reagents.



2 Touch [Yes] when the confirmation dialog appears.

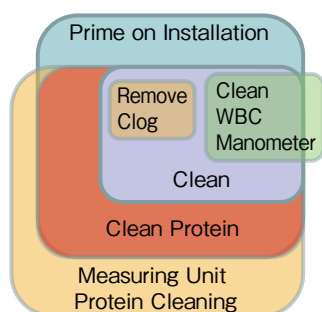


7-2-4. Maintenance Operation

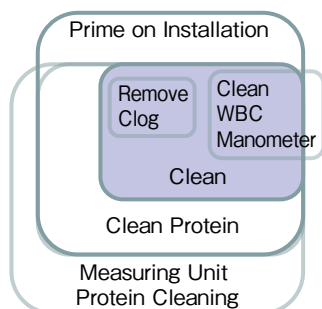
7-2-4-1. Opening the Maintenance screen



Touch [Maintenance Operation] on the Maintenance screen to open the Maintenance Operation screen.



7-2-4-2. Cleaning

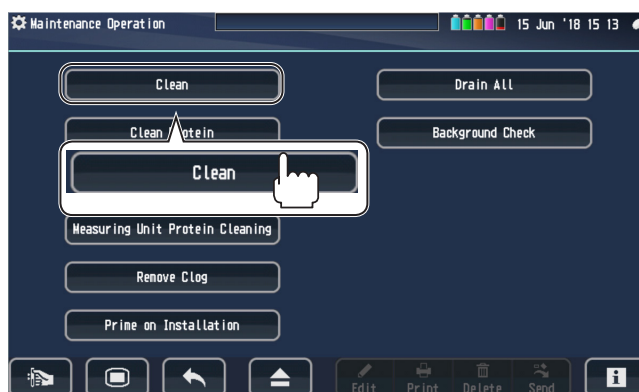


Operating time: About 15 min. (MEK-1305), 9 min. (MEK-1303), 8 min. (MEK-1301, MEK-1302)

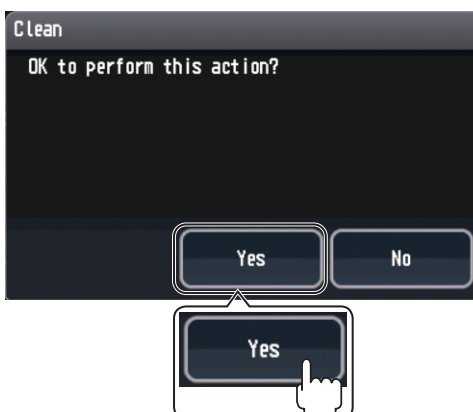
Cleans the flow paths inside the analyzer with CLEANAC•710 detergent and ISOTONAC•3.

Any dirt clinging to the flow path can be removed by periodically flushing it with CLEANAC•710 detergent.

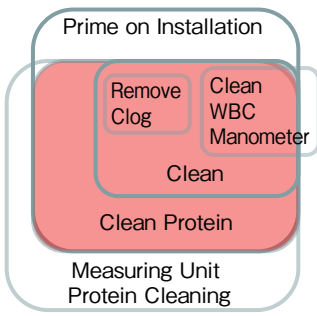
- 1 Touch [Clean] on the Maintenance Operation screen.



- 2 Touch [Yes] when the confirmation dialog appears.



7-2-4-3. Protein Cleaning



Operating time: About 20 min. (MEK-1305), 19 min. (MEK-1303), 18 min. (MEK-1301, MEK-1302)

Cleans the flow paths inside the analyzer with detergent (CLEANAC•710 and CLEANAC•3) and ISOTONAC•3.

The primary factors in making the flow path inside the analyzer dirty are protein and lipids in the blood, which are cleaned by CLEANAC•3 detergent.

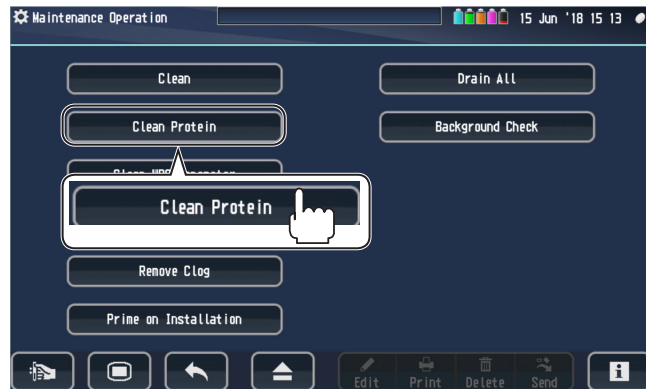
The analyzer regularly notifies the operator when it is time for protein cleaning.

In addition, run protein cleaning in the following cases.

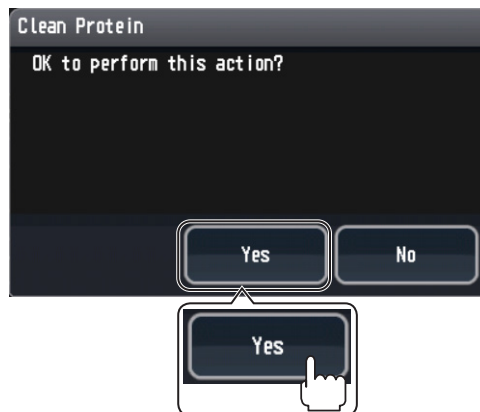
- If the background noise fails to decrease
- If blockage messages appear frequently
- When disposing of the analyzer unit
- If normal cleaning is ineffective

NOTE: Run protein cleaning at least once a month.

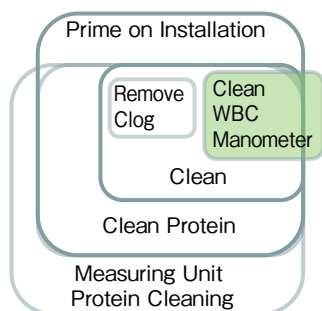
1 Touch [Clean Protein] on the Maintenance Operation screen.



2 Touch [Yes] when the confirmation dialog appears.



7-2-4-4. Cleaning the WBC Manometer



Operating time: About 4 min.

Cleans the WBC manometer inside the analyzer of dirt and bubbles with CLEANAC•710 detergent. (stronger than cleaning)

Run Clean WBC Manometer if the messages “WBC upper manometer dirty” or “WBC lower manometer dirty” appear, or if the analyzer fails to recover when [Restore] is touched.

“User Information [4xxxx]” (p. 3-57)

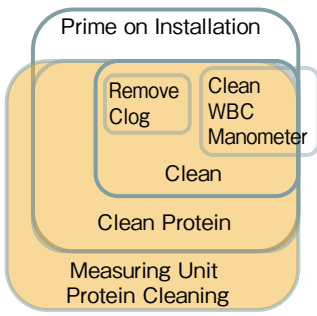
- 1 Touch [Clean WBC Manometer] on the Maintenance Operation screen.



- 2 Touch [Yes] when the confirmation dialog appears.



7-2-4-5. Performing the Measuring Unit Protein Cleaning



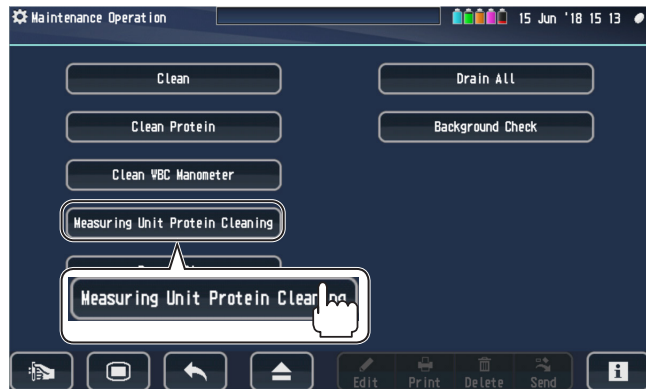
Operating time: About 30 min. (MEK-1305), 29 min. (MEK-1303), 27 min. (MEK-301, MEK-1302)

Cleans protein with a focus on the measuring unit.

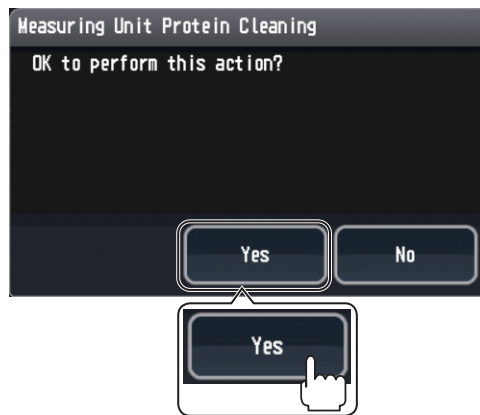
Run measuring unit protein cleaning in the following cases.

- If noise messages appear frequently
- When background interference often occurs and if the analyzer fails to recover even after cleaning (“Cleaning” (p. 7-17))

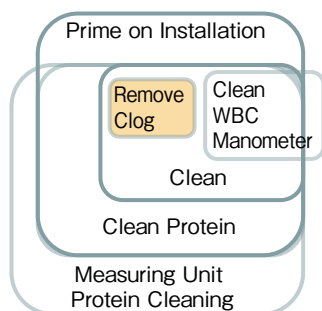
1 Touch [Measuring Unit Protein Cleaning] on the Maintenance Operation screen.



2 Touch [Yes] when the confirmation dialog appears.



7-2-4-6. Removing Clogs



Operating time: About 2 min.

Removes clogs from detection holes inside the analyzer.

High voltage is applied across the electrodes to clear clogs.

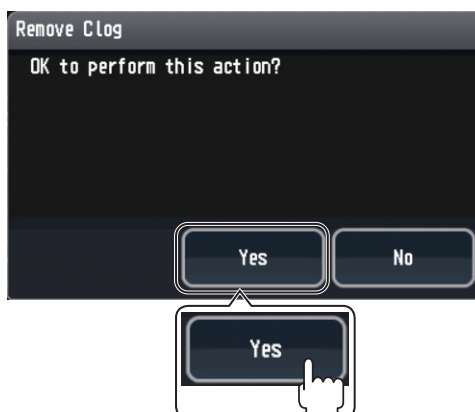
Run Remove Clog if the messages “WBC Detection Hole Clog” appears, or if the analyzer fails to recover when [Restore] is touched.

 “User Information [4xxxx]” (p. 3-57)

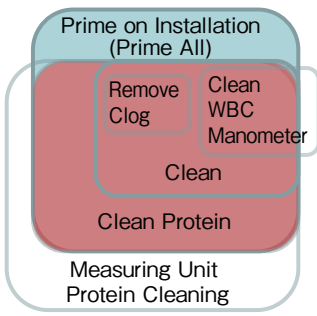
- 1 Touch [Remove Clog] on the Maintenance Operation screen.



- 2 Touch [Yes] when the confirmation dialog appears.



7-2-4-7. Priming on Installation



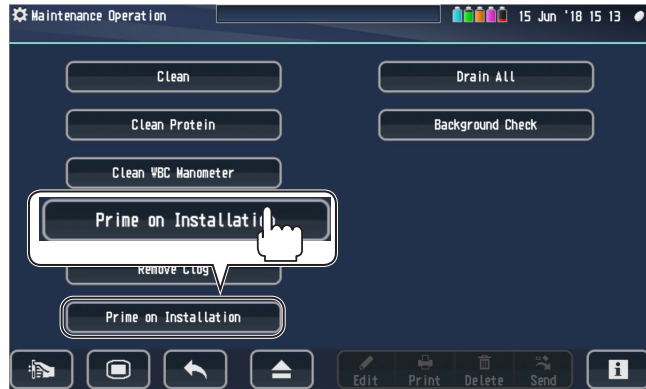
Operating time: About 30 min. (MEK-1305), 28 min. (MEK-1303), 26 min. (MEK-1301, MEK-1302)

Primes the analyzer when it is installed.

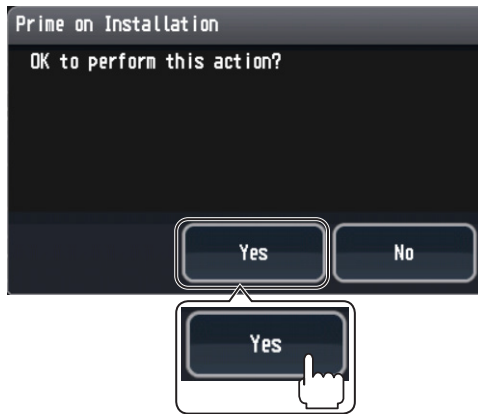
It performs protein cleaning and reagent priming.

Also, when fluid is drained from the analyzer as in the next section, Prime on Installation can replace the reagent in the analyzer.

- 1 Touch [Prime on Installation] on the Maintenance Operation screen.



- 2 Touch [Yes] when the confirmation dialog appears.




7-2-4-8. Draining Fluid from the Analyzer

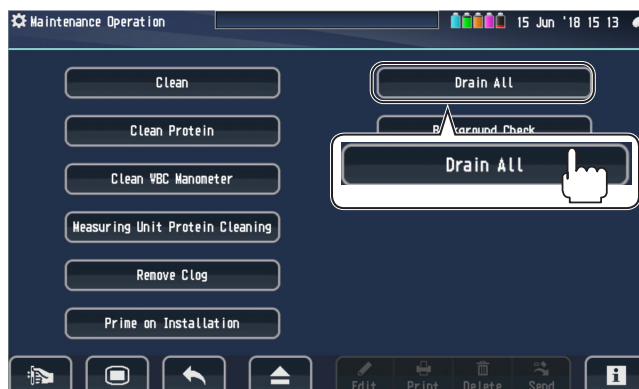
Operating time: About 10 min. (MEK-1305), 9 min. (MEK-1303), 8 min. (MEK-1301, MEK-1302)

Drains all reagents and waste from flow paths in the analyzer for cases like maintenance inspection and long-term storage.

NOTE: Before draining fluid from the analyzer, remove the reagent tubes.

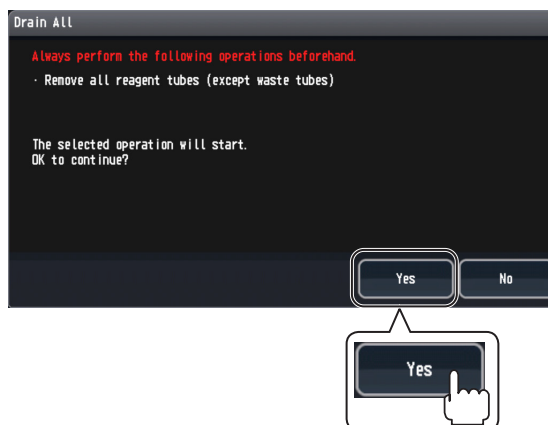
 “Long Term Storage and Transport” (p. 7-97)

- 1 Touch [Drain All] on the Maintenance Operation screen.



- 2 When the confirmation dialog appears, disconnect all the reagent tubes (ISOTONAC•3, HEMOLYNAC•310, CLEANAC•710 and CLEANAC•3) except the waste fluid tube and then touch [Yes].

NOTE: Disconnect the reagent tubes on the reagent side. If reagent tubes are disconnected from the back of the analyzer, reagent may splash out.

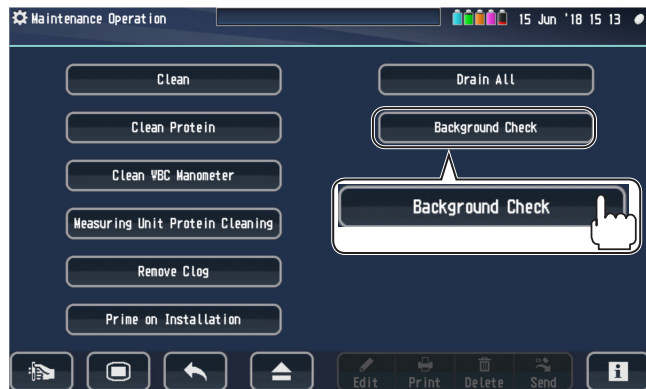


7-2-4-9. Background Check

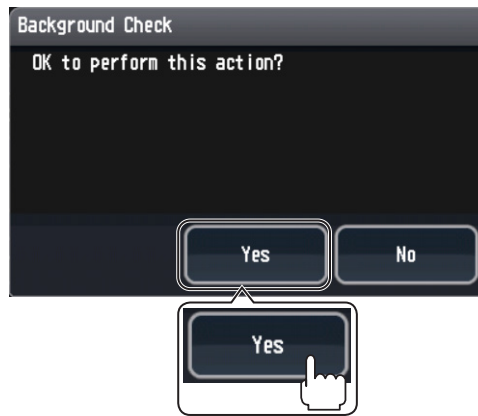
Operating time: About 2 min.

Measures the background and the effect of noise.

- 1 Touch [Background Check] on the Maintenance Operation screen.



- 2 Touch [Yes] when the confirmation dialog appears.



7-2-5. Periodic Maintenance

7-2-5-1. Opening the Screen or Window

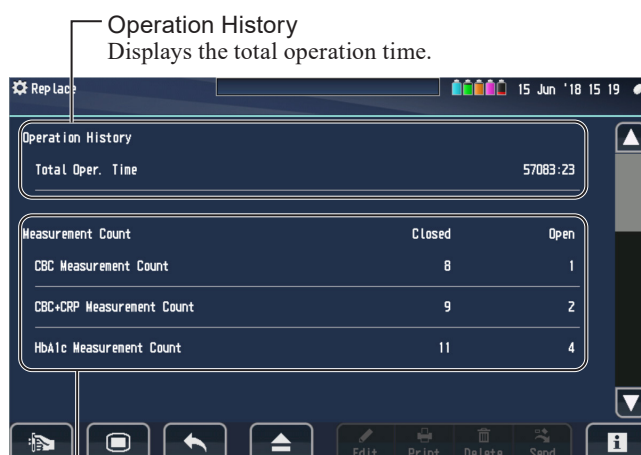


Touch [Replace] on the Main Menu screen to open the Replace screen.

[▲] or [▼]
Switches the screen up or down.



7-2-5-2. Checking the Operation History



Measurement Count
Indicates the measurement count of each parameter for each measurement method.

7

7-2-5-3. Replacing Periodic Replacement Parts

This function is for preparing to replace periodic replacement parts and resetting the usage counts after doing so.

 “Periodic Maintenance” (p. 7-65)



Item	Description
Management of Periodic Replacement Parts	Touch [Prepare All] to drain reagent from inside the analyzer and prepare all periodic replacement parts to be replaced.
Rinse Unit Usage Count	After cleaning the rinse unit, touching [Reset] resets its usage count to 0.
Pump Tube Usage Count	After replacing the periodic replacement parts, touching [Reset] resets their usage count to 0.
Sampling Nozzle Usage Count	
Hemoglobin Filter (FL1) Usage Count	
Open Filter (FL2) Usage Count	
Closed Filter (FL3) Usage Count (MEK-1302 and MEK-1303 only)	
Release Nozzle Usage Count (MEK-1302 and MEK-1303 only)	
ESR Pump Tube Usage Count (MEK-1305 only)	
ESR Valve Tube Usage Count (MEK-1305 only)	

7-2-6. Operation Log

Checks the operation and message history of the analyzer.

7-2-6-1. Opening the Screen or Window



Touch [Log] on the Maintenance screen to open the Log screen.

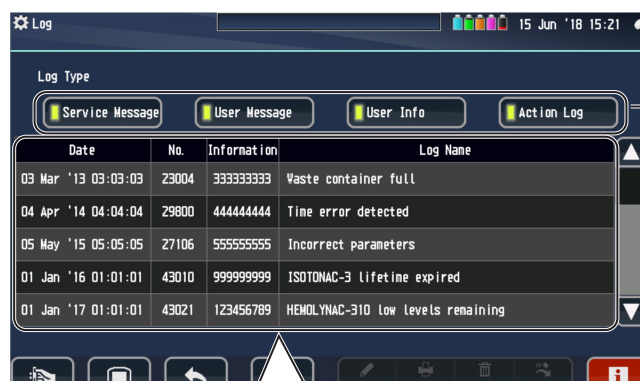
[▲] or [▼]
Switches the screen up or down.



7-2-6-2. Checking Operation Logs

Select the log type to check the operation log.

Log Type	Description
Service Message	Log of serious analyzer messages (analyzer messages: 00001 to 04511), such as recommending calling service personnel.
User Message	Log of analyzer messages (analyzer messages: 10100 to 29902) that are recoverable by the user.
User Info	Log of analyzer messages (analyzer messages: 41000 to 48201) for determining whether or not the user can recover from them.
Action Log	Log of actions other than measurements.



Selects the log level.

Date: Displays the date and time of logs found.
No.: Displays the number of logs found. For details, refer to “Analyzer Messages” (p. 3-12).
Information: Information for service personnel.
Log Name: Displays the name of logs found.

Date	No.	Information	Log Name
03 Mar '13 03:03:03	23004	333333333	Waste container full
04 Apr '14 04:04:04	29800	444444444	Time error detected

7-2-7. Analyzer Information

Shows the analyzer information such as the model number, serial number and software version.

7-2-7-1. Opening the Device Information Screen



Touch [Device Information] on the Maintenance screen to open the Device Information screen.



7-2-7-2. Checking the Analyzer Information

Information

Displays the model name, serial number, and Mac address.



Version

Displays the software versions, etc.

Item	Description
Analyzer Model	The model of analyzer is stored on the AMP CONTROL BD and is automatically recognized and displayed.
Serial Number	The serial number stored on the AMP CONTROL BD is displayed.
Mac Address	Displays the board-specific Mac Address that was entered at the factory.
Version	Displays the versions of installed software: MAIN Software, BOOT Software, FPGA and CPLD. All of this software is written onto the AMP CONTROL BD.

7-3. Service Maintenance Operations


Displays the Service window for performing maintenance on the analyzer.


NOTE: It is necessary to switch the operator to Technical User in order to open the Service window.

Item	Description	Reference
Sensor Monitor	Checks and adjusts the state of each sensor, temperature, LED.	p.7-31
Maintenance Operations	Performs maintenance like circuit tests, saving logs, clears all analyzer message, release all solenoids.	p.7-40
Consumables Management	Checks the usage counts and operation limits (recommended guide for replacing parts when using the analyzer for a long time) of valves and the various units. Usage counts can also be reset after parts are replaced.	p.7-41
Serial Number	When the AMP CONTROL BD is replaced, enter the serial number of the analyzer.	p.7-43
Adjust Touch Panel	Adjust the calibration of the touchpoint on the touchscreen.	p.7-44
Magnetic Valve Check	Checks that individual valves open and close and the operation of the rotary pump.	p.7-45
Unit Check	Checks the operation of each unit or functional block individually.	p.7-46
MC-130W	For the MC-130W CBC MEASURING UNIT, it runs Clean MC, Drain Cups, Inspect WBC Manometer, Circuit Test, Measure Background, Drain MC.	p.7-46
MC-131W (MEK-1303 only)	For the MC-131W CHM MEASURING UNIT, it runs Auto (Calibration), Self Check, check of cartridge holder operation.	p.7-49
ME-130W (MEK-1305 only)	Checks the operation of the ME-130W ESR MEASURING UNIT.	p.7-50
MP-130W	Checks the operation of the ISO pump (MP-130W ISO PUMP UNIT).	p.7-52
MP-131W (MEK-1303 only)	Checks the operation of the sample pump (MP-131W SAMPLE PUMP UNIT).	p.7-53
MP-132W	Checks the operation of the RBC pump (MP-132W RBC PUMP UNIT).	p.7-54
MP-133W	Checks the operation of the MP-133W ROTARY PUMP UNIT.	p.7-55
MP-134W (MEK-1305 only)	Checks the operation of the ESR pump (MP-134W ESR PUMP UNIT).	p.7-56
MS-130W	Checks the operation of the SAMPLER UNIT (operation of the sampling nozzle).	p.7-57
MS-131W (MEK-1302 and MEK-1303 only)	Checks the operation of the MS-131W OPEN AIR UNIT (operation of the release nozzle and opening the tube holder).	p.7-59
MH-130W	Runs an open/close test of valve No. 21 of the MH-130W HGB MEASURING UNIT. It also checks the HGB LED temperature and LED ON/OFF voltages.	p.7-60
PV	Checks the operation of the front panel unit (buzzer, indicators, power LED, screen display).	p.7-61
Adjust Rel. Posn. of MS-130W (MEK-1303 only)	Adjusts the positioning of the sampling nozzle and cartridge for the SAMPLER UNIT.	p.7-62
Adjust Rel. Posn. of MS-130W (MEK-1305 only)	Adjusts the positioning of the sampling nozzle and ESR cup for the SAMPLER UNIT.	p.7-62
2D barcode (MEK-1303 only)	Checks the QR code of cartridges.	p.7-63
Create Demo Data	Creates a data list, QC data and demo data for logs.	p.7-64
Jig Communication Mode	Set to ON when checking leaks with a leak check jig.	p.7-64

7-3-1. Changing the Operator to a Technical User

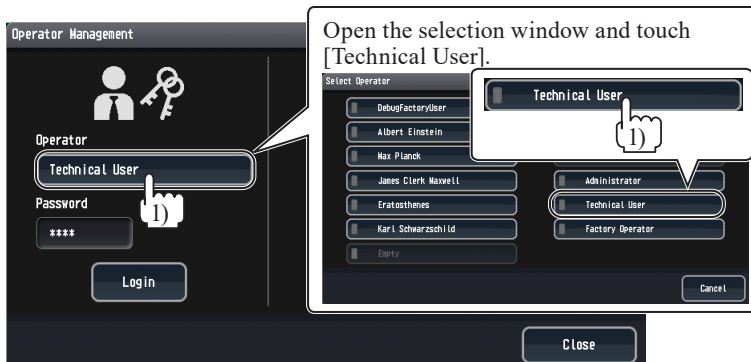


- 1 Open the Main Menu screen.
If a different screen is open, touch  at the bottom left of the screen.

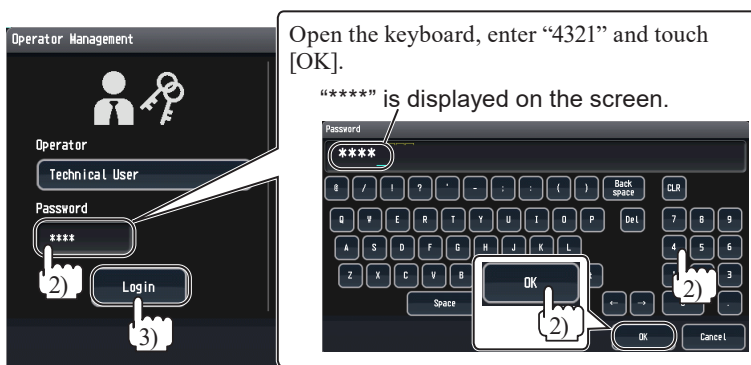
- 2 Touch  on the Main Menu screen to open the Operator Management window.



- 3 Switch the operator.
 - 1) Set the operator to Technical User.



- 2) Enter the password "4321 (default)".
- 3) Touch [Login].




7-3-2. Notes on the Service Window

- Although it is assumed that it will be used by skilled service personnel, if a mistake is made in using it, reagent may leak inside the analyzer.
- The Service window has a function that is to be used with the special jig at the factory. Since it does not work without the jig, do not use any function not listed in this service manual.
- Each of the unit and functional blocks can be operated individually from the Service window. When operating in a state with reagents or samples still inside, take all due care to avoid leaks or infection.
- Functions may be added to the Service window as needed to improve productivity.
- Never use anything if you do not know the proper method as doing so may damage the analyzer.

7-3-3. Opening the Service Window



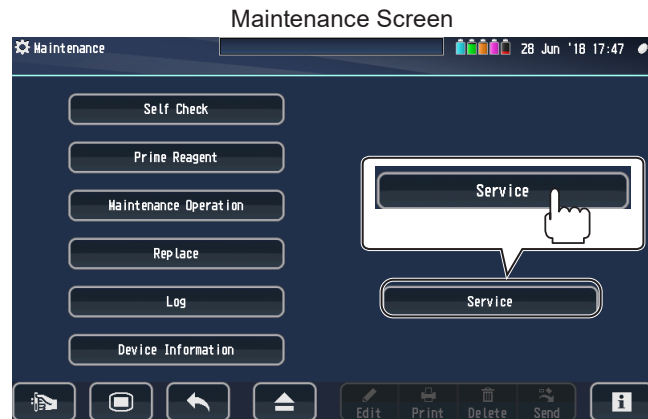
1 Switch the operator to Technical User and open the Main Menu screen.
If a different screen is open, touch  at the bottom left of the screen.



2 Touch [Maintenance] on the Main Menu screen to open the Maintenance screen.

3 Touch [Service] on the Maintenance screen to open the Service window.

NOTE: If the operator is not “Technical User”, [Service] is not displayed.



Service Window



7-3-4. Sensor Monitor



Touch [Sensor Monitor] on the Service window to open the Sensor Monitor window. The state of each sensor, temperature, LED can be checked, and adjusted when needed, from the Sensor Monitor window.

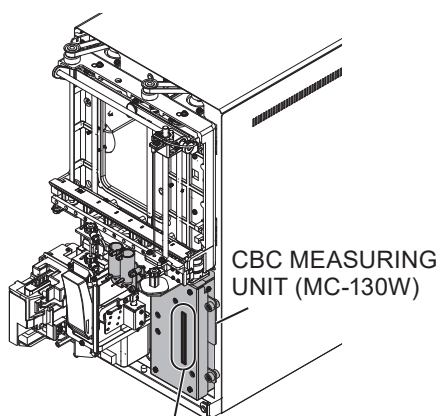
[▲] or [▼]
Switches the screen up or down.



7-3-4-1. Adjust Liquid Sensor (WBC Manometer)

Adjusts the WBC manometer.

“Adjusting the WBC Manometer” (p. 6-5)



The liquid sensors are inside the slit (two places, upper and lower).



Runs an automatic wet adjustment.

Primes the manometer.

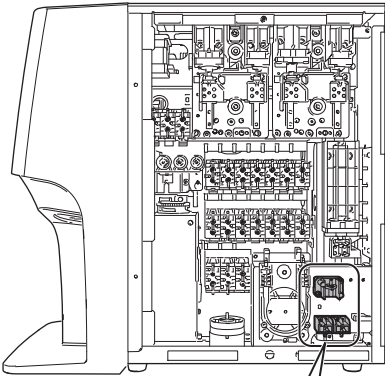
Drains the manometer.

Item	Description
Gain Type	Indicates the position (upper, lower) of the liquid sensor in the WBC manometer in the MC-130W CBC MEASURING UNIT.
Liquid Sensor	Indicates the current status detected by the WBC manometer liquid sensor. <ul style="list-style-type: none"> • FULL: liquid is present • EMPTY: liquid is not present
Check Range EMPTY	Indicates the target voltage (at least 1.8 V) for determining EMPTY.
Adjust Range FULL	Indicates the target voltage 0.35 V for adjusting in the FULL state. When adjusting this, make sure the measured value is within the range of 0.3 to 0.5 V.
Measured Value	Indicates the voltage currently detected by the liquid sensor.
Gain	Indicates the current gain value. Touching the value allows a gain value to be input manually.

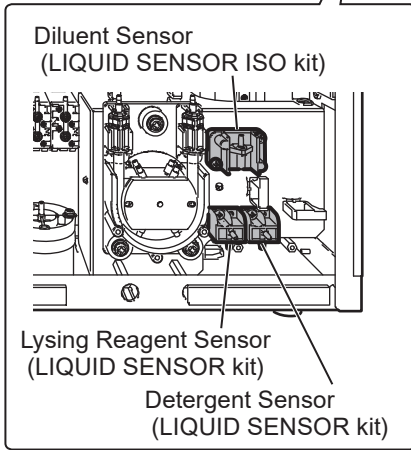
7-3-4-2. Adjust Liquid Sensor (Diluent, Lysing Reagent, Detergent)

Adjusts liquid sensors and/or the LIQUID SENSOR BD.

 “Adjusting the Liquid Sensor/LIQUID SENSOR BD” (p. 6-7)




Runs a dry or wet automatic adjustment of the photodiode voltage.

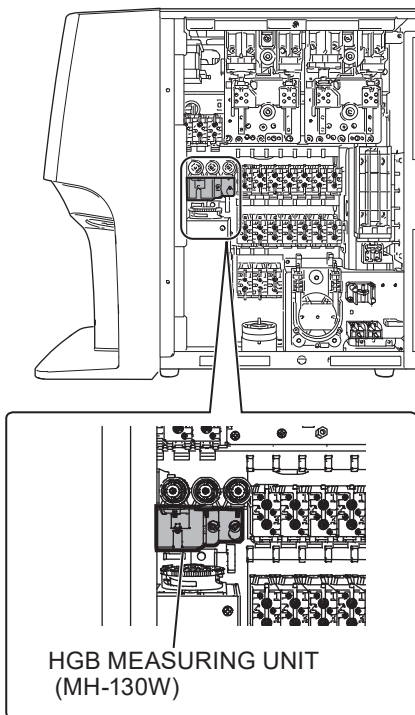


Item	Description
Gain Type	Indicates the type of liquid sensor.
Liquid Sensor	Indicates the current status detected by the liquid sensor. <ul style="list-style-type: none"> • FULL: liquid is present • EMPTY: liquid is not present
Check Range EMPTY	Indicates the target voltage (at least 1.8 V) for determining EMPTY.
Adjust Range FULL	Indicates the target voltage 0.35 V for adjusting in the FULL state. When adjusting this, make sure the measured value is within the range of 0.3 to 0.5 V.
Measured Value	Indicates the voltage currently detected by the liquid sensor.
Gain	Indicates the current gain value. Touching the value allows a gain value to be input manually.

7-3-4-3. Adjust LED

Adjusts the HGB.

 "Adjusting the HGB" (p. 6-10)



Runs a wet automatic adjustment of the photodiode voltage.

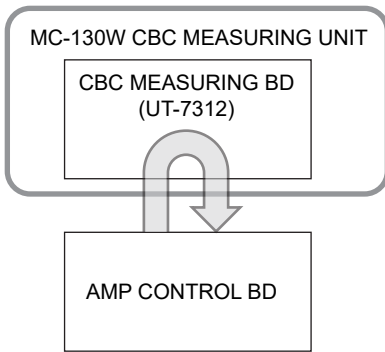
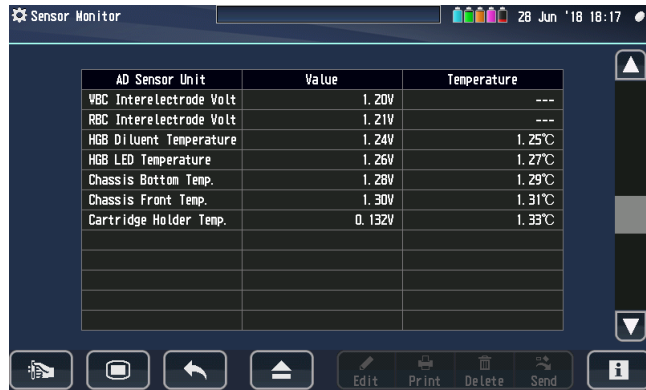
Prior to adjustment, primes the MH-130W HGB MEASURING UNIT.

Item	Description
Gain Type	The type is the HGB voltage converted from the light of the LED inside the MH-130W HGB MEASURING UNIT.
Adjust Range	Indicates the target voltage 4.00 V for adjusting the photodiode voltage of the LED in the FULL state. When adjusting this, make sure the measured value is within the range of 3.9 to 4.1 V.
Measured Value	Indicates the current voltage.
Gain	Indicates the current gain value. Touching the value allows a gain value to be input manually.

7-3-4-4. AD Sensor Unit

Checks the WBC Interelectrode Voltage, RBC Interelectrode Voltage and the status of temperature sensors in different parts of the analyzer.

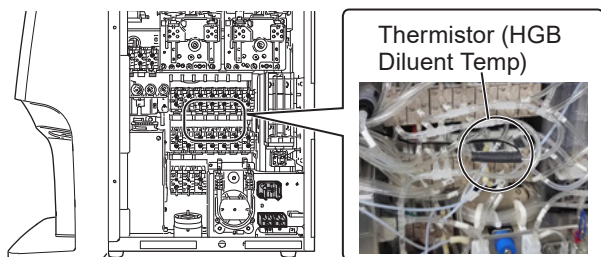
NOTE: The screen appearance may vary depending on the product.



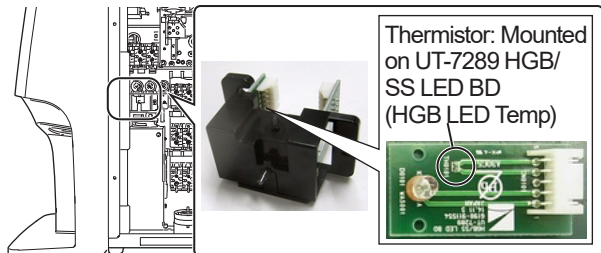
Item	Description
WBC Interelectrode Volt RBC Interelectrode Volt	During a circuit test, when pulses generated by the AMP CONTROL BD are looped back and analyzed by the UT-7312 CBC MEASURING BD, these indicate the interelectrode voltages.
HGB Diluent Temperature HGB Led Temperature Chassis Bottom Temperature Chassis Front Temperature (MEK-1303, MEK-1305 only) Cartridge Holder Temp (MEK-1303 only) ESR Measuring Unit Temp (MEK-1305 only) ESR LED Temperature (MEK-1305 only)	Checks the temperatures of analyzer parts and the voltage for calculating the temperatures.

Temperature Sensor (Thermistor) Location

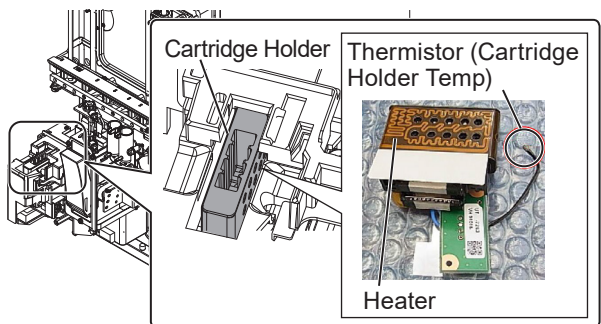
• HGB Diluent Temperature



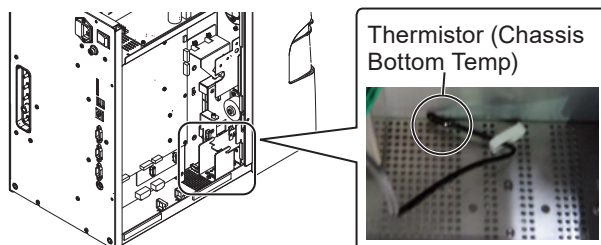
• HGB LED Temperature



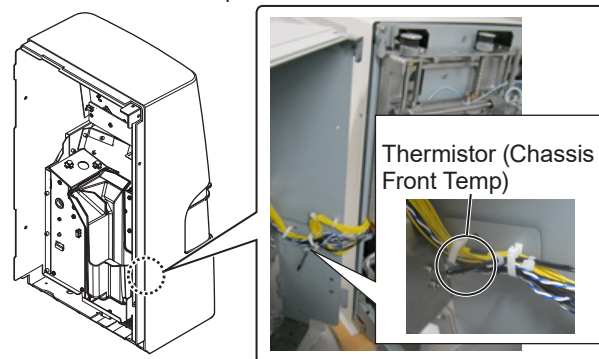
• Cartridge Holder Temperature



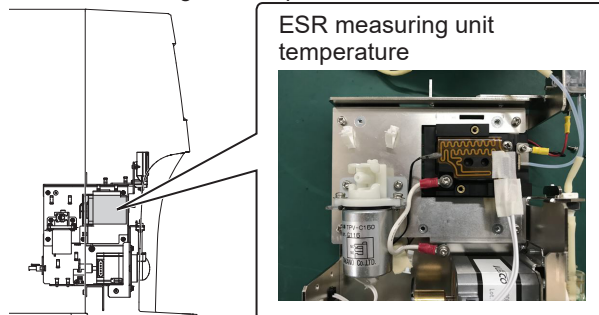
• Chassis Bottom Temperature



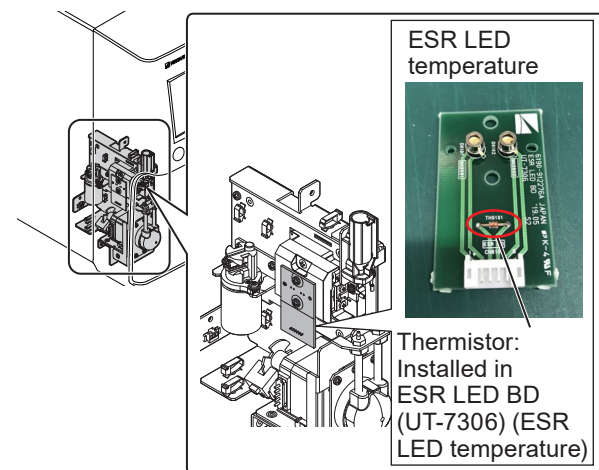
• Chassis Front Temperature



• ESR measuring unit temperature

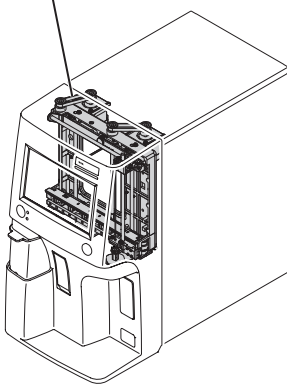


• ESR LED temperature



7-3-4-5. MS-130W (X), MS-130W (Y)

SAMPLER UNIT

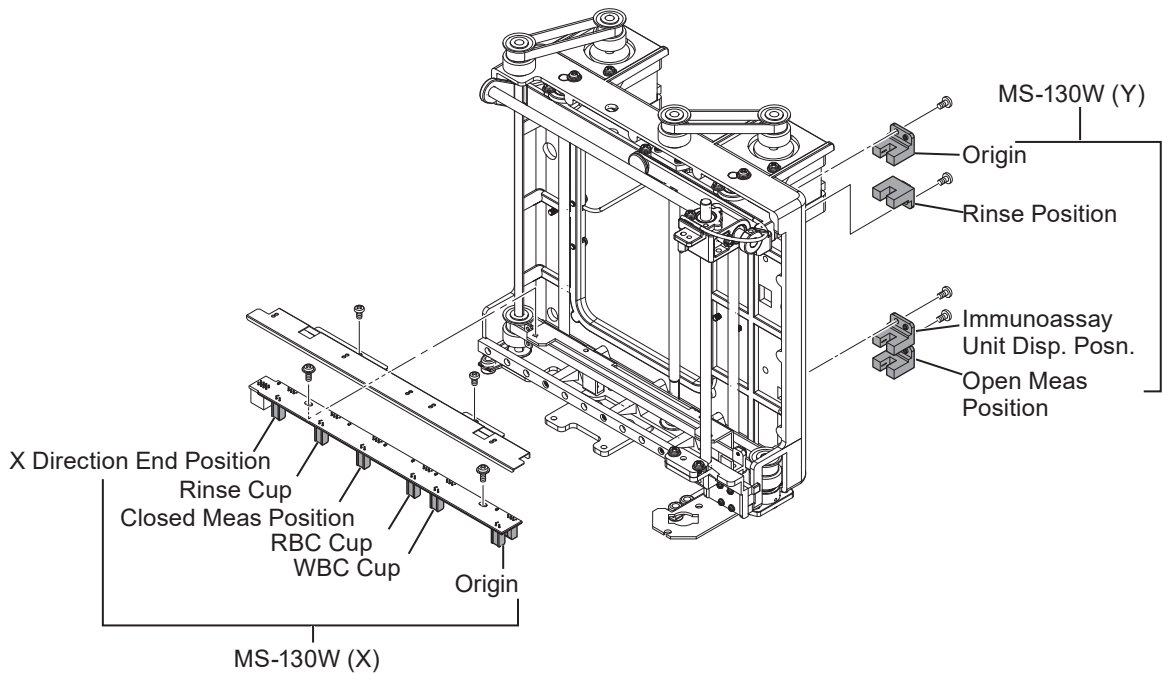
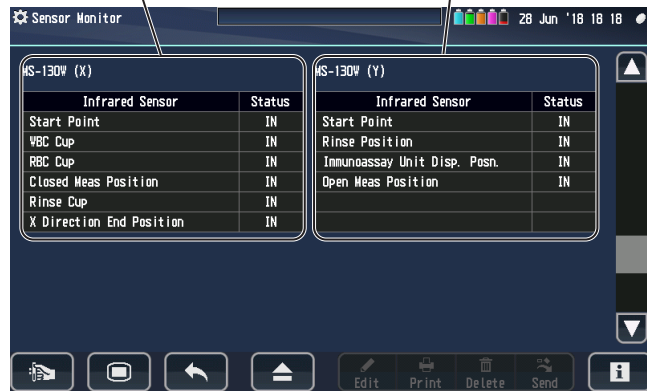


Checks the status of sensors of the SAMPLER UNIT.

When the sampling nozzle moves to the position of each sensor, its status switches to “IN”.

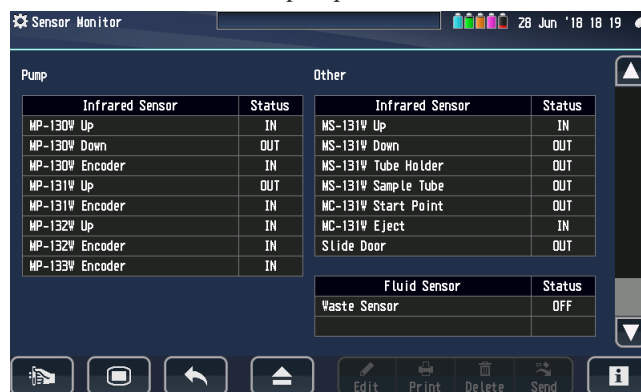
Indicates the status of X direction (right/left) sensors.

Indicates the status of Y direction (up/down) sensors.

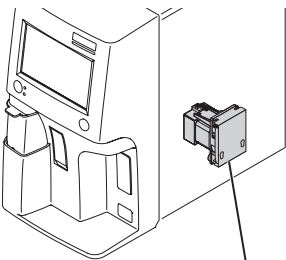
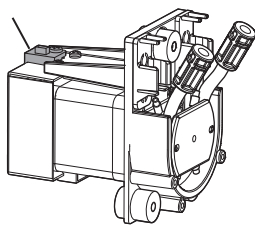
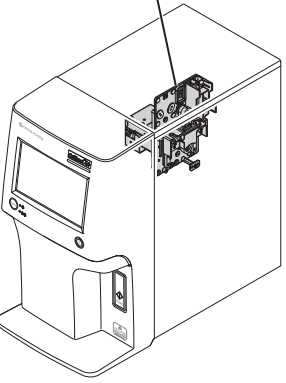
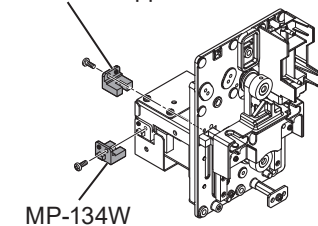


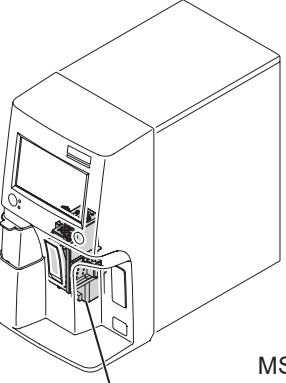
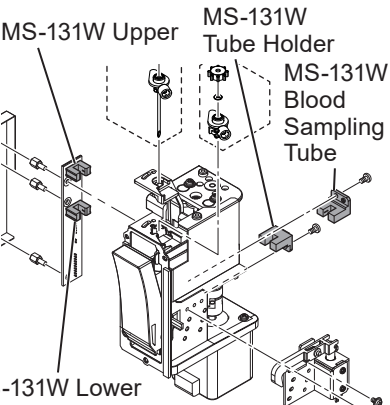
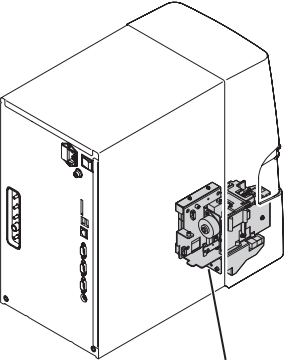
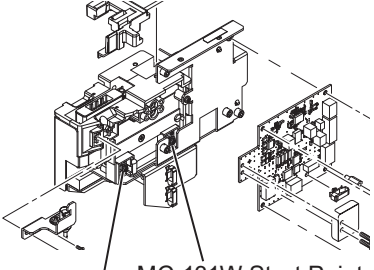
7-3-4-6. Pump, Other

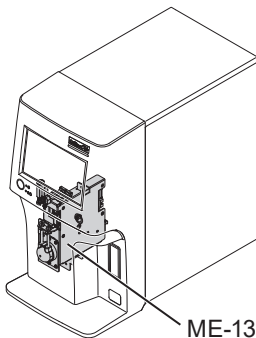
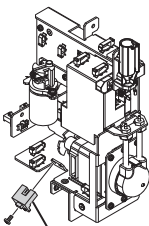
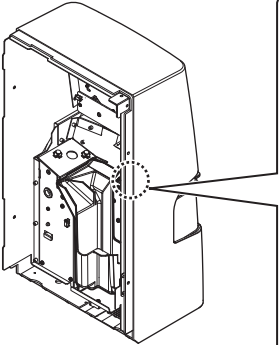
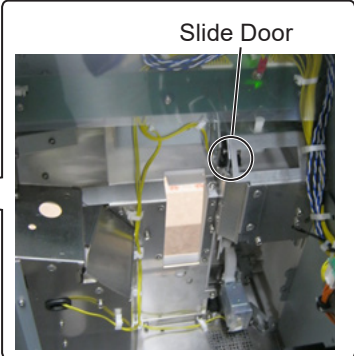
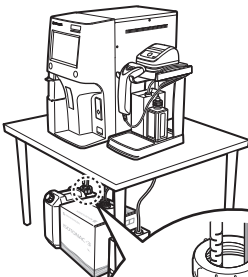
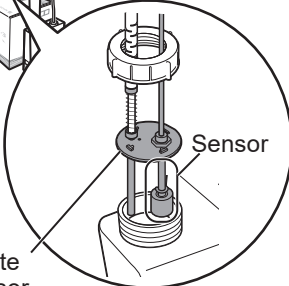
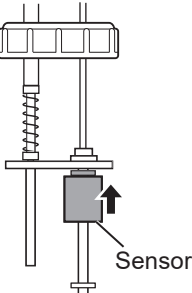
Checks the status of sensors of each pump unit and of other units.



Pump Infrared Sensor		
Item	Description	Sensor Location
MP-130W Upper	When the piston moves to the position of each sensor, its status switches to "IN".	<p>MP-130W ISO PUMP UNIT</p>
MP-130W Lower		
MP-130W Encoder	When motor rotation moving the piston up or down is detected, its status switches to "IN".	
MP-131W Upper (MEK-1303 only)	When the piston moves to the position of the sensor, its status switches to "IN".	<p>MP-131W SAMPLE PUMP UNIT</p>
MP-131W Encoder (MEK-1303 only)		
MP-132W Upper	When the piston moves to the position of the sensor, its status switches to "IN".	<p>MP-132W RBC PUMP UNIT</p>
MP-132W Encoder		

Pump Infrared Sensor		
Item	Description	Sensor Location
MP-133W Encoder	When motor rotation operating the pump is detected, its status switches to "IN".	  <p>MP-133W Encoder</p> <p>MP-133W ROTARY PUMP UNIT</p>
MP-134W Upper (MEK-1305 only)	When the piston moves to the position of the sensor, its status switches to "IN".	  <p>MP-134W Upper</p> <p>MP-134W Encoder</p> <p>MEK-1305</p>
MP-134W Encoder (MEK-1305 only)	When motor rotation moving the piston up or down is detected, its status switches to "IN".	

Other Infrared Sensor		
Item	Description	Sensor Location
MS-131W Upper (MEK-1302 and MEK-1303 only)	When the release nozzle moves to the position of each sensor, its status switches to "IN".	  <p>MS-131W Upper</p> <p>MS-131W Lower</p> <p>MS-131W Tube Holder</p> <p>MS-131W Blood Sampling Tube</p> <p>MS-131W OPEN AIR UNIT</p>
MS-131W Lower (MEK-1302 and MEK-1303 only)		
MS-131W Tube Holder (MEK-1302 and MEK-1303 only)		
MS-131W Blood Sampling Tube (MEK-1302 and MEK-1303 only)		
MC-131W Start Point (MEK-1303 only)	When the cartridge holder moves to the position of the sensor, its status switches to "IN".	  <p>MC-131W Start Point</p> <p>MC-131W Eject</p> <p>MC-131W CHM MEASURING UNIT</p>
MC-131W Eject (MEK-1303 only)		

Other Infrared Sensor		
Item	Description	Sensor Location
ME-130W Encoder (MEK-1305 only)	When motor rotation operating the pump is detected, its status switches to "IN".	  <p>ME-130W Encoder</p> <p>ME-130W ESR MEASURING UNIT</p>
Slide Door (MEK-1303 only)	When the slide door opens, its status changes to "IN".	  <p>Slide Door</p>
Waste Sensor	When the sensor is lifted up, its status switches to "ON".	   <p>Waste Sensor</p> <p>Sensor</p> <p>Sensor</p>

7-3-5. Maintenance Operation



Touch [Maintenance Operation] on the Service window to open the Maintenance Operation screen.

The following maintenance operations can be done from the Maintenance Operation screen.

Touch the desired item and then touch [Yes] when the confirmation dialog appears.



Item	Description
Circuit Test	Performs a circuit test. The content of this test is the same as the circuit test performed under a self check (“Self Check” (p. 7-5)) in user maintenance. The test results are saved in the data list as “CIRCUIT CHECK”.
Clear Error	Clears all analyzer message of information that are currently occurring. This puts the analyzer in its restore state, but does not resolve the cause of messages.
Release All Solenoids	Releases the excitation of all motors in the analyzer to a state they can be operated manually. Touch [Restore] on the Information screen to return to the previous state.
Save Simple Log	R&D uses these to analyze an instrument.
Save Full Logs	They are not normally used.

7-3-6. Consumables Management



Touch [Consumables Management] on the Service window to open the Consumables Management window. Usage counts and operation limits (recommended guide for replacing parts when using the analyzer for a long time) of valves and the various units can be checked from the Consumables Management window.

Usage counts can also be reset after parts are replaced.



Indicates the current operation count.

Numbers are displayed in red when the operation counter passes the operation limit.
 Note: An analyzer message is not displayed even when the operation counter passes the operation limit.

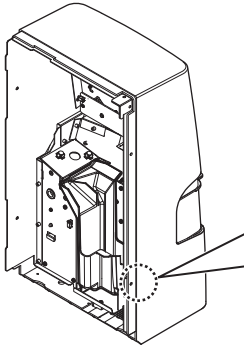
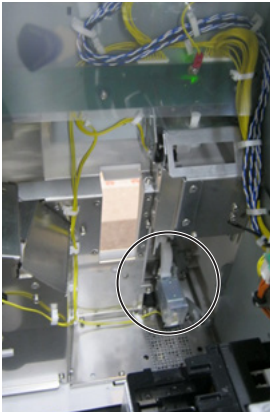
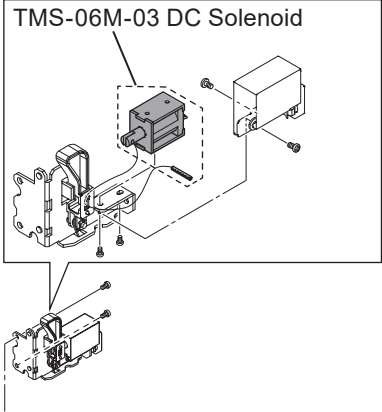
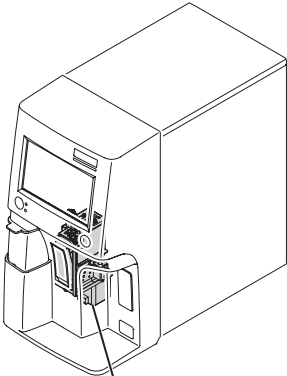
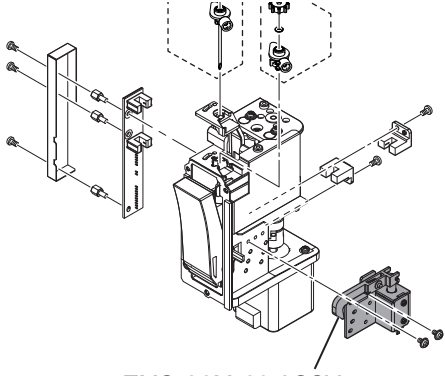
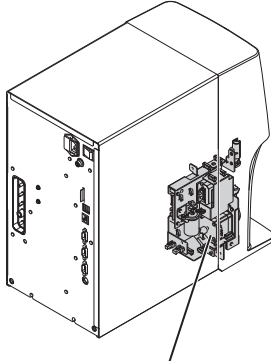
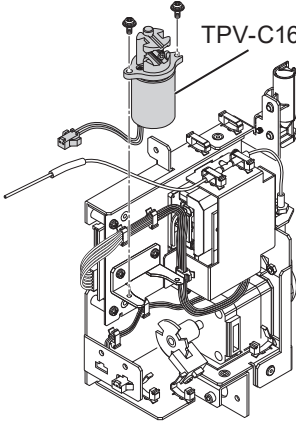


Follow steps 1) and 2) below when resetting the Operation Counter after replacing parts.

- 1) Touch the line of the replaced part to open an input window.
- 2) Enter "0" and touch [OK].

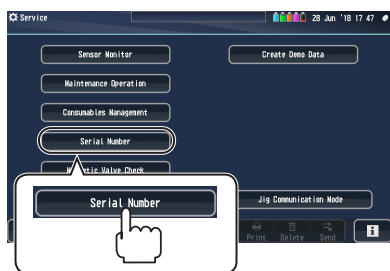


Valves (1/5) to Valves (5/5)	
Part Name	Location of Consumables
MV1A and MV1B to MV12A and MV12B	For information about the location of valves (No.1 to No. 21), refer to "Electromagnetic Valves" (p. 4-50). When replacing electromagnetic valves, reset the operation counter of A and B at the same time. Example: When electromagnetic valve No. 1 is replaced, reset MV1A and MV1B.

Pinch Valves and Solenoids	
Part Name	Location of Consumables
Slide Door (MEK-1303 only)	   <p>TMS-06M-03 DC Solenoid</p>
Tube Holder (MEK-1302 and MEK-1303 only)	  <p>MS-131W OPEN AIR UNIT</p> <p>TMS-06M-03 ASSY</p>
ESR Pinch Valve (MEK-1305 only)	  <p>TPV-C160 Pinch Valve</p> <p>ME-130W ESR MEASURING UNIT</p>

Samplers and Pumps	
Part Name	Location of Consumables
MS-130W/MS-130W-01 (X)	For information about the location of consumables, refer to “Units and Boards” (p. 2-36).
MS-130W/MS-130W-01 (Y)	
MS-131W (MEK-1302 and MEK-1303 only)	
DP_HEMO	
MP-130W	
MP-131W (MEK-1303 only)	
MP-132W	
MP-133W	
MP-134W (MEK-1305 only)	
MC-131W (MEK-1303 only)	

7-3-7. Serial Number

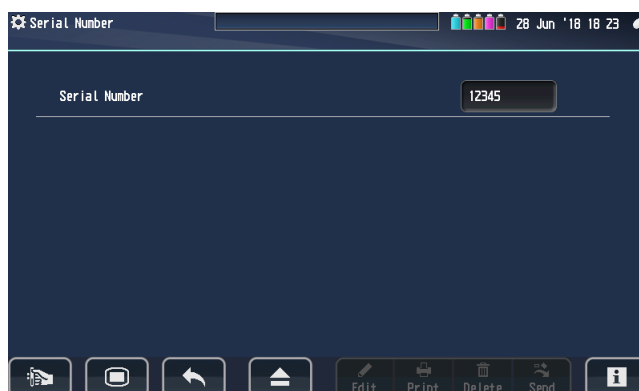


Touch [Serial Number] on the Service window to open the Serial Number window.

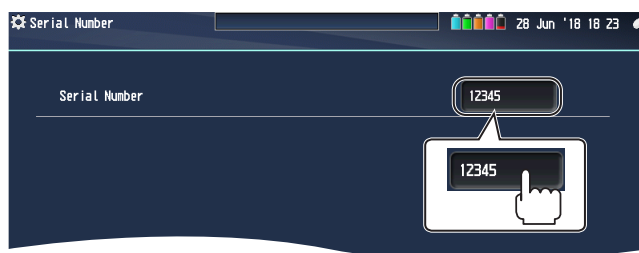
When the AMP CONTROL BD is replaced, enter the serial number of the analyzer.

The serial number that is entered is displayed on the Analyzer Information window of user maintenance.

 “Checking the Analyzer Information” (p. 7-27)



- 1 Touch [Serial Number] to open its input window.



- 2 Enter the serial number of the analyzer and touch [OK].



7-3-8. Adjusting the Calibration of the Touchpoint on the Touchscreen



With the power turned off, press the Measure switch and Power key. The touch panel calibration screen is displayed.

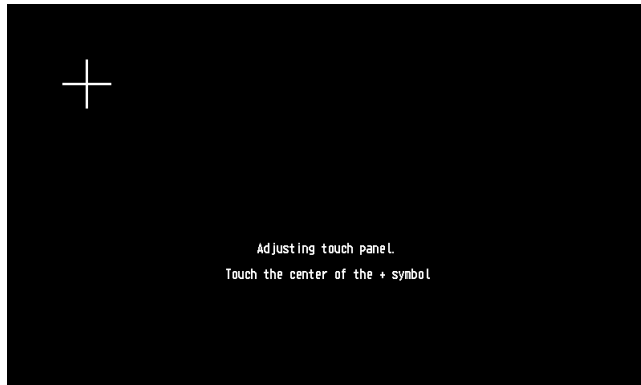
Adjust the calibration of the touchpoint on the touchscreen.

1 Press the Reset key to adjust the calibration of the touch screen panel pointer.

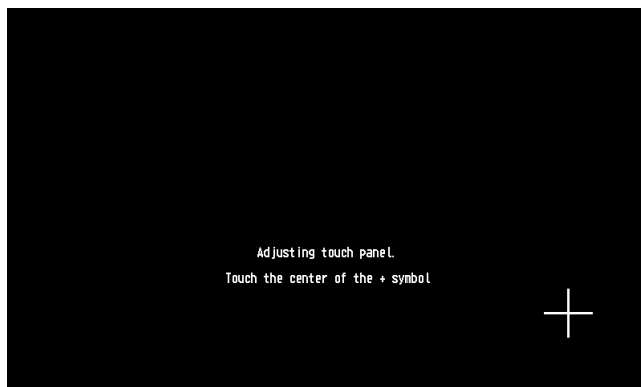
When adjustment is complete, press the Power key.

The power turns off.

2 Touch the center of the + mark at the top left of the screen.



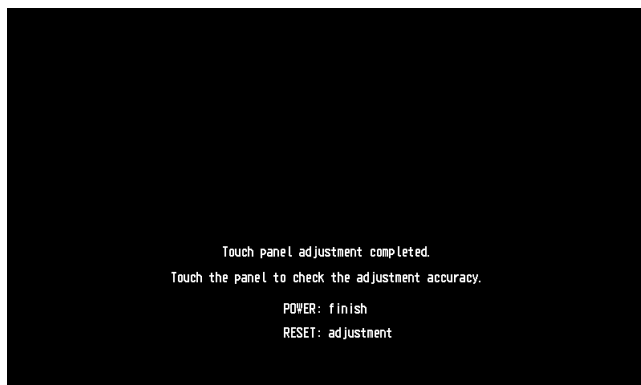
3 Touch the center of the + mark at the bottom right of the screen.



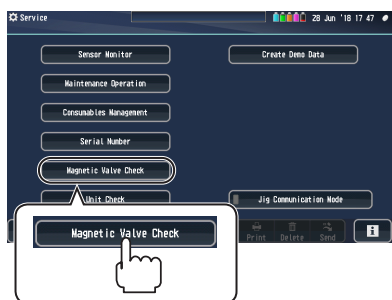
4 The original screen is displayed.

To end adjustment, press the Power key. The power turns off.

To adjust the calibration again, press the Reset key.



7-3-9. Magnetic Valve Check



Touch [Magnetic Valve Check] on the Service window to open the Magnetic Valve Check window.

The Magnetic Valve Check window is for checking that individual valves open and close and the operation of the rotary pump.



- When the Magnetic Valve Check screen is opened or closed, the analyzer initializes.
- When a self check finishes, only MV1A is open, while all other electromagnetic valves are closed.

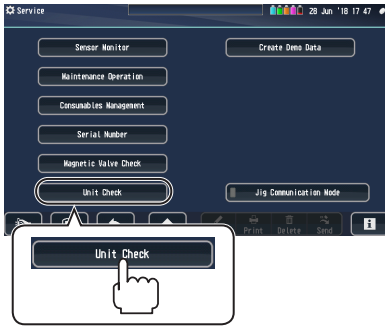
Checks that valves open and close.



Checks the operation of the rotary pump.

Item	Description
Valves	Checks that valves open and close. For details, refer to “Checking the Operation of Electromagnetic Valves” (p. 7-101).
Rotary	<p>Checks the operation of the MP-133W ROTARY PUMP UNIT.</p> <ul style="list-style-type: none"> • Left: Operates the discharge of liquid inside the analyzer to the waste port side. • Stop: Stops operation. • Right: Operates drawing in of liquid on the waste port side into the analyzer. <p>NOTE: As the rotary pump is moved by hand, be careful about liquid leaks and overflowing. Also, operate the rotary pump after checking that the flow path is connected. To check just its operation, remove the tube joints from the left and right tube holders. When checking the operation of [Right], in particular, if the proper steps are not taken, such as removing tube joints, it may cause excessive pressure and the tubes coming off.</p> <div style="text-align: center;"> <p>MP-133W ROTARY PUMP UNIT</p> </div>

7-3-10. Unit Check



Touch [Unit Check] on the Service window to open the Unit Check window. The Unit Check window is for checking the operation of each unit or functional block individually.

NOTE • The screen appearance may vary depending on the product.

- When checking in a state with reagents or samples still inside, be careful to avoid leaks or infection.
- As units and functional blocks operate individually, take care to avoid interference with other units.



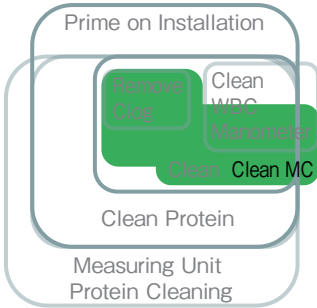
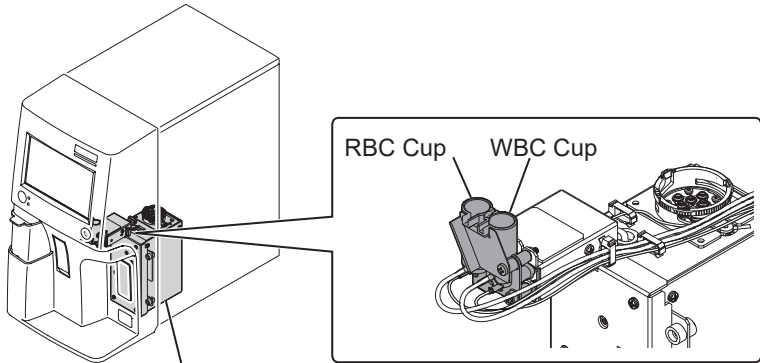
7-3-10-1. MC-130W



Touch [MC-130W] in the Unit Check window to open the MC-130W window. The MC-130W window is for checking the operation of the MC-130W CBC MEASURING UNIT.

Touch the desired item and then touch [Yes] when the confirmation dialog appears.



Parameter (Operating Time)	Description
Clean MC (About 9 min.)	<p>After replacing the unit, this cleans and primes the new MC-130W CBC MEASURING UNIT. It cleans the inside of the MC with CLEANAC•710 detergent. (It does not use CLEANAC•3.)</p> 
Drain Cup (Under 1 min.)	<p>Drains reagents and samples in the WBC and RBC cups. No analyzer message appears after draining.</p>  <p style="text-align: center;">MC-130W CBC MEASURING UNIT</p> <p>How to Recover: To recover, run a user maintenance self check (“Self Check” (p. 7-5)).</p>
Inspect WBC Manometer (Under 1 min.)	<p>This supplies reagent to the WBC manometer, checks the voltage and displays the judgment results. Make sure the judgment is “PASS”.</p>
Circuit Test (Under 1 min.)	<p>Tests the circuits of the MC-130W CBC MEASURING UNIT. The test results are saved in the data list as “CIRCUIT CHECK”, the same as a user maintenance self check (“Self Check” (p. 7-5)). However, it does not test the CRP circuit.</p>
Background (About 1 min.)	<p>Measures the reagent inside the cups of the MC-130W CBC MEASURING UNIT. After measurement, it primes the cup, so it is possible to continue on to measure the background.</p> <ul style="list-style-type: none"> • WBC: Measured value of WBC • RBC: Measured value of RBC • PLT: Measured value of PLT • W-ELE: Electrode voltage¹ on the WBC side during measurement • R-ELE: Electrode voltage¹ on the RBC side during measurement • WBC Time: Time from to reach upper sensor of the manometer from its lower sensor <p>¹ This electrode voltage is the raw voltage value that actually passes through the detection hole. In a user maintenance self check, the electrode voltage of the circuit test/sensor monitor is used to check the voltage in the circuit being tested.</p> <p>As this is different from the background measured in a user maintenance self check (“Self Check” (p. 7-5)), the results are recorded in the data list as “UNIT BACK GROUND”.</p>

7. Maintenance

Parameter (Operating Time)	Description
Drain MC (About 4 min.)	<p>Drains all reagents inside the MC-130W CBC MEASURING UNIT.</p> <p>This is primarily run when replacing the MC-130W CBC MEASURING UNIT.</p> <p>No analyzer message appears after draining.</p> <p>Note: Before running Drain MC, disconnect the HEMOLYNAC•310 tube.</p> <p>How to Recover:</p> <p>To recover, perform steps 1) and 2) below.</p> <p>1) When the MC-130W CBC MEASURING UNIT has been replaced and the tubes re-connected, run Clean MC and fill the inside of the MC-130W CBC MEASURING UNIT with reagents.</p> <p>2) Run a user maintenance self check (“Self Check” (p. 7-5)) and then check the analyzer.</p>

7-3-10-2. MC-131W (MEK-1303)



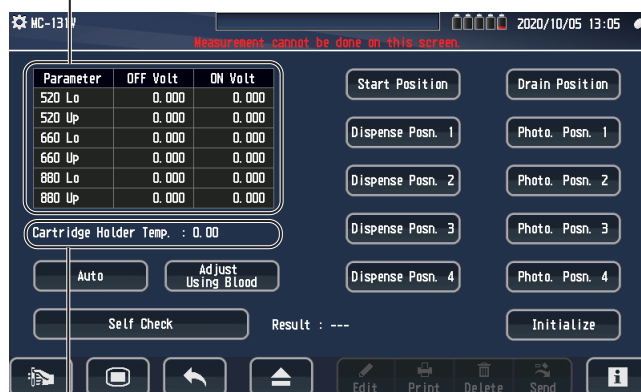
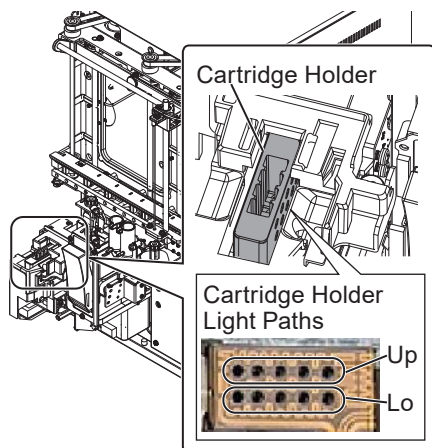
Touch [MC-131W] in the Unit Check window to open the MC-131W window. From the MC-131W window, check the operation of the MC-131W CBC MEASURING UNIT.

Touch the desired item and then touch [Yes] when the confirmation dialog appears.

Indicates the voltage value when the LEDs of the different wavelengths (CH1: 520 nm, CH2: 660 nm, CH3: 880 nm) are turned ON and OFF.
Note: Does not indicate the correct voltage when started up using Reset + Power. Touch Initialize at the bottom right of the screen to display the correct voltage.

The ON voltage varies with the position of the cartridge holder.

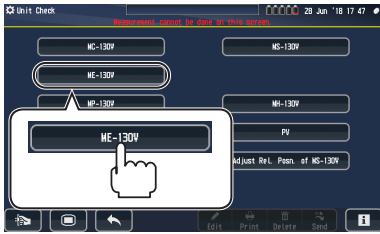
- When the cartridge holder is in a photometric position: About 3.2 V
- When the cartridge holder is in any other position: 4.0 V or higher



Indicates the current temperature of the cartridge holder.

Parameter (Operating Time)	Description
Auto (About 2 min.)	Automatically calibrates the voltages (ON volt) when the LEDs of the wavelengths come ON at position 4 of the cartridge holder during an immunoassay. Although the temperature of the cartridge holder drops because its heater is turned OFF during calibration, the heater switches back ON after calibration. How to Recover: Run a [Self Check] on this window and then check the analyzer.
Adjust Using Blood	Synchronize the HGB value measured by the immunoassay unit with the HGB value obtained from CBC measurement. For details, see “6-7. Adjusting the Immunoassay Unit with Blood” on p 6-14.
Self Check (About 1 min.)	Checks that the voltage (ON volt) when the LEDs of the wavelengths come ON at position 4 of the cartridge holder during an immunoassay and the cartridge holder temperature are within their judgment ranges as below and displays the results. If the self check finishes normally, the result PASS is displayed. Judgment Range: <ul style="list-style-type: none"> • LED voltage (ON volt): 2.7 to 3.7 V • Cartridge holder temp: 36 to 38°C (96.8 to 100.4°F)
Start Position, Drain Position, Dispense Posn. 1, Photo. Posn. 1 to Dispense Posn. 4, Photo. Posn. 4	Moves the cartridge holder to the position of the parameter.
Initialize	Initializes MC-131W CHM MEASURING UNIT and AMP CONTROL BD communication. Note: This does not initialize cartridge holder position.

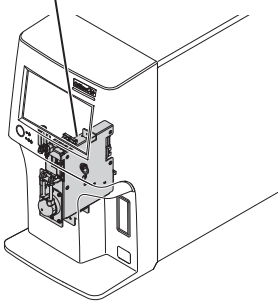
7-3-10-3. ME-130W (MEK-1305)



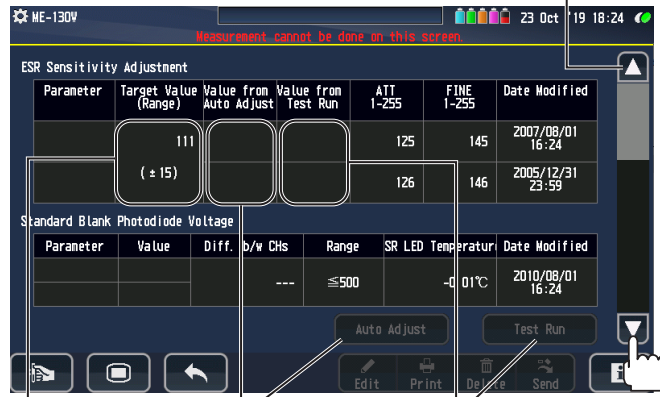
Touch [ME-130W] in the Unit Check window to open the ME-130W window. The ME-130W window is used for checking the operation of the ME-130W ESR measuring unit

Touch the desired item, and then touch [Yes] when the confirmation dialog box appears.

ME-130W ESR MEASURING UNIT



[▲] or [▼]
Scrolls the screen up or down.



The calibration measurement value is updated by automatic calibration measurement.

The confirmation measurement value is updated by confirmation measurement.

Enter the assay value (light receiving value) for MEK-CAL.

Item	Description
Auto Adjust	After entering the assay value (light receiving value) for MEK-CAL to the target value, perform automatic adjustment measurement using MEK-CAL. Automatic calibration is run, and the calibration measurement value is updated.
Test Run	Perform confirmation measurement using MEK-CAL. The confirmation measurement value is updated. Check that the measured value is within the following range. Judgment range: <ul style="list-style-type: none"> Difference between target value and confirmation measurement value: -15 to +15 Difference between channels: ≤ 500

[▲] or [▼]
Scrolls the screen up or down.



Displays the ranges of normal values.

Displays the measurement values.

After performing Prime ME on the next screen, check that the measurement value is within the confirmation range with liquid.

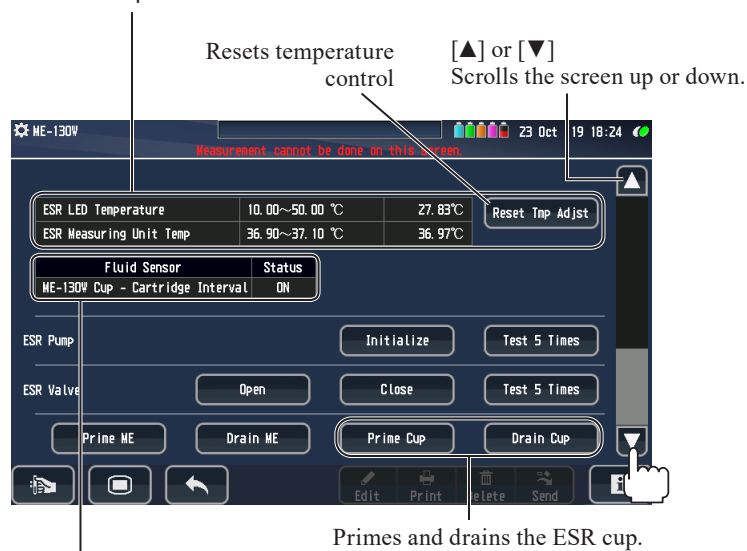
The measurement values when the LED is turned ON and OFF are displayed on the ESR light receiving value confirmation screen.

The measurement value varies depending on whether there is liquid in the ESR measurement cartridge.

Shows the current ESR LED temperature and ESR measurement unit temperature.

NOTE: Note: The temperature when the heater is off is displayed by Reset + Power ON start.

Touch [Temperature Control Initialize] at the screen top right to display the temperature when the heater is ON.

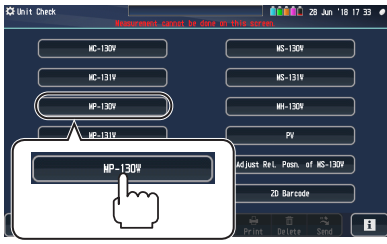


Shows the status of the liquid sensor.

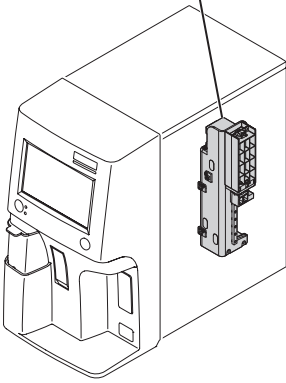
To check the operation of the liquid sensor, touch [Prime Cup] and [Drain Cup] at the screen bottom right to check that the status changes.

Item	Description
ESR pump initialization	Moves the ESR pump to its initialized position.
ESR pump test 5 times	Moves the ESR pump to its initialized position, and then 5 turns to the left and 5 turns to the right.
ESR valve open/close	Performs the ESR valve open/close operation. Visually check the open/close status of the ESR valve
ESR valve test 5 times	Repeat the ESR valve open/close operation 5 times. Visually check the open/close status of the ESR valve
Prime ME (about 2 min.)	This primes the new ME-130W ESR measuring unit. This is primarily run after replacing the ME-130W ESR measuring unit. Detergent is not used.
Drain ME (about 1 min.)	Drains all reagents inside the ME-130W ESR measuring unit. This is primarily run when replacing the ME-130W ESR measuring unit. No analyzer message appears after draining. Recovery procedure: To recover, perform steps (1) and (2) below. (1) After the ME-130W ESR measuring unit is replaced and the tubes are re-connected, run Prime ME and fill the inside of the ME-130W ESR measuring unit with reagents. (2) Run a user maintenance self check (p.11-3), and then check the analyzer.
Prime Cup (about 1 min.)/ Drain Cup (about 1 min.)	Primes and drains reagents in the ESR cups. No analyzer message appears after draining.

7-3-10-4. MP-130W



MP-130W ISO PUMP UNIT



Touch [MP-130W] in the Unit Check window to open the MP-130W window. The MP-130W window is for checking the operation of the ISO pump (MP-130W ISO PUMP UNIT).

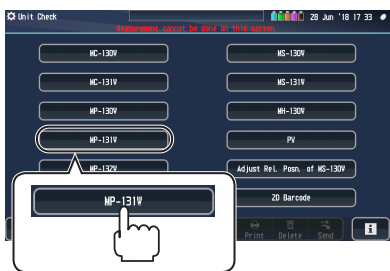
Touch the desired item and then touch [Yes] when the confirmation dialog appears.

NOTE: Before operating it, make sure there are no reagents inside the ISO Pump (MP-130W ISO PUMP UNIT). Also, disconnect the tubes connected to the ISO Pump (MP-130W ISO PUMP UNIT) to avoid developing pressure inside the analyzer.

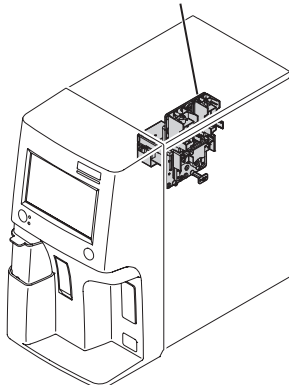


Item	Description	
Initialize	Moves the piston of the pump to its initialized position.	Initialize
Full Stroke	Moves the piston of the pump to its full stroke position.	Full Stroke
Test 5 Times	Moves the piston of the pump to its initialized position and then moves it repeatedly between the initialized position and the full stroke position five times.	Piston

7-3-10-5. MP-131W (MEK-1303)



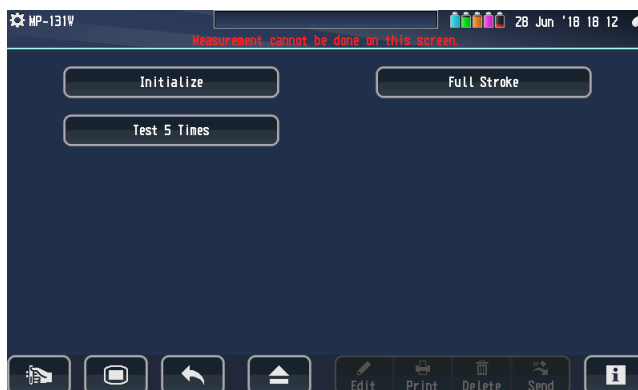
MP-131W SAMPLE PUMP UNIT



Touch [MP-131W] in the Unit Check window to open the MP-131W window. The MP-131W window is for checking the operation of the sample pump (MP-131W SAMPLE PUMP UNIT).

Touch the desired item and then touch [Yes] when the confirmation dialog appears.

NOTE: Before operating it, make sure there are no reagents inside the sample pump (MP-131W SAMPLE PUMP UNIT). Also, disconnect the tubes connected to the sample pump (MP-131W SAMPLE PUMP UNIT) to avoid developing pressure inside the analyzer.



Item	Description	
Initialize	Moves the piston of the pump to its initialized position.	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Initialize</p> </div> <div style="text-align: center;"> <p>Full Stroke</p> </div> </div> <p style="text-align: center;">Piston</p>
Full Stroke	Moves the piston of the pump to its full stroke position.	
Test 5 Times	Moves the piston of the pump to its initialized position and then moves it repeatedly between the initialized position and the full stroke position five times.	

7-3-10-6. MP-132W

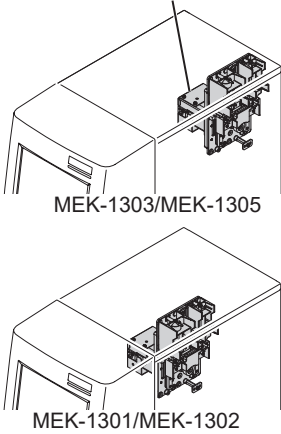


Touch [MP-132W] in the Unit Check window to open the MP-132W window. The MP-132W window is for checking the operation of the RBC pump (MP-132W RBC PUMP UNIT).

Touch the desired item and then touch [Yes] when the confirmation dialog appears.

NOTE: Before operating it, make sure there are no reagents inside the RBC pump (MP-132W RBC PUMP UNIT). Also, disconnect the tubes connected to the RBC pump (MP-132W RBC PUMP UNIT) to avoid developing pressure inside the analyzer.

MP-132W RBC PUMP UNIT

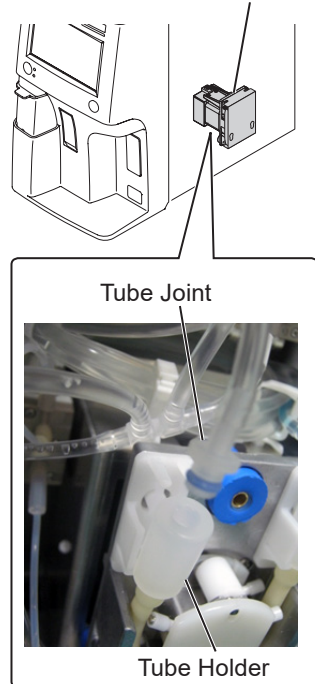


Item	Description	
Initialize	Moves the piston of the pump to its initialized position.	
Full Stroke	Moves the piston of the pump to its full stroke position.	
Test 5 Times	Moves the piston of the pump to its initialized position and then moves it repeatedly between the initialized position and the full stroke position five times.	

7-3-10-7. MP-133W



MP-133W ROTARY PUMP UNIT



Touch [MP-133W] in the Unit Check window to open the MP-133W window. The MP-133W window is for checking the operation of the rotary pump (MP-133W RBC PUMP UNIT).

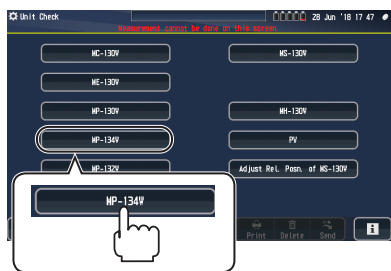
Touch the desired item and then touch [Yes] when the confirmation dialog appears.

NOTE: Before operating it, make sure there are no reagents inside the rotary pump (MP-133W RBC PUMP UNIT). Also, disconnect the tube joints from the left and right tube holders to avoid developing pressure inside the analyzer.

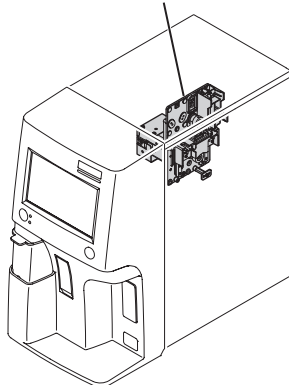


Item	Description
Initialize	Moves the rotary pump to its initialized position.
Test 5 Times	Moves the rotary pump to its initialized position and then five turns to the left and five turns to the right.

7-3-10-8. MP-134W (MEK-1305)



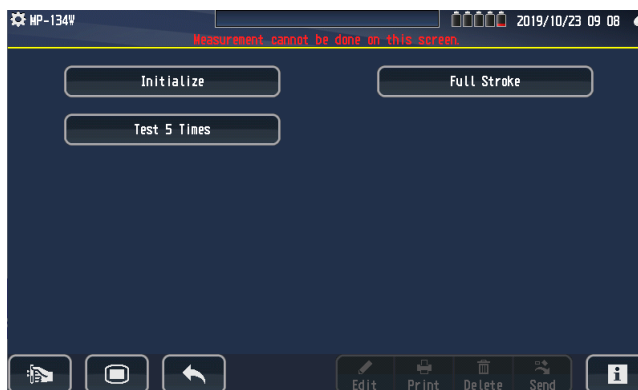
MP-134W ESR PUMP UNIT


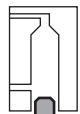


Touch [MP-134W] in the Unit Check window to open the MP-134W window. The MP-134W window is for checking the operation of the ESR pump (MP-134W ESR pump unit).

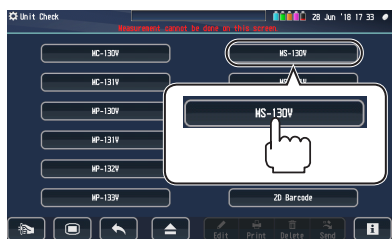
Touch the desired item, and then touch [Yes] when the confirmation dialog box appears.

NOTE: Before operating, make sure that there are no reagents inside the the ESR pump (MP-134W ESR pump unit). Also, disconnect the tubes connected to the ESR pump (MP-134W ESR pump unit) to avoid generating pressure inside the analyzer.



Item	Description	Initialize	Full Stroke
Initialize	Moves the piston of the pump to its initialized position.		
Full Stroke	Moves the piston of the pump to its full stroke position.		
Test 5 Times	Moves the piston of the pump to its initialized position and then moves it repeatedly between the initialized position and the full stroke position five times.		

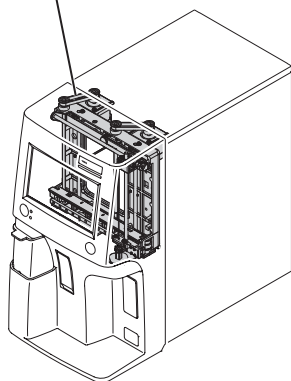
7-3-10-9. MS-130W



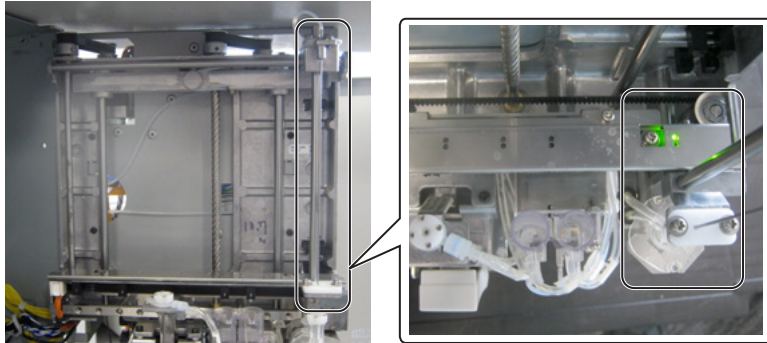
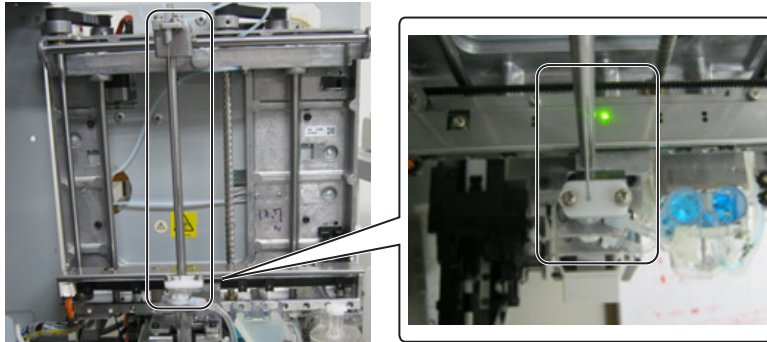
Touch [MS-130W] in the Unit Check window to open the MS-130W window. The MS-130W window is for checking the operation of the SAMPLER UNIT (operation of the sampling nozzle).

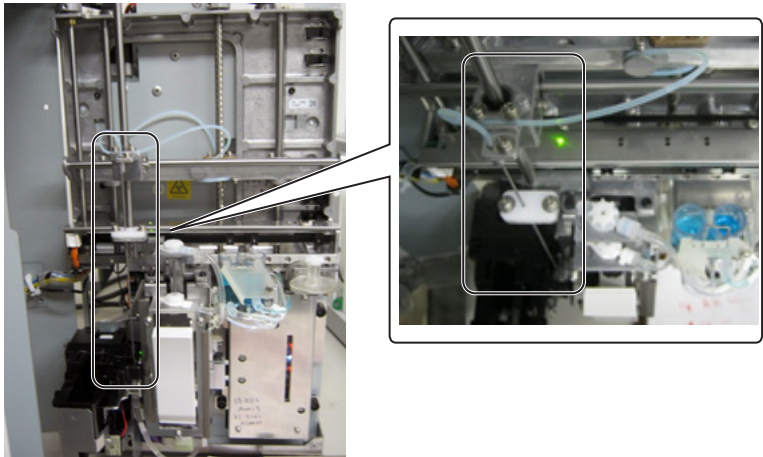
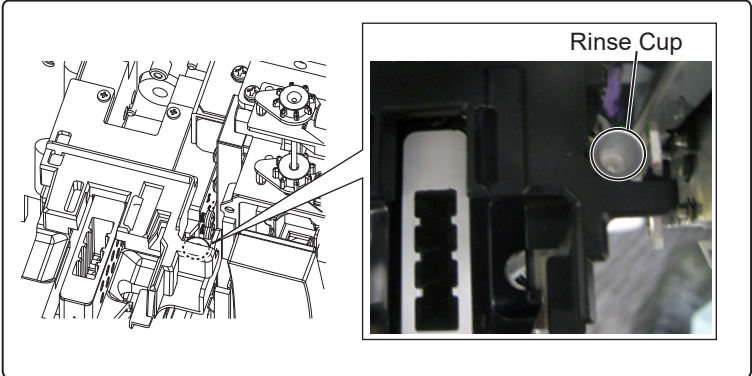
Touch the desired item and then touch [Yes] when the confirmation dialog appears.

SAMPLER UNIT



Indicates the current measurement parameter and method. To change them, change the "Parameter Set" in the same way as a normal measurement. Under [Stepwise Execution] it executes the measurement operation displayed.

Item	Description
Initialize	Moves the sampling nozzle to its initialized position. Initialize 
Open Rinse	The sampling nozzle moves until it reaches the open rinse position. This is slightly lower than the initialized position.
Open Aspirate	The sampling nozzle moves until it reaches the position for aspirating a sample. This is slightly lower than the open rinse position.
Closed Origin	Moves the sampling nozzle to the origin position for closed measurement. Closed Origin 

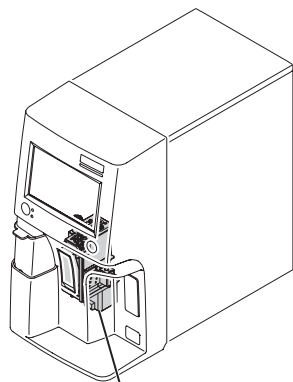
Item	Description
Upper Rinse Cup	<p>Moves the sampling nozzle above the rinse cup of the MC-131W CHM MEASURING UNIT.</p> <p style="text-align: center;">Upper Rinse Cup</p>  
Operation at CBC Measurement	<p>Performs the series of operations that take place during CBC measurement.</p> <p>The sampling nozzle moves to the following positions.</p> <p>Open Aspirate → Open Rinse → WBC Cup → RBC Cup → Initialized Position</p>
Stepwise Execution	<p>Performs the series of measurement steps one at a time, using the conditions in Current Settings.</p> <p>Repeat steps 1) and 2) to proceed through measurements one step at a time.</p> <ol style="list-style-type: none"> 1) Touch [Stepwise Execution]. 2) Touch [Yes] when the confirmation dialog appears.

7-3-10-10. MS-131W (MEK-1302/MEK-1303)



Touch [MS-131W] in the Unit Check window to open the MS-131W window. The MS-131W window is for checking the operation of the MS-131W OPEN AIR UNIT (operation of release nozzle and opening the tube holder).

Touch the desired item and then touch [Yes] when the confirmation dialog appears.



MS-131W OPEN AIR UNIT

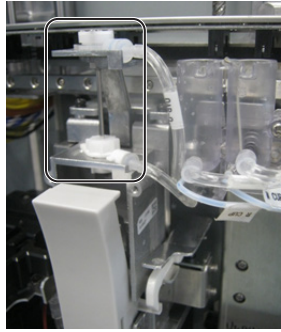
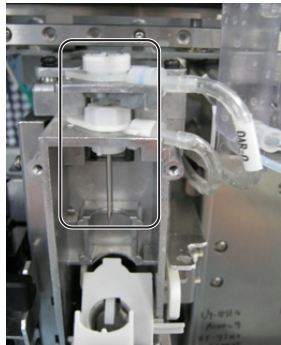
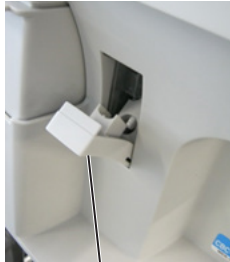


Tube Holder Sensor

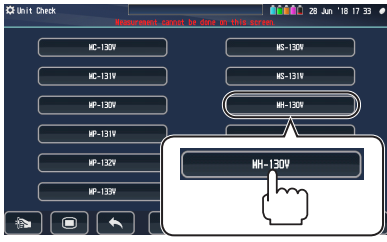
- IN: The tube holder is closed.
- OUT: The tube holder is open.

Sample Tube Sensor

- IN: A sample tube is present and the holder is closed.
- OUT: No sample tube present.

Item	Description	
Initialize	Moves the release nozzle to its initialized position.	<p>Initialize</p> 
Full Stroke	Moves the release nozzle to its full stroke position. NOTE <ul style="list-style-type: none"> • Before running this function, make sure that no foreign object is in the tube holder. • A sharp needle comes out, so be careful during operation. 	<p>Full Stroke</p> 
Tube Holder Open	Opens the tube holder.	 <p>Tube Holder</p>

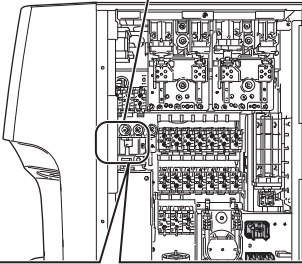
7-3-10-11. MH-130W



Touch [MH-130W] in the Unit Check window to open the MH-130W window. The MH-130W window is for running open/close tests of valve No. 21 of the MH-130W HGB MEASURING UNIT. It also checks the HGB LED temperature and LED ON/OFF voltages.

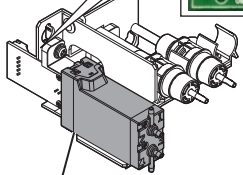
Touch the desired item and then touch [Yes] when the confirmation dialog appears.

MH-130W HGB MEASURING UNIT



• HGB Led Temperature Sensor

Thermistor: Mounted on UT-7289 HGB/SS LED BD



Magnetic Valve No.21



Indicates the current HGB LED temperature and LED ON/OFF voltages.

Item	Description
MV21 Open and Close Test	Repeats opening and closing electromagnetic valve No. 21 three times.

7-3-10-12. PV



Touch [PV] in the Unit Check window to open the PV window.

The PV window is for checking the operation of the front panel unit (buzzer, indicators, power LED, screen display).

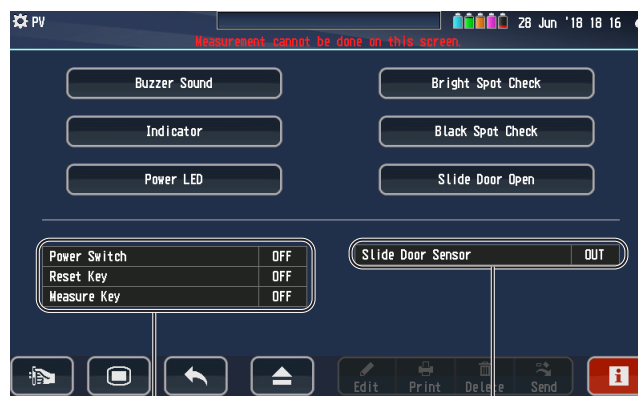
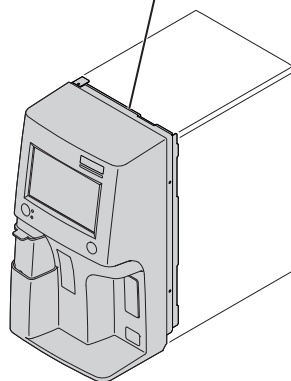
Touch the desired item and then touch [Yes] when the confirmation dialog appears.



Front panel units vary with the model.

- MEK-1301: PV-130W FRONT PANEL UNIT OP
- MEK-1302: PV-131W FRONT PANEL UNIT OP/CL
- MEK-1303: PV-132W FRONT PANEL UNIT PLUS
- MEK-1305: PV-130W FRONT PANEL UNIT OP

Front Panel Unit



Press each switches on the front panel unit and check that the display switches to “ON”.
When PV screen is displayed, each switch does not work.

Indicates status of slide door (MEK-1303 only)

- IN: Closed
- OUT: Open

Item	Description
Buzzer Sound	Sounds a buzzer during the test pattern.
Indicator	Indicators light during the test pattern.
Power LED	Power LED lights during the test pattern.
Bright Spot Check	Check the screen display. Go through steps 1) to 6) below to confirm that the number of defects, such as bright and black spots, are within the specified range. Specified value: bright spots + black spots ≤ 5
Black Spot Check	1) Touch [Bright Spot Check] to make the entire screen dark. 2) Visually count the defects (bright spots) on the screen. 3) Touch the screen to return to the PV window. 4) Touch [Black Spot Check] to make the entire screen bright. 5) Visually count the defects (black spots) on the screen. 6) Touch the screen to return to the PV window.
Slide Door Open (MEK-1303 only)	Opens the slide door.

7-3-10-13. Adjust Rel. Posn. of MS-130W



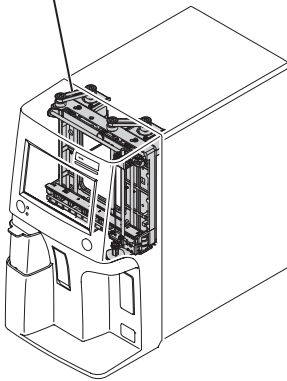
Touch [Adjust Rel. Posn. of MS-130W] in the Unit Check window to open the Adjust Rel. Posn. of MS-130W window.

The Adjust Rel. Posn. of MS-130W window is for adjusting the positioning of the sampling nozzle and cartridge.

“Adjusting the WBC Manometer” (p. 6-5)

MEK-1303

SAMPLER UNIT

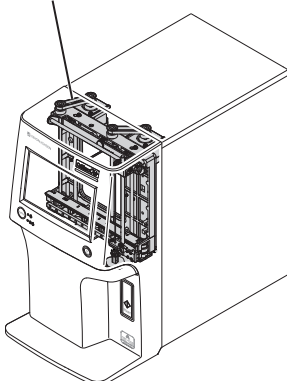


Item	Description
Start Position	Moves the sampling nozzle to its initialized position.
Adjust Up/Down Left/Right	Opens the Adjust Up/Down Left/Right window and moves the calibration position of the sampling nozzle. Adjusts the sampling nozzle up/down and/or left/right. Touching an arrow in the calibration window moves the sampler 0.2 mm in the corresponding direction.
Adjust Forward/Back Left/Right	Opens the Adjust Forward/Back Left/Right window and moves the calibration position of the sampling nozzle. Adjust the sampling nozzle forward/back and/or left/right. Touching an arrow in the calibration window moves the cartridge holder 0.2 mm in the corresponding direction.
Initialize Calibration Settings	Initializes the calibration value at 10.0.

MEK-1305



SAMPLER UNIT



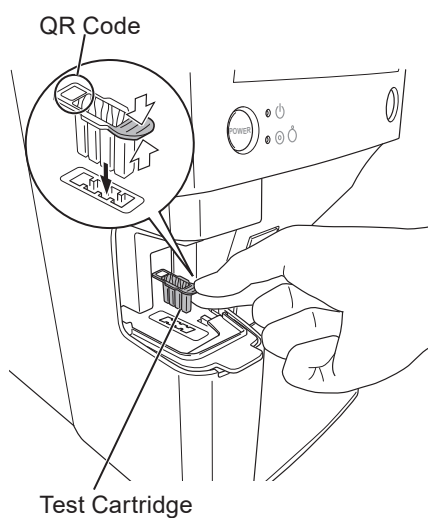
Item	Description
Start Position	Moves the sampling nozzle to its initialized position.
Adjust Up/Down Left/Right	Opens the Adjust Up/Down Left/Right window and moves the calibration position of the sampling nozzle. Adjusts the sampling nozzle up/down and left/right. Touching an arrow in the calibration window moves the sampling nozzle by 0.2 mm in the selected arrow direction.
Drain Cup	Drains reagents in the ESR cups.
Prime Cup	Fills reagents in the ESR cups.
Initialize Calibration Settings	Initializes the calibration value to 10.0.

7-3-10-14. 2D Barcode (MEK-1303)

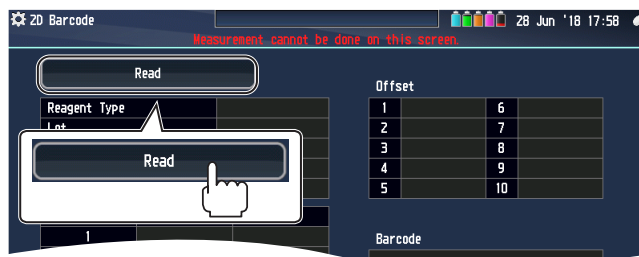


Touch [2D Barcode] in the Unit Check window to open the 2D Barcode window.

The 2D Barcode window is for reading the QR code on a test cartridge and checking its reagent information.

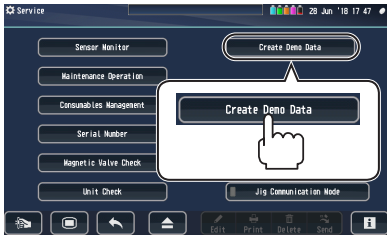


- 1 Just as under normal analysis, set the test cartridge in the cartridge holder.
- 2 Touch [Read] on the 2D Barcode window and check the information of the test cartridge.



Check the information of the QR code on a test cartridge.

7-3-11. Create Demo Data




Creates the following demo data.

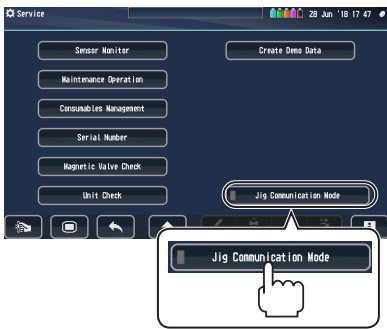
NOTE: Demo data is created after all data is deleted. If necessary, backup data.

- Data list
- Quality control data
- History data
- System settings

Touch [Create Demo Data] on the Service window and then touch [Yes] when the confirmation dialog appears.


 It takes several minutes to create demo data.

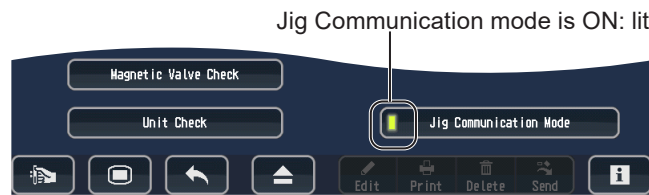
7-3-12. Jig Communication Mode



Turn the Jig Communication mode ON when connecting a leak check jig and leak check software to the analyzer.

Touch [Jig Communication Mode] on the Service window to turn the Jig Communication mode on.

 When the Jig Communication mode is ON, the [Jig Communication Mode] indicator lights.



7-4. Periodic Maintenance

⚠ WARNING

Always wear rubber gloves to protect yourself from infection.

7-4-1. Analyzer

7-4-1-1. Periodic Maintenance Parts


The following parts require periodic maintenance at the intervals indicated below to maintain the functionality and performance of the analyzer.

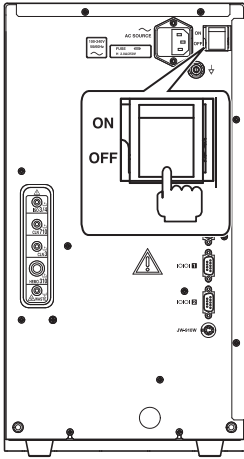
Periodic Maintenance Parts		Part Name	Supply Code or Code No.	Replace/Clean Interval	Reference
Replace					
Filters	Hemoglobin Filter (FL1)	Hemoglobin Filter Assy	T802	<ul style="list-style-type: none"> When necessary because very dirty, deformed, etc. Every 6,000 measurements 	p.7-66
	Open filter (FL2)				
	Closed filter (FL3) ¹				
Pump tubing		Pump tubing Assy	YZ-010B0	<ul style="list-style-type: none"> When necessary because very dirty, deformed, etc. Once a year Every 6,000 measurements 	p.7-69
Release nozzle ¹		Release Nozzle ASSY	YZ-009B7	<ul style="list-style-type: none"> When necessary because very dirty, deformed, etc. Once a year Every 6,000 measurements 	p.7-73
Sampling nozzle		Sampling nozzle	YZ-009B8	<ul style="list-style-type: none"> When necessary because very dirty, deformed, etc. Every 24,000 measurements 	p.7-79
O-ring	Rinse unit	Packing. PIERCE PACKING	RP-6114937377	<ul style="list-style-type: none"> When necessary because very dirty, deformed, etc. Once a year 	p.7-81
	Release nozzle rinse unit ¹	O-RING (AS568-004)	RP-6114936660		p.7-81
ESR pump tube ²		Assy. ESR PUMP TUBE DSW1-P3-G	RP-9000068657	<ul style="list-style-type: none"> When necessary because very dirty, deformed, etc. Once every five years Every 24,000 measurements 	p.7-82
ESR valve tube ²		PINCH VALVE TUBE	RP-6114937815	<ul style="list-style-type: none"> When necessary because very dirty, deformed, etc. Once every five years Every 24,000 measurements 	p.7-84
Valves	3-way Valve	3-way valve D13A-35A	RP-9000057722	<ul style="list-style-type: none"> As needed, such as when extremely dirty or when the appearance has changed Magnetic valve No. 17 is replaced once every 5 years or every 24,000 measurements 	p.7-100
	2-way Valve	2-way valve module D13A-25A	RP-9000057721		
Cleaning					
Rinse unit		–	–	Every 6000 measurements, or as needed, such as when very dirty or deformed	p.7-77

¹ MEK-1302 and MEK-1303 only

² MEK-1305 only

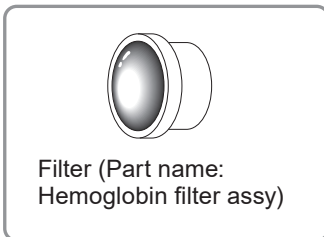
7-4-1-2. Preparing for Periodic Maintenance

- 1 Open the Replace screen.
 “Opening the Screen or Window” (p. 7-24)
- 2 Touch [Prepare All] on the Periodic Replacement Parts window.
 Waste is discharged and power turns off automatically.



- 3 Turn off the main power switch on the back of the analyzer and disconnect the power cord from the wall outlet.

7-4-1-3. Replacing the Filter



Replacement schedule:

- When necessary because very dirty, deformed, etc.
- Every 6,000 measurements

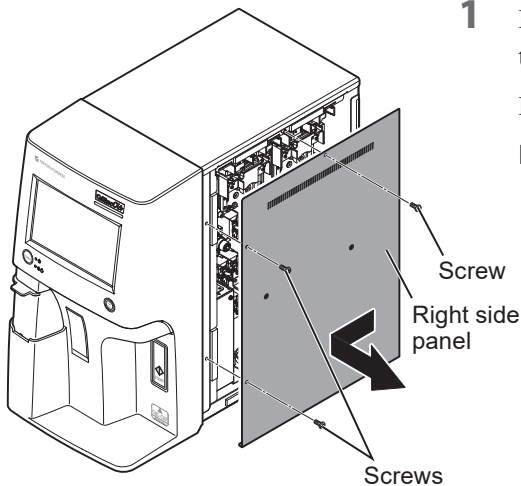
Part name:

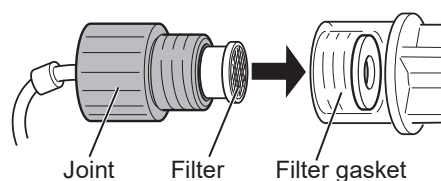
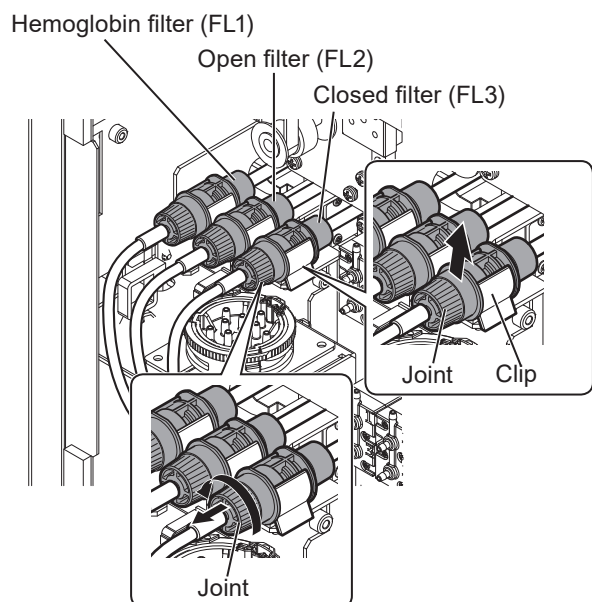
Hemoglobin filter assy (supply code: T802)



- 1 Remove the three screws from the right side panel of the analyzer and open the right side panel.

Pull the right side panel toward you to open it.

NOTE: Store the removed screws in a safe place for reuse later.





- 1** Lift up the three filter joints (two with the MEK-1301/MEK-1305) (FL1 & FL2 only) and release them from their clips.
- 2** Rotate the joint counter-clockwise.
- 3** Look at the surface of the filter and check for debris sticking to it.
NOTE: Do not touch the surface of the filter.
- 4** Use tweezers or the like to remove anything sticking to it. Remove and replace the filters with new ones if they are very dirty.
 Replace the filter gaskets with new ones if they are very dirty, deformed or scratched.
- 5** Install the joint by pushing it back in as it was and turn it clockwise.
NOTE
 - Be careful not to bend or break the internal filter gasket during installation.
 - Make sure the filter joint is tight.
 - If there is a leak, make sure there are no scratches or cracks in the surface around the filter and reinstall it.
- 6** Perform steps **1** and **2** in reverse order to return the analyzer to its previous state.
- 7** Plug the power cord into the wall outlet and turn the analyzer ON. Touch [No] when the Self Check confirmation dialog appears (if Auto Login is OFF).
 If Auto Login is ON:
The self check runs automatically with a FAIL result.

8 Reset the usage count of filters that were replaced.

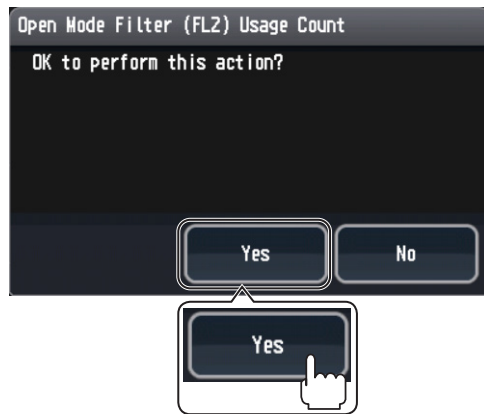
1) Open the Replace screen.

 | “Opening the Screen or Window” (p. 7-24)


2) Touch [Reset].



3) Touch [Yes] when the confirmation dialog appears.



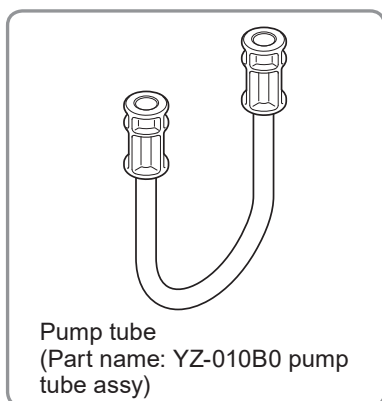
9 Make sure the message “21210 Maintenance part replacement in progress” is displayed and then touch [Restore].

 | “User Message [2xxxx]” (p. 3-46)

10 Run a self check.

 | “Self Check” (p. 7-5)

7-4-1-4. Replacing the Pump Tube



Replacement schedule:

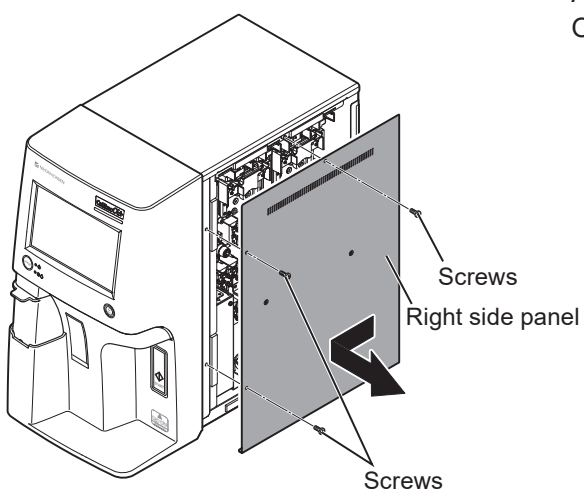
- When necessary because very dirty, deformed, etc.
- Once a year
- Every 6,000 measurements

Part name:

YZ-010B0 pump tube assy (supply code: YZ-010B0)

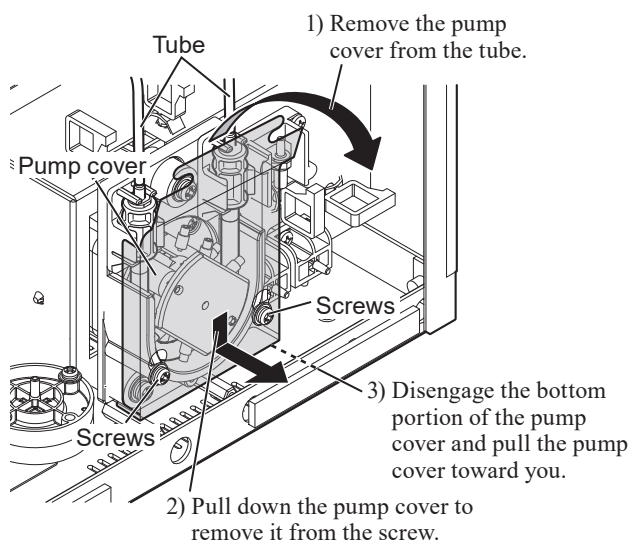
NOTE • If there is water droplet or liquid leak in the pump tube, immediately replace it with a new one. Otherwise, the analyzer may corrode. Also, if the pump tube leaks frequently, the pump unit may also need to be replaced. For details, contact your Nihon Kohden representative.

- Always use the YZ-010B0 pump tube assy for this analyzer. Other equipment can not be used.

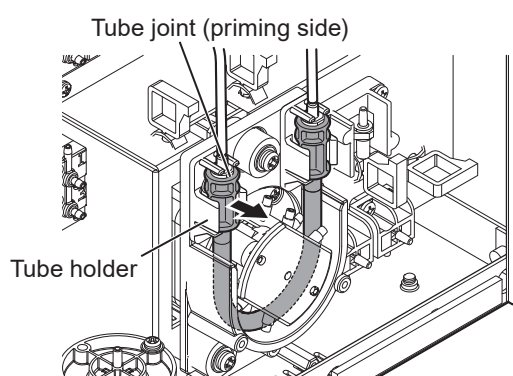


- 1 Remove the three screws from the right side panel of the analyzer and open the right side panel.

NOTE: Store the removed screws in a safe place for reuse later.

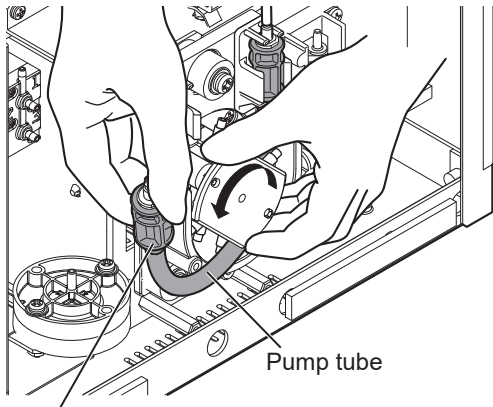


- 2 Remove the pump cover as shown in the figure on the left.

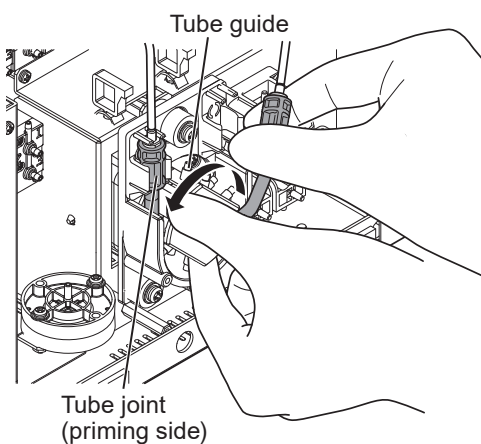
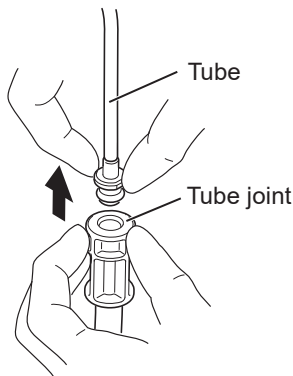
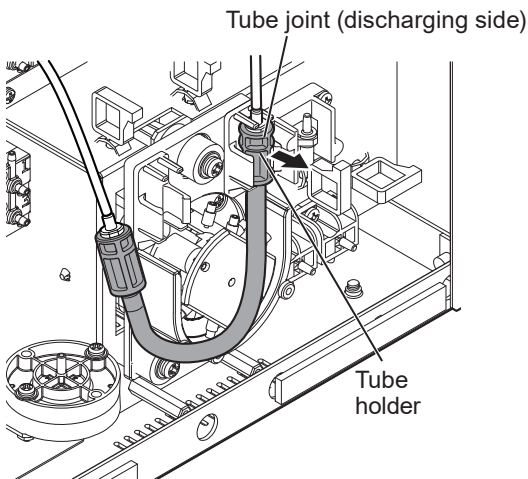


- 3 Pull the tube joint on the priming side toward you to remove it from the tube holder.

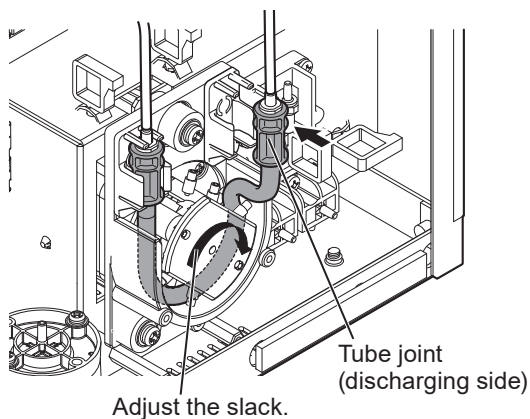
7. Maintenance



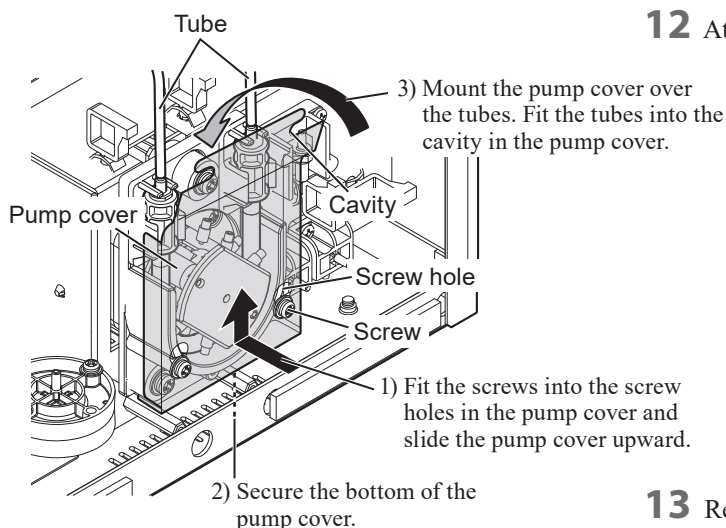
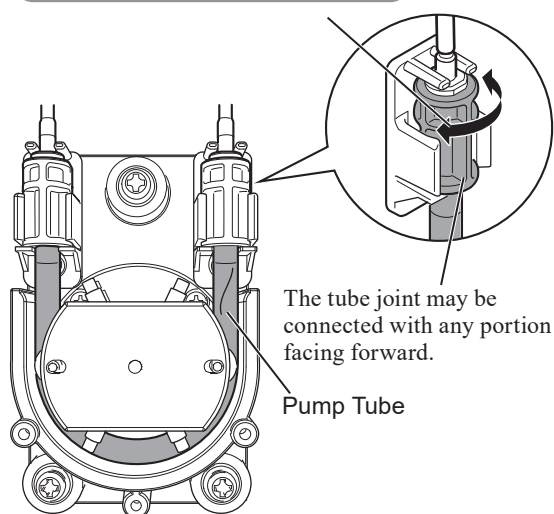
Tube joint (priming side)



- 4** Pull the tube joint on the priming side, and gradually extend the pump tube while turning the roller.
- 5** Pull the tube joint on the discharging side toward you to remove it from the tube holder.
- 6** Remove the tube from the tube joint of the pump tube. Remove the tube on the priming side, followed by the discharging side.
- 7** Connect the new pump tubes. Connect the tube on the priming side, followed by the discharging side.
NOTE: Make sure to connect the pump tube on the priming side (left) first. Starting from the tube joint on the discharging side (right) could compress the air in the pump tube, possibly causing it to become unattached.
- 8** Fit the tube joint into the tube holder on the priming side.
- 9** Push the tube in while turning the roller. Make sure to push the tube joint all the way in.
NOTE: Attach the pump tube so that it does not twist.



If the pump tube is twisted, turn the tube joint to straighten it.



10 Fit the tube joint into the tube holder on the discharging side, as shown in the figure.

NOTE

- If there is slack in the pump tube, turn the roller in the reverse direction to adjust it. If the pump tube has too much slack, it may rub against the tube guide during operation, possibly damaging the pump tube.

- If the tube joint is not attached in the position shown in the figure, the pump tube may wear out prematurely.

11 Check to make sure the pump tubes are not twisted.

NOTE: If the pump tube is twisted, turn the tube joint to straighten it. Otherwise, it may wear out prematurely.

7

12 Attach the pump cover as shown in the figure on the left.

13 Reverse step **1** to return the analyzer to its original state.

14 Connect the power cord to a wall outlet, then turn on the power of the analyzer. When the Self Check screen is displayed, touch [No] (only when Auto Login is Off).




When Auto Login is set to On

A self-check runs automatically, and the result is "FAIL".

15 Reset the pump tube usage count.

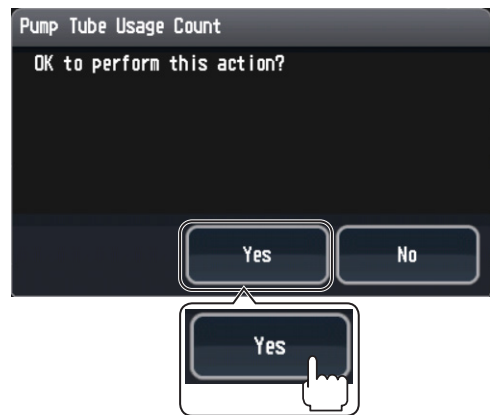
1) Open the Replace screen.

 | “Opening the Screen or Window” (p. 7-24)


2) Touch [Reset].



3) When a confirmation message appears, touch [Yes].



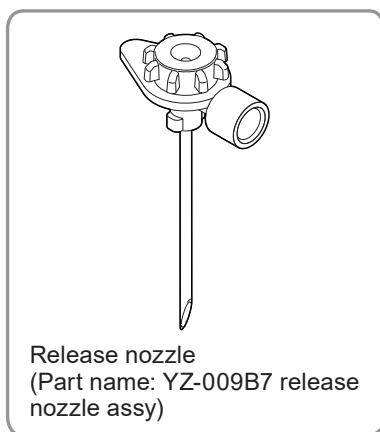
16 Check that a “21210 Maintenance part replacement in progress” message is displayed on the Information screen and touch [RESTORE].

 | “User Message [2xxxx]” (p. 3-46)

17 Start the self check.

 | “Self Check” (p. 7-5)

7-4-1-5. Replacing the Release Nozzle (MEK-1302/MEK-1303)



Replacement schedule:

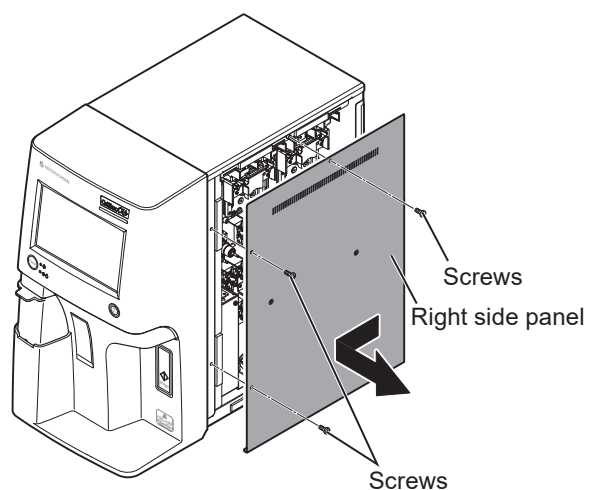
- When necessary because very dirty, deformed, etc.
- Once a year
- Every 6,000 measurements

Part name:

YZ-009B7 release nozzle assy (supply code: YZ-009B7)

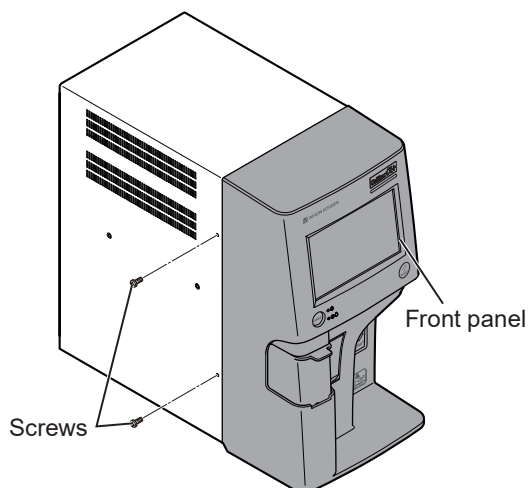


The MEK-1301 and MEK-1305 do not have a release nozzle.



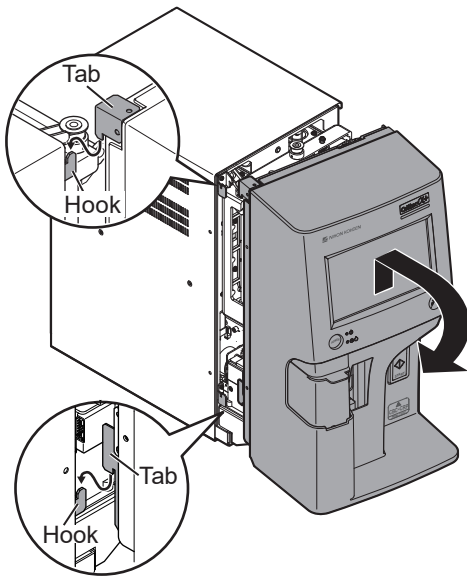
- 1 Remove the three screws from the right side panel of the analyzer and open the right side panel.

7

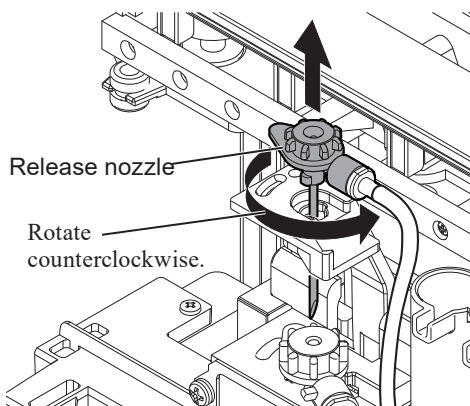


- 2 Remove the two screws from the left side panel of the analyzer and remove the front panel.

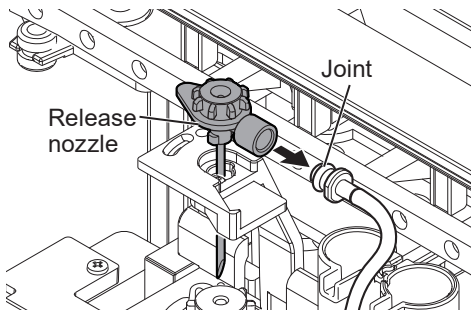
7. Maintenance



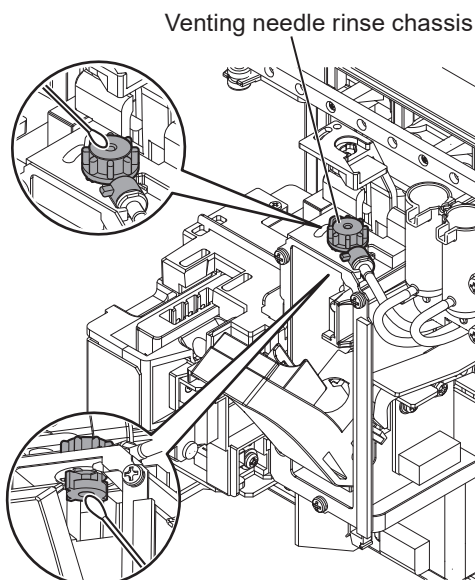
- 3 Fit the tabs of the front panel onto the hooks in the analyzer case (two locations, top and bottom) as shown in the figure.



- 4 While turning the release nozzle counterclockwise, pull it straight up and out.



- 5 Remove the joint from the release nozzle.
NOTE: Be careful with the needle when removing it.



- 6 Clean the release nozzle rinse chassis.
Use a cotton swab moistened with water or CLEANAC•3 to remove hardened residue or dirt from the release nozzle rinse chassis.

NOTE: Do not use alcohol to clean the release nozzle rinse chassis.



If the inside of the release nozzle rinse chassis is dirty, disassembly, cleaning or replacement is required.

If the O-ring inside the release nozzle rinse chassis is dirty, replace it with a new one.

Contact your Nihon Kohden representative.

- 7** If the inside of the release nozzle rinse unit is dirty, perform steps 1) to 4) to clean the inside and O-ring of the release nozzle rinse unit.

NOTE: Replace the O-ring inside the release nozzle rinse unit once a year.

- 1) Turn the release nozzle rinse unit counterclockwise and lift it straight up and out.
- 2) Remove the release nozzle rinse unit from the joint.

- 3) Remove the rinse cap and clean the inside of the release nozzle rinse unit and its O-ring.

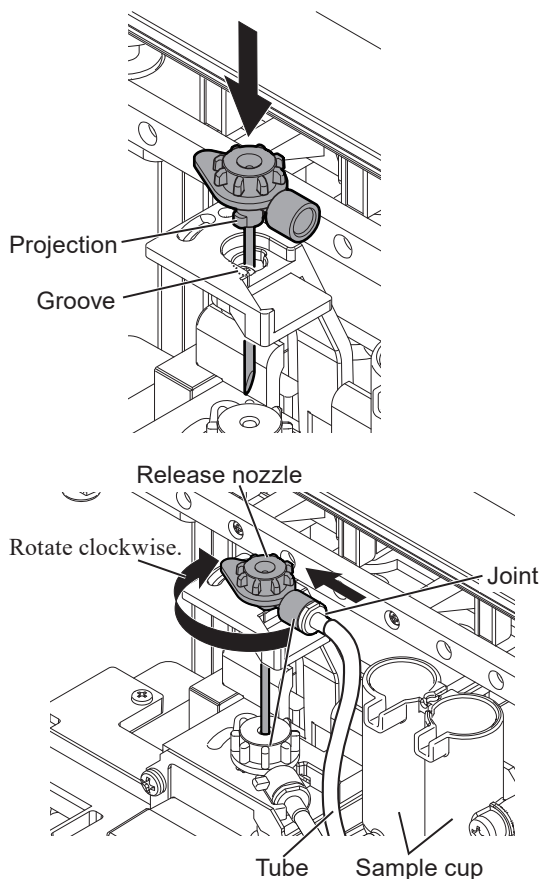
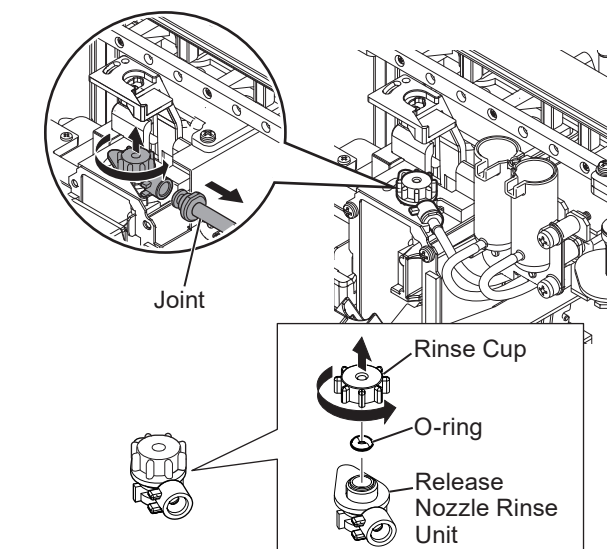
NOTE

- Take care not to damage the O-ring. If the O-ring is damaged, it may cause a leak.


- Replace the O-ring with a new one if it is very dirty or deformed.

- 4) Perform steps 1) to 3) in reverse order to return the release nozzle rinse unit to its previous state.

- 8** Fit the projection of the new release nozzle into the groove in the chassis.




- 9** Attach the joint to the release nozzle, and turn it clockwise to tighten it.

 Position the tube in front of the sample cup.

- 10** Reverse steps **1** to **3** to return the analyzer to its original state.

- 11** Connect the power cord to a wall outlet, then turn on the power of the analyzer. When the Self Check screen is displayed, touch [No] (only when Auto Login is Off).

 When Auto Login is set to On
A self-check runs automatically, and the result is "FAIL".

2 Reset the usage count of the new release nozzle.

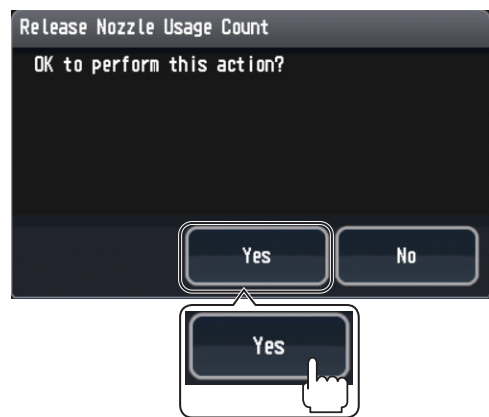
1) Open the Replace screen.

 | “Opening the Screen or Window” (p. 7-24)

2) Touch [Reset].



3) When a confirmation message appears, touch [Yes].



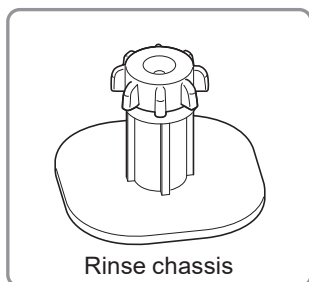
12 Check that a “21210 Maintenance part replacement in progress” message is displayed on the Information screen and touch [RESTORE].

 | “User Message [2xxxx]” (p. 3-46)

13 Start the self check.

 | “Self Check” (p. 7-5)

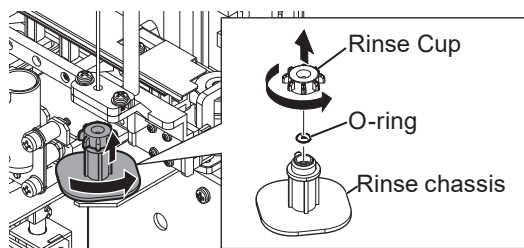
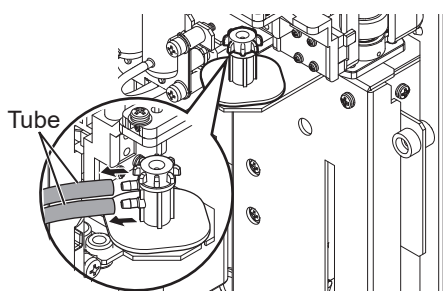
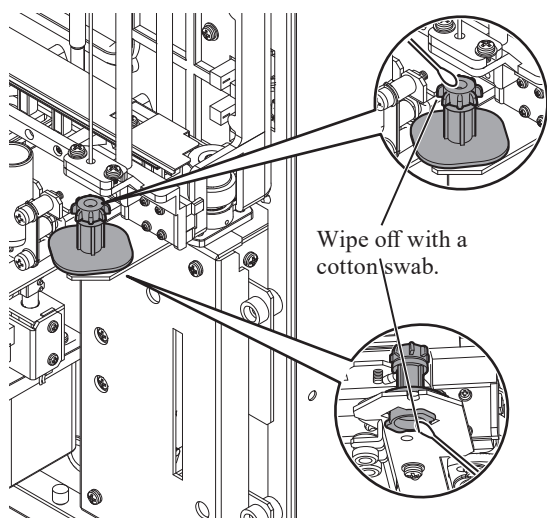
7-4-1-6. Cleaning the Rinse Chassis



Cleaning schedule:

- When necessary because very dirty, deformed, etc.
- Every 6,000 measurements

Clean hardened residue or dirt from the rinse chassis.



1 Refer to steps **1** to **3** of “Replacing the Release Nozzle (MEK-1302/MEK-1303)” (p. 7-73) and remove the front panel unit.

2 Use a cotton swab moistened with water or CLEANAC•3 to remove clotted blood or dirt sticking to the rinse chassis.

NOTE: Do not use alcohol to clean the rinse chassis.



If the inside of the rinse chassis is dirty, disassembly, cleaning or replacement is required.

If the O-ring inside the rinse chassis is dirty, replace it with a new one.

Contact your Nihon Kohden representative.

3 If the inside of the rinse unit is dirty, perform steps 1) to 4) to clean the inside and O-ring of the rinse chassis.

NOTE: Replace the O-ring inside the rinse chassis once a year.

1) Disconnect the two tubes from the rinse chassis.

2) Turn the rinse unit 90° counterclockwise and then lift it straight up and out.

3) Remove the rinse cap and clean the inside of the rinse chassis and its O-ring.


NOTE • Take care not to damage the O-ring. If the O-ring is damaged, it may cause a leak.

- Replace the O-ring with a new one if it is very dirty or deformed.

4) Perform steps 1) to 3) in reverse order to return the rinse chassis to its previous state.

4 Perform steps **1** and **3** of “Replacing the Release Nozzle (MEK-1302/MEK-1303)” (p. 7-73) in reverse order to return the analyzer to its previous state.

5 Plug the power cord into the wall outlet and turn the analyzer ON. Touch [No] when the Self Check confirmation dialog appears. (If Auto Login is OFF)

 If Auto Login is ON:
The self check runs automatically with a FAIL result.

6 Reset the usage count of the rinse chassis.

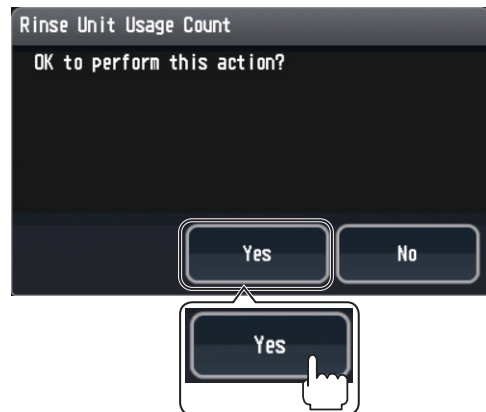
1) Open the Replace screen.

 “Opening the Screen or Window” (p. 7-24)


2) Touch [Reset].



3) When a confirmation message appears, touch [Yes].



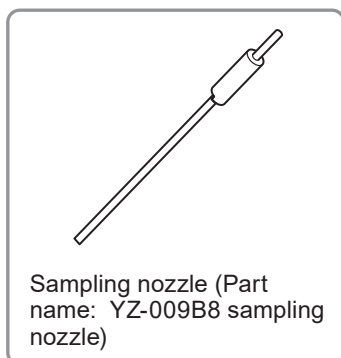
7 Check that a “21210 Maintenance part replacement in progress” message is displayed on the Information screen and touch [RESTORE].

 “User Message [2xxxx]” (p. 3-46)

8 Start the self check.

 “Self Check” (p. 7-5)

7-4-1-7. Replacing the Sampling Nozzle



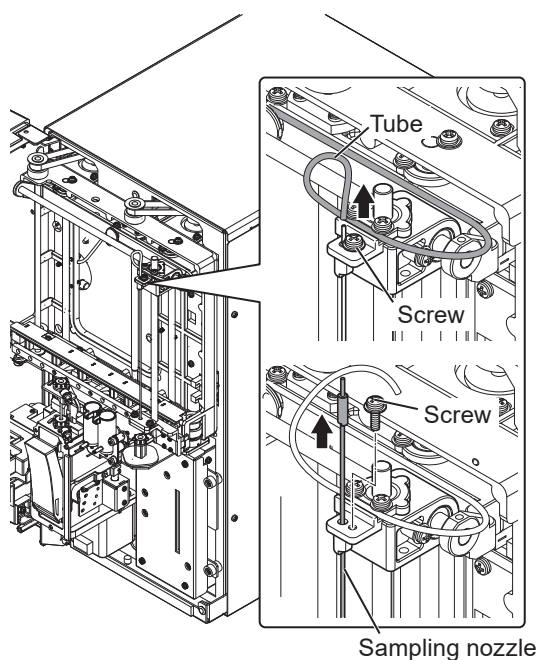
Replacement schedule:

- When necessary because very dirty, deformed, etc.
- Every 24,000 measurements

Part name:

YZ-009B8 sampling nozzle (supply code: YZ-009B8)

NOTE: Store the removed screws in a safe place for reuse later when installing the replacement sampling nozzle.



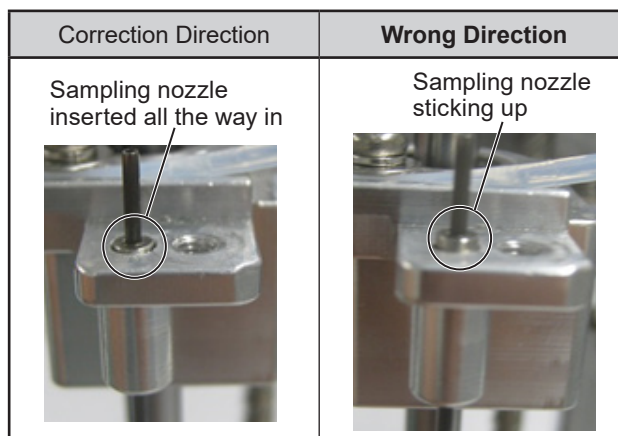
1 Refer to steps **1** to **3** of “Replacing the Release Nozzle (MEK-1302/MEK-1303)” (p. 7-73) and remove the front panel unit.

2 Disconnect tubes connected to the sampling nozzle.

3 Remove the screw.

4 Pull out the sampling nozzle and replace it with a new one.

NOTE: Fasten the sampling nozzle facing so it can be inserted all the way in. If it is not facing the right direction, the sampling nozzle will stick out.



5 Perform steps **1** and **3** in reverse order to return the analyzer to its previous state.

6 Plug the power cord into the wall outlet and turn the analyzer ON. Touch [No] when the Self Check confirmation dialog appears. (If Auto Login is OFF)



If Auto Login is ON:

The self check runs automatically with a FAIL result.

7 Reset the usage count of the new sampling nozzle.

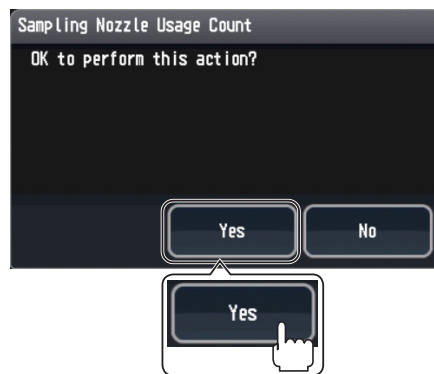
1) Open the Replace screen.

 | “Opening the Screen or Window” (p. 7-24)

2) Touch [Reset].



3) When a confirmation message appears, touch [Yes].




8 Check that a “21210 Maintenance part replacement in progress” message is displayed on the Information screen and touch [RESTORE].

 | “User Message [2xxxx]” (p. 3-46)

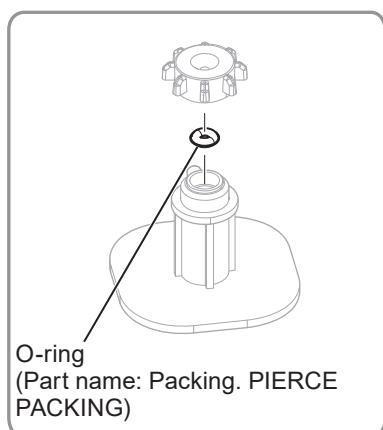
9 Start the self check.

 | “Self Check” (p. 7-5)

10 For the MEK-1303, adjust the position of the sampling nozzle and cell.

 | “Adjusting the Sampling Nozzle and the Cell Position (MEK-1303)” (p. 6-21)

7-4-1-8. Replacing the O-ring Inside the Rinse Chassis



Replacement schedule:

- When necessary because very dirty, deformed, etc.
- Once a year

Part name:

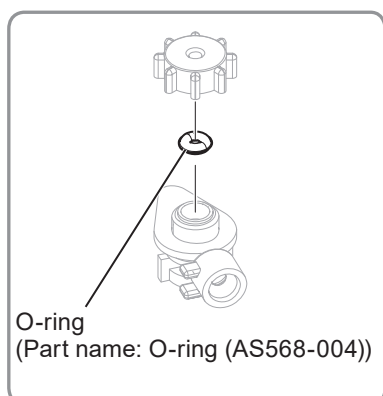
Packing. PIERCE PACKING (Code No. : RP-6114937377)

Refer to p.7-77 when cleaning the rinse unit and replacing the O-ring inside.

NOTE: After replacing the O-ring, reset the usage count of the rinse unit.

7

7-4-1-9. Replacing the O-ring Inside the Release Nozzle Rinse Chassis (MEK-1302/MEK-1303)



Replacement schedule:

- When necessary because very dirty, deformed, etc.
- Once a year

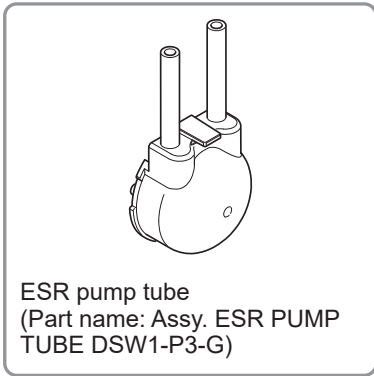
Part name:

O-ring (AS568-004) (Code No. : RP-6114936660)

Refer to “Replacing the Release Nozzle (MEK-1302/MEK-1303)” (p. 7-73) when replacing the O-ring inside the release nozzle rinse unit.

NOTE: If the release nozzle is not replaced at the same time as the O-ring, do not reset the release nozzle usage count.

7-4-1-10. Replacing the ESR Pump Tube (MEK-1305)



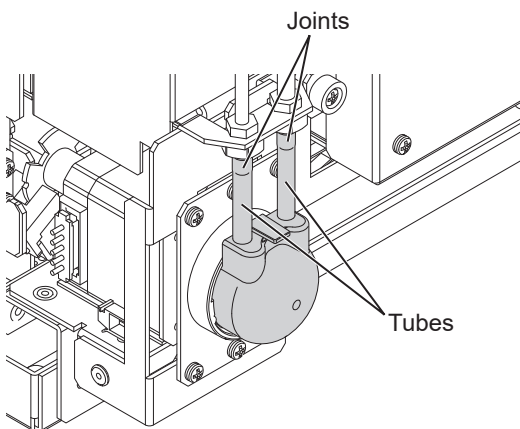
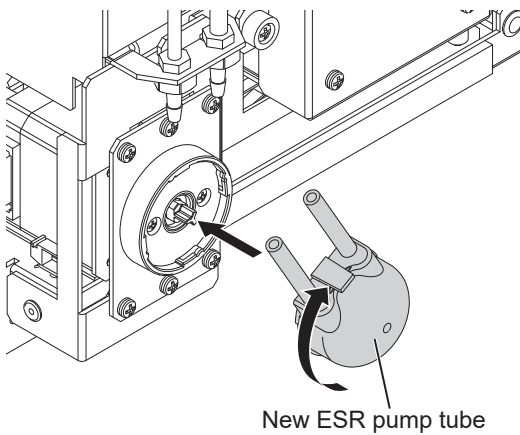
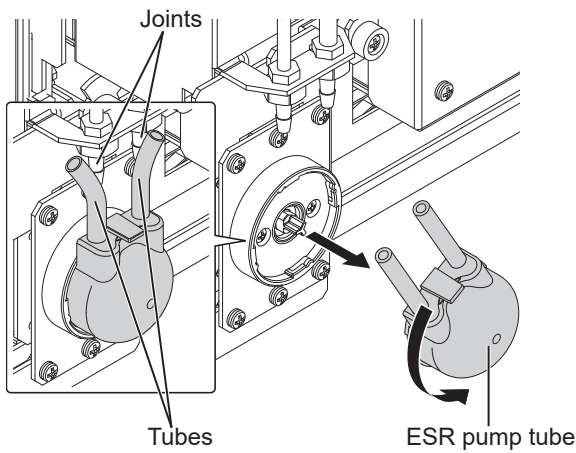
Replacement schedule:

- When necessary because very dirty, deformed, etc.
- Once every five years
- Every 24,000 measurements

Part name:

Assy. ESR PUMP TUBE DSW1-P3-G (code No.: RP-9000068657)

NOTE: If there is water droplet or liquid leak in the pump tube, immediately replace it with a new one. Otherwise, the analyzer may corrode.



- 1 Refer to steps 1 to 3 of “Replacing the Release Nozzle (MEK-1302/MEK-1303)” (p. 7-73) and remove the front panel unit.
 - 2 Remove the tubes from the joints.
 - 3 Turn the ESR pump tube 30 degrees to the left, and pull the tube toward you to remove it from the analyzer.
 - 4 Attach the new ESR pump tube to the analyzer and turn the tube 30 degrees to the right to fix it.
 - 5 Attach the tubes to the joints. Check to make sure the tubes are not twisted.
 - 6 Reverse step 1 to reassemble the analyzer.
 - 7 Connect the power cord to a wall outlet, then turn on the power of the analyzer. When a “Start self check?” message appears, touch [No]. (only when “Auto Login” will be “Off”)
- 💡 When “Auto Login” is set to “On”
A self-check runs automatically, and the result will be “FAIL”.

8 Reset the ESR pump tube usage count.

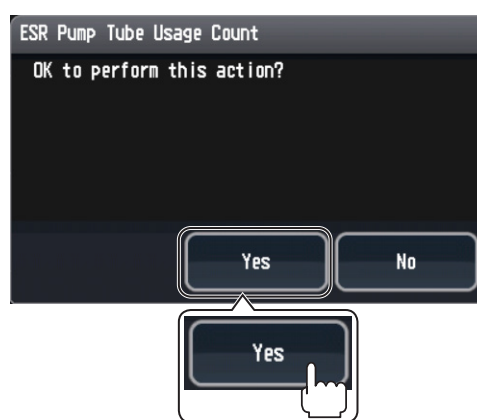
1) Open the Replace screen.

 | “Opening the Screen or Window” (p. 7-24)

2) Touch [Reset].



3) When a confirmation message appears, touch [Yes].



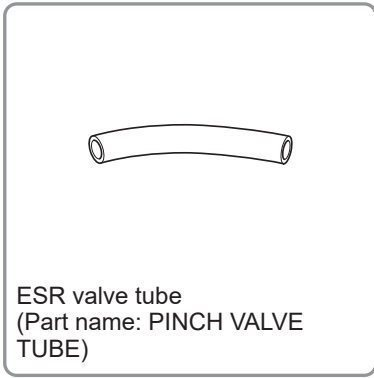
9 Check that a “21210 Maintenance part replacement in progress” message is displayed on the Information screen and touch [RESTORE].

 | “User Message [2xxxx]” (p. 3-46)

10 Start the self check.

 | “Self Check” (p. 7-5)

7-4-1-11. Replacing the ESR Valve Tube (MEK-1305)



Replacement schedule:

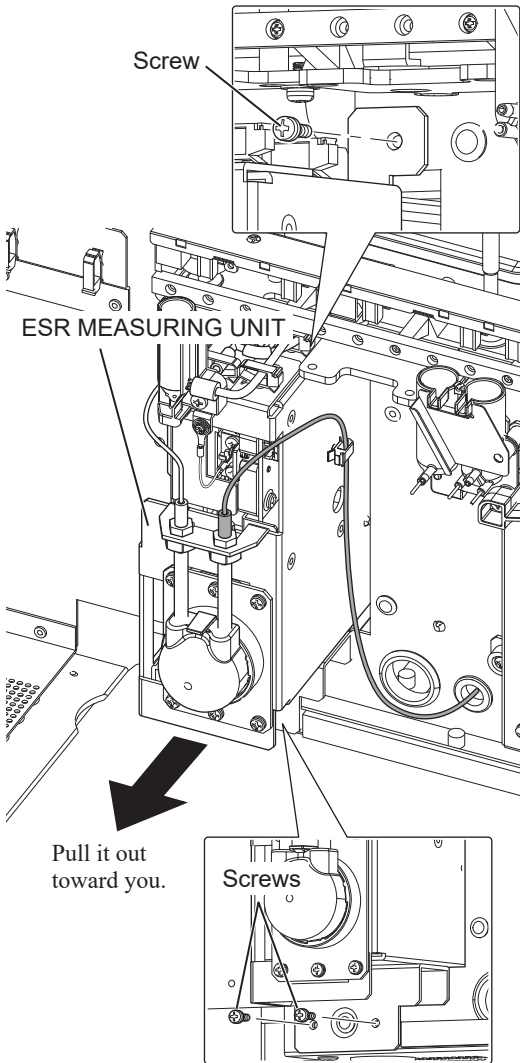
- When necessary because very dirty, deformed, etc.
- Once every five years
- Every 24,000 measurements

Part name:

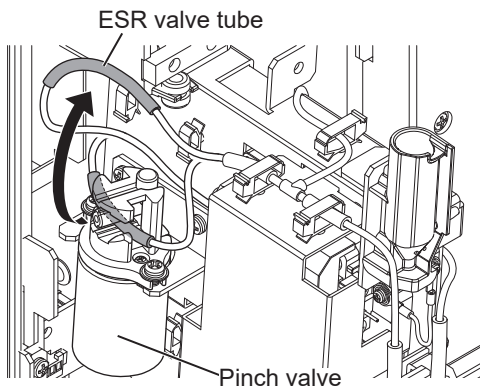
PINCH VALVE TUBE (code no.: RP-6114937815)

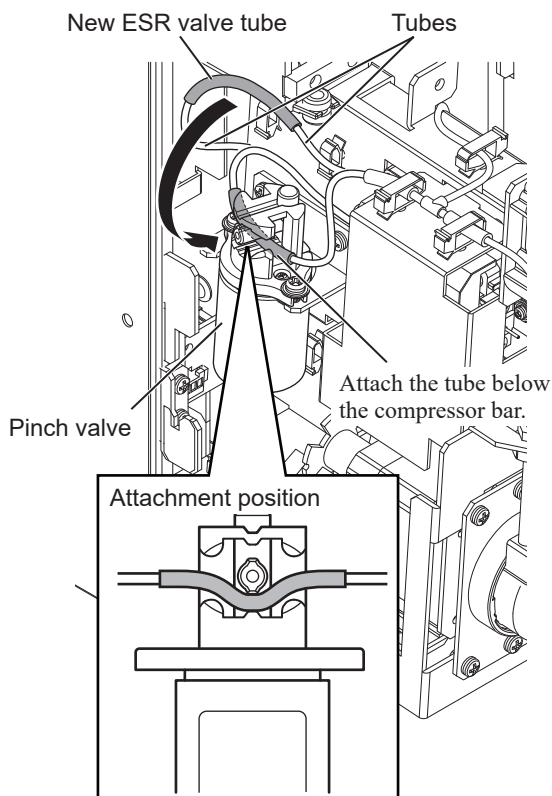
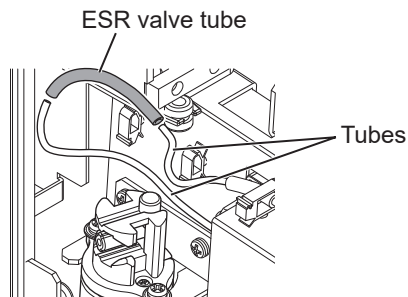
NOTE: If there is water droplet or liquid leak in the ESR valve tube, immediately replace it with a new one. Otherwise, the analyzer may corrode.

- 1** Refer to steps **1** to **3** of “Replacing the Release Nozzle (MEK-1302/MEK-1303)” (p. 7-73) and remove the front panel unit.
- 2** Remove the three screws fixing the ESR MEASURING UNIT and pull the unit out toward you.



- 3** Remove the ESR valve tube from the pinch valve.





- 4 Remove the ESR valve tube from the tubes as shown in the figure on the left.

- 3 Attach the new ESR valve tube to the tubes shown on the left.

- 4 Attach the ESR valve tube below the compressor bar of the pinch valve.

NOTE: The ESR valve tube must be attached below the compressor bar. When it is attached above the compressor bar, the analyzer does not operate normally.

- 5 Reverse steps 1 and 2 to reassemble the analyzer.

- 6 Connect the power cord to a wall outlet, then turn on the power of the analyzer. When a “Start self check?” message appears, touch [No]. (only when “Auto Login” will be “Off”)



When “Auto Login” is set to “On”

A self-check runs automatically, and the result will be “FAIL”.

- 7 Reset the ESR valve tube usage count.

- 1) Open the Replace screen.

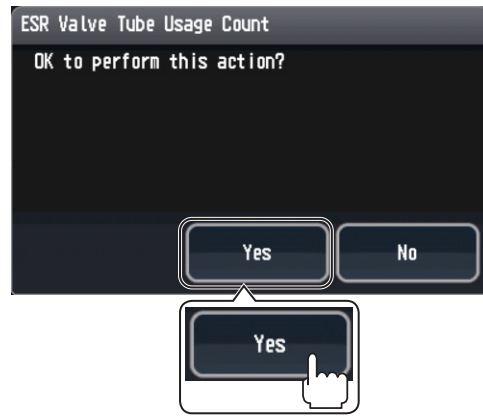


“Opening the Screen or Window” (p. 7-24)

- 2) Touch [Reset].



3) When a confirmation message appears, touch [Yes].



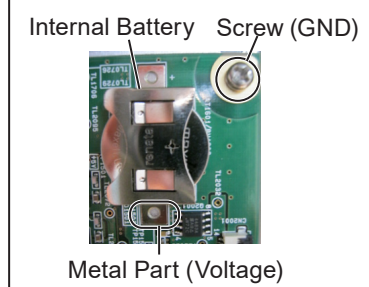
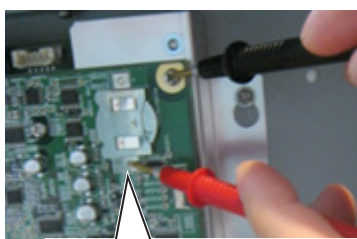
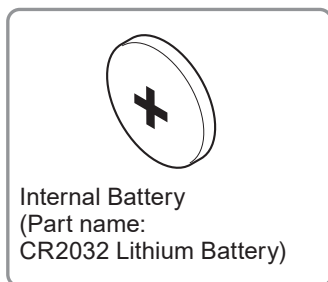
8 Check that a “21210 Maintenance part replacement in progress” message is displayed on the Information screen and touch [RESTORE].

 | “User Message [2xxxx]” (p. 3-46)

9 Start the self check.

 | “Self Check” (p. 7-5)

7-4-1-12. Replacing the Internal battery



Replacement schedule:

- When the Battery Volt judgment is FAIL during the circuit test of a self check.
- The analyzer message “45000: Internal battery voltage drop” appears.

Part name:

CR2032 Lithium battery (supply code: X209)

The clock of the analyzer does not work properly if the voltage of the internal battery drops, so replace the battery in the AMP CONTROL BD right away.

- 1 Turn the main power switch OFF and unplug the power cord from the wall outlet.

 “Disassembly Preparation” (p. 4-2)

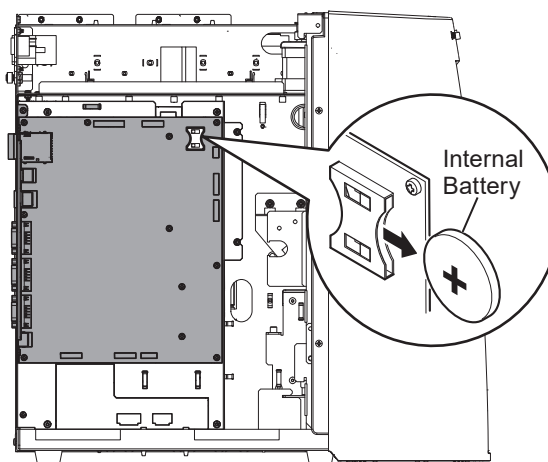
- 2 Remove the left cover.

 “Removing the Left Cover” (p. 4-4)

- 3 Use a digital multimeter as shown in the figure to measure the battery voltage (voltage between screw of AMP CONTROL BD and metal part) and confirm it has dropped below 2.75 V.

If at 2.75 V or higher, the internal battery is normal. Replace the AMP CONTROL BD.

- 4 Slide the internal battery out to remove it and replace with a new battery.




- 5 Run a self check and make sure the judgment of Battery Volt displayed for the Circuit Test on the Self Check Results screen is “PASS”.

 “Running Self Checks” (p. 7-6)

- 6 Perform steps 1 and 2 in reverse order to return the analyzer to its previous state and plug the power cord into the wall outlet.

- 7 Open the System Setting screen and set the Date and Time.

 “Date and Time” (p. 8-8)

- 8 Check the items other than Date and Time on the System Setting screen and make sure they are correct.

7-4-1-13. Disposing of the Analyzer and Medical Waste

 **WARNING**

- Dispose of the analyzer, replaced parts (such as sampling needle and pierce tube), waste fluid and parts used for collecting sample blood (such as needles, syringes and vials) according to your local laws for disposing of infectious medical waste (for incineration, melt treatment, sterilization and disinfection).
- Before disposing of the analyzer, perform strong cleaning and remove the sampling needle and venting needle from the analyzer.
If the above warning is not followed, it causes infection or environmental contamination.

 **WARNING**

Always wear rubber gloves to protect yourself from infection.



Follow your local laws for disposing of medical waste.

7-4-2. Reagents

For information about the diluent, detergent and hemolysing reagent, refer to the package and manual provided with them.

7-4-3. Optional Items

Same as the analyzer



“Replacing the Internal battery” (p. 7-87)

7-5. Cleaning and Disinfection

7-5-1. Analyzer

⚠ WARNING

- Be careful not to directly touch any place where blood sample is or may have contacted.
- Always wear rubber gloves to protect yourself from infection.

⚠ CAUTION

Before maintenance, perform cleaning, discharge the fluid, and turn off the analyzer main power. If the analyzer is lifted or tilted without cleaning and draining, the liquid in the cups may spill and damage the electronic circuit or the operator may receive electrical shock. If maintenance is performed while the power is on, the operator may receive electrical shock or the analyzer may start unexpectedly when a key is pressed.

- NOTE
- Use the cleaning and disinfection methods described in this operator's manual.
 - Following cleaning and disinfection, wipe off moisture with a dry cloth and thoroughly dry the analyzer before use.
 - When using a flammable solvent such as ethanol for cleaning and disinfecting, avoid doing so in enclosed spaces and ventilate the room adequately.

7-5-1-1. Cleaning the Surface of the Analyzer

Cleaning schedule: About once a month

Wipe the surface with a soft cloth moistened with ethanol disinfectant (concentration: 76.9 to 81.4 vol% at 15°C (59°F)), neutral detergent diluted with water, or isopropyl alcohol (concentration 70 vol%). After cleaning, dry it completely.

Wipe the LCD display with a soft dry cloth.

- NOTE
- Do not use bleach or organic solvent such as thinner or benzene, because these cause the plastic surface to melt or crack.
 - If using a wet cloth with water (or detergent), wring the cloth well to prevent the liquid from spilling into the analyzer.
 - Note that disinfecting ethanol or detergent that spills into the analyzer through the gap at the edge of the display may cause a failure.

7-5-1-2. Disinfecting the Surface of the Analyzer

Disinfecting schedule: When an infectious substance (blood) is present on the surface of the analyzer or when the analyzer is moved to another facility.

Wipe the surface with a soft cloth moistened with ethanol disinfectant (Concentration: 76.9 to 81.4 vol% at 15°C (59°F)).

NOTE • Use disinfectants with the correct concentration.

- Do not use bleaches or organic solvents such as thinner or benzine, because these cause the plastic surface to melt or crack.
- After disinfecting it with a sprayer, do not leave the analyzer without first wiping it thoroughly.

7-5-2. Inside the Analyzer

When performing maintenance and repairs, open the front panel unit and check for dirt inside the analyzer and clean it as needed.



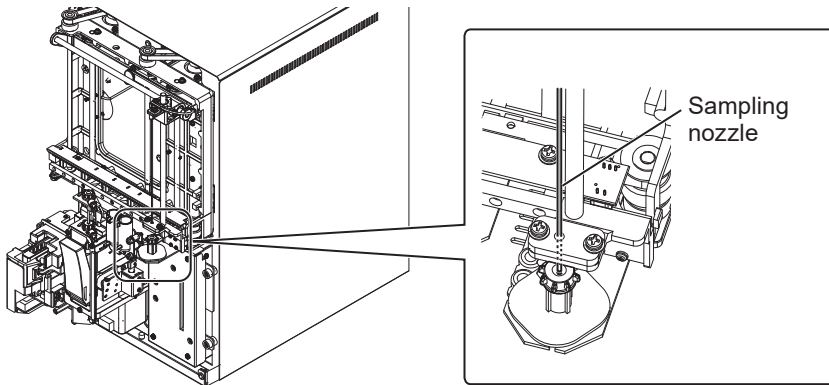
Opening the Front Panel Unit

“Opening the FRONT PANEL UNIT” (p. 4-3)

7-5-2-1. Cleaning the Sampling Nozzle

Cleaning schedule: When there are blood clots or salt crystals sticking to it.

Use a cotton swab moistened with water or CLEANAC•3 to remove clotted blood or dirt sticking to the sampling nozzle.



7-5-2-2. Cleaning the Rinse Chassis

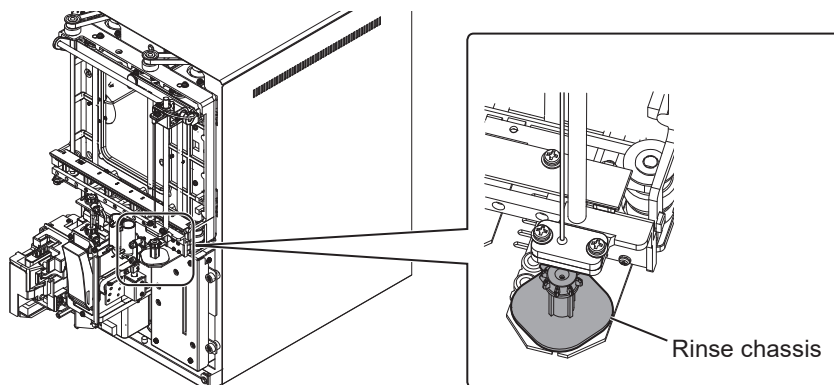
Cleaning schedule: When there are blood clots or salt crystals sticking to it.

Clean the rinse unit just like during periodic maintenance.

NOTE: After cleaning the rinse chassis, reset its usage count.



“Cleaning the Rinse Chassis” (p. 7-77)



7

7-5-2-3. Cleaning the Tube Guide Plate

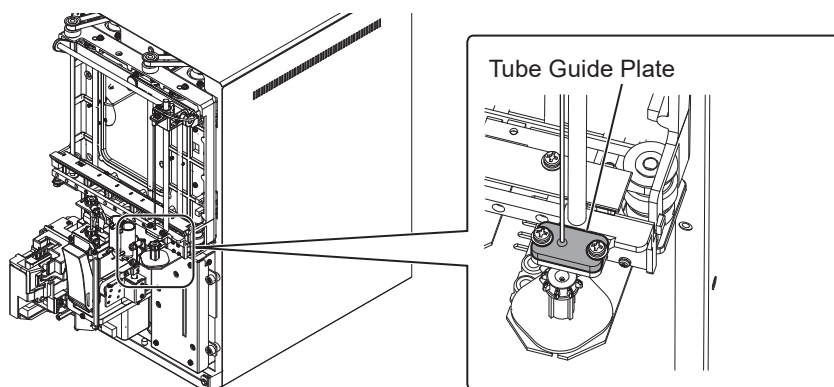
Cleaning schedule: When there are blood clots or salt crystals sticking to it.

Use a cotton swab moistened with water or CLEANAC•3 to remove clotted blood or dirt sticking to the tube guide plate.

When the tube guide plate is removed, refer to Section 6 and adjust as follows.

- Adjustment of positions of sampling nozzle and open rinse

NOTE: If the tube guide plate is dirty, background noise may rise.

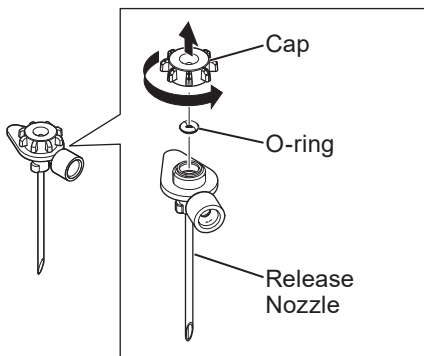
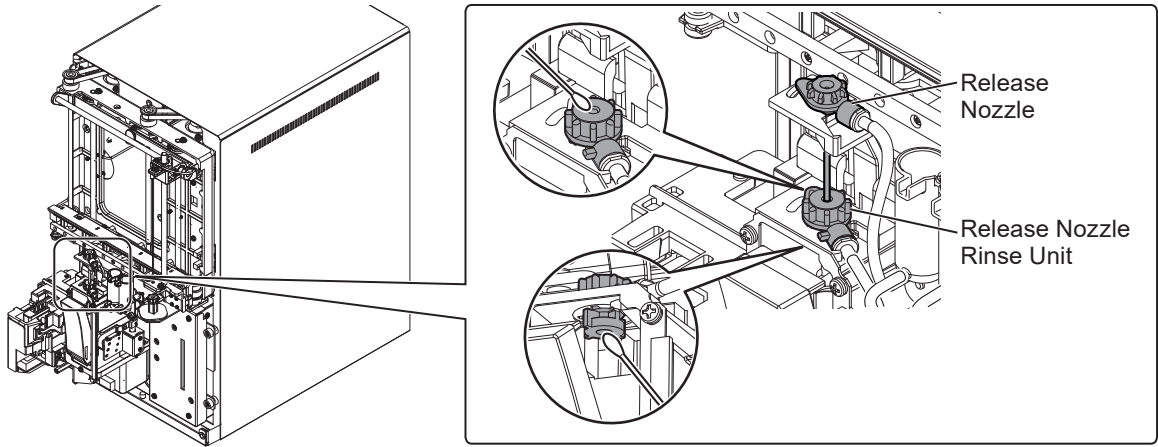


7-5-2-4. Cleaning the Release Nozzle and Release Nozzle Rinse Chassis (MEK-1302/MEK-1303)

Cleaning schedule: When there are blood clots or salt crystals sticking to it.

Use a cotton swab moistened with water or CLEANAC•3 to remove clotted blood or dirt sticking to the release nozzle rinse unit or release nozzle.

NOTE: Do not use alcohol to clean the release nozzle rinse unit or release nozzle.



If the inside of the release nozzle is dirty, refer to “Replacing the Release Nozzle (MEK-1302/MEK-1303)” (p. 7-73), remove the release nozzle and clean the O-ring inside.

- NOTE**
- Take care not to damage the O-ring. If the O-ring is damaged, it may cause a leak.
 - Replace the O-ring with a new one if it is very dirty or deformed.

Part name:
PIERCE PACKING (Code No. : RP-6114937377)

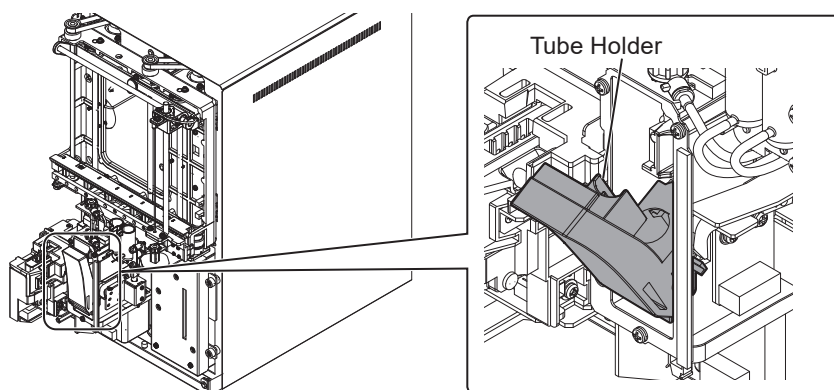
If the inside of the release nozzle rinse unit is dirty, refer to “Replacing the Release Nozzle (MEK-1302/MEK-1303)” (p. 7-73) and clean the inside and O-ring of the release nozzle rinse unit.

7-5-2-5. Cleaning the Tube Holder (MEK-1302/MEK-1303)

Cleaning schedule: When there are blood clots or salt crystals sticking to it.

Use a cotton swab moistened with water or CLEANAC•3 to remove clotted blood or dirt sticking to the tube holder.

NOTE: If the inside of the tube holder is dirty, it may cause sensor errors.

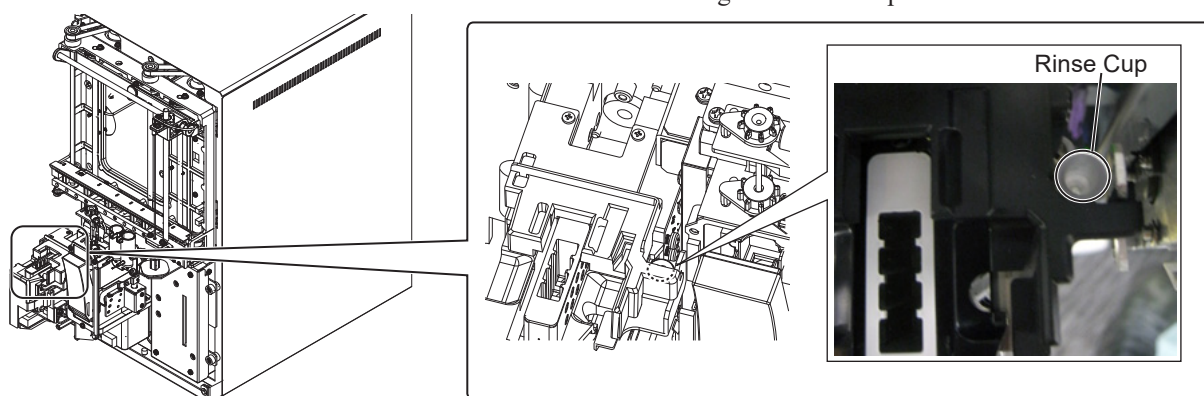


7

7-5-2-6. Cleaning the Rinse Cup (MEK-1303)

Cleaning schedule: When the rinse cup and around it are dirty.

Use ethanol for disinfecting (One that meets Japanese Pharmacopoeia standards. Concentration: Ethanol 76.9 to 81.4% by vol. at 15°C (59°F)) to moisten a cotton swab and clean dirt sticking to the rinse cup.

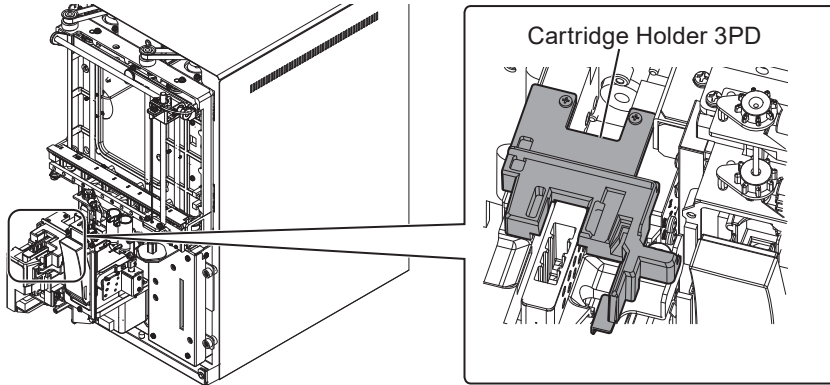


7-5-2-7. Cleaning the Block Cell 3PD (MEK-1303)

Cleaning schedule: When there are blood clots or salt crystals sticking to it.

Use a cotton swab moistened with water or CLEANAC•3 to remove clotted blood or dirt sticking to cartridge holder 3PD.

NOTE: As the part constitutes the reference position for cartridges and the sampling nozzle, clean the cartridge holder 3PD without removing it.



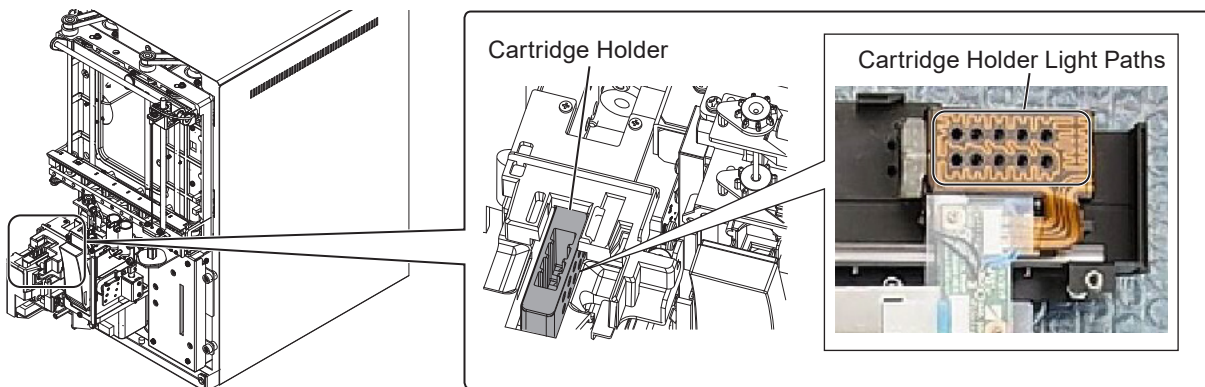
7-5-2-8. Cleaning the Cell Block Optical Path (MEK-1303)

Cleaning schedule: When the results of a circuit test in a self check (immune photodiode voltage) is FAIL.

Clean the cartridge holder light path.

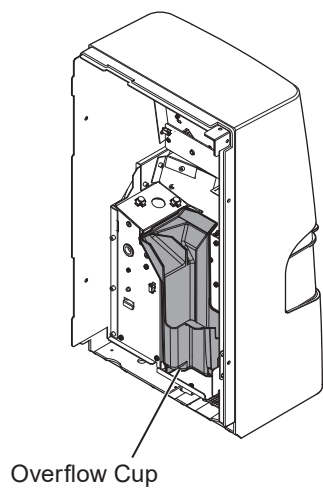
Blow out dust and dirt with compressed air.

NOTE: If there is dust or dirt in the light path, the photodiode voltage obtained will be inaccurate and the results of self check circuit tests will be FAIL.

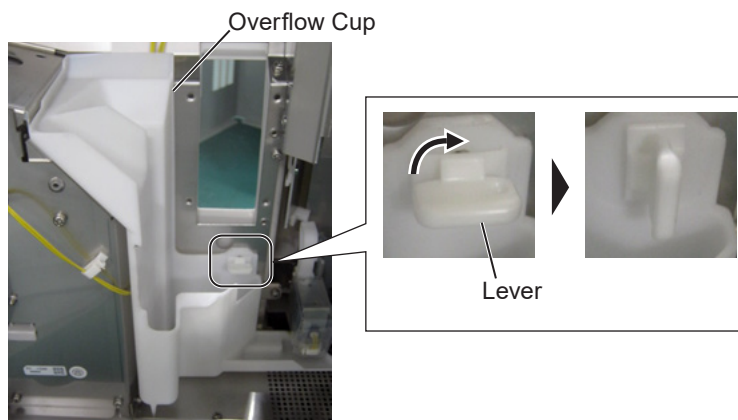


7-5-2-9. Cleaning the Overflow Cup

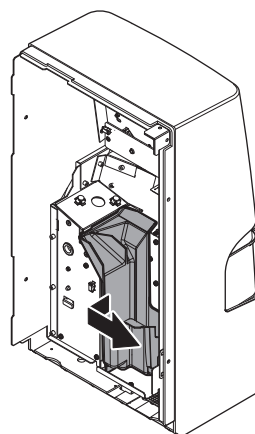
Cleaning schedule: When there are blood clots or salt crystals sticking to it.
Remove the overflow cup as follows and rinse out with tap water.



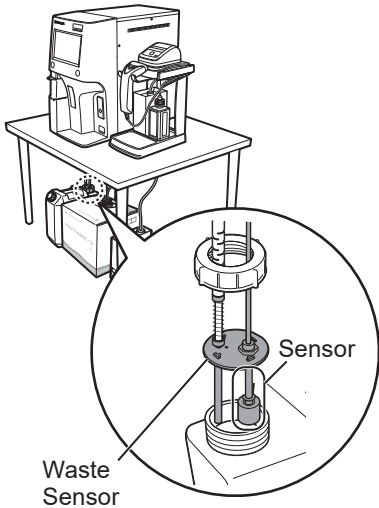
- 1 Turn the lever of the overflow cup 90°.



- 2 Pull the overflow cup forward slightly and slide it sideways to remove it.



7-5-3. Waste Sensor

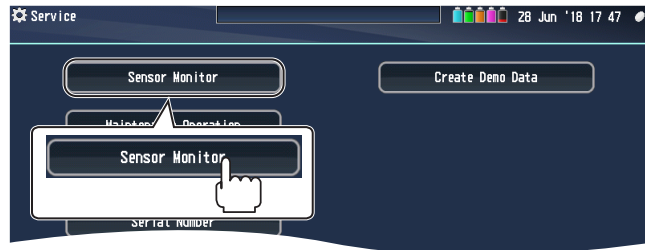


Remove the waste sensor from the waste bottle and make sure the sensor is not stuck due to being dirty.

If the sensor is sticking, clean it with tap water and check the operation of the waste sensor as follows.

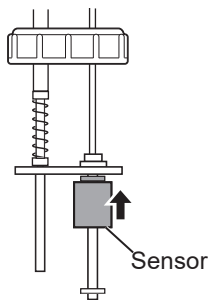
- 1 Open the Service window and touch [Sensor Monitor].

"Opening the Service Window" (p. 7-30)



- 2 Touch [▲] or [▼] in the Sensor Monitor window and display the pumps.

- 3 Check and make sure the status of the waste sensor goes to ON when the sensor is lifted up.



[▲] or [▼]
Switches the screen up or down.



Check.

7-5-4. Optional Items

Same as the analyzer

7-6. Storage and Transport

7-6-1. Long Term Storage and Transport

⚠ CAUTION

Before moving the analyzer, do the following.

- Perform cleaning and discharge the fluid. If the analyzer is lifted or tilted without draining, the liquid in the cups may spill and damage the electronic circuit or the operator may receive electrical shock.
- Turn off the analyzer main power and disconnect the power cord from the AC outlet. If the analyzer is moved while the power is on, the operator may receive electrical shock or the analyzer may start unexpectedly when a key is pressed.

During long term (more than a week) storage or transport, diluent remaining inside the analyzer dries and crystallizes, contaminating the inside of the analyzer. This may cause clogs in the fluid path or device failure.

If the analyzer needs to be stored for more than a week or transported, clean the inside by flushing the fluid path with distilled water and performing the Drain All operation.

If there is no distilled water, commercially available purified water is acceptable.

1 Perform cleaning.



When washing with distilled water, use the YZ-0252 cleaning kit.

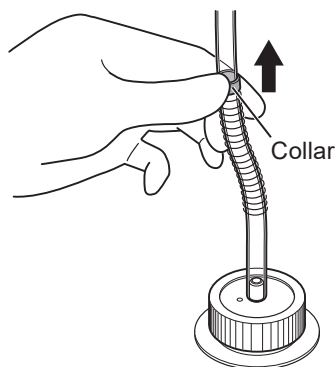


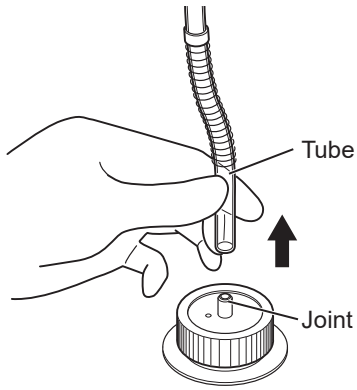
“Cleaning” (p. 7-17)

2 Disconnect the ISOTONAC•3 (or ISOTONAC•4), CLEANAC•710, CLEANAC•3 and HEMOLYNAC•310 tubes from the joints of the reagent bottles, leaving only the waste tube connected to the waste bottle.

Removing the ISOTONAC•3/ISOTONAC•4 Tube

- 1) Move the blue collar.

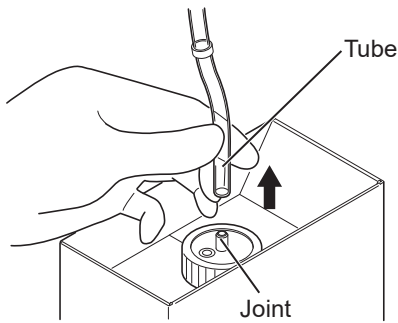




- 2) Hold the tip of the tube and remove the tube from the joint.
- NOTE: Be careful not to lose the spring for preventing breakage.

Removing the CLEANAC•3 or CLEANAC•710 Tube

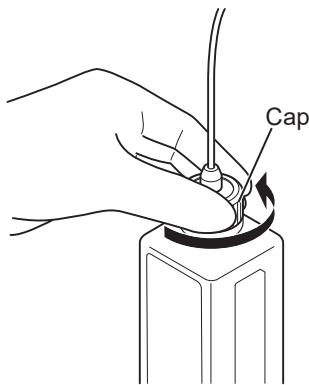
Hold the tip of the tube and remove the tube from the joint.



Removing the HEMOLYNAC•310 Tube

Remove the tube along with the cap.

NOTE: After removing the tube, store it in a safe place so that the portion of the tube from inside the container does not come into contact with the analyzer, a table.




- 3** Run Drain All and drain all the reagent in the analyzer.





The analyzer powers OFF.

 “Draining Fluid from the Analyzer” (p. 7-23)

- 4** Turn the sub power switch on the back panel OFF and remove the reagent port cover.


- 5** Disconnect the reagent tubes from the reagent ports.

 Save the tubes as they will be reconnected in step **13**.

- 6 Put distilled water in YZ-0252 Sample Transport Kit (hereafter, “sample transport kit”) and attach the tubes of the sample transport kit to the ports of ISOTONAC•3, CLEANAC•710, CLEANAC•3 and HEMOLYNAC•310.
 -  The sample transport kit consists of a set of tubes and a container for distilled water.
- 7 Make sure the analyzer message “21110 Analyzer internal draining in progress” is displayed and the Information screen and then touch [Restore].
 -  “User Message [2xxxx]” (p. 3-46)
- 8 Run Drain All and drain all the reagent in the analyzer.
The analyzer powers OFF.
 -  “Draining Fluid from the Analyzer” (p. 7-23)
- 9 Turn the sub power switch on the back panel OFF.
- 10 Remove the sample transport kit tubes.
- 11 Re-install the reagent port cover that was removed in step 4 on the back of the analyzer.
- 12 Cut off about 1 cm from the end (side that attaches to the reagent bottle) of the tubes of ISOTONAC•3, CLEANAC•710 and CLEANAC•3, which were removed in step 5.
 -  Do not cut the HEMOLYNAC•310 tube.
- 13 Attach the tubes for ISOTONAC•3, CLEANAC•710, CLEANAC•3 and HEMOLYNAC•310 to their reagent bottles.

7-6-1-1. Using the Analyzer After Long Term Storage

NOTE: Perform the following procedures if the reagents were drained from the analyzer for long-term storage or transport.

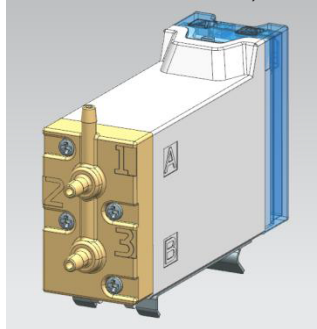
- 1 Connect the reagent tubes to the analyzer.
- 2 Plug the power cord into the wall outlet and turn the analyzer ON.
- 3 Make sure the analyzer message “21110 Analyzer internal draining in progress” is displayed and the Information screen and then touch [Restore].
 -  “Priming on Installation” (p. 7-22)

7-7. Electromagnetic Valve Maintenance

7-7-1. Electromagnetic Valve Structure

Appearance

3-way Valve D13-35A
(Parts Code:
RP-9000057722)



2-way Valve D13-25A
(Parts Code:
RP-9000057721)



- Flow paths From the top, one to four (only the 13-25A has four)
- Solenoids From the top, A, B

Internal Structure

3-way Valve D13-35A

(CLOSE)



(A OPEN)

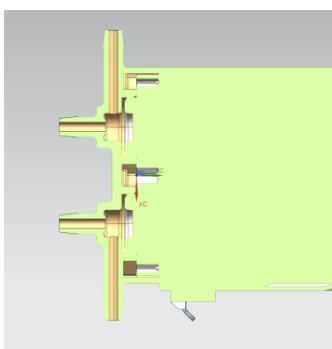


(B OPEN)

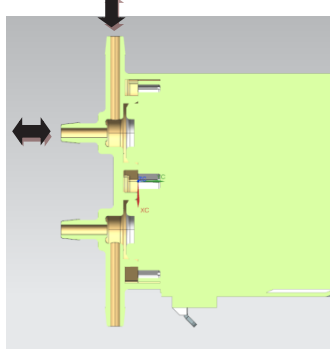


2-way Valve D13-25A

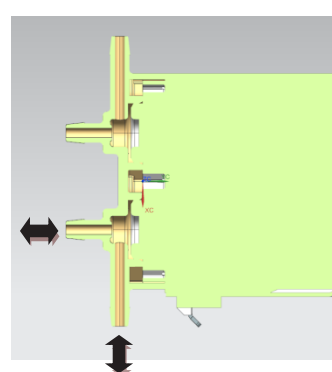
(CLOSE)



(A OPEN)




(B OPEN)



7-7-2. Checking the Operation of Electromagnetic Valves

Check operation of valves.

 Detailed information about the valves
“Electromagnetic Valves” (p. 4-50)

7-7-2-1. Electromagnetic Valve Opening and Closing Check

NOTE: As valves will be operated by hand, be careful about liquid leaks and overflowing. Also, open and close the valves after checking that the flow path is connected.

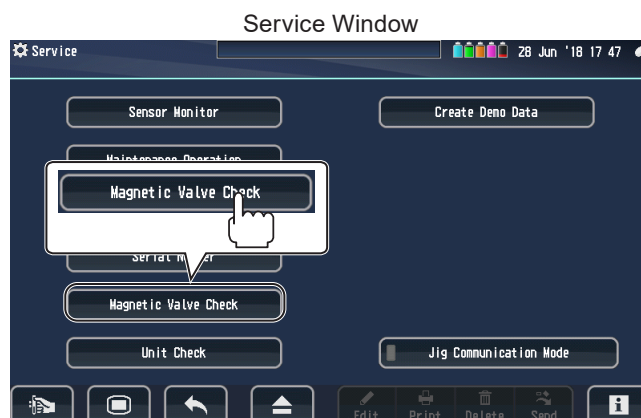


- When the Magnetic Valve Check screen is opened or closed, the analyzer initializes.
- When a self check finishes, only MV1A is open, while all other electromagnetic valves are closed.

1 Open the Service window.

 “Opening the Service Window” (p. 7-30)


2 Touch [Magnetic Valve Check] on the Service window to open the Magnetic Valve Check window.

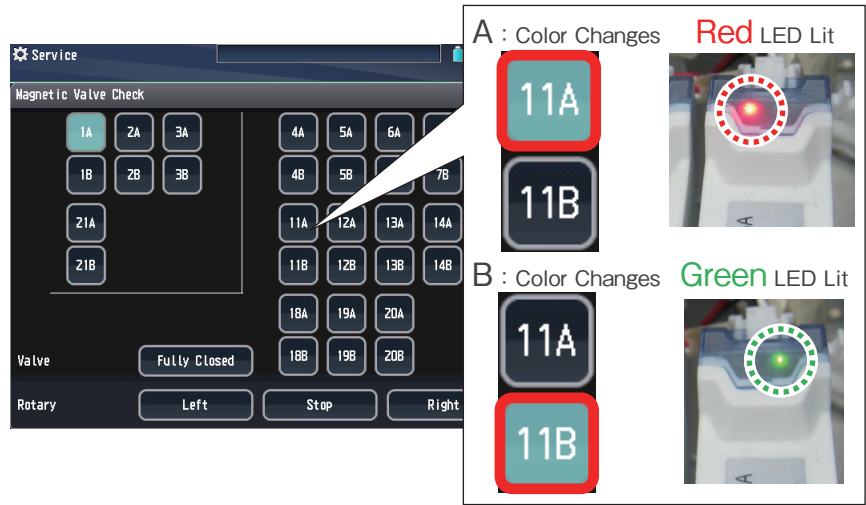


3 Touch an operation button 1 to 21 (A&B) on the Magnetic Valve Check screen and check the closing/opening of the valve.

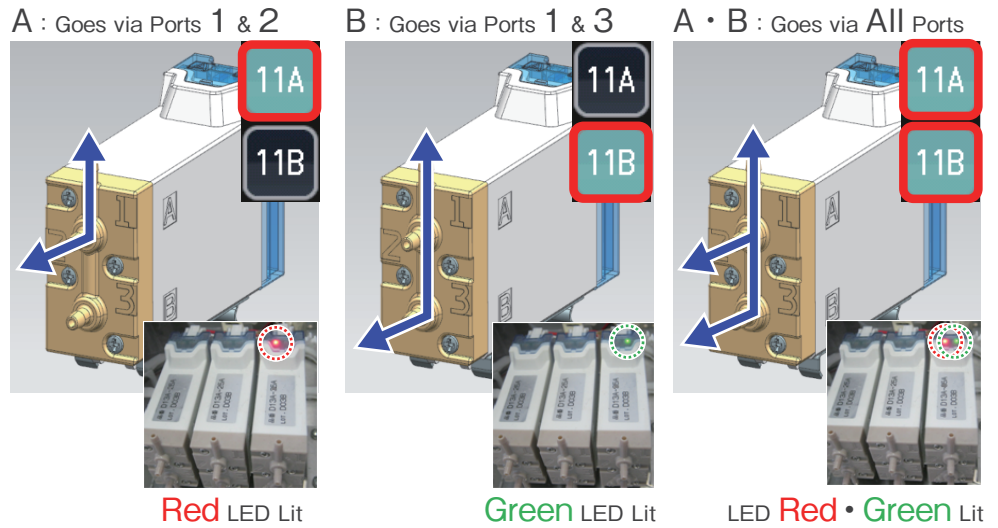
Touching the “#A/B” button of a valve opens the corresponding valve.

The color of the operation button also changes color and the LED lights.

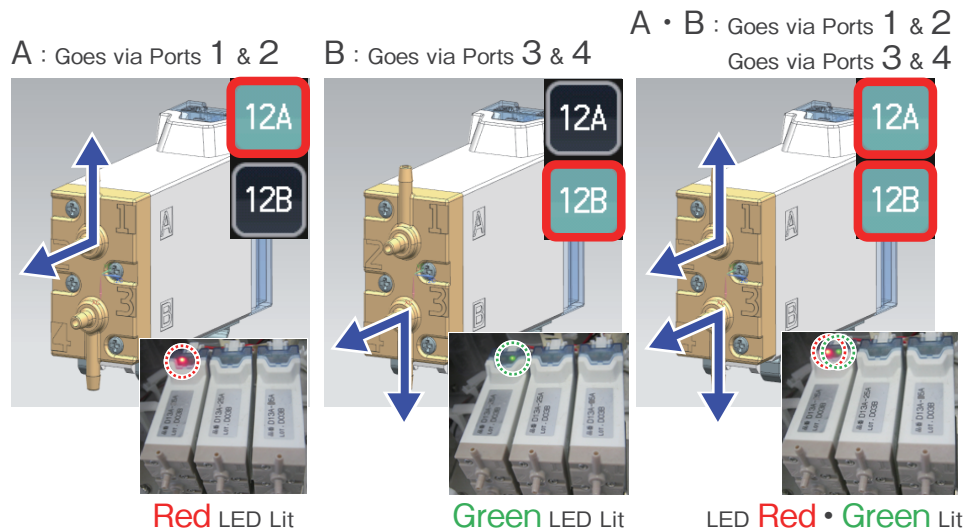
 Touching [Fully Closed] closes all electromagnetic valves.



Check the operation of three-way valves.



Check the operation of two-way valves.



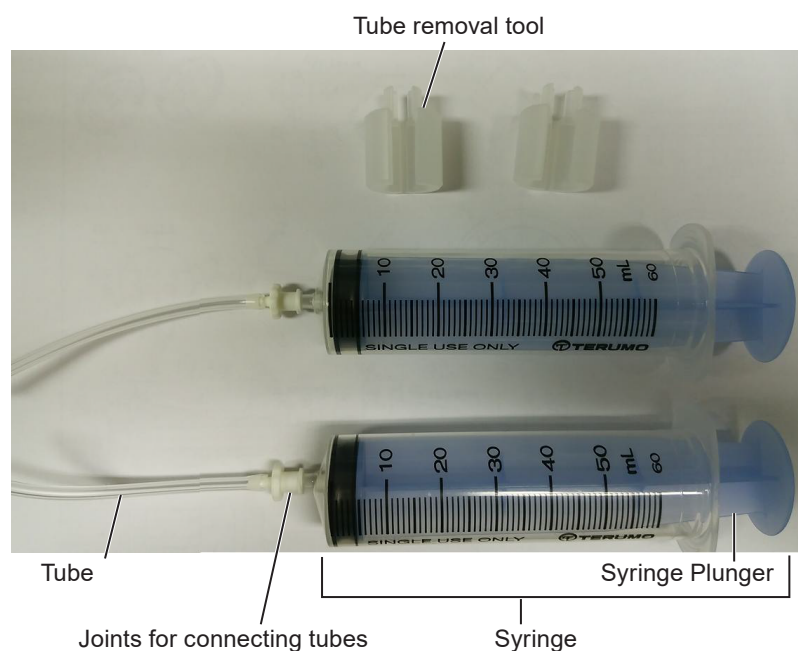
7-7-2-2. Checking Suspected Problems

If an electromagnetic valve is suspected to be faulty, use the following valve inspection jig to check its operation. If faulty, replace the valve.

After replacing it, check its operation again and make sure the problem is resolved.

JIG, valve inspection jig (Parts code: RPK-9000061776)

Components	Qty.
50 mL syringe	2
Joints for connecting tubes	2
Tube removal tool	2
Tube	2



A Open (Red LED lit)



B Open (Green LED lit)




1 Checks that valves open and close.

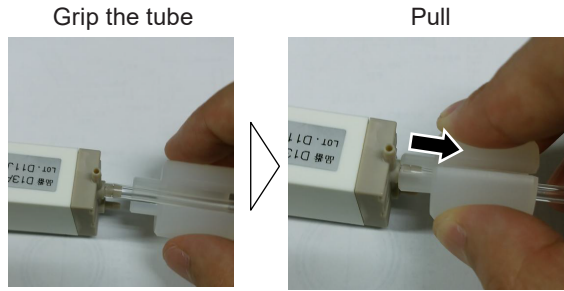
 “Electromagnetic Valve Opening and Closing Check” (p. 7-101)

If the LED of the valve fails to light, potential causes are as follows.

- AMP CONTROL BD faulty
- BD on magnetic valve faulty
- Faulty magnetic valve cable
- Magnetic valve cable inserted incorrectly

- 2** Use the tube removal tool to disconnect the tubes connected to the valve suspected to be faulty.

 Twisting the tube removal tool slightly while pulling on it helps making disconnecting tubes easier.



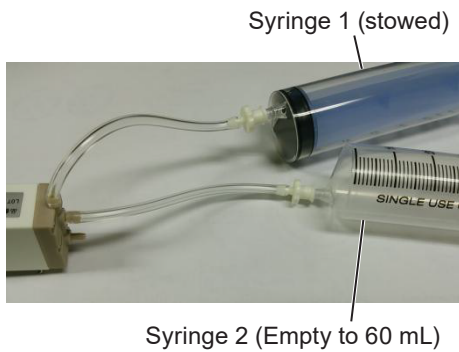
- 3** Run pressure tests 1 and 2 and check the flow path of the valve.

Pressure Test 1

Perform pressure test 1 with the valve closed (with the LED of the valve OFF).

- 1) Connect syringes as shown below before and after the flow path being checked.

- Syringe 1: Stowed state (Plunger pressed in to the zero mark)
- Syringe 2: Draw the plunger to the 60 mL mark.

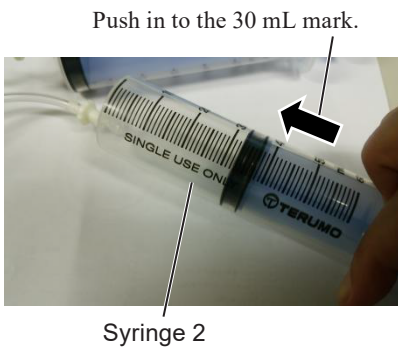


- 2) Press the plunger of syringe 2 in to the 30 mL mark, release and see what happens. (60 mL to 30 mL applies about 150 kPa of pressure.)

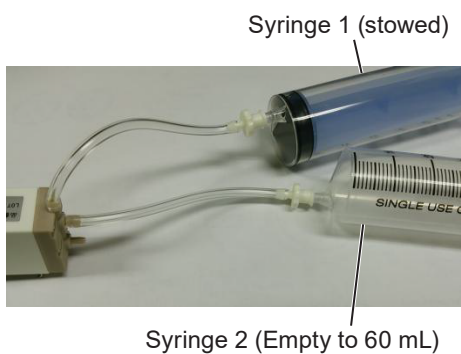
Normal	Plunger of syringe 2 returns to the 60 mL mark.
Abnormal	Plunger of syringe 2 remains as the 30 mL mark.

If abnormal, it may be caused by the following, so replace the valve with a new one.

- Diaphragm seal fault due to blockage by foreign matter.
- Leak from inside to outside of valve



Pressure Test 2



1) Connect syringes as shown below before and after the flow path being checked.

- Syringe 1: Stowed state (Plunger pressed in to the zero mark)
- Syringe 2: Draw the plunger to the 60 mL mark.

The connections are the same as in pressure test 1.

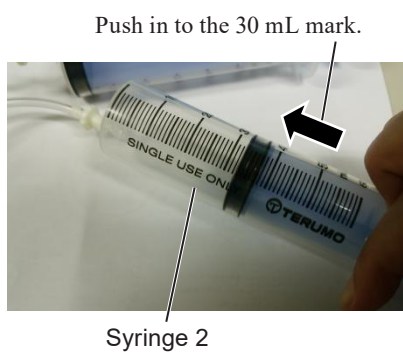
2) Open the valve of the flow path to be tested.

“Electromagnetic Valve Opening and Closing Check” (p. 7-101)

Example: For valve No.11

A : Color Changes Red LED Lit

B : Color Changes Green LED Lit



3) Press the plunger of syringe 2 in to the 30 mL mark, release and see what happens.

Normal	<p>Plunger of syringe 1 moves to the 30 mL mark.</p> <p>Moves to the 30 mL mark.</p> <p>Syringe 1</p>
Abnormal	<p>Plunger of syringe 2 returns to the 60 mL mark.</p>

If abnormal, it may be caused by the following, so replace the valve with a new one.

- BD on magnetic valve faulty
- Malfunction of the solenoid inside the valve

4 Reconnect the tubes disconnected in step 2.

“Reconnecting the TOALON Tube” (p. 4-52)

8

System Settings

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8-1. System Settings

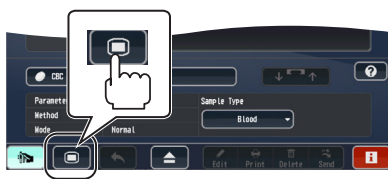
On the Settings screen, settings can be changed as appropriate for the purpose and condition of the analyzer.

NOTE: Only the administrator or qualified personnel can change system settings.

8-1-1. Opening the Settings Screen

Switching the operator to Technical User allows the Advanced screen to be displayed.

 “Advanced” (p. 8-16)



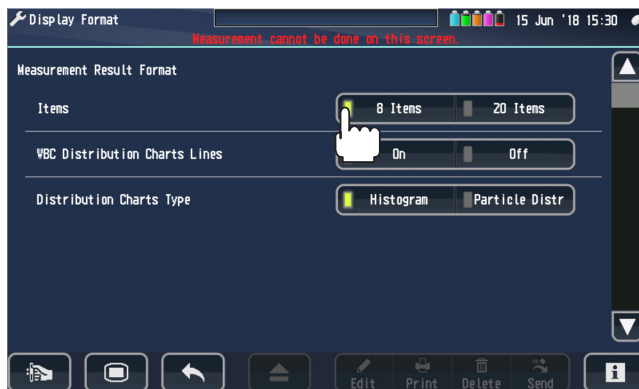
1 Touch  at the lower left to open the Main Menu screen.

2 Touch [Settings] on the Main Menu screen. The Settings screen opens.



8-1-2. Changing Settings

Touch a key to change settings.



Example: Display Format screen

8-1-3. Sample Type

The upper and lower limits for measurement values can be set according to sample type. The upper and lower limits for the selected sample type become the criteria for abnormal values.

Setting Item		Settings (___ : Default Setting)	Description	
Sample Type	On, Off (check boxes)	Blood, Male, Female, Child, Infant, Other 1 to Other 4 (The above are the default names.)	Selects the sample types displayed in the sample type drop-down menu in the Measurement screen.	
	Name	Up to 8 characters (Blank)	Names can be set for the chosen sample types.	
	Normal Range Low - High	WBC (10 ³ /μL)	0 to 299.90 (4.00 - 9.00)	Set the upper and lower limits of the normal range. These become the judgment criteria for abnormal values for the parameter. Touch [Default] to reset the upper and lower limit values to their default values.
		RBC (10 ⁶ /μL)	0 to 9.99 (3.76 - 5.70)	
		HGB (g/dL)	0 to 29.90 (12.00 - 18.00)	
		HCT (%)	0 to 99.9 (33.5 - 52.0)	
		MCV (fL)	20.0 to 199.0 (80.0 - 100.0)	
		MCH (pg)	10.0 to 50.0 (28.0 - 32.0)	
		MCHC (g/dL)	10.0 to 50.0 (31.0 - 35.0)	
		RDW-CV (%)	0 to 50.0 (11.6 - 14.0)	
		RDW-SD (fL)	0 to 199.0 (42.8 - 51.0)	
		PLT (10 ³ /μL)	0 to 1490.0 (150.0 - 350.0)	
		PCT (%)	0 to 2.99 (0.16 - 0.33)	
		MPV (fL)	0 to 20.0 (7.0 - 11.0)	
		PDW (%)	0 to 50.0 (15.5 - 18.9)	
		P-LCR (%)	0 to 100.0 (20.0 - 58.0)	
		LY% (%)	0 to 100.00 (17.00 - 57.00)	
		MO% (%)	0 to 100.00 (0.00 - 10.00)	
		GR% (%)	0 to 100.00 (42.00 - 85.00)	
	LY# (10 ² /μL)	0 to 2999.0 (7.0 - 51.0)		
MO# (10 ² /μL)	0 to 2999.0 (0.0 - 9.0)			
GR# (10 ² /μL)	0 to 2999.0 (17.0 - 77.0)			
Normal Range	CRP (mg/dL) ¹	0.10 to 80.00 (1.00)	Set the standard value.	
	HbA1c (%) ¹	4.0 to 13.0 (6.0 - 6.5)		
	ESR (mm) ²	0 to 200 (20)		

¹ Only available for the MEK-1303.

² Only available for the MEK-1305.

8-1-4. Sensitivity/Threshold

When counting particles, such as each kind of cell, configure the settings of the analyzer to match the characteristics of the particle to count.

NOTE: Do not change the sensitivity/threshold settings to adjust the precision of counting human blood cells.

Setting Item		Settings (___: Default Setting)	Description	
Sensitivity/Threshold	WBC	Sensitivity	1 to 15 (<u>5</u>)	
		Threshold	1 to 15 (<u>4</u>)	
	RBC	Sensitivity	1 to 15 (<u>5</u>)	
		Threshold	1 to 15 (<u>10</u>), <u>Auto</u>	When Auto Threshold is set to “On”, the Threshold setting is set to “Auto”.
		Auto Threshold	<u>On</u> , Off	Sets whether to set the threshold automatically.
PLT	Threshold	1 to 15 (<u>5</u>)	Sets the threshold.	


8-1-5. Measurement

Setting Item		Settings (___: Default Setting)	Description	
Measurement	Routine	Remeasure Message	<u>On</u> , Off	Sets whether to display the “Auto Remeasuring” message in the message display area.
		Use Previous Measurement Conditions	<u>On</u> , Off	Sets whether to continue using the previously-set measurement mode for subsequent measurements. When set to “Off”, the uppermost measurement conditions of the parameter settings are used.
		Show Patient Info Edit Key	<u>On</u> , Off	Sets whether to show the [Patient Information] key in the Measurement screen.
		Default Display in the Results Screen	<u>Histogram</u> , Normal Range	Select the data displayed in the additional data display area when the Measurement Results screen is opened. (When the analyzer detects a flag or message, a flag or message (icon) is displayed regardless of this setting.)
		ESR TEMP corr Temperature	15°C to 35°C (<u>18°C</u>)	Set the environment temperature (room temperature) used for calculating “ESR TEMP corr.” (p. 2-14).
		Sampling Nozzle Operation	On, <u>Off</u>	Sets whether the sampling nozzle operation key for stowing the nozzle is shown in the Measurement screen during CBC measurements in open mode.
		Lower Sampling Nozzle After Measurement	<u>On</u> , Off	Sets whether to lower the sampling nozzle after CBC measurements in open mode.
		Pre-dilution Blood Volume	10 µL, <u>20 µL</u>	Sets the sample volume for measuring in pre-dilution mode.
	Parameter Settings	“Registering the Parameter Settings” (p. 8-5)		
	QC Parameter Settings	“Registering the QC Parameter Settings” (p. 8-6)		

8-1-5-1. Registering the Parameter Settings

You can register the parameter settings that can be selected on the Measurement screen.



 To change the order, select the parameter setting and touch [↑] or [↓].

The default settings for the parameter settings are as follows.

MEK-1301

Item	Mode	Operation Method
CBC	Normal	Open
CBC	Capillary	Open
CBC	WBC high concentration	Open
CBC	Pre-dilution	Open
—	—	—

MEK-1302

Item	Mode	Operation Method
CBC	Normal	Closed
CBC	WBC high concentration	Closed
CBC	Normal	Open
CBC	Capillary	Open
CBC	WBC high concentration	Open

MEK-1303

Item	Mode	Operation Method
CBC+CRP	Normal	Closed
CBC+CRP	Normal	Open
CBC+CRP	Capillary	Open
CBC	Normal	Closed
HbA1c	Normal	Closed

MEK-1305

Item	Mode	Operation Method
CBC+ESR	Normal	Open
CBC	Normal	Open
CBC	Capillary	Open
CBC	Pre-Dilution	Open
CBC	WBC High	Open

When Changing the Parameter Setting Items

You can change the individual setting items of the default parameter settings.

- 1 Select the parameter to change and touch [Edit].




- 2 Edit Parameter Settings window opens. Touch [Clear].



- 3 Set Name, Parameter, Method, and Mode. Touch [OK].

Select in order of Parameter, Method, and Mode. The mode that can be selected depends on the selected parameter and method.



 If a name is not entered, the name is automatically set according to the selected parameter, mode and method.

8-1-5-2. Registering the QC Parameter Settings

You can register the QC parameter settings. The procedure is the same as “Registering the Parameter Settings”.

 “Registering the Parameter Settings” (p. 8-5)

8-1-6. Display Format

Setting Item		Settings (___: Default Setting)	Description
Measurement Result Format	Items	8 items, <u>20 items</u>	Sets the number of items to display on the Measurement Results screen.
	WBC Distribution Charts Lines	On, <u>Off</u>	Sets whether to show the classification lines on the WBC distribution chart.
	Distribution Charts Type	Histograms, <u>Particle Distr</u>	Sets whether to show the distribution chart as a histogram or as a particle (granularity) distribution chart.
Data List Items	Select ID Display	Sample ID, Patient ID, <u>Both</u>	Select the ID shown in Data List screen. This can only be selected when ID setting (under Operation) is set to "Both".
	Display Items	OFF: Sample type	Sets the items to display on the Data List screen.
Display Format	Highlight Flag	Leukocytosis (10 ³ µL)	Sets the flag to highlight in the Data List and Measurement Results screens.
		Leukopenia (10 ³ µL)	
		Poor Hemolyzation	
		Erythrocyte Ghost	
		Lymphocyte Analysis Impossible	
		Granulocyte Analysis Impossible	
		Leukocyte Unclassifiable	
		Large Nucleated Cells	
		Erythrocytosis (10 ⁶ µL)	
		Anemia (g/dL)	
		Anisocytosis (%)	
		Microcytosis (fL)	
		Macrocytosis (fL)	
		Hypochromia (g/dL)	
		Abnormal MCHC	
		Thrombocytosis (10 ³ µL)	
		Thrombocytopenia (10 ³ µL)	
		PLT Clumps	
		PLT-RBC Interference	
		Abnormal CRP Response (MEK-1303 only)	
High CRP Levels (mg/dL) (MEK-1303 only)			

Setting Item		Settings (___: Default Setting)	Description
Display Format	Highlight Flag	High ESR (MEK-1305 only)	<u>ON</u> , OFF 0 to 200 (when set to ON: 20)
		High RBC Aggregation (MEK-1305 only)	<u>ON</u> , OFF
		RBC Aggregation Delay (MEK-1305 only)	<u>ON</u> , OFF
	Show Color Message for Judgment (Red)	Reagent Priming Error	<u>On</u> , Off
		Carryover	<u>On</u> , Off
		Short Sample	<u>On</u> , Off
	Show Color Message for Judgment (Orange)	Insufficient Stirring	<u>On</u> , <u>Off</u>
		WBC High	<u>On</u> , Off
		Lysing/Chyle/Cold Agglutination	<u>On</u> , Off
		PLT Clumps	<u>On</u> , Off
	Show Color Message for Judgment (Yellow)	Poor Hemolyzation	<u>On</u> , Off
		WBC Panic Value (10 ³ µL)	<u>On</u> , Off Lower limit: 1.50, Upper limit: 20.00
		HGB Panic Value (g/dL)	<u>On</u> , Off Lower limit: 5.00, Upper limit: 20.0
	Show Color Message for Judgment (Yellow)	PLT Panic Value (10 ³ µL)	<u>On</u> , Off Lower limit: 30.00, Upper limit: 1000.00
		common	Keyboard

Sets the flag to highlight in the Data List and Measurement Results screens.

Set the color messages to display in the Measurement Results screen.

The Data List and Measurement Results screens are also highlighted along with the color message.

Select the on-screen keyboard type.

8-1-7. Date and Time

Setting Item		Settings (___: Default Setting)	Description
Date and Time	Date format	YYYY/MM/DD, DD/MM/YYYY, 'YY MM DD, DD MM 'YY, <u>DD MMM 'YY</u> , MMM DD 'YY	Sets the date and time format.
	Date and time	Year, month, day, hour, minute	YYYY, MM, DD, hh, mm (<u>current date and time</u>)

Sets the date and time.

8-1-8. Output Settings

		Setting Item	Settings (___: Default Setting) and Keys	Description	
Output Settings	Compact Printer port	Basic Settings	Print after Measurement	On, <u>Off</u>	Sets whether to automatically print the measurement results after measurement.
			Print Key Output	On, <u>Off</u>	Sets whether to print when [Print] is touched on any window.
			Format	<u>Compact</u> (fixed)	The printing format is fixed to “Compact”.
		Format: Compact Printer	CBC Print Item Settings	20 items, 8 items	Selects each item for which to apply.
			Print Normal Range Graph	On, <u>Off</u>	Sets whether to print the normal range graph.
			Print WBC Distribution Diagram	On, <u>Off</u>	Sets whether to print the WBC distribution charts.
			Print RBC Distribution Diagram	On, <u>Off</u>	Sets whether to print the RBC distribution charts.
			Print PLT Distribution Diagram	On, <u>Off</u>	Sets whether to print the PLT distribution charts.
			Print Chart Diagram	On, <u>Off</u>	Sets whether to print the chart diagram.
	Print Flag/Message	On, <u>Off</u>	Set whether to print flags and messages.		
	Print Research Parameters	On, <u>Off</u>	Set whether to print the research parameters.		
	Auto Print Copies (1 to 3)	<u>1</u> to 3	Sets the number of copies to be printed when “Print after Measurement” is set to “On”.		
	Serial Port 1	Basic Settings	Send After Measurement	On, <u>Off</u>	Sets whether to automatically send the measurement results after measurement.
			Send Key Function	On, <u>Off</u>	Sets whether to enable the Send key output.
			Host (MEK-1301, MEK-1302, MEK-1305 only)	<u>CHM-4100 Series</u>	Select the model of the external device. The communication setting for the selected device is applied to the analyzer.
			Format	ASTM, <u>Other</u>	Sets the communication format.
		Comm. Settings including Baud Rate	Baud Rate	19200, <u>9600</u> , 4800	Sets the format for data sent to the device connected to the serial port 1.
			Data Bits	<u>8</u> , 7	
Parity			<u>Even</u> , Odd, None		
Stop Bits			<u>1</u> , 2		
Format: Other		Mode	<u>MEK-6500</u> (fixed)	Set when “Other” is selected under “Format” from the “Basic Settings”.	
		Format	<u>YY/MM/DD</u> , DD-MM-YY		
	ID Digits	4 digits, <u>13 digits</u>			
	Number of CBC Items	<u>18 items</u> , 8 items			

Setting Item		Settings (___: Default Setting) and Keys	Description		
Output Settings	Serial Port 2	Basic Settings	Send After Measurement	<u>On</u> , Off	Sets whether to automatically print the measurement results after measurement.
			Send Key Function	<u>On</u> , Off	Sets whether to enable the Send key output.
			Auto Print Data from External Device (MEK-1301, MEK-1302, MEK-1305 only)	<u>On</u> , Off	Set whether to automatically print data sent from the external device connected to the analyzer.
			Format	<u>Other</u> , Card	Sets the communication format.
	Comm. Settings including Baud Rate	Baud Rate	19200, <u>9600</u> , 4800	Sets the format for data sent to the device connected to the serial port 2.	
		Data Bits	<u>8</u> , 7		
		Parity	<u>Even</u> , Odd, None		
		Stop Bits	<u>1</u> , 2		
	Format: Other	Mode	MEK-1301, MEK-1302 or MEK-1305: <u>MEK-6500</u> (fixed)	Set when “Other” is selected under “Format” from the “Basic Settings”.	
			MEK-1303: <u>CHM-4100</u> , <u>MEK+CHM</u>		
		Format	<u>YY/MM/DD</u> , <u>DD-MM-YY</u>		
		ID Digits	4 digits, <u>13</u> digits		
	Format: Card Printer	Number of CBC Items ¹	<u>18</u> items, 8 items	Set when “Other” is selected under “Format” from the “Basic Settings” and “MEK+CHM” is selected under “Mode” from the “Format: Other”.	
			Number of CBC Items		<u>20</u> items, 8 items
			Format		<u>YY/MM/DD</u> , <u>DD-MM-YY</u>
			Top Space		1 to 50 (<u>5</u>)
			Left Space		<u>0</u> to 26
	Row Size	5 to 60 (<u>10</u>)			
	USB Port	Basic Settings	Print after Measurement	On, <u>Off</u>	Sets whether to automatically print the measurement results after measurement.
			Print Key Function	On, <u>Off</u>	Sets whether to enable the Send key output.
Print Protocol			<u>PCL3GUI</u> , <u>PCL5/5e/5c</u>	Sets the print protocol.	
Print Items			<u>Distribution</u> , Simple Chart	Sets the items to print.	
Print Items		Print Header Comment	(Optional)	Set the content to be printed in the header.	

Setting Item		Settings (___: Default Setting) and Keys	Description		
Output Settings	LAN Port	IP Address	<u>192.168.0.82</u>	Sets the IP address of the analyzer.	
		Subnet Mask	<u>255.255.255.0</u>	Sets the subnet mask.	
		Default Gateway	<u>0.0.0.0</u>	Sets the default gateway.	
		ASTM Communication	On, <u>Off</u>	Sets whether to use the communication protocol.	
		PCL Communication	On, <u>Off</u>		
		Maintenance Systems Communications	On, <u>Off</u>	The Maintenance Systems Communications setting is for use in Japan only. Do not set this setting to ON.	
		ASTM Communication Settings	Host IP Address	<u>192.168.0.83</u>	Set these when “On” is selected under “ASTM Communication” from the “LAN Port”.
			Ports	<u>51001</u>	
			Auto Output After Measurement	On, <u>Off</u>	
			Send Key Function	On, <u>Off</u>	
	Output Distribution Chart		On, <u>Off</u>		
	PCL Communication Settings	Host IP Address	<u>192.168.0.84</u>	Set when “On” is selected under “PCL Communication” from the “LAN Port”.	
		Ports	<u>9100</u>		
		Print after Measurement	On, <u>Off</u>		
		Print Key Function	On, <u>Off</u>		
		Print Protocol	<u>PCL3GUI, PCL5/5e/5c</u>		
		Print Items	<u>Distribution, Simple Chart</u>		
SD Card	Output CSV File	Auto Output After Measurement	On, <u>Off</u>	Sets whether to automatically output a CSV file after measurement.	
		Send Key Function	On, <u>Off</u>	Sets whether to output a file when the Send key is touched.	
	Save/Restore Data	System Settings	Backup, Restore	Saves or restores the system setting data.	
		Data List	Backup, Restore	Saves or restores the data list items.	
Format SD Card		Run	Prepare the SD card to receive data. NOTE: This deletes all the data items inside the SD card. Take a backup beforehand if necessary.		
Common	Automatically Output	Print	<u>All, Checked</u>	Select the range of the data items to be printed or sent to another device automatically after measurements. • All: All the data items are printed or sent to another device. • Checked: Only the data items that are checked by Auto Check are printed or sent to another device.	
		Send			

¹ Only available for the MEK-1303.

8-1-9. Units

The batch settings for the units of each convention are shown in the table below.
The units can be changed freely.
The default setting is "USA".

		Settings (___: Default Setting)					Description
		Japan	USA	SI	SI MOD	MIXED	
Units	WBC	10 ² /μL	10 ³ /μL	10 ⁹ /L	10 ⁹ /L	10 ⁹ /L	Set the unit system for the measurement parameters.
	RBC	10 ⁴ /μL	10 ⁶ /μL	10 ¹² /L	10 ¹² /L	10 ¹² /L	
	HGB	g/dL	g/dL	g/L	mmol/L	g/L	
	HCT	%	%	L/L	%	%	
	PLT	10 ⁴ /μL	10 ³ /μL	10 ⁹ /μL	10 ⁹ /L	10 ⁹ /L	
	RDW-CV	%	%	%CV	%CV	%CV	
	PDW	%	%	%	%CV	%	
	CRP ¹	mg/dL	mg/L	mg/L	mg/dL	mg/dL	
	HbA1c ¹	%	%	mmol/mol	mmol/mol	%	

¹ Only available for the MEK-1303.

8-1-10. Volume and Brightness

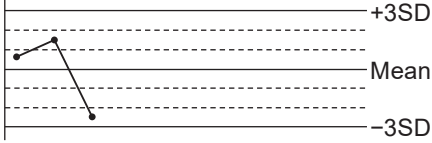
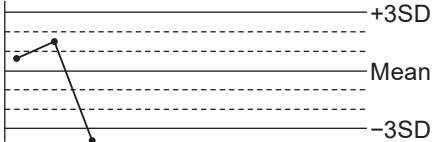
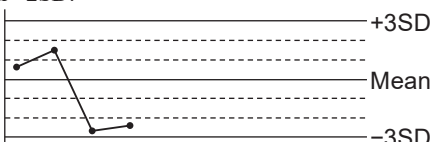
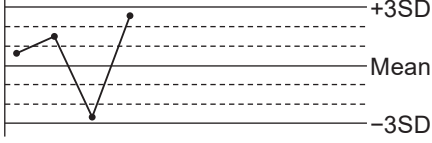
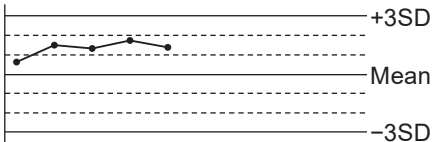
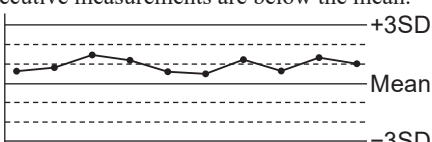
Setting Item		Settings (___: Default Setting)	Description
Date and Time	Measure count sound	On, Off	Sets whether to output a count sound when counting blood cells.
	Volume	Off, Low, Mid, High	Sets the buzzer volume.
	Screen brightness	Bright, Normal, Dark	Sets the brightness of the LCD screen.

8-1-11. Operation

Setting Item		Settings (___: Default Setting)	Description
Operation	Background Check during Self Check	On, Off	Sets whether to perform background checks during a self check.
	Auto Login	On, Off	Sets whether to automatically log in when the analyzer is turned on. <ul style="list-style-type: none"> On: Log in automatically when the power is turned on. Off: Turn on the power, and then log in manually.
	Auto Check	All, No Error, Normal Only, Off	Sets whether to automatically check (confirm) the measurement results after measurement. <ul style="list-style-type: none"> All: Automatically checks (confirms) all measurement results. No Error: Error data is left as unconfirmed, but other data is checked (confirmed). Normal Only: Automatically checks (confirms) data for normal measurement results only. Off: All the measurement results are checked (confirmed) manually.
	Initialize ID at Power On	On, Off	Sets whether to initialize the sample ID or patient ID to 0001 when turning the power on or off.

Setting Item			Settings (___: Default Setting)	Description	
Operation	Sample ID Setting Method		Auto, <u>Manual</u>	<p>Selects the method for setting the sample IDs.</p> <ul style="list-style-type: none"> • Auto: The 4 digits to the right are incremented automatically from 0001 to 9999. If characters other than numbers are entered to the 4 digits to the right, the next ID is reset to start from 0001. • Manual: The ID is initialized on each measurement. 	
	ID Digits		20 digits, <u>13 digits</u> , 4 digits	Sets the number digits to display and input for the ID.	
	ID setting		Sample ID, Patient ID, <u>Both</u>	<p>Sets the IDs to be used.</p> <ul style="list-style-type: none"> • Sample ID: Shows the sample IDs. • Patient ID: Shows the patient IDs. • Both: Shows both the sample IDs and patient IDs. 	
	Auto Cleaning Times	1st	Hour	<u>00</u> to <u>23</u>	<p>Set the number of times, clock time and operation for automatic cleaning or self check.</p> <p>NOTE: If the analyzer power will not be turned off for 24 hours or more, set the "Auto Cleaning Time" so that cleaning and self check are performed for every 24 hours. When setting the "Auto Cleaning Time", make sure to set the time when the analyzer will not be used. The analyzer does not perform the operations set in "Auto Cleaning Time" if some operation such as measurement is in progress.</p>
			Minute	<u>00</u> to <u>59</u>	
			Operation	<u>Clean</u> , <u>Self check</u> , <u>Off</u>	
		2nd	Hour	<u>00</u> to <u>23 (6)</u>	
			Minute	<u>00</u> to <u>59</u>	
			Operation	<u>Clean</u> , <u>Self check</u> , <u>Off</u>	
		3rd	Hour	<u>00</u> to <u>23</u>	
			Minute	<u>00</u> to <u>59</u>	
			Operation	<u>Clean</u> , <u>Self check</u> , <u>Off</u>	
		4th	Hour	<u>00</u> to <u>23</u>	
			Minute	<u>00</u> to <u>59</u>	
			Operation	<u>Clean</u> , <u>Self check</u> , <u>Off</u>	
Sleep Timer	Put Screen to Sleep		On, <u>Off</u>	Set whether to put the screen to sleep if the analyzer is not operated by the user for a specified time period.	
	Time to Sleep	Minute	5 to 999 (<u>30</u>)		
Language			Japanese, <u>English</u> , German, French, Italian, Russian, Turkish, Spanish, Czech, Serbian, Portuguese, Romanian, Greek	Sets the display language.	

8-1-12. QC (Quality Control)

Setting Item		Settings (__: Default Setting)	Description	
QC	QC		On, Off When “Off” is selected, the status icon becomes grey, and quality control is not performed.	
	Quality Control at Every Login		On, Off When set to “On” in quality control, sets whether to perform quality control on each login.	
	Auto Judgment Method	Assay Value/Limit	On, Off	Sets whether to use the assay values and limits.
		Average/SD	On, Off	Sets whether to use the average and standard deviations.
		Westgard Multirules	On, Off	Sets whether to use Westgard multirules.
	Average/SD	X limit	$\pm 2SD, \pm 3SD$	Sets the calculation method for X limit.
	Auto Judgment Method Westgard Multirules	1-2S	On, Off	When set to “On”, the quality control is failed when a single measurement exceeds the mean $\pm 2SD$. 
		1-3S	On, Off	When set to “On”, the quality control is failed when a single measurement exceeds the mean $\pm 3SD$. 
		2-2S	On, Off	When set to “On”, the quality control is failed when two consecutive measurements exceed the mean $+2SD$ or the mean $-2SD$. 
		R-4S	On, Off	When set to “On”, the quality control is failed when the difference between two consecutive measurements exceeds 4SD. 
4-1S		On, Off	When set to “On”, the quality control is failed when four consecutive measurements exceed the mean $+1SD$ or four consecutive measurements exceed the mean $-1SD$. 	
10-X		On, Off	When set to “On”, the quality control is failed when ten consecutive measurements are above the mean or ten consecutive measurements are below the mean. 	

Setting Item		Settings (___: Default Setting)	Description	
QC	X̄B Settings	Batch number	20 to 100 (20)	
		MCV Median (fL)	20.0 to 199.0 (89.5)	
		MCV Limit (fL)	0 to 10.0 (3.0)	
		MCH Median (pg)	10.0 to 50.0 (30.5)	
		MCH Limit (pg)	0 to 10.0 (1.0)	
		MCHC Median (g/dL)	10.0 to 50.0 (33.8)	
		MCHC Limit (g/dL)	0 to 10.0 (1.0)	
	QC Graph Other Items	Selected Parameter 1	WBC, RBC, HGB, HCT, MCV, MCH, MCHC, RDW-CV, RSW-SD, PLT, PCT, MPV, PDW, LY%, MO%, GR%, CRP (MEK-1303 only), ESR (MEK-1305 only), Not Selected	Select the parameters to display on the QC Trendgraph screen when [Other] is touched.
		Selected Parameter 2		
		Selected Parameter 3		
		Selected Parameter 4		
Selected Parameter 5				

How to calculate limits for L-J control

The upper and lower limits for L-J control are automatically calculated as follows.

Upper limit: $(+3SD) = X + 3\sigma$

Lower limit: $(-3SD) = X - 3\sigma$

(X: mean, σ : standard deviation)

8-1-13. Reagent Management

Setting Item		Settings (___: Default Setting)	Description	
Reagent Management	Show Units	ISOTONAC•3/4 (Diluent)	mL/L	
		CLEANAC•710 (Detergent)	mL/L	
		CLEANAC•3 (Detergent)	mL/L	
		HEMOLYNAC•310 (Hemolysing Reagent)	mL/L	
		Waste	mL/L	
	Waste Settings	Waste Container Size	10.00	Enter the size of the waste container that is connected to the analyzer.
		Waste Sensor	On, Off	Set to On to use an optional waste sensor. The waste fluid volume count operation depends on this setting. <ul style="list-style-type: none"> • On: The waste sensor is enabled and the analyzer does not monitor the waste fluid volume. Measurement continues even if the warning level is exceeded. • Off: The analyzer monitors the waste fluid volume. Measurement is stopped if the warning level is exceeded. When the waste container is not used and the waste fluid volume does not have to be monitored, set the "Waste Container Size" to "0 L". The analyzer stops monitoring the waste fluid volume.

8-1-14. Advanced

NOTE: It is necessary to switch the operator to Technical User in order to open the Advanced screen.

- 1 Switch the operator to Technical User.

 | “Changing the Operator to a Technical User” (p. 7-29)

- 2 Touch [ADV] on the Settings screen to open the Advanced screen.

 | “Opening the Settings Screen” (p. 8-2)



Setting Item		Settings (___:Default Setting)	Description	
Advanced	Protein Cleaning Frequency	CBC Measurement Count	1 to 200 (<u>150</u>)	
		Immunoassay Measurement Count ¹	1 to 100 (<u>75</u>)	
		ESR Measurement Count ²	1 to 200 (<u>150</u>)	
	Histogram Smoothing		On, Off	Sets whether to smooth the display of histograms or not.
	High Altitude Mode Setting		On, Off	Sets whether to put the analyzer in sensitive mode or not.
	PC Format		On, Off	Confirms whether to display the PC transfer format or not.
	ID for External Output		Load from Left, Load from R	Sets the ID format when outputting externally.
	Quality Control Mode		X-R, L & J	Sets the quality control mode.
	Facility Coefficient	CRP Slope ¹	800 to 1200 (<u>1000</u>)	Sets the facility coefficient. NOTE: The facility coefficient is applied to human blood only. If it is set to a value other than 1000, coefficient calculation must be performed for adjustment. Be sure to set the proper facility coefficient.
		HbA1c Slope ¹	900 to 1100 (<u>1000</u>)	
ESR Slope ²		500 to 2000 (<u>1000</u>)		
Nozzle Position for Closed Mode Aspiration ³		Normal, Raised	In closed measurement, this switches the downward movement position of the sampling nozzle when aspirating.	

Setting Item		Settings (___:Default Setting)	Description	
Advanced	Open Aspirate Height (0 to 6)	<u>0</u> to 6	In open measurement, this switches the downward movement position of the sampling nozzle when aspirating.	
	Show MiniNet Key	On, <u>Off</u>	Sets whether to display the MiniNet transfer format or not.	
	CBC+ESR Adjustment Indexes for Differences in each Mode ²	WBC Related	900 to 1100 (<u>1010</u>)	Sets the coefficient for correcting the CBC value of the CBC+ESR measurement. NOTE: Do not change the CBC+ESR adjustment indexes for Differences in each Mode setting from the default value.
		RBC Related	900 to 1100 (<u>980</u>)	
	MEK-6500 Compatible View	On, <u>Off</u>	Change the maximum number of display digits for WBC, LY, MO, GR, LY%, MO%, GR%, HGB and PLT display values to MEK-6500 compatible format.	
Capillary Volume ¹	<u>10</u> μ L, 20 μ L	Change the inspiration volume for CBC and CBC+CRP measurement in capillary mode.		

¹ Only available for the MEK-1303.

² Only available for the MEK-1305.

³ Only available for the MEK-1302/MEK-1303.

8-2. Backing Up System Settings

The system settings can be backed up onto an SD card.

NOTE • It is only possible to save the current settings. One SD card can only hold one backup set.

- Reagent management settings and settings that cannot be changed by the user (Advanced, Maintenance Systems Communications) cannot be backed up.

1 Turn off the analyzer and switch off the main power on the rear of the analyzer.

2 Insert the SD card into the analyzer SD card slot.

NOTE: Handle the SD card according to “SD Cards” in the operator’s manual.

3 Switch on the main power on the rear of the analyzer to turn the analyzer on.

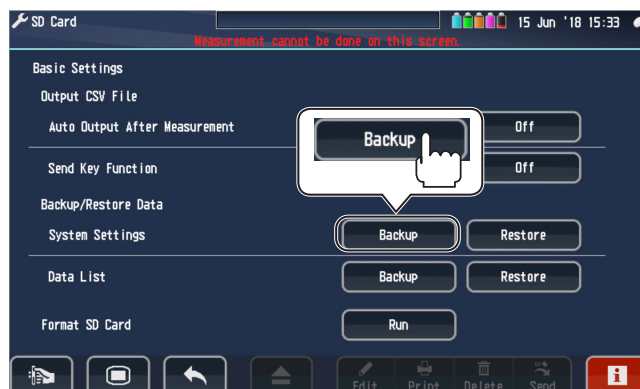
4 On the Settings screen, touch [Output Settings] then [SD Card].

 | “Opening the Settings Screen” (p. 8-2)

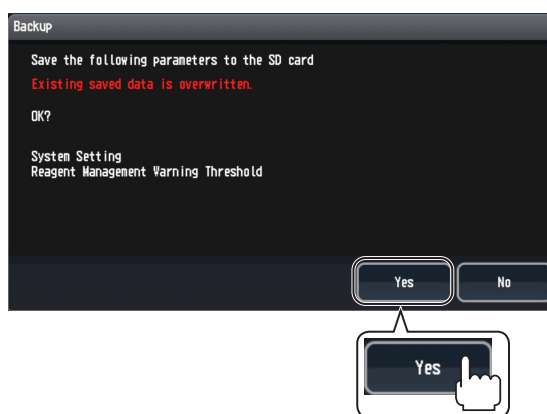


5 Touch the [Backup] key of [System Settings] under [Backup/Restore Data].

NOTE: Do not touch another key.



- 6** When a confirmation message appears, touch [Yes].



- 7** Turn off the analyzer and switch off the main power on the rear of the analyzer.
- 8** Eject the SD card.

8-3. Restoring System Settings

Previously backed up data can be restored from an SD card.

 | “Backing Up System Settings” (p. 8-18)

NOTE: Reagent management settings and settings that cannot be changed by the user (Advanced, Maintenance Systems Communications) cannot be restored.

1 Take a backup of the system by following the procedure described in Steps **1** to **3** of “Backing Up System Settings” (p. 8-18), then insert the SD card in which the backup data is saved into the analyzer SD card slot.



2 On the Settings screen, touch [Output Settings] then [SD Card].

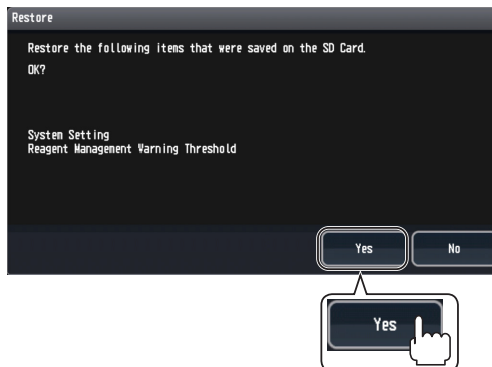


3 Touch the [Restore] key of [System Settings] under [Backup/Restore Data].

NOTE: Do not touch another key.



4 When a confirmation message appears, touch [Yes].



5 Turn off the analyzer by following the procedure described in Steps **7** to **8** of “Backing Up System Settings” (p. 8-18), then eject the SD card.

8-4. Backing Up the Data List Items

The items in the data list can be backed up onto an SD card.

NOTE • It is only possible to save the current settings. One SD card can only hold one backup set.

- Attempting to back up to an SD card which already contains backup data overwrites the previous backup data.

1 Insert the SD card to save the backup data into the SD card slot on the analyzer by following the procedures described in Steps 1 to 3 of “Backing Up System Settings”, then turn the analyzer power on.

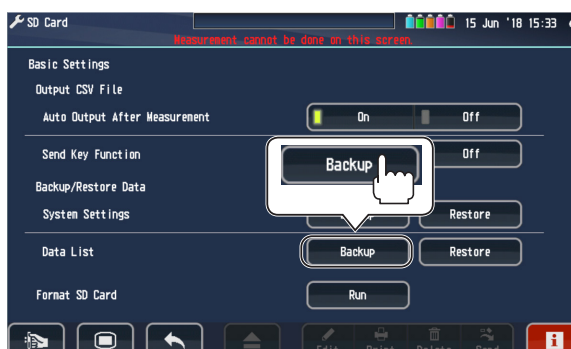


2 On the Settings screen, touch [Output Settings] then [SD Card].

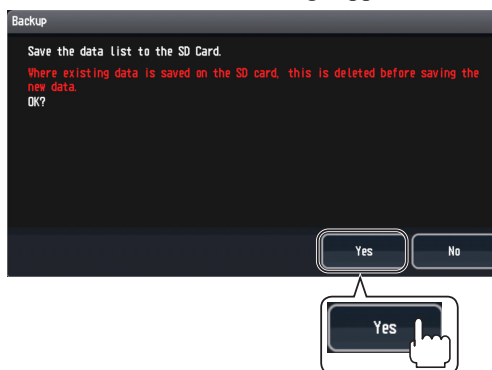


3 Touch the [Backup] key of [Data List] under [Backup/Restore Data].

NOTE: Do not touch another key.



4 When a confirmation message appears, touch [Yes].



5 Turn off the analyzer power by following the procedures described in Steps 7 to 8 of “Backing Up System Settings”, then eject the SD card.

8-5. Restoring the Data List

Previously backed up data can be restored from an SD card.

 “Backing Up the Data List Items” (p. 8-21)

- 1 Insert the SD card in which the backup data is saved into the SD card slot on the analyzer by following the procedures described in Steps 1 to 3 of “Backing Up System Settings”, then turn the analyzer power on.



- 2 On the Settings screen, touch [Output Settings] then [SD Card].

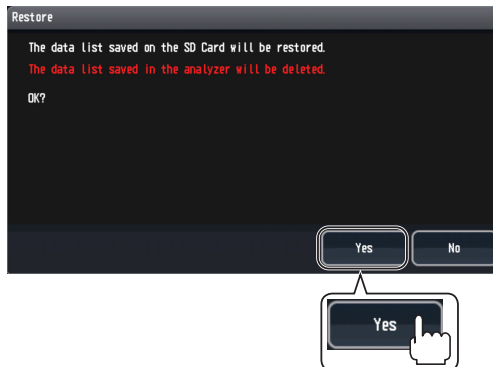


- 3 Touch the [Restore] key of [Data List] under [Backup/Restore Data].

NOTE: Do not to touch another key.



- 4 When a confirmation message appears, touch [Yes].



- 5 Turn off the analyzer power by following the procedures described in Steps 7 to 8 of “Backing Up System Settings”, then eject the SD card.

8-6. Initializing System Settings

8-6-1. Opening the Initialize Screen

On the Settings screen, touch [Initialize].

 “Opening the Settings Screen” (p. 8-2)



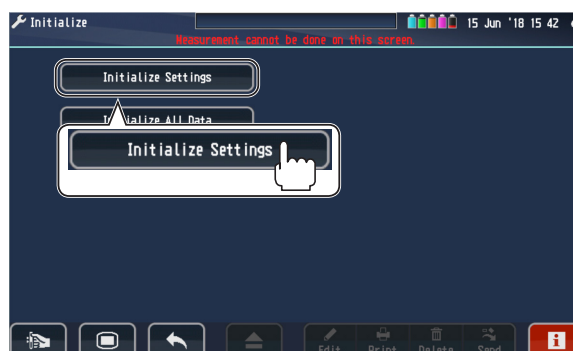
8

8-6-2. Initializing the Settings

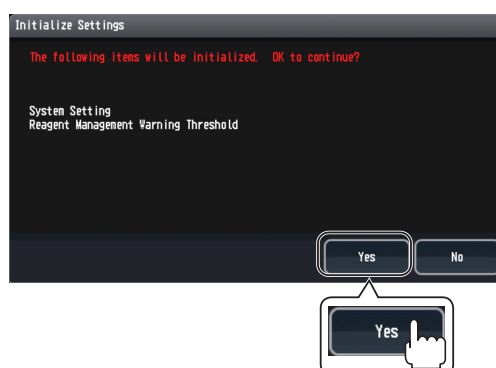
You can return the following settings to their default.

- System Settings
- Warning Level settings on the Reagent Management screen

1 On the Settings screen, touch [Initialize] then [Initialize Settings].



2 When a confirmation message appears, touch [Yes].



8-6-3. Initializing the Settings and Deleting All Data

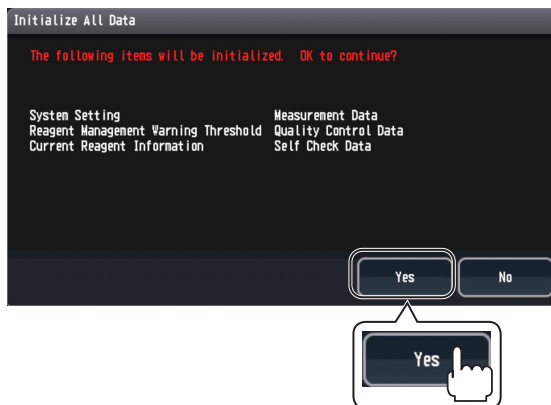
You can return the following settings to their default as well as deleting the following data items.

- System Settings
- Warning Level settings on the Reagent Management screen
- Current reagent information
- Measurement values
- Quality control data
- Self check results

1 On the Settings screen, touch [Initialize] then [Initialize All Data].



2 When a confirmation message appears, touch [Yes].



8-6-4. Initializing the SD Card

You can initialize the SD card inserted in the analyzer.

- 1 Insert the SD card to initialize into the SD card slot on the analyzer by following the procedures described in Steps 1 to 3 of “Backing Up System Settings”, then turn the analyzer power on.



- 2 On the Settings screen, touch [Output Settings] then [SD Card].

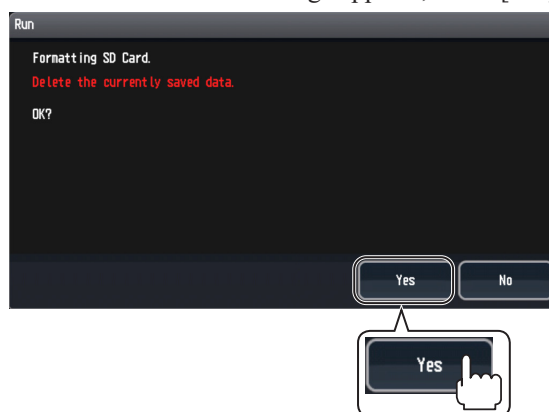


- 3 Touch the [Run] key beside [Format SD Card].

NOTE: Do not to touch another key.



- 4 When a confirmation message appears, touch [Yes].



- 5 Turn off the analyzer power by following the procedures described in Steps 7 to 8 of “Backing Up System Settings”, then eject the SD card.

9

Maintenance Procedure

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9-1. Periodic Inspection

The periodic inspection should be performed once every six months or at the period specified by local law. Make sure that the analyzer operates properly and replace the consumables.

If the periodic inspection is not performed, degradation or loss of function may go unnoticed and lead to misdiagnosis.

The following sections contain details on the inspection contents and inspection procedures required to keep the analyzer operating correctly. Periodic inspections should be performed by qualified service personnel, and the results of the inspections should be written in the “Maintenance Check Sheet” at the end of this manual. Keep the “Maintenance Check Sheet” in a safe place as a record of the analyzer periodic inspections. Make copies of the “Maintenance Check Sheet” at the end of the manual for use. The item numbers listed in the “Maintenance Check Sheet” correspond to the numbers of the check items in “Inspection Procedure” (p. 9-3).

9-2. Inspection Procedure

NOTE: Perform maintenance inspections in the order listed.

Before starting inspections, open the Periodic Maintenance window of the Maintenance screen and check for any parts that need to be replaced.



“Replacing Periodic Replacement Parts” (p. 7-25)

Reagents

1 Visually check the following.

- There are enough reagents.

Inform the customer when the level of consumables is low.

- Check that Nihon Kohden products are used as reagents.

The analyzer uses the reagents in the table below.

Name and Model		Supply Code	Packing Unit
Diluent	ISOTONAC•3	T436D	18 L
	ISOTONAC•4	—	20 L
Detergent	CLEANAC•710	T438H	2 L
		—	3 L
	CLEANAC•3	T438E	500 mL
		—	1 L
CBC Hemolysing reagent	HEMOLYNAC•310	T493D	250 mL

Name and Model		Supply Code	Packing Unit	
Test cartridge (for MEK-1303)	Celltac chemi CRP 4N	CR-420W	CR-420W	25 × 2 boxes
		CR-421W	CR-421W	25 × 1 box
	Celltac chemi HbA1c N	HA-420W	HA-420W	25 × 2 boxes
		HA-421W	HA-421W	25 × 1 box

- The reagent is not past the expiration date.

Appearance

2 Visually check the following.

If the outside or the reagent rack are dirty, clean them.

- There is no damage in the exterior and the exterior is not dirty or scratched.
- There is no fluid leakage.
- The aspiration unit or a switch or key is not cracked or loose.
- The labels are not dirty or peeling.
- The reagents are connected correctly, and the tubes are not broken, bent or clogged.
- The peripheral devices are connected correctly, and the connection cables are not damaged.
- Consumables such as recording paper have not run out.

9

Power Cord

3 Visually check whether the included three-prong power cord is being used and free of dirt, damage or tears in coating.

Basic Operations

4 Turn the analyzer ON and make sure it starts up normally.

5 Check to see if the date and time displayed at top right of the screen are correct. If they are incorrect, correct them on the System Setting screen.

6 Make sure there are no places that are not displayed on the display or that are remarkably discolored.

7 Make sure that when an on-screen key is pressed, the display of the key and where the panel is touched are the same. If the pressed point is out of alignment, take steps to correct it and avoid problems.



“Troubleshooting” (p. 3-67)

Checking Inside the Analyzer

WARNING

Always wear rubber gloves to protect yourself from infection.

- NOTE**
- During a maintenance inspection, reset the usage count of periodic replacement parts after completing all the checks inside the analyzer (checking and/or replacing periodic replacement parts).
 - Give all due care to not directly touch any parts to which a sample is or may be sticking.

Prepare for periodic maintenance.



“Preparing for Periodic Maintenance” (p. 7-66) Steps **1** to **2**

Open the front panel unit and remove the right cover.



• “Opening the FRONT PANEL UNIT” (p. 4-3)

• “Removing the Right Cover” (p. 4-4)

8 Inspect/replace the three filters.



“Replacing the Filter” (p. 7-66) Steps **2** to **6**

9 Inspect/replace pump tubing.



“Replacing the Pump Tube” (p. 7-69) Steps **2** to **12**

10 For the MEK-1302 or MEK-1303, inspect/replace release nozzle.



“Replacing the Release Nozzle (MEK-1302/MEK-1303)” (p. 7-73) Steps **4** to **9**

11 For the MEK-1302 or MEK-1303, inspect/replace O-ring inside the release nozzle rinse chassis.



“Replacing the O-ring Inside the Release Nozzle Rinse Chassis (MEK-1302/MEK-1303)” (p. 7-81)

12 Inspect/clean the rinse chassis.



“Cleaning the Rinse Chassis” (p. 7-77) Steps **2** to **3**

13 Inspect/replace the O-ring inside the rinse chassis.



“Replacing the O-ring Inside the Rinse Chassis” (p. 7-81)

14 Inspect/replace the sampling nozzle.










“Replacing the Sampling Nozzle” (p. 7-79) Steps **2** to **4**

15 For the MEK-1305, inspect/replace the ESR pump tube.



“Replacing the ESR Pump Tube (MEK-1305)” (p. 7-82) Steps **2** to **5**

- 16** For the MEK-1305, inspect/replace the ESR valve tube.
 “Replacing the ESR Valve Tube (MEK-1305)” (p. 7-84) Steps **2** to **6**
- 17** Inspect/clean the tube guide plate.
 “Cleaning the Tube Guide Plate” (p. 7-91)
- 18** For the MEK-1302 or MEK-1303, inspect/clean the tube holder.
 “Cleaning the Tube Holder (MEK-1302/MEK-1303)” (p. 7-93)
- 19** For the MEK-1303, inspect/clean the rinse cup.
 “Cleaning the Rinse Cup (MEK-1303)” (p. 7-93)
- 20** For the MEK-1303, inspect/clean the cartridge holder 3PD.
 “Cleaning the Block Cell 3PD (MEK-1303)” (p. 7-94)
- 21** For the MEK-1303, inspect/clean the cartridge holder light path.
 “Cleaning the Cell Block Optical Path (MEK-1303)” (p. 7-94)
- 22** Inspect/clean the overflow cup.
 “Cleaning the Overflow Cup” (p. 7-95)

After checking the inside of the analyzer, turn its power OFF.

The method of doing so may be different due to the setting of Auto Login under system settings.

If the system setting Auto Login is ON:

It performs a self check automatically, so pressing the power switch while pressing the reset switch cancels the self check.

If the system setting Auto Login is OFF:

Login to the analyzer.

Touch [No] when the following confirmation dialog appears.



Switch the operator to Technical User when the power comes ON.

 “Advanced” (p. 8-16)

- 23** If periodic replacement parts were replaced, open the Periodic Maintenance window and reset their usage counts.


 “Replacing Periodic Replacement Parts” (p. 7-25)

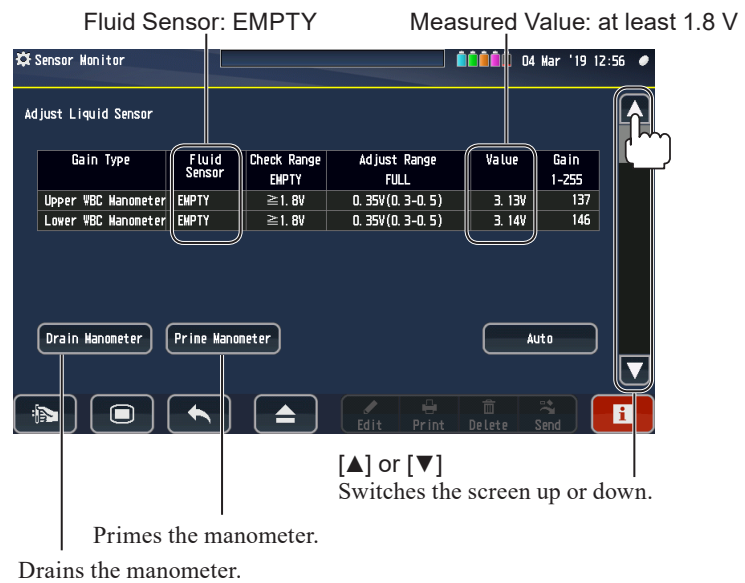
Checking and Adjusting the Sensor

- 24** Touch [▲] or [▼] in the Sensor Monitor window of the Service window to display Upper WBC Manometer or Lower WBC Manometer under Adjust Liquid Sensor, and then touch the [Drain Manometer] key to drain the manometer.

Check that the “Value” is within the specified range (at least 1.8 V). After confirming, touch [Prime Manometer] to prime the manometer.

If the measured value is outside the range, check again after adjusting using the procedure **28** (check while in a wet state).

 “Adjust Liquid Sensor (WBC Manometer)” (p. 7-31)



- 25** If a waste sensor is connected, remove the waste sensor from the waste fluid bottle and inspect the waste sensor (check it works).

 “Waste Sensor” (p. 7-96)

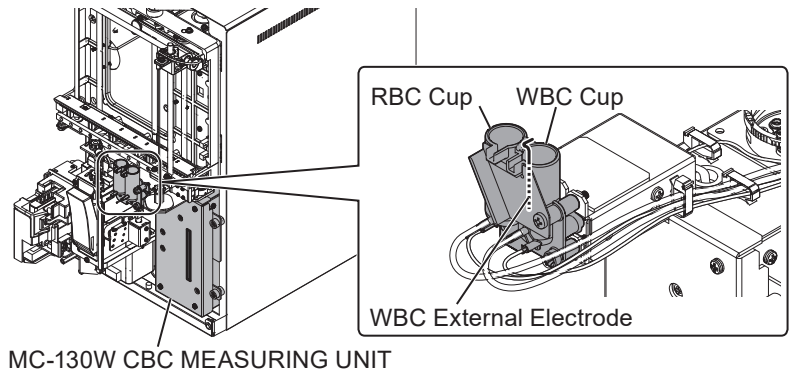
- 26** Touch [Restore] on the Information screen to execute the Prime on Installation operation.

 “Restoring Operation” (p. 3-13)

At this stage, confirm that priming to the WBC manometer that was drained in step **24** is normal and that the restore operation is completed normally.

- 27** Check the sample cups (RBC Cup and WBC Cup) and WBC external electrode of the MC-130W CBC MEASURING UNIT and if they are particularly dirty and/or corroded, run Measuring Unit Protein Cleaning from the Maintenance screen.

 “Performing the Measuring Unit Protein Cleaning” (p. 7-20)




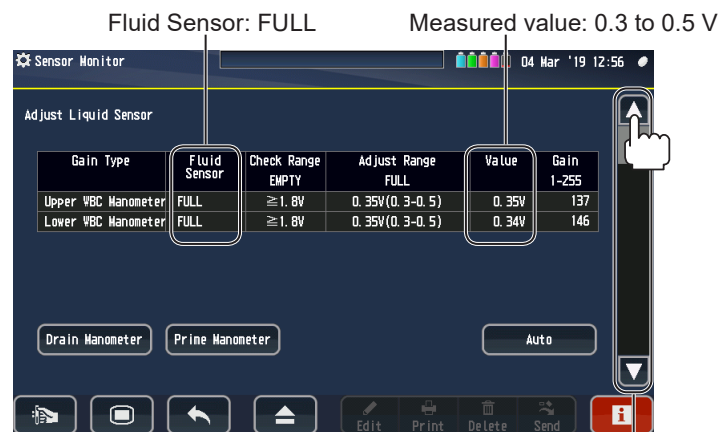
- 28** Touch [▲] or [▼] in the Sensor Monitor window of the Service window and display Upper WBC Manometer or Lower WBC Manometer under Adjust Liquid Sensor, then make sure the “Value” is within the adjusted range (0.3 to 0.5 V).

If outside the range, touch [Auto] and check and make sure the “Value” becomes between 0.3 and 0.5 V.

After automatic calibration, perform a check in a dry state. (See procedure 24.)

After confirming, touch [Prime Manometer] to prime the manometer, and make sure that “Value” becomes between 0.3 and 0.5 V.

 “Adjust Liquid Sensor (WBC Manometer)” (p. 7-31)

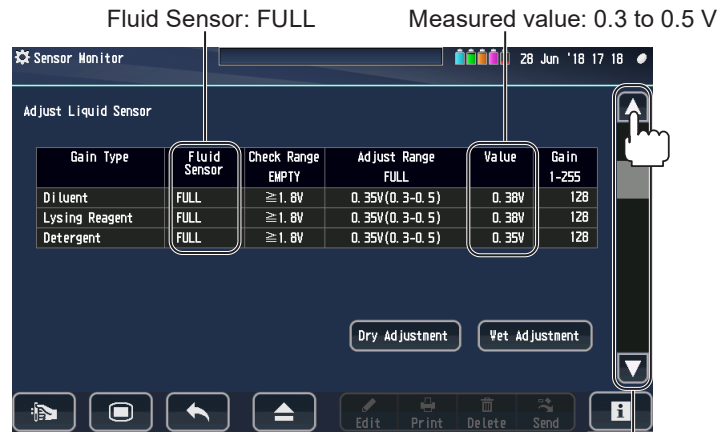


[▲] or [▼]
Switches the screen up or down.

29 Touch [▲] or [▼] in the sensor monitor window and display Diluent, Lysing Reagent and Detergent under Adjust Liquid Sensor, then make sure the “Value” is within the adjusted range (0.3 to 0.5 V).

If outside the range, touch [Wet Adjustment] and check and make sure the “Value” becomes between 0.3 and 0.5 V.

 “Adjust Liquid Sensor (Diluent, Lysing Reagent, Detergent)” (p. 7-32)



[▲] or [▼]
Switches the screen up or down.

Checking the Self Check Results


30 Open the Maintenance screen and run a self check.

NOTE: Make sure the slide door is closed when running a self check (MEK-1303 only).

 “Running Self Checks” (p. 7-6)

At such time, make sure the self check runs normally.

31 Open the Results Summary window from the Self Check Results screen and check the details of the self check results.

 “Viewing the Detailed Information of the Self-check Results” (p. 7-7)

After checking the details of the self check results, install the front panel unit and right cover and return the analyzer to its prior state.

 • “Opening the FRONT PANEL UNIT” (p. 4-3)
• “Removing the Right Cover” (p. 4-4)

Confirmation and Calibration CBC Using Hematology Controls MEK-3DN/MK-3CN and Calibrator MEK-CAL



It may be necessary to check and/or calibrate data in the pre-dilution and capillary modes depending on how the customer uses the analyzer. Measure and calibrate by switching the mode in the same way as during closed and open calibrations.

- 32** Measure the hematology controls MEK-3DN (for MEK-1301, MEK-1302 and MEK-1305) and MK-3CN (for MEK-1303) based on the following QC parameters.

To check the data in pre-dilution mode or capillary mode, normally, measure the hematology control in pre-dilution/capillary mode.

QC Parameter	
MEK-1301	[QC] CBC normal open
MEK-1305	
MEK-1302	[QC] CBC normal closed, normal open
MEK-1303	



Operator's Manual: Chapter 7 "Quality Control"

9

After measurements, check the following items and delete the measured data for confirmation.

- Confirm whether the measurement data is within the assay value range, and record it in the maintenance check sheet.
- Open the Calibration screen, check the current values of the calibration coefficients, and record them in the maintenance check sheet.



"Opening the Calibration Screen" (p. 5-3)

When the measurement data is outside the assay value range, use the blood cell counter calibrator MEK-CAL to calibrate the CBC.

NOTE • Because the calibration data is used in adjustment of other equipment and at testing laboratories, when calibration is needed, do not make any changes without first checking with the customer and obtaining permission.

- For users where quality control has not been performed, set "Quality Control" to "ON" in the system settings. Then, return "Quality Control" back to "OFF" after the inspection is completed.



"QC (Quality Control)" (p. 8-14)

CBC Calibration

During calibration, check the mean values and calibration coefficients of the measurement data, and record them in the maintenance check sheet.



"Calibrating the CBC" (p. 5-4)

After calibration, measure the hematology controls again, and check the following items.

- Confirm whether the measurement data is within the range of the assay values, and record the data in the maintenance check sheet.

Confirmation and Calibration CRP Using Calibrator CR-CAL (MEK-1303)



- CRP cannot be calibrated with closed or pre-dilution mode.
- Depending on how the customer uses the analyzer, the data may need to be confirmed and calibrated in capillary mode. Perform measurement and calibration by switching the mode in the same way as open calibrations.

33 Measure the calibrator CR-CAL twice in open mode.



“Calibration of the CRP (MEK-1303 Only)” (p. 5-10)

After measuring, check the following items.

- From the Calibration Measurement screen, confirm that the difference between the current value and calculated value of the calibration coefficient is within the specified range (± 60 or less), and record the mean value of the two measurements and the current value of the calibration coefficient in the maintenance check sheet.



“Opening the Calibration Screen” (p. 5-3)

When the difference is outside the specified range, conduct three more measurements, and record the mean value of the five measurements, including the two measurements taken above, in the maintenance check sheet.

Also, derive the calibration coefficient from these five measurement results, and record the calibration coefficient after calibration in the maintenance check sheet.

NOTE: Because the calibration data is used in adjustment of other equipment and at testing laboratories, when calibration is needed, do not make any changes without first checking with the customer and obtaining permission.



“Calibration of the CRP (MEK-1303 Only)” (p. 5-10)

Measure the calibrator CR-CAL twice in open mode.



“Calibration of the CRP (MEK-1303 Only)” (p. 5-10)

After measuring, check the following items.

- From the Calibration Measurement screen, confirm that the difference between the current value and calculated value of the calibration coefficient is within the specified range (± 60 or less), and record the mean value of the two measurements in the maintenance check sheet.

Confirmation HbA1c Using HbA1c Control YZ-004B8 (MEK-1303)

- 34** Measure the HbA1c control YZ-004B8 (MEK-1303: For HbA1c) twice based on the following QC parameters.

QC Parameter	
MEK-1303	[QC] HbA1c normal open

 Operator's Manual: Chapter 7 "Quality Control"

After measuring, check the following items.

- Confirm that the mean value of the two measurements is within the range of the reference value, and record it in the maintenance check sheet.

When the measurement data is outside the range of the reference value, it is likely that the reagent or sample is deteriorated. Change the test cartridge and HbA1c control YZ-004B8, perform a thorough mixing, and then conduct two measurements again.

NOTE: When the calibration data is used in adjustment of other equipment and at testing laboratories, or even if no adjustment is performed, changing of the calibration coefficient for HbA1c may change the trend for patient measurement results in certain cases. Do not change the calibration coefficient of HbA1c without first obtaining permission.

Confirmation and Adjustment ESR Using Hematology Control MEK-3DL and Calibrator MEK-CAL (MEK-1305)

35 Measure the hematology control MEK-3DL twice based on the following QC parameters.

QC Parameter	
MEK-1305	[QC] CBC + ESR normal open

 Operator's Manual: Chapter 7 "Quality Control"

After measurement, check the following items, and delete the measured data for confirmation.

- Confirm that the mean value of the two measurements is within the range of the assay value, and record it in the maintenance check sheet.

When the measurement data is outside the range of the assay value, the sample may be deteriorated. Change the hematology control MEK-3DL mix thoroughly, and then measure twice again.

If the problem fails to improve from the foregoing countermeasures use the blood cell counter calibrator MEK-CAL to adjust the ESR.

ESR Adjustment

Perform the "Adjusting the ESR Measuring Unit Photometric Sensitivity (MEK-1305)" and check the following items.

- Confirm the setting values before and after adjustment in the ME-130W window of the Service window, and record them in the maintenance check sheet.

 "Adjusting the ESR Measuring Unit Photometric Sensitivity (MEK-1305)" (p. 6-17)

After adjustment, measure the hematology control twice again, and check the following items.

- Confirm that the mean value of the two measurements is within the range of the assay value, and record it in the maintenance check sheet.

Others

Check the printer, barcode reader, communications and software version.

36 Print from the accessory WA-130W compact printer and check the following.

- Whether possible to print by touching the [Print] key.
- Whether the paper feed works properly
- Whether auto-printing work properly
- Whether any dots are missing in the printouts on recording paper

37 If an external printer (inkjet printer, card printer or the like.) is being used, print from it and check the following.

- Whether the paper feed works properly
- Whether there are any problems with the printout on recording paper

38 Check whether the barcode reader can read barcodes of assay sheets correctly.



When confirming step **32**, no problem exists if the barcode of the assay sheet can be read.

39 If connected to equipment like electronic medical charts, make sure data is transmitted correctly.

40 Open the Analyzer Information window of the Maintenance screen and check the version of the Main Software and the SUM value.



“Analyzer Information” (p. 7-27)

41 Open the Advanced screen in the system settings, and check the value for “Facility Coefficient”.



“Advanced” (p. 8-16)

**MEK-1301/MEK-1302/MEK-1303/MEK-1305
Maintenance Check Sheet**

Issuance No. _____

Facility name		Installation site		Date of purchase		Date of maintenance check					
Model		Serial number		Version number		Maintenance number					
Sign by engineer who did the maintenance check											
Reagents and appearance				Result	Action	Checking the Self Check Results		Value	Result	Action	
1	There are enough reagents.					30	The self check is running normally.				
	Check that Nihon Kohden products are used as reagents.						Reagent Check				
2	The reagent is not past the expiration date.					ISOTONAC-3/4					
	There is no damage, dirt or scratch in the exterior.					CLEANAC-710					
	There is no fluid leakage.					CLEANAC-3					
	The aspiration unit or a switch or key is not cracked or loose.					HEMOLYNAC-310					
	The labels are not dirty or peeling.					Circuit Test					
	The reagents are connected correctly, and the tubes are not broken, bent or clogged.					WBC 91.5±5% (86.9 to 96.1)					
3	Devices are connected correctly, cables are not damaged.					RBC 57±5% (54 to 60)					
	Consumables such as recording paper have not run out.					MCV 36.8±5% (35.0 to 38.7)					
	Power cable and safety			Result	Action	WBC Volt 18.10V±0.6V (17.50 to 18.70) V					
	Check whether the included three-prong power cord is used and free of dirt, damage or tears in coating.					RBC Volt 18.10V±0.6V (17.50 to 18.70) V					
Basic Operations, Checking Inside the Analyzer				Result	Action	HGB ON Volt 3.50V to 4.50V V					
4	Turn the analyzer ON and make sure it starts up normally.					HGB OFF Volt 0.05V to 0.15V V					
5	Check that the date and time are correct.					Battery Volt 2.75V to 3.60V V					
6	Check that the display is normal.					Immune Photodiode Voltage²					
7	Check that the touch panel pressing position is aligned correctly.					CH1 Lo Volt 2.700V to 3.700V V					
8	Inspect/replace the three filters.					CH1 Up Volt 2.700V to 3.700V V					
9	Inspect/replace pump tubing.					CH2 Lo Volt 2.700V to 3.700V V					
10 ¹	Inspect/replace release nozzle.					CH2 Up Volt 2.700V to 3.700V V					
11 ¹	Inspect/replace O-ring inside the release nozzle rinse chassis.					CH3 Lo Volt 2.700V to 3.700V V					
12	Inspect/clean the rinse chassis.					CH3 Up Volt 2.700V to 3.700V V					
13	Inspect/replace the O-ring inside the rinse chassis.					ESR Unit Light Reception Level³					
14	Inspect/replace the sampling nozzle.					CH1 Blank ON 800 to 5000					
15 ³	Inspect/replace the ESR pump tube.					CH2 Blank ON 800 to 5000					
16 ³	Inspect/replace the ESR valve tube.					CH1 Blank OFF 0 to 10					
17	Inspect/clean the tube guide plate.					CH2 Blank OFF 0 to 10					
18 ¹	Inspect/clean the tube holder.					CH1 Blank Diff 0 to 500					
19 ²	Inspect/clean the rinse cup.					CH2 Blank Diff 0 to 500					
20 ²	Inspect/clean the cartridge holder 3PD.					Thermistor Check					
21 ²	Inspect/clean the cartridge holder light path.					Chassis bottom temp. 10.00 to 35.00°C °C					
22	Inspect/clean the overflow cup.					Chassis front Temp. ^{2,3} 10.00 to 37.00°C °C					
23	If periodic replacement parts were replaced, reset usage counts.					HGB Diluent Temp. 10.00 to 50.00°C °C					
Checking and Adjusting the Sensor				Value	Result	Action	HGB LED Temp. 10.00 to 50.00°C °C				
24	EMPTY Upper WBC Manometer	at least 1.8 V	V			Immunoassay unit Temp. ² 36.00 to 38.00°C °C					
	EMPTY Lower WBC Manometer	at least 1.8 V	V			ESR Measuring Unit Temp. ³ 36.50 to 37.50°C °C					
25	Inspect the waste sensor					ESR LED Temp. ³ 10.00 to 50.00°C °C					
	make sure the priming operation and all reagents are replenished normally.					Background Check					
26	Check that priming to the WBC manometer and the restore operation are normal.					WBC 0.0 to 2.0×10 ² μL					
	FULL Upper WBC Manometer			0.3V to 0.5V	V		RBC 0 to 2×10 ⁴ μL				
27	FULL Lower WBC Manometer			0.3V to 0.5V	V		HGB 0.00 to 0.10g/dL				
	FULL Diluent			0.3V to 0.5V	V		PLT 0.00 to 1.00×10 ⁴ μL				
28	FULL Lysing Reagent			0.3V to 0.5V	V		Periodic Replacement Parts				
	FULL Detergent			0.3V to 0.5V	V		HGB Filter (FL1) 6000 times times				
								Open Mode Filter (FL2) 6000 times times			
								Rinse Unit 6000 times times			
								Pump Tube 6000 times times			
								Sampling Nozzle 24000 times times			
								Closed Mode Filter (FL3) ¹ 6000 times times			
								Release Nozzle ¹ 6000 times times			
								ESR Pump Tube ³ 24000 times times			
								ESR Valve Tube ³ 24000 times times			
								Remaining Message Check			
								Remaining Message			

¹ MEK-1302/MEK-1303

² MEK-1303

³ MEK-1305

Facility name	Model	Serial number	Version number	Maintenance number		
CBC: Confirmation and Calibration Using Hematology Controls MEK-3DN/MK-3CN and Calibrator MEK-CAL		Result	Action	Others	Result	Action
32	Check/calibrate measurement data and record the calibration coefficients and measurement values in the following table.			36	Check operation of WA-130W compact printer.	
				37	Check operation of external printer. External printer model []	
CRP: Confirmation and Calibration Using Calibrator CR-CAL		Result	Action	38	Check operation of barcode reader.	
33 ²	Check/calibrate measurement data and record the calibration coefficients and measurement values in the following table.			39	Check communication.	
				40	Main software version [] Main software sum []	
HbA1c: Confirmation Using HbA1c Control YZ-004B8		Result	Action	41	Facility Coefficient CRP ² [] HbA1c ² [] ESR ³ []	
34 ²	Check measurement data and record the measurement values in the table at the next page.					
ESR: Confirmation and Adjustment Using Hematology Control MEK-3DL and Calibrator MEK-CAL		Result	Action			
35 ³	Check/Adjust measurement data and record the measurement and adjustment values in the table at the next page.					

CBC confirmation: Closed ¹ , Open							CBC confirmation: Capillary, Pre-dilution						
MEK-3DN/MK-3CN Lot.No. []							MEK-3DN/MK-3CN Lot.No. []						
Item	Closed ¹		Open		Result	Action	Item	Capillary		Pre-dilution		Result	Action
	measurement value	Calibration coefficient	measurement value	Calibration coefficient				measurement value	Calibration coefficient				
WBC							WBC						
LY%							LY%						
MO%							MO%						
GR%		—		—			GR%		—		—		
RBC							RBC						
HGB							HGB						
HCT							HCT						
MCV		—		—			MCV		—		—		
MCH		—		—			MCH		—		—		
MCHC		—		—			MCHC		—		—		
RDW-CV							RDW-CV					— ⁴	— ⁴
PLT							PLT						
MPV							MPV						
After CBC calibration: Closed ¹ , Open							After CBC calibration: Capillary, Pre-dilution						
MEK-CAL Lot.No. []							MEK-CAL Lot.No. []						
WBC							WBC						
RBC							RBC						
HGB							HGB						
HCT							HCT						
RDW-CV							RDW-CV						
PLT							PLT						
MPV							MPV						
CBC confirmation again after calibration: Closed ¹ , Open							CBC confirmation again after calibration: Capillary, Pre-dilution						
MEK-3DN/MK-3CN Lot.No. []							MEK-3DN/MK-3CN Lot.No. []						
WBC		—		—			WBC		—		—		
LY%		—		—			LY%		—		—		
MO%		—		—			MO%		—		—		
GR%		—		—			GR%		—		—		
RBC		—		—			RBC		—		—		
HGB		—		—			HGB		—		—		
HCT		—		—			HCT		—		—		
MCV		—		—			MCV		—		—		
MCH		—		—			MCH		—		—		
MCHC		—		—			MCHC		—		—		
RDW-CV		—		—			RDW-CV		—		—	— ⁴	— ⁴
PLT		—		—			PLT		—		—		
MPV		—		—			MPV		—		—		
CRP confirmation: Open							CRP confirmation: Capillary						
CR-CAL Lot.No. []							CR-CAL Lot.No. []						
Item	Two-time measurement value	Calibration coefficient	Target	Five-time measurement value	Result	Action	Item	Two-time measurement value	Calibration coefficient	Target	Five-time measurement value	Result	Action
After CRP calibration: Open							After CRP calibration: Capillary						
CRP				—			CRP				—		

¹ MEK-1302/MEK-1303

² MEK-1303

³ MEK-1305

⁴ Not determined in capillary/pre-dilution mode.

Facility name			Model			Serial number		Version number		Maintenance number		
34 ²	HbA1c confirmation: Open						/					
	YZ-004B8 Lot.No. []											
	Item	Two-time measurement value	Calibration coefficient	—	Result	Action						
HbA1c												
35 ³	ESR confirmation: Open						/					
	MEK-3DL Lot.No. []											
	Item	Two-time measurement value			Result	Action						
	ESR											
	Before ESR adjustment											
	ESR Sensitivity Adjustment		Parameter	Target Value	Value from Auto Adjust	Value from Test Run	ATT	FINE	Date Modified			
			ESR CH1	()								
			ESR CH2	±15								
	Standard Blank Value		Parameter	Value	Diff. b/w CHs	Range	ESR LED Temp		Date Modified			
			ESR CH1			≤500						
		ESR CH2										
ESR adjustment: Open						/						
MEK-CAL Lot.No. []												
Item	Two-time measurement value			Result	Action							
ESR												
ESR Sensitivity Adjustment		Parameter	Target Value	Value from Auto Adjust	Value from Test Run	ATT	FINE	Date Modified				
		ESR CH1	()									
		ESR CH2	±15									
Standard Blank Value		Parameter	Value	Diff. b/w CHs	Range	ESR LED Temp		Date Modified				
		ESR CH1			≤500							
		ESR CH2										
ESR confirmation again after Adjustment: Open						/						
MEK-3DL Lot.No. []												
Item	Two-time measurement value			Result	Action							
ESR												

² MEK-1303 ³ MEK-1305

Measuring instrument	Product name	Control No. (Serial No.)	Expiration date	Product name	Control No. (Serial No.)	Expiration date

Component equipment				Accessories and supplies	
				Product name	Qty
Proposal item					
Process item					
Unprocessed item					

Overall determination				Notes			
<input type="checkbox"/> No abnormalities. Continue usage. <input type="checkbox"/> Although there is no impediment to usage, repairs should be scheduled. <input type="checkbox"/> A usage problem was found. Repair immediately.							
Inspection date		Inspection time		Inspector		Approved by	
Date		Start	HH	MM			
		End	HH	MM			
Company name				Emergency contact information			
Address							



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Contact information is accurate as of Jun 2022. Visit <https://www.nihonkohden.com/> for the latest information.

The model and serial number of your device are identified on the rear or bottom of the unit.

Write the model and serial number in the spaces provided below. Whenever you call your representative concerning this device, mention these two pieces of information for quick and accurate service.

Model _____

Serial Number _____

Your Representative

Note for users in the territory of the EEA and Switzerland:

Any serious incident that has occurred in relation to the device should be reported to the European Representative designated by the manufacturer and the Competent Authority of the Member State of the EEA and Switzerland in which the user and/or patient is established.



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