Instructions for Use

AU5800 Chemistry Analyzer

CE IVD

A98352AC
September 2015

Beckman Coulter, Inc.
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Brea, CA 92821 U.S.A.

BECKMAN COULTER

Instructions for Use
AU5800 Chemistry Analyzer
PN A98352AC (September 2015)

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Rx Only
Original Instructions

Revision History

This document applies to the latest software listed and higher versions. When a subsequent software version changes the information in this document, a new issue will be released.

A98352AC, July 2015

Software version 5.0

This document was created to:

- Replace the current User's Guide with the Instructions for Use and Reference Manual.
- Improve the content and usability of the instructions.
- Change the humidity condition from 40% RH to 20% RH.
- Add 66039 to the parts list.
- Update the Hazards section.
- Update the Fluorocarbon Label section.
- Add the IVD symbol.
- Change caution from Class 3R Laser Radiation to Class 2 Laser Radiation.
- Change part number MU858000 to Drain Tube 3.
- Add the 180 mL bottle.
- Add the following tables:
  - Cup or Tube Available for Racks.
  - Cup Nested (Inserted) in Tube Available for Racks.
- Move the *Replace the Photometer Lamp* procedure to As Needed Maintenance.
- Add the reagent adapter part numbers.
- Add Japan part numbers to the maintenance sections.
- Update the following screens:
  - Figure 4.14 Sample: Test Requisition Tab
  - Figure 4.18 Add On Dialog
  - Figure 4.19 Confirm Add On Order (Requisition)
  - Figure 4.21 Delete Requisition Dialog
  - Figure 4.26 Search Dialog
  - Figure 5.5 Rack Data Dialog
- Update the Replace the Wash Syringe procedure.
- Add the following maintenance procedures to As Needed Maintenance:
  - Clean the Rack
  - Clean the Rack Tray
  - Clean the Rack Transfer Lanes
  - Save Parameters
  - Reset the System from *Stop* to *Standby* Mode
  - Replace the ISE Mix Bar

A98352AB, October 2012

Software version 4.11

This document was created to:

- Incorporate AU5800 RTWB rev AB part number B04129.
- Incorporate AU5800 LIH document rev AB part number B16531.
- Add a new procedure on how to install a new wash syringe.
- Add a new option to set periodic cleaning for the ISE sample probe in **Parameters** > **Misc.** > **Contamination Parameters** > **Periodic Cleaning (Sample Probe)**.
- Add a new option for TCP/IP online connection to LIS.
- Change the corporate address.

Initial Issue, A98352AA, October 2010

Software version 2.06

This document was created to provide instructions on how to use the AU5800® Chemistry Analyzer.

Warranty

The system is covered by and subject to the provisions of the warranty included in your contractual agreement for the system or its reagents.

The customer is responsible for routine preventive maintenance procedures. Repairs arising from the failure to perform these maintenance procedures at the indicated time intervals are made at the discretion of Beckman Coulter, and at the customer's expense.

Warranty

Safety Notice

Read all product manuals and consult with Beckman Coulter trained personnel before you operate the system. Do not perform any procedure before you carefully read all instructions. Always follow the product labels and the recommendation from the manufacturer. For more information, contact Beckman Coulter.

Alerts for Warning, Caution, Important, Note, and Tip

WARNING

Warning indicates a potentially hazardous situation which, if not avoided, could cause death or serious injury. Warning can indicate the possibility of erroneous data that could cause an incorrect diagnosis.

CAUTION

Caution indicates a potentially hazardous situation which, if not avoided, can cause minor or moderate injury. Caution can also alert against unsafe practices, or indicate the possibility of erroneous data that could cause an incorrect diagnosis.

IMPORTANT

Important indicates important information to follow.

NOTE

Note indicates notable information to follow.

TIP

Tip indicates information to consider.

Summary of Hazards

This section describes the possible hazards of the system. The hazards of individual procedures in this manual are included in the warnings or cautions within the instructions. Read this section before you operate this system.

Follow the power requirements in the system specifications. Follow the procedures and safety warnings throughout this manual.

If you use the system in a manner not specified by Beckman Coulter, the protection provided by the system can be impaired and incorrect results or system failure can occur.

Bar Code Reader

Do not adjust or remove the housing of any bar code reader. The bar code readers use lasers and looking directly at the laser light can be hazardous. Assume that the laser is always on.

Use of control or adjustments or performance of procedures other than these specified herein may result in hazardous radiation exposure.

Biohazardous and Chemical Materials

Observe all biohazard precautions when doing maintenance, service, or troubleshooting on the system. Biohazard precautions include, but are not limited to, wearing gloves, eye shields, and lab coats, and washing hands after working on contaminated portions of the system.

Follow all laboratory procedures and policies for handling infectious and pathogenic materials.

Avoid skin contact with reagents and other chemical preparations. Wear Personal Protective Equipment (PPE) to work with reagents and other chemical preparations used with the system. For more information, refer to the related SDS (Safety Data Sheet).

Clean spills of biohazardous or other potentially hazardous substances on the system immediately. If the system must be decontaminated, contact Beckman Coulter.

Follow your laboratory procedure for biohazardous and hazardous material disposal.

Electric Shock

Do not replace or service any components where you can contact hazardous parts that could cause electric shock. Beckman Coulter must perform this maintenance.

Electrical Ground

Never operate the system until the power cord is connected correctly to an electrical ground.

Use a three-pronged (grounded) power cord to connect the system to a matching three-wire grounded outlet. Do not use an adapter to connect the power plug to a two-pronged outlet.

Electromagnetic Compatibility

The system generates, uses, and can radiate radio frequency energy. If the system is not installed and operated correctly, this energy can cause interference with other equipment. In addition, other equipment can radiate radio frequency energy to which the system is

sensitive. If you suspect interference between the system and other equipment, Beckman Coulter recommends the following actions to correct the interference:

1. This IVD medical equipment complies with the emission and immunity requirements described in this part of the EN/IEC 61326 series.
2. As to emission, this equipment has been designed and tested to CISPR 11 Class A, so in a domestic environment, it may cause radio interference, in which case, you may need to take measures to mitigate the interference.
3. It is recommended to evaluate electromagnetic environment prior to operation of the device.
4. Do not use this device in close proximity to sources of strong electromagnetic radiation (for example, unshielded intentional RF sources), as these can interfere with the proper operation.
5. Confirm that the equipment is operating from a different power service connector than the power service connector for the system.
6. Do not use medical equipment that can be susceptible to malfunctions caused by Electric Magnetic Field (EMF) near the system.

Flammable Materials

Do not use this system near flammable materials.

Moving Parts

While the system is in operation, do not touch or go close to any moving parts. Close protective guards and covers during operation. Failure to close covers correctly can cause injury or incorrect results.

Liquid Waste

Handle all liquid waste as potentially infectious.

Some liquid waste can require special treatment before disposal. Follow your laboratory procedure.

Some substances in the reagents, control materials, calibrators, and wash solutions have disposal regulations. Follow your laboratory procedure.

Solid Waste

Handle all solid waste as potentially infectious.

Some solid waste can require special treatment before disposal. Follow your laboratory procedure.

Handle any used or replaced parts (such as tubes, mix bars, probes, cuvettes, and wash nozzles) as infectious waste materials. Follow your laboratory procedure.

AU5800 Hazards

- A Beckman Coulter representative installs the system. If the system installation needs modification, contact Beckman Coulter.
- If the system malfunctions, power off the system completely using the main breaker located on the left side of the analyzer before any repair service.
- If fluid is spilled on the system, turn off the main breaker located on the left side of the analyzer immediately. Wipe up the spill only after turning off the main system breaker. If fluid enters the system after a spill, contact Beckman Coulter before restarting the analyzer.
- After transferring the analysis results to a laboratory information system, confirm that the sample numbers and sample IDs are correct.
- Substances such as Lipemia, Icterus, and Hemolysis can interfere with results. Refer to the reagent IFU for specific substance interference information.
- To be sure the analytical data is accurate:
  - Confirm the quality of deionized (DI) water is within specifications.
  - Confirm that all tests have passed calibration, and calibration is not expired.
  - Inspect the quality control data.
- Use the correct reagent, calibrator, and control to analyze samples.
- Avoid excessive reagent agitation, which can cause bubbles. If bubbles are visible on the surface of the reagent, remove them. Confirm that the reagent bottles are placed securely on the reagent tray with the correct adapters and partitions. If the bottles are tilted, incorrect results can occur, or you can damage the reagent probe.
- Prepare reagents, wash solutions, calibrators, and QC samples according to the Instructions for Use (IFU), paying particular attention to any reconstitution, mixing, and pretreatment instructions.
- Handling samples:
  - Sample to sample carryover is one potential source of analytical error in the clinical laboratory. Do not use the same sample run on an AU Chemistry system for analysis of analytes for which a small quantity of carryover could cause problems with the results.
  - This system analyzes serum, urine, plasma, and other sample types. Other refers to other body fluids such as cerebrospinal fluid (CSF). Some samples cannot be analyzed depending on the analysis test, reagent, and sample tubes used. For questions regarding reagent and sample tube type, contact Beckman Coulter.
  - Use serum or plasma that is clot free, or urine that is free from suspended matter. If serum or urine contains clots or suspended matter, the probe can clog and cause problems with the analysis results.
  - Chemicals present in the sample (medicine, anticoagulant, preservative, and so on) can significantly interfere with the results.
  - Highly viscous samples can interfere with the testing of the samples and the reliability of data.
  - Refer to the Instructions for Use (IFU) for each test for correct sample collection and storage. Incorrect storage of samples can alter the analyte in a sample.
  - Use only sample containers and sample tubes specified by Beckman Coulter.
  - To reduce the risk of interference, centrifuge and then separate serum and plasma samples adequately from blood cells immediately. Before analysis, confirm that samples are free from suspended matter, such as fibrin. While the system has a

sophisticated clot detection mechanism, this mechanism is not able to detect all clots. Carefully inspect the samples.
  - Collect urine samples using correct preservatives and remove any suspended matter using centrifugation before analysis (CLSI GP16-A2).
  - Confirm that any anticoagulants or collection devices that employ a barrier are compatible with the test reagent being used. Refer to the Instruction for Use for suitable and validated sample types. Use caution when using sample tubes containing barriers or gels. Confirm the suitability of all collection devices in use.
  - For information about whether a serum separating agent is correct or not, contact the chemical reagent manufacturer or distributor.
  - When using sample containers or tubes containing a separating medium, confirm that there is enough serum to avoid contaminating or blocking the sample probes with the separating medium.
  - Confirm that there is enough sample for correct sampling to occur. The small amount of wash water left on the sample probe can dilute the volume of sample left in the sample tube.
- To prevent water leaks, confirm that Beckman Coulter has fitted water supply and drainage hoses according to local guidelines.
- To confirm system performance, maintain and inspect the system periodically by replacing the parts according to the instructions in this guide.
  - Have and follow a maintenance schedule for this system.
  - Create a maintenance routine for the computer software and hardware, including frequent backing up of data containing analysis settings, results history, and the alarm log list file.
  - Do not store backups onsite. Keep one copy on-site for reference and one copy offsite.
- Before using the system for the first time, set parameters for the reagent and sample quantity, measurement wavelength, calibrator values, and so on. Enter test specific parameters from the chemistry setting sheet to have optimum system performance. Enter any updates to these settings into the system immediately.
- Dedicate the computer hardware to only running the system software. Do not connect the computer hardware to the Internet, unless instructed to do so by Beckman Coulter.
- Keep the analyzer covers closed except for startup procedures and maintenance. If the covers are open for extended periods of time, excess condensation can be generated in the reagent refrigerators and cause errors.

AU5800 Hardware Labels

The following hardware labels are attached to the AU5800. Use caution, observe, and follow all warning labels. Do not cover or remove these labels. If the labels peel off or become illegible, contact Beckman Coulter to replace the labels. Orange labels indicate that there is a risk of Serious Injury. Yellow labels indicate that there is a risk of Personal Injury, Fire, or Damage.

Safety Electric Shock Label

This symbol indicates an area of the system that should not be accessed under any circumstances, due to risk of electrical shock. (Labeling Position: From the back view of the rack feeder unit, on the lower right side near the inlet of the power cable.)

High Temperature Danger Label

This symbol indicates the risk of burning by touching the hot photometer lamp directly when replacing it. (Labeling Position: near the light source lamp.)

Biohazard Label

This symbol indicates the use of biohazardous material. Wear protective clothing and follow universal precautions as dictated by local or national regulations (CLSI GP17-A2, ISO15190 or 29CFR 1910.1030).

Risk of biohazardous materials such as sample probes, mix bars, sample rack, wash nozzle component, cuvette, sample probe wash well, condensed waste liquid drain hole, ISE sample pot, ISE roller pump tubing, drain hole, and so forth. (Labeling Position: On the front and rear surface (analyzer units), near the water outlet (rack feeder unit), and on the front and rear surface (ISE unit).)

Laser Radiation Label

CLASS 1 LASER PRODUCT complies with IEC60825-1. (Labeling Position: near the inlet of the power cable on the rear side of the rack feeder unit.)

CAUTION-CLASS 2 LASER RADIATION WHEN OPEN DO NOT STARE INTO THE BEAM. (Labeling Position: near the sample ID bar code reader of the rack feeder unit.)

Personal Injury Label

This symbol indicates areas where a risk of injury due to system movement is possible. Fingers or other body parts should be kept clear of these areas during system operation.

- Danger of injury by moving parts of the sample probes, reagent probes, mix bars, wash nozzle component, and so forth. (Labeling Position: on the front and rear surface of each analyzer and ISE unit.)

- Danger of injury by operation parts of syringe. (Labeling Position: near the sample syringes, wash syringes, and reagent syringes (analyzer unit), and sample syringe, wash syringe, and buffer syringe (ISE unit).)
- Danger of injury by moving parts on the rack feeder unit. (Labeling Position: near the rack input component, rack output component, priority rack input component, and central surface of the rack feeder unit.)
- Danger of injury by moving parts, for example the ISE roller pump, and so forth. (Labeling Position: back of the ISE cover.)

Danger Label

Indicates a potentially hazardous situation which, if not avoided, could result in operator's injury and/or serious physical damage.

- Danger of leak from water supply and discharge component. (Labeling Position: near the water outlet)
- To avoid electrical shock, do not remove the cover connector screws to access the water supply component. (Labeling Position: near the power outlet of water supply component (option).)
- Do not lean against the monitor, which could result in it falling down. (Labeling Position: near the monitor arm.)

Recycling Label

This label is required in accordance with the Waste Electrical and Electronic Equipment (WEEE) Directive of the European Union. The presence of this label indicates that:

1. the device was put on the European Market after August 13, 2005 and
2. the device is not to be disposed of via the municipal waste collection system of any member state of the European Union

Customers must understand and follow all laws regarding the correct decontamination and safe disposal of electrical equipment. For Beckman Coulter products bearing this label, contact your dealer or local Beckman Coulter office for details on the take-back program that facilitates the correct collection, treatment, recovery, recycling and safe disposal of these products.

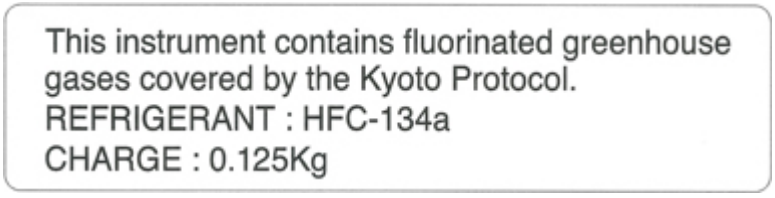
For the Japan Market:

This system is considered an industrial waste, subject to special controls for infectious waste. Prior to disposal of the system, refer to the "Waste Disposal and Public Cleaning Law" for compliance procedures.

C-Tick Mark Label

The C-Tick mark is intended for use on products that comply with the applicable Electromagnetic Compatibility (EMC) standards in the Australian or New Zealand market.

Fluorocarbon Label



This system uses a HFC (hydro fluorocarbon) cooling medium.

HFC chemicals cannot be discharged indiscriminately. When the system is discarded, recover HFC chemicals.

The type and volume of the HFC chemicals are described on the label.

Restriction of Hazardous Substances (RoHS) Labels

These labels and materials declaration table (the Table of Hazardous Substance's Name and Concentration) meet People's Republic of China Electronic Industry Standard SJ/T11364-2006 "Marking for Control of Pollution Caused by Electronic Information Products" requirements.

RoHS Caution Label

This logo indicates that this electronic information product contains certain toxic or hazardous elements, and can be used safely during its environmental protection use period. The number in the middle of the logo indicates the environmental protection use period (in years) for the product. The outer circle indicates that the product can be recycled. The logo also signifies that the product should be recycled immediately after its environmental protection use period has expired. The date on the label indicates the date of manufacture.

RoHS Environmental Label

This logo indicates that the product does not contain any toxic or hazardous substances or elements. The “e” stands for electrical, electronic and environmental electronic information products. This logo indicates that this electronic information product does not contain any toxic or hazardous substances or elements, and is green and is environmental. The outer circle indicates that the product can be recycled. The logo also signifies that the product can be recycled after being discarded, and should not be casually discarded.

For In Vitro Diagnostic Use Label

IVD

This symbol is for an in vitro diagnostic medical device.

AU5800 System Display and Labels

Figure 1 On Switch

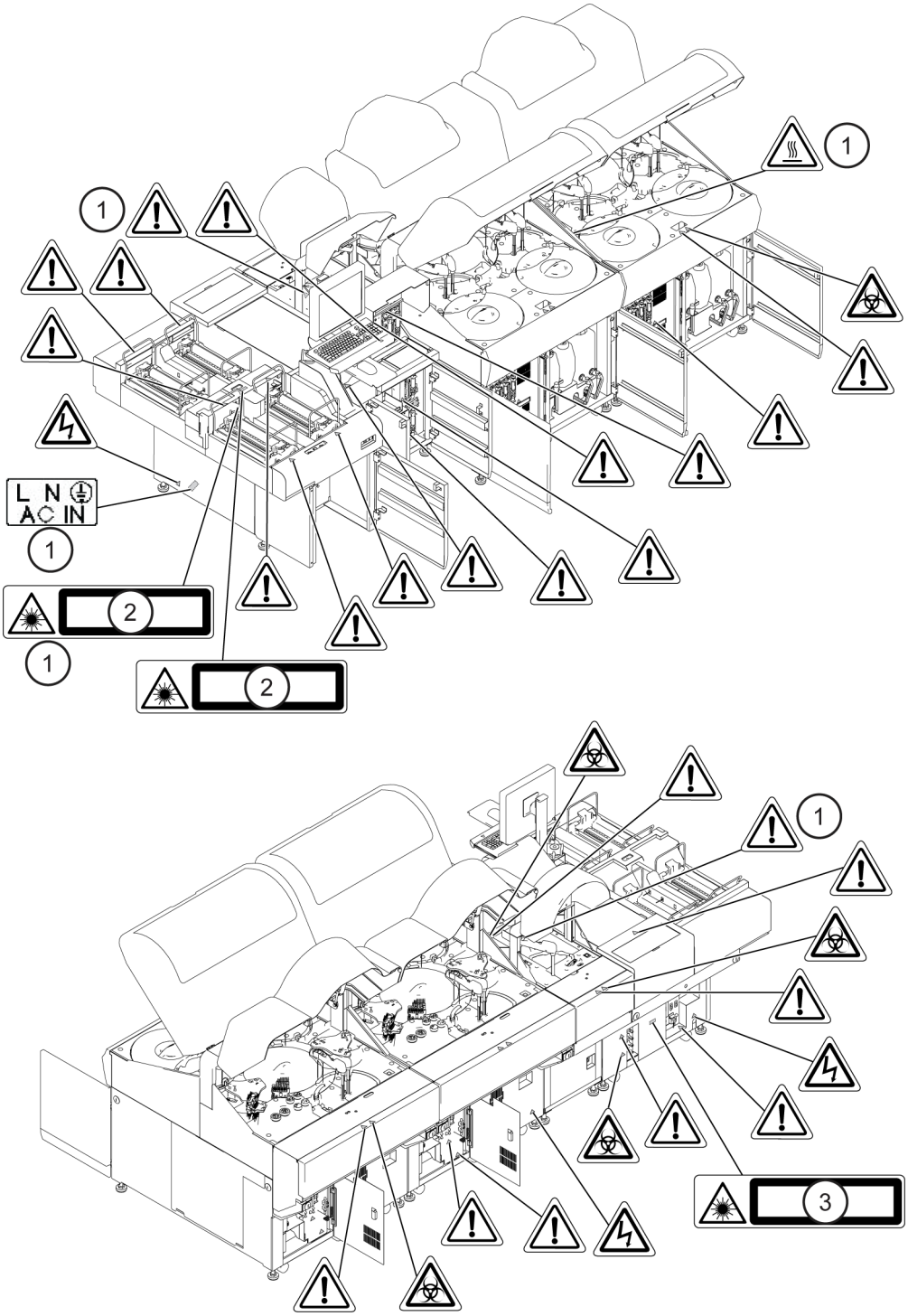
Figure 2 Off Switch

Figure 3 Ground Terminal

Labels

- Stripes - Orange stripes affixed to the system surface indicate the movement areas of the hardware components. Avoid these areas during operation.
- Warning Labels - Identify areas of the system where hazards exist and where caution should be taken to avoid serious injury or death.
- Instruction Labels - Instruction labels are affixed on the system at relevant locations to alert the operator to operate the system correctly.

Figure 4 AU5800 Labels



1. Placed inside the cover
2. CAUTION-CLASS 2 LASER RADIATION WHEN OPEN DO NOT STARE INTO THE BEAM
3. CLASS 1 LASER PRODUCT complies with IEC60825-1

Contents

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Introduction

Intended Use

The AU5800 Chemistry Analyzer measures analytes in samples, in combination with appropriate reagents, calibrators, quality control (QC) material, and other accessories. This system is for in vitro diagnostic use only.

Introduction
Intended Use

CHAPTER 1

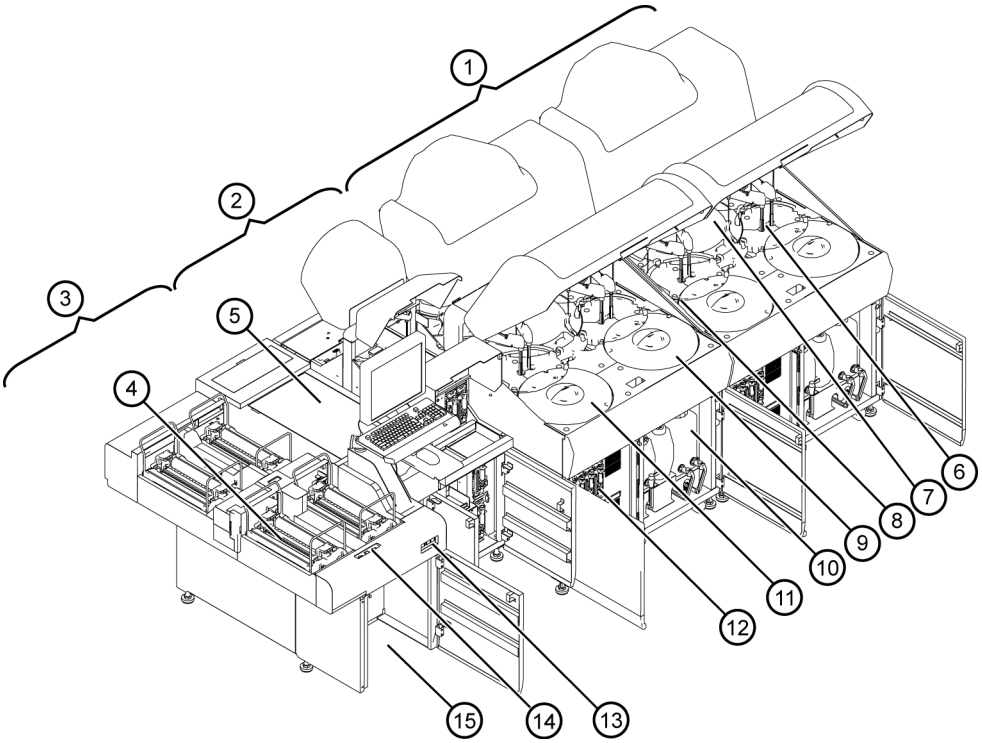
System Overview

Hardware Overview

This section provides a description and diagram with location of each hardware component and unit.

Hardware Component Overview

Figure 1.1 Hardware Overview (Top and Front View)

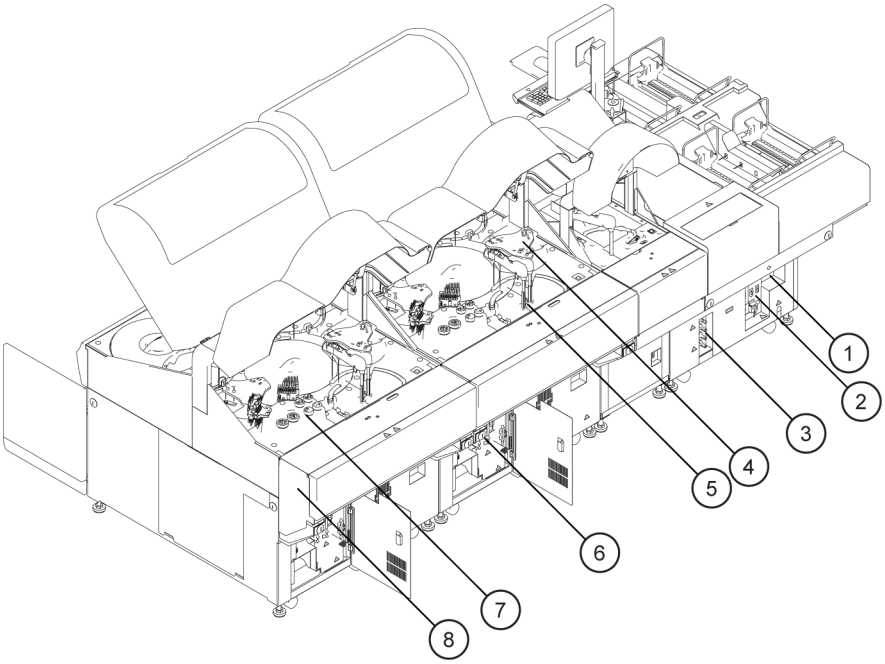


1. Analyzer units
2. ISE unit (option)
3. Rack feeder unit
4. Rack input component
5. Rack buffer component
6. Reagent transfer component
7. Cuvette wheel component
8. Photometry component
9. R1 refrigerator component
10. Tank storage (analyzer unit)
11. R2 refrigerator component
12. Syringe component
13. Operation buttons
14. LEDs and RACK SET/DIAG button (rack feeder unit)
15. Tank storage (rack feeder unit)

NOTE

For information on the hardware components when the AU5800 is connected to the Beckman Coulter laboratory automation system, refer to AU5800 Laboratory Automation Connecting Kit addendum.

Figure 1.2 Hardware Overview (Top and Back View)



1. Breaker and fuses
2. Power supply component
3. Water supply and drain connections
4. Mix bar component
5. Sample transfer component
6. Syringe component
7. Wash nozzle component
8. Rack transfer component

Breakers and Fuses

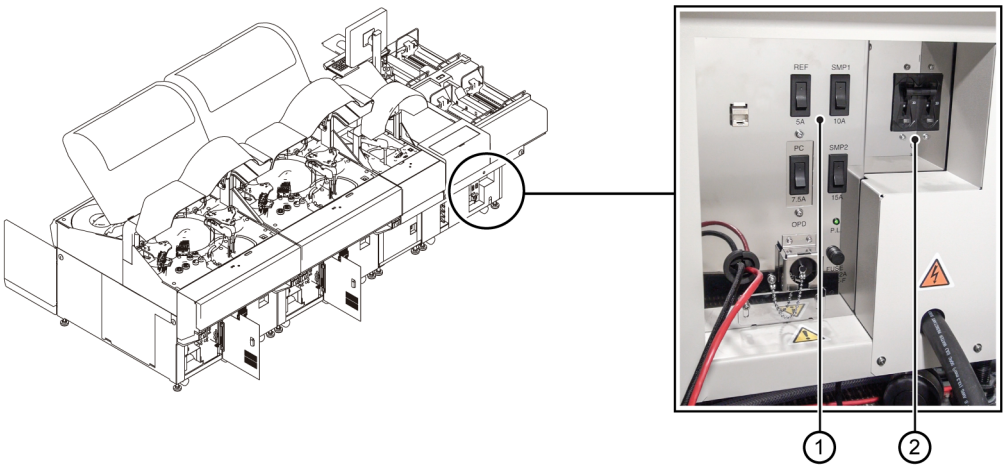
The back of the rack feeder unit has one main breaker, and subbreakers including REF, PC, SMP1, and SMP2. Each unit has REF and ANL subbreakers.

To completely power off the system, turn off the main breaker.

The main system breaker circuit board allows the power in specific areas of the system to be isolated. The main breaker (main power switch) automatically shuts down all the breaker switches. In normal conditions, all of the breaker switches are in the on position.

Subbreakers located on the back of each unit are used for protection. In normal conditions, the breakers are On.

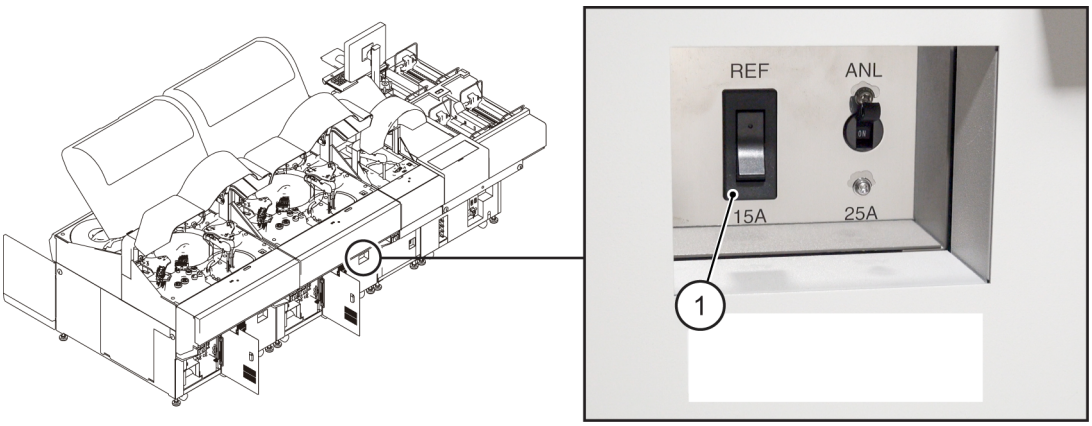
Figure 1.3 Breakers on the Rack Feeder Unit



1. Subbreakers
2. Main breaker

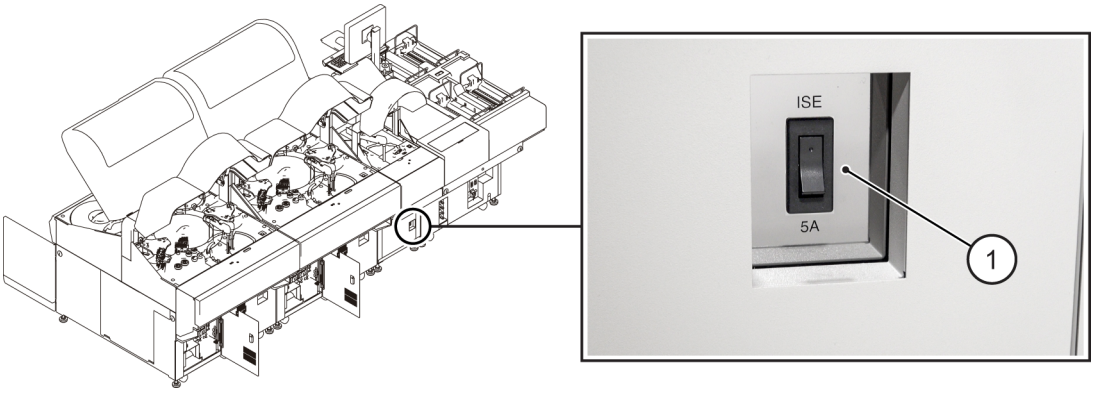
Main breaker and subbreakers are on the back of the rack feeder unit.

Figure 1.4 Subbreakers on Back of Analyzer Unit



1. Subbreakers

Figure 1.5 Subbreaker on the Back of ISE Unit



1. Subbreaker

Operation Buttons

Figure 1.6 Operation Buttons

1. ON button (Green)
2. EM STOP button (Orange)
3. RESET button (White)

- On (sub power) button (**ON**) - The **ON** button turns on the analyzer and PC, and the system initializes.
- Emergency Stop button (**EM STOP**)- The **EM STOP** button turns off all power to the analyzer immediately. Use this button if there is an emergency, or to turn off the system completely after an End Process. The power to the PC is not turned off by pressing **EM STOP**.
- Reset button (**RESET**) - The **RESET** button supplies the main power to the system, and is used after an emergency stop or power failure. To be sure there is correct synchronization after an emergency stop, turn off the PC by performing an End Process. In rare cases, an End Process takes a long time or cannot be performed because there is no response from the analyzer. In these cases, select **Ctrl** + **Alt** + **Delete**, then select **Shutdown** to turn off the PC. To reboot the system, press **RESET**, and then press **ON**. After an emergency stop, wait 5 seconds before pressing **RESET**, then wait 5 seconds before pressing **ON**. Reset also resets the power failure detection circuit and generates the `Power Failure Detected` alarm.

LEDs and RACK SET/DIAG Buttons (Rack Feeder Unit and Priority Rack Input Component)

The rack input component, rack output component, and priority rack input component each have LEDs to show the status of each area.

NOTE

For information on the LEDs and operation buttons when the AU5800 is connected to the Beckman Coulter laboratory automation system, refer to AU5800 Laboratory Automation Connecting Kit addendum.

LED

Table 1.1 Rack Input Component

LED	Description
Amber LED flashing	Racks are in the process of loading onto the system. Wait until the amber LED turns off before loading or unloading a rack tray.
Green LED ON	Racks on this tray are transferred first.

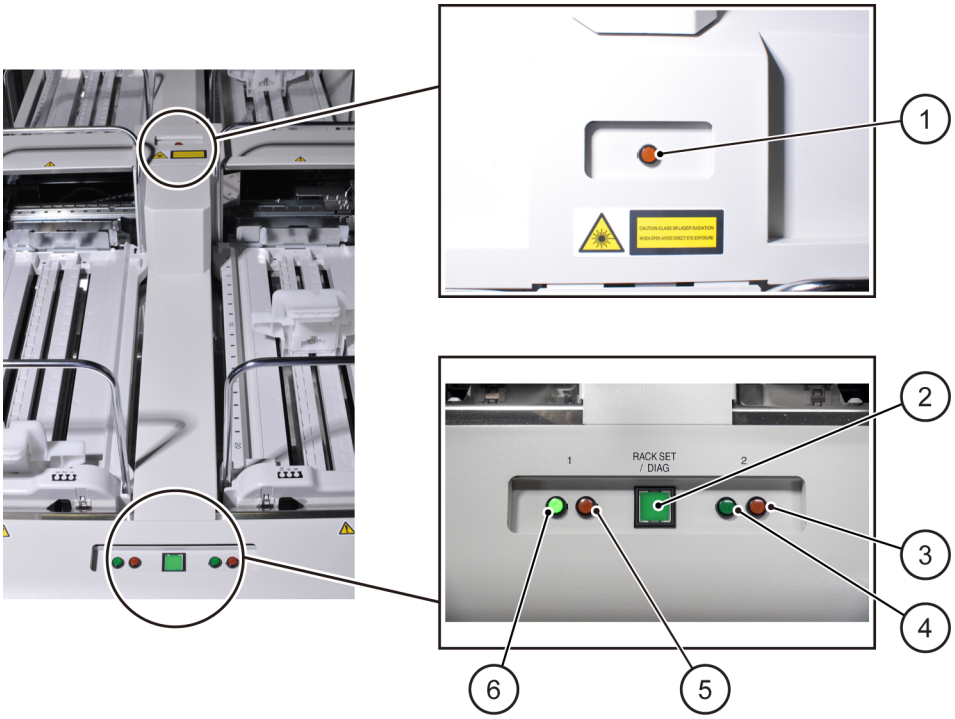
Table 1.2 Priority Rack Input Component

LED	Description
Amber LED flashing	Racks are in the process of loading onto the system. If the cover is lifted, a `Priority Rack Cover Open` alarm is generated. Wait until the amber light turns off to load additional priority racks.

Table 1.3 Rack Output Component

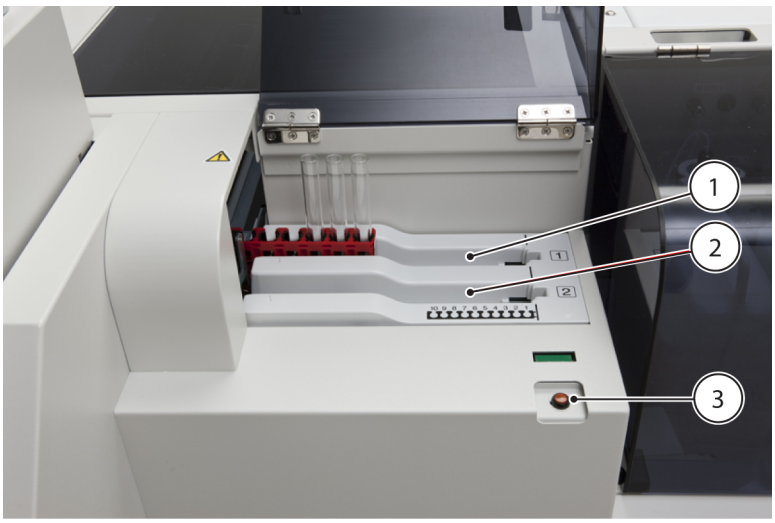
LED	Description
Amber LED flashing	Racks are in the process of unloading to the rack output tray. Wait until the amber light turns off before removing a rack output tray from the rack output component.

Figure 1.7 Rack Input Component and Rack Output Component



1. Rack output component LED
2. RACK SET/DIAG button
3. Rack input tray 2 amber LED
4. Rack input tray 2 green LED
5. Rack input tray 1 amber LED
6. Rack input tray 1 green LED

Figure 1.8 Priority Rack Input Component



1. Priority rack input position 1
2. Priority rack input position 2
3. Priority rack input component LED

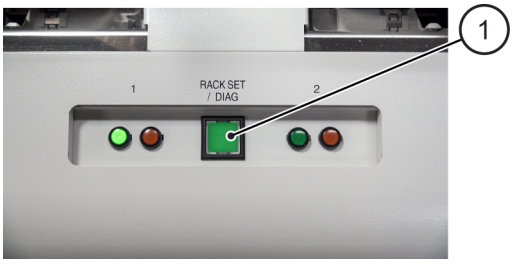
RACK SET/DIAG and DIAG Buttons

- RACK SET/DIAG button

— Use this button to load a rack(s) or tray when racks are moving on the rack input component. The green RACK SET/DIAG button LED is On, and the amber LED flashes when racks are moving on the rack input component. Press the RACK SET/DIAG button to stop moving racks. The RACK SET/DIAG button flashes, the amber LED stops flashing, and racks or a tray can be loaded. Press the RACK SET/DIAG button again to resume rack movement on the rack input component. The RACK SET/DIAG button LED is off when no racks are on the rack input component.

— The RACK SET/DIAG button is used to initiate functions in the Maintenance and Diagnostics screens.

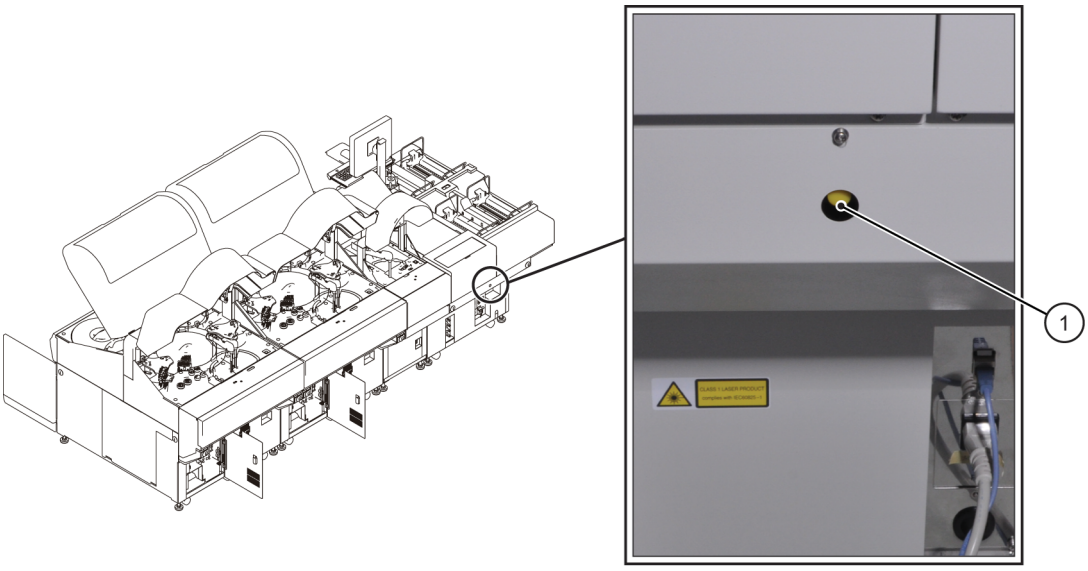
Figure 1.9 Front of Rack Feeder Unit



1. RACK SET/DIAG button

- DIAG button - Use this button to initiate functions in the Maintenance and Diagnostics screens.

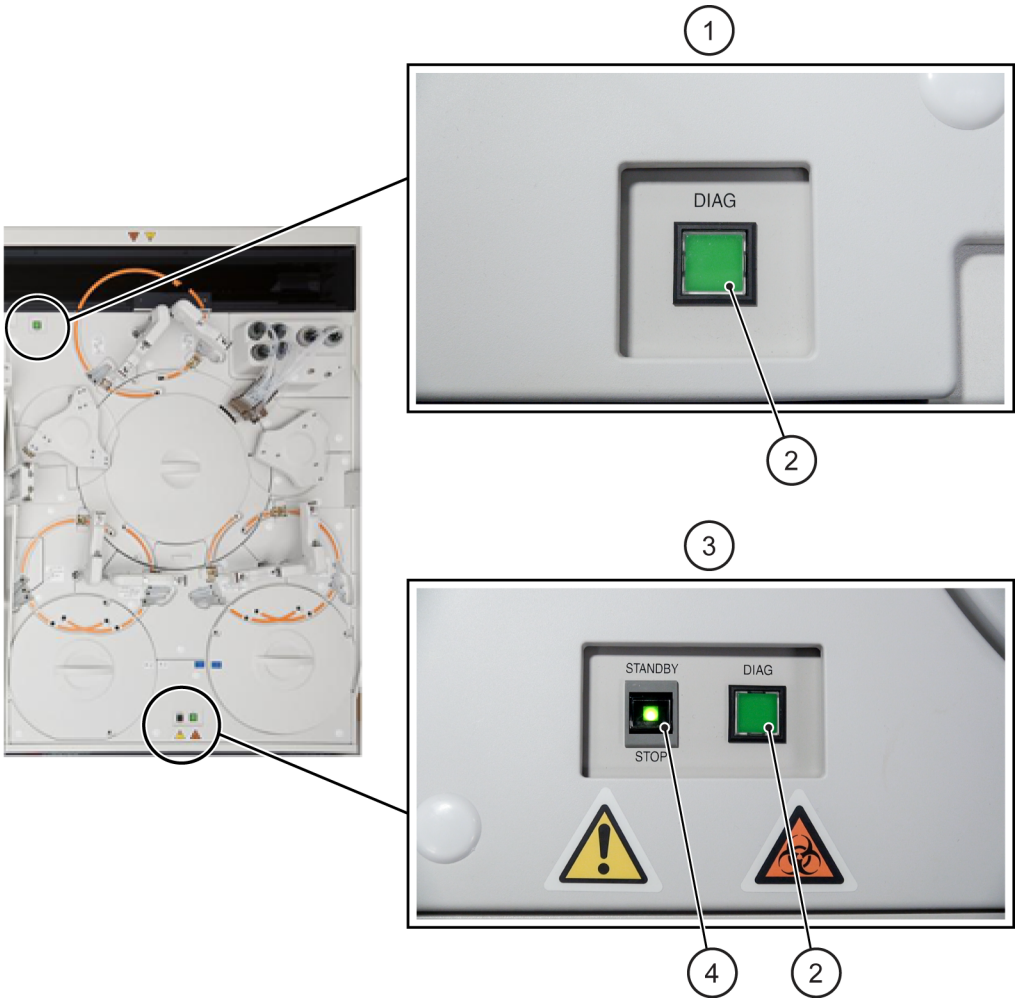
Figure 1.10 Back of Rack Feeder Unit



1. DIAG button

STOP/STANDBY Switch and DIAG Buttons (Analyzer Units)

Figure 1.11 STOP/STANDBY Switch and DIAG Button



1. Top view of analyzer unit (back left)
2. DIAG button
3. Top view of analyzer unit (front central)
4. STOP/STANDBY switch

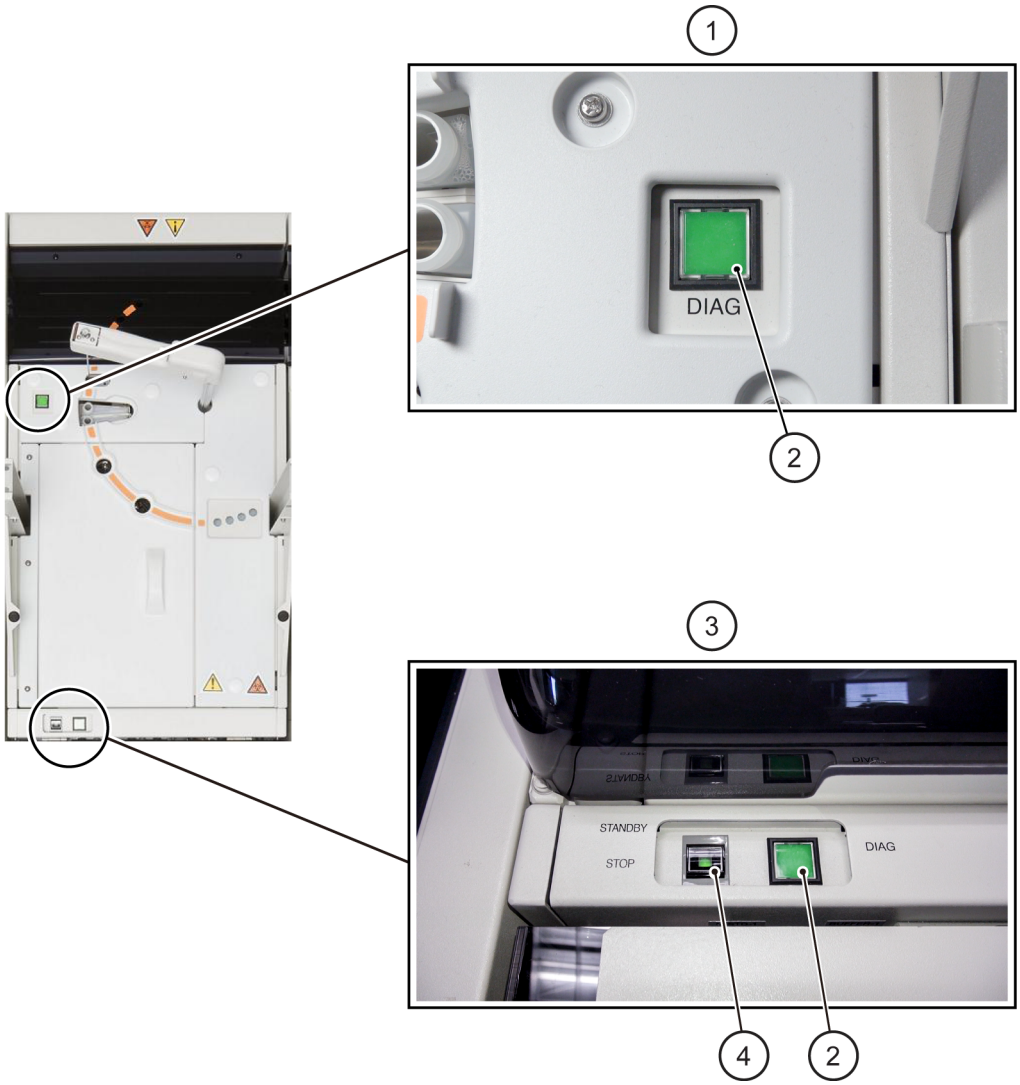
- STOP/STANDBY switch - Use this switch to change between *Standby* and *Stop* modes on each unit. If STOP is selected during *Measure* mode, all results in progress on the unit are lost. Press STANDBY to reset the unit and return to *Standby* mode. Follow your laboratory procedure to rerun incomplete samples.

  STOP/STANDBY LED:

  — On: *Standby* mode
  — Off: *Stop* mode
- DIAG button - Use this button to initiate functions in the Analyzer Maintenance and Diagnostics screens. A DIAG button is on the front and back of each analyzer unit.

STOP/STANDBY Switch and DIAG Buttons (ISE Unit)

Figure 1.12 STOP/STANDBY Switch and DIAG Button



1. Top view of ISE unit (back left)
2. DIAG button
3. Top view of ISE unit (front left)
4. STOP/STANDBY switch

- STOP/STANDBY switch - Use this switch to change between *Standby* (ISE ready) and *Stop* modes on the ISE unit. If STOP is selected during *Measure* mode, all results in progress on the ISE unit are lost. Press STANDBY to reset the unit and return to *Standby* (ISE ready) mode. Follow your laboratory procedure to re-run incomplete samples.

  STOP/STANDBY LED:

  — On: *Standby* mode
  — Off: *Stop* mode
- DIAG button - Use this button to initiate functions in the ISE Maintenance and Diagnostics screens. A DIAG button is on the front and back of the ISE unit.

Rack Feeder Unit

NOTE

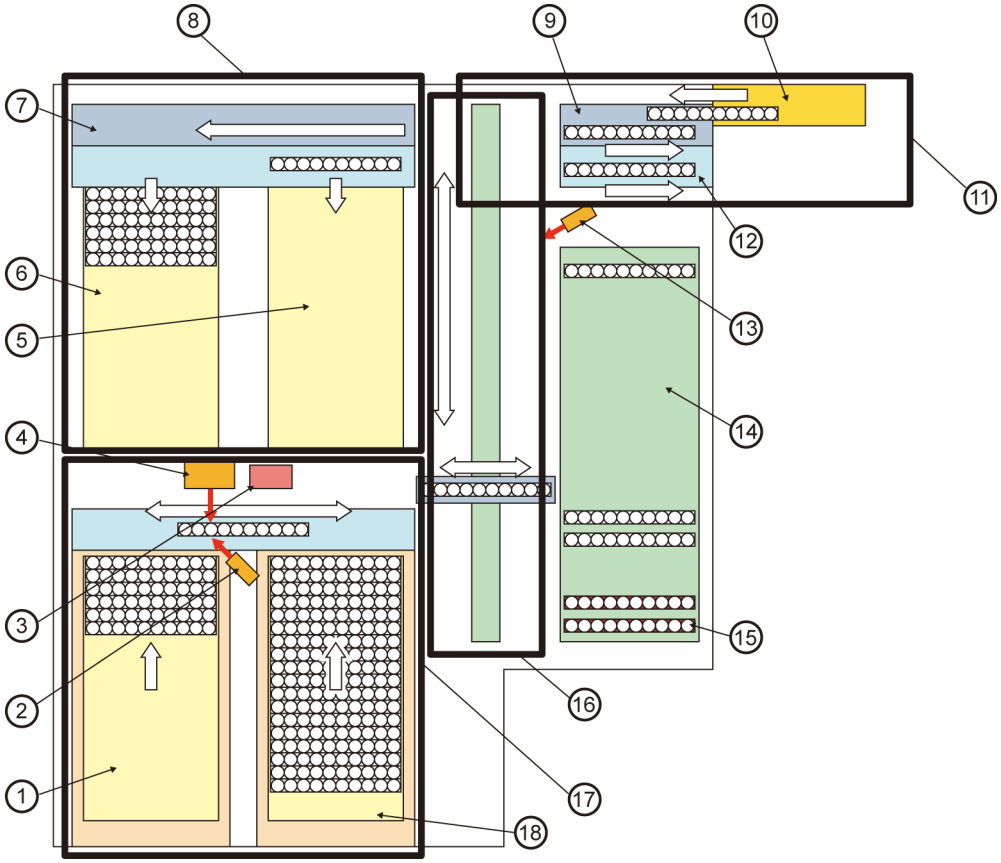
For information on the rack feeder unit when the AU5800 is connected to the Beckman Coulter laboratory automation system, refer to the AU5800 Laboratory Automation Connecting Kit addendum.

This unit is for loading and unloading racks.

Racks are loaded on the rack input component or priority rack input component. A bar code reader reads the rack ID and sample ID, and the information is automatically transferred to the analyzer PC. Covers prevent dirt or dust from getting into samples during analysis, and the main covers should be closed during normal operation.

Figure 1.13 Top View of Rack Feeder Unit

Figure 1.14 Top View of Rack Feeder Unit



1. Rack input tray 1
2. Rack ID bar code reader for rack input
3. Cup detector sensor
4. Sample ID bar code reader
5. Rack output tray 2
6. Rack output tray 1
7. Rack output lane
8. Rack output component
9. Primary sample transport lane
10. Return lane
11. Rack transfer component
12. Bypass lane
13. Rack ID bar code reader for rack output
14. Rack buffer component
15. Priority rack input component
16. Vertical rack transfer component
17. Rack input component
18. Rack input tray 2

Table 1.4 Sample ID Bar Code Reader Specifications

Item	Specification
Wave length	650 nm
Maximum output	85 µW
Beam divergence	60 degrees
Pulse width	112 µS
Scan rate	500 Hz
Class	2

Table 1.5 Rack Feeder Unit Functions

Component	Description
Rack input component	Loads racks on the system. A maximum of 20 racks can be loaded on rack input tray 1 or 2. The rack input trays (1 and 2) are placed on the rack input component, then racks are loaded on the system when analysis is started.
Priority rack input component	Loads racks on the system with a higher priority than the rack input component. Two positions are available to load priority racks. The rack in position 1 is loaded first. When the priority rack input component LED is flashing, additional racks cannot be loaded. Racks are not processed from the priority input component if three or more blue, yellow, or green racks are on the rack input component until the blue, yellow, and green racks move from the rack input tray.
Rack buffer component	Twenty-three positions to temporarily hold racks before processing on the rack transfer component for the initial or repeat run. If Auto Repeat is On, the position the rack is assigned to for the initial run is reserved for holding the rack before the repeat run analysis or the rack output tray.
Rack transfer component	Three rack transportation belts include the primary sample transport lane, the bypass lane, and the return lane.
Rack output component	Unloads racks from the system. Collects a maximum of 20 racks on rack output tray 1 and 20 racks on rack output tray 2. The rack output trays can be removed and replaced on the rack output component.

Rack Input to Rack Transport Flow

1. According to the parameters programmed before analysis, racks are transferred to the rack buffer component. If the priority rack input component has a rack present, that rack is processed first. If there is not an open location on the rack buffer component, the vertical rack transfer component begins operating when an open location is available.
2. Racks move from the rack input component or priority rack input component, the rack ID is read, the rack type is detected, the presence and type of tube or cup is detected, and the sample ID is read. Then the racks are transferred to the rack buffer component.

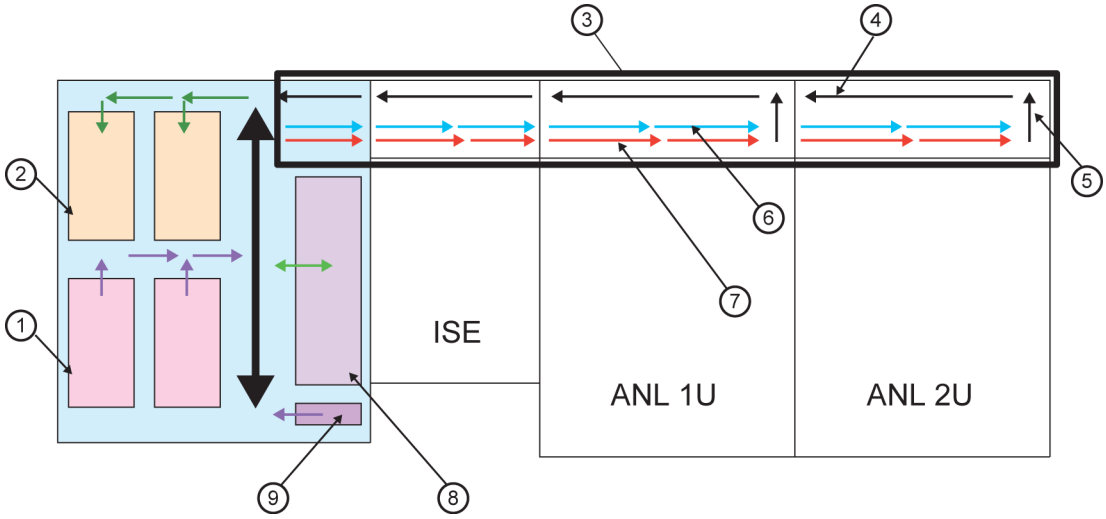
3. Racks are transferred to the primary sample transport lane or the bypass lane. Repeat racks and emergency (red) racks are always transferred to the bypass lane. Reagent blank (blue), calibration (yellow), QC (green), and routine (white) racks are transferred in the order the racks are loaded on the rack input component or priority rack input component. Reagent blank, calibration, and QC racks are always transferred to the primary sample transport lane.

Rack Transfer Flow

Racks are transferred to the sample aspiration position on each unit by the primary sample transport lane or the bypass lane.

- Primary sample transport lane: Moves routine racks to the sample aspiration position on each unit.
- Bypass lane: Moves red racks and repeat racks to the sample aspiration position on each unit. The lane is also used to bypass a unit if no tests were requisitioned on a unit, or if a problem exists on the primary sample transport lane.
- Return lane: Moves racks to the rack output component when sample aspiration is complete. If the Auto Repeat option is On, racks are first moved to the rack buffer component.
- Lane changer: Moves racks between the primary sample transport lane, bypass lane, and return lane from unit to unit.

Figure 1.15 Rack Transfer Flow



1. Rack input tray
2. Rack output tray
3. Rack transfer component
4. Return lane
5. Lane changer
6. Primary sample transport lane
7. Bypass lane
8. Rack buffer component
9. Priority rack input component

Rack Input to Rack Output Flow

Racks are loaded onto the rack input component and move to the rack transfer component. Routine racks move on the primary sample transport lane to the sample aspiration

position. When sample aspiration is complete, the rack moves to the next unit or the return lane.

Emergency and repeat racks are moved to the bypass lane sample aspiration position. The bypass lane sample aspiration position has priority over the primary sample transport lane sample aspiration position. A rack moves to the bypass lane if it can bypass a unit because no tests were ordered (requisitioned) on that unit. In this case, the lane changer moves it to the primary sample transport lane for sample aspiration.

When sample aspiration is complete (all units) for the rack, the lane changer moves the rack to the return lane.

Racks on the return lane are moved to the rack output component or the rack buffer component. If Auto Repeat is enabled, racks move to the rack buffer component until sample analysis is complete. Racks are then processed for repeat analysis, or move to the rack output tray if there were no repeat orders (requisitions).

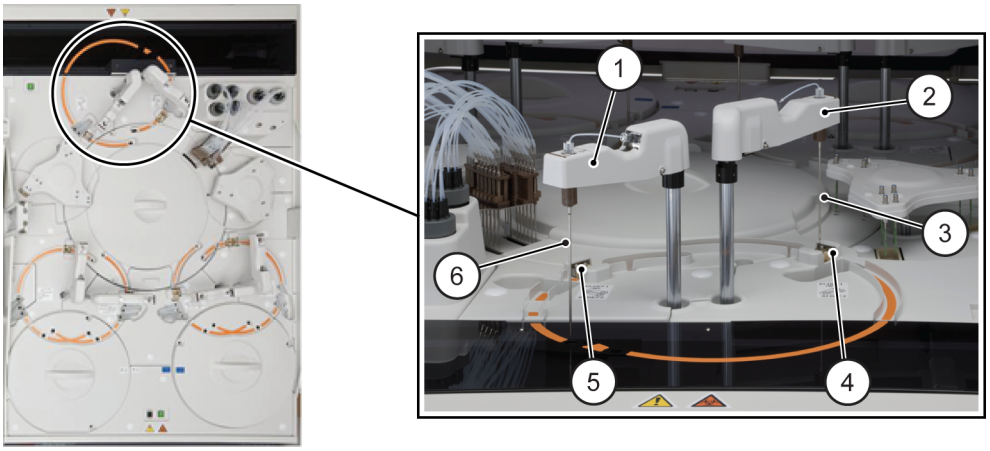
TIP

Racks can be transferred to other units if the ISE unit or an analyzer unit is in *Stop* mode except for some mechanical errors on the rack transfer component.

Sample Transfer Component

The sample probes (S1 and S2) and liquid level detectors dispense sample or diluent, and detect liquid level. Two sample probes (S1 and S2) are on each analyzer unit. The sample probes have downward collision detection and clot detection. Sample is aspirated from the tube or cup and dispensed into the inner cuvettes (S1 probe) or outer cuvettes (S2 probe). The sample probe is rinsed with deionized water internally and externally in the sample probe wash well between each sample dispense.

Figure 1.16 Sample Transfer Component

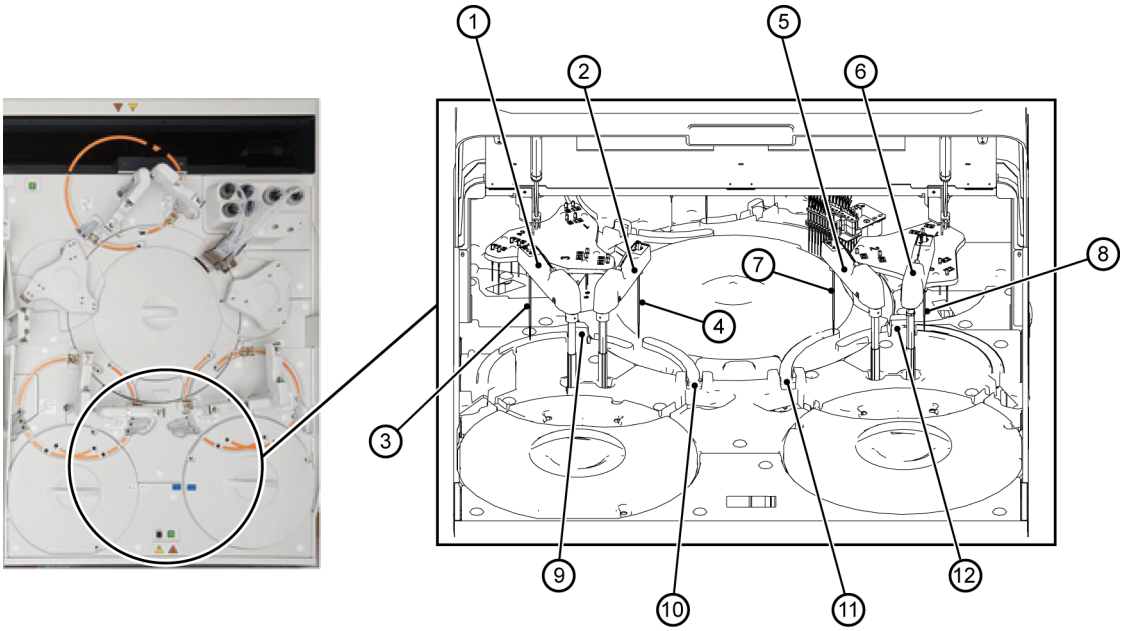


1. Sample transfer component (S2)
2. Sample transfer component (S1)
3. Sample probe (S1)
4. Sample probe wash well (S1)
5. Sample probe wash well (S2)
6. Sample probe (S2)

Reagent Transfer Component

The reagent probes (R1-1, R1-2, R2-1, R2-2) and liquid level detectors dispense reagent or diluent, and detect liquid level. Four reagent probes (R1-1, R1-2, R2-1, R2-2) are on each analyzer unit. The reagent probes have downward collision detection. Reagent is aspirated from the R1 and R2 refrigerators and dispensed into the inner cuvettes (R1-1 and R2-1 probes) or outer cuvettes (R1-2 and R2-2 probes). The probes are rinsed with deionized water internally and externally in the reagent probe wash well between each reagent dispense.

Figure 1.17 Reagent Transfer Component

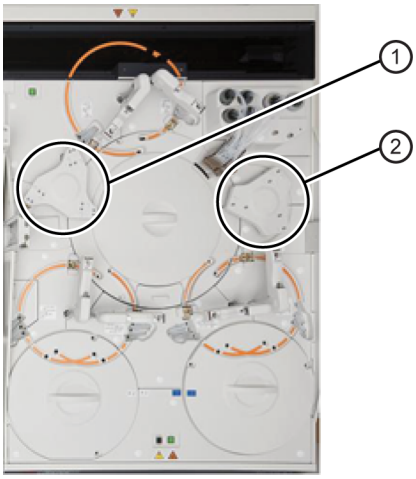


1. Reagent transfer component (R2-2)
2. Reagent transfer component (R2-1)
3. Reagent probe (R2-2)
4. Reagent probe (R2-1)
5. Reagent transfer component (R1-1)
6. Reagent transfer component (R1-2)
7. Reagent probe (R1-1)
8. Reagent probe (R1-2)
9. Reagent probe wash well (R2-2)
10. Reagent probe wash well (R2-1)
11. Reagent probe wash well (R1-1)
12. Reagent probe wash well (R1-2)

Mix Bar Component

Mix bars are used to mix the reagent and sample in the cuvette. The R1/S mix bar component contains 12 spiral-shaped mix bars identified by a blue top. A mix occurs after R1 and sample dispense. The R2 mix bar component contains six L-shaped mix bars identified by the yellow top. A third mix occurs after the R2 dispense. After mixing in the cuvette, the mix bars are cleaned in diluted wash solution, then rinsed in deionized water in the wash wells.

Figure 1.18 Mix Bar Component



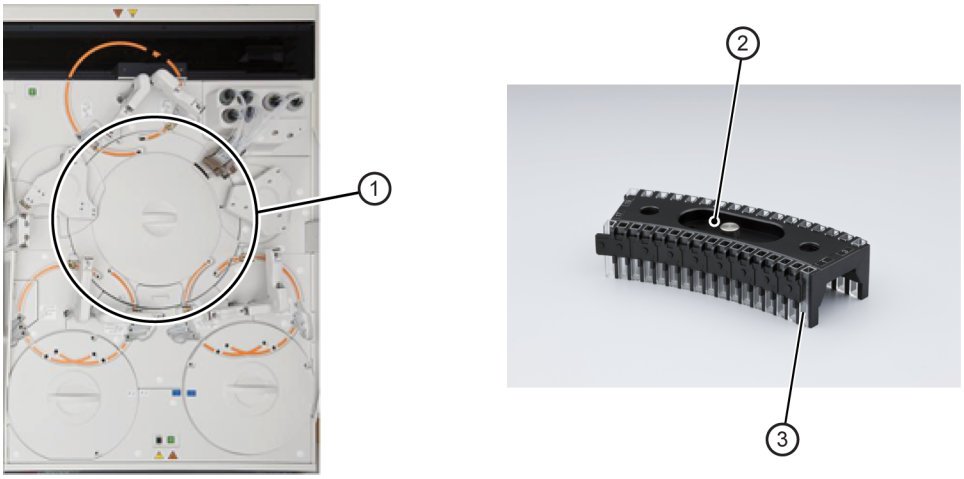
1. R1/S mix bar component
2. R2 mix bar component

Cuvette Wheel Component

The incubator surrounds the cuvettes in the cuvette wheel component and the incubation bath keeps the reaction temperature of the cuvettes at 37 °C. A cuvette is made from optical glass with a light path of 5 mm.

- Minimum reaction volume: 80 µL.
- Maximum reaction volume: 287 µL.

Figure 1.19 Cuvette Wheel Component



1. Cuvette wheel component
2. Cuvette wedge
3. Cuvette

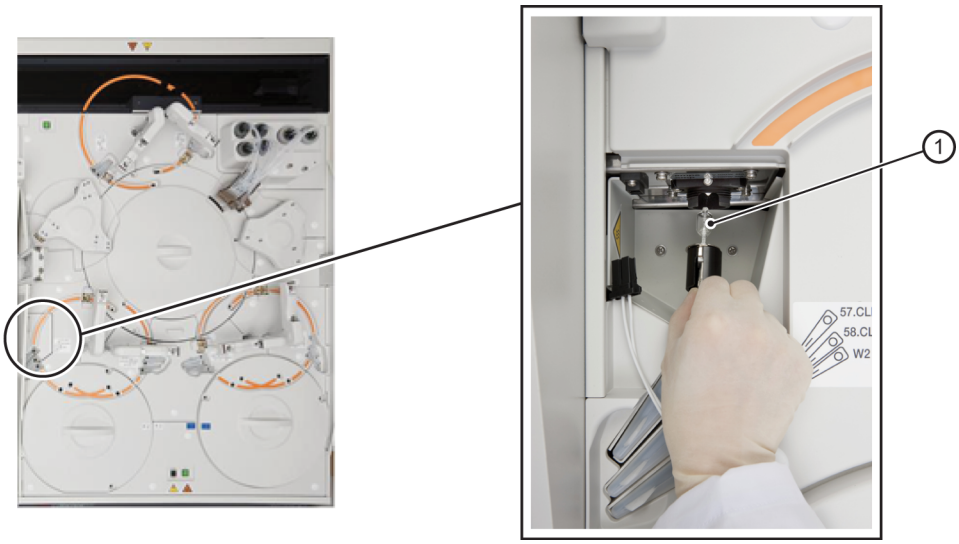
The cuvette wheel contains a total of 408 cuvettes, with 204 cuvettes each on the inner and outer positions. The wheel is divided into 12 wedges. The wash nozzle component automatically cleans the cuvettes. The weekly photocal maintenance procedure monitors the cuvette integrity. From photocal results, clean and replace cuvettes as required.

Cuvettes are continuously monitored in *Measure* mode by the real-time water blank check method. The real-time water blank check method compares the water blank reading obtained during analysis to the previous water blank reading. If the water blank reading check fails the specification, the system generates a `Photometry Error During Cuvette Wash` alarm. If the system detects a cuvette overflow or unstable photometry, the system generates a `Photometry Error During Cuvette Wash` alarm. For more information, refer to Recovering from a Photometry Error During a Cuvette Wash Alarm.

Photometry Component

The photometry component includes a halogen lamp, lenses, a diffraction grating, and a photodetector to measure the amount of light transmitted through the reaction solution in the cuvette. The diffraction grating splits the light into 13 wavelengths. Each analyzer unit contains a photometry component.

Figure 1.20 Photometry Component



1. Photometer lamp

WARNING

Never touch the photometer lamp or look directly into the photometer lamp when the lamp is illuminated. The lamp is hot when the system is on.

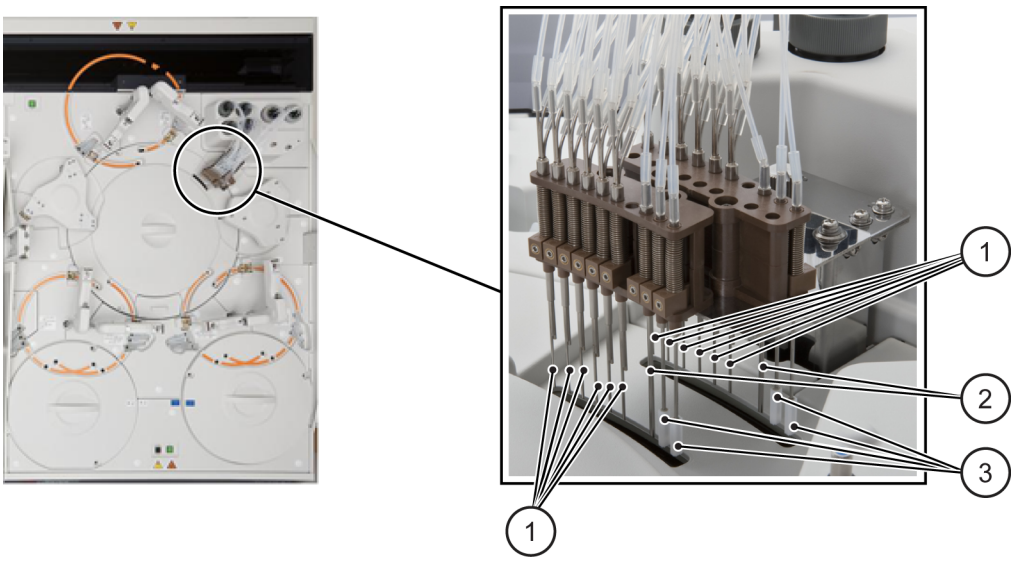
Wash Nozzle Component

The wash nozzle component cleans, rinses, and dries the cuvettes automatically. The wash nozzle component includes six wash nozzles, one aspiration nozzle, and two dry nozzles for the inner and outer cuvettes.

Each wash nozzle is a 3-way nozzle used to clean the cuvettes. The longest nozzle aspirates liquid, the middle nozzle dispenses, and the shortest nozzle aspirates any overflow liquid.

The aspiration nozzle aspirates any remaining liquid in the cuvette. The dry nozzle uses the fluorocarbon polymer tip to bring any remaining moisture to the bottom of the cuvette, then aspirates to dry the interior of the cuvette completely.

Figure 1.21 Wash Nozzle Component

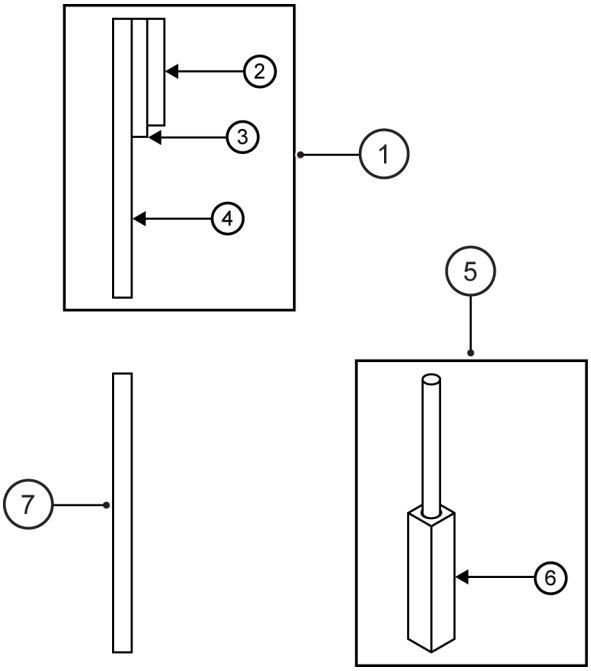


1. Wash nozzle
2. Aspiration nozzle
3. Dry nozzle

The dispensing sequence of the wash nozzles, from left to right in the diagram:

- Nozzle 1 and 2 - Diluted wash solution
- Nozzle 3 to 6 - Warm deionized water
- Nozzle 7 - Aspiration
- Nozzle 8 and 9 - Drying

Figure 1.22 Wash Nozzle



1. Wash nozzle
2. Overflow nozzle
3. Liquid (wash solution and warm deionized water) dispense nozzle
4. Liquid (reaction, wash solution, and warm deionized water) aspirating nozzle
5. Dry nozzle
6. Drying tip
7. Aspiration nozzle

Reagent Refrigerator Component

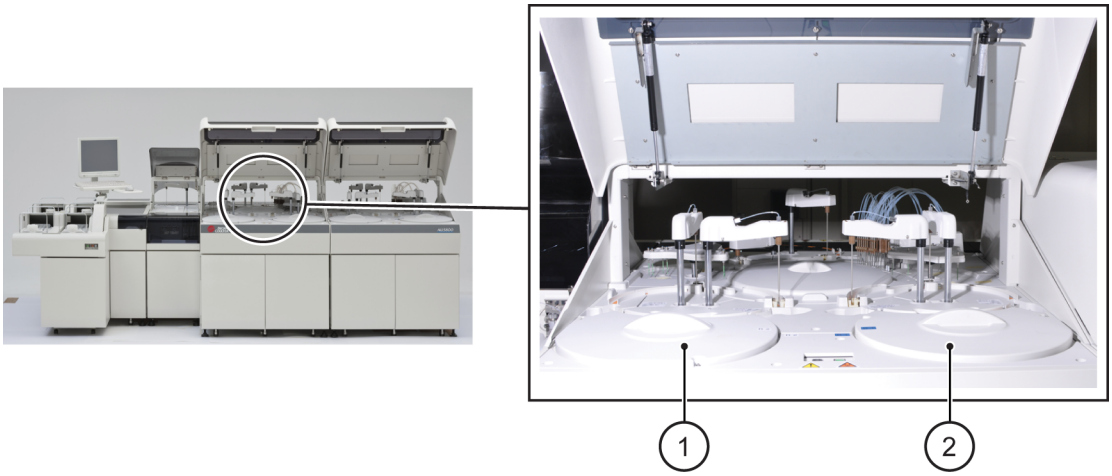
The R1 refrigerator contains the first reagent (R1), and the R2 refrigerator contains the second reagent (R2). Even when an End Process is performed, the temperature of the refrigerators is maintained between 4°C (39.2 °F) and 12°C (53.6 °F).

Place the reagent bottle on the corresponding tray (R1 or R2) in the R1 refrigerator or R2 refrigerator.

Both R1 and R2 refrigerators have 54 positions. Each refrigerator uses applicable adapters or partitions for various sizes of reagent bottles: 15 mL, 30 mL, 60 mL, and 180 mL.

Each bottle position can be designated as reagent ID (bar code labeled) or fixed (not bar code labeled). During a reagent check, reagent bottles are detected, reagent IDs are read, and reagent volume is calculated.

Figure 1.23 Refrigerators



1. R2 refrigerator
2. R1 refrigerator

IMPORTANT

Confirm that the reagent bottles are placed in the refrigerator with the reagent ID facing outwards. Confirm that all reagent bottle caps are removed before placing them in the refrigerator.

Syringe Component

Each analyzer unit has:

- Two sample syringes (S1 and S2)
- Four reagent syringes (R1-1, R1-2, R2-1, and R2-2)
- Two wash syringes (W1 and W2)

Sample and reagent syringes dispense the required volume of sample or reagent.

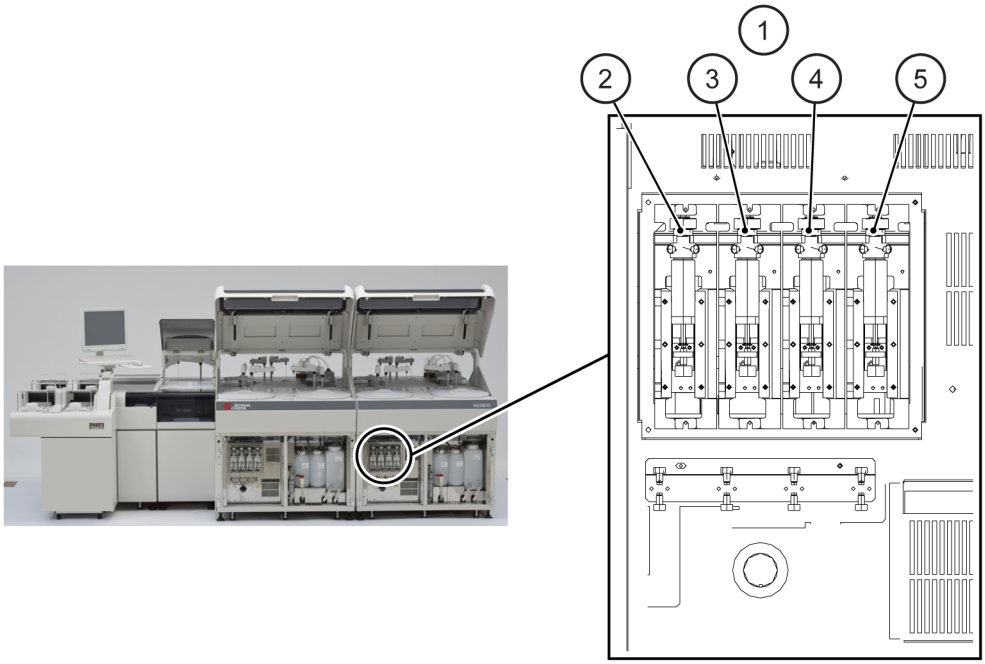
Wash syringes dispense deionized water for the internal sample probe wash.

On the front of each analyzer unit, behind the front door, are four reagent syringes. Two syringes dispense reagent to the inner cuvettes (R1-1 and R2-1), and two syringes dispense reagent to the outer cuvettes (R1-2 and R2-2).

The reagent syringes are in the following order from left to right:

- R2-2 (outer)
- R2-1 (inner)
- R1-1 (inner)
- R1-2 (outer)

Figure 1.24 Reagent Syringe Location



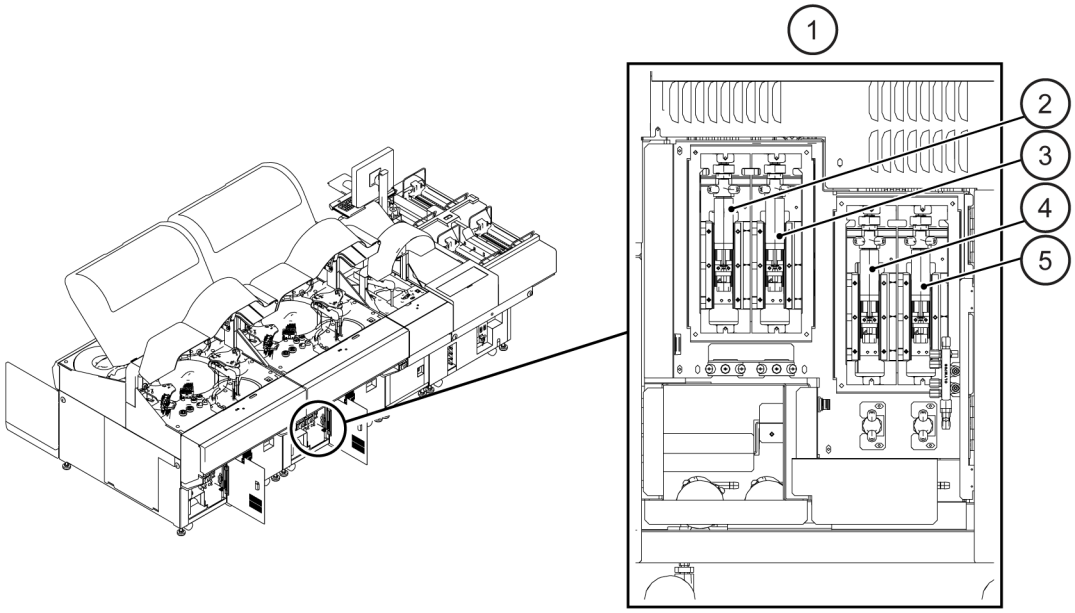
1. Front of the analyzer unit
2. R2-2 (outer)
3. R2-1 (inner)
4. R1-1 (inner)
5. R1-2 (outer)

On the back of each analyzer unit, behind the rear door, are two wash syringes and two sample syringes. Sample syringe S1 dispenses sample to the inner cuvettes, and wash syringe W1 rinses the interior of sample probe S1. Sample syringe S2 dispenses sample to the outer cuvettes, and wash syringe W2 rinses the interior of sample probe S2.

The syringes are in the following order from left to right:

- Wash syringe W2 (outer)
- Wash syringe W1 (inner)
- Sample syringe S2 (outer)
- Sample syringe S1 (inner)

Figure 1.25 Wash and Sample Syringe Location



1. Back of the analyzer unit
2. Wash syringe W2 (outer)
3. Wash syringe W1 (inner)
4. Sample syringe S2 (outer)
5. Sample syringe S1 (inner)

Tank Storage (Rack Feeder Unit)

The rack feeder unit contains the master wash solution tank that supplies wash solution to the wash solution tank located on each analyzer unit.

Figure 1.26 Master Wash Solution Tank

Master Wash Solution Tank

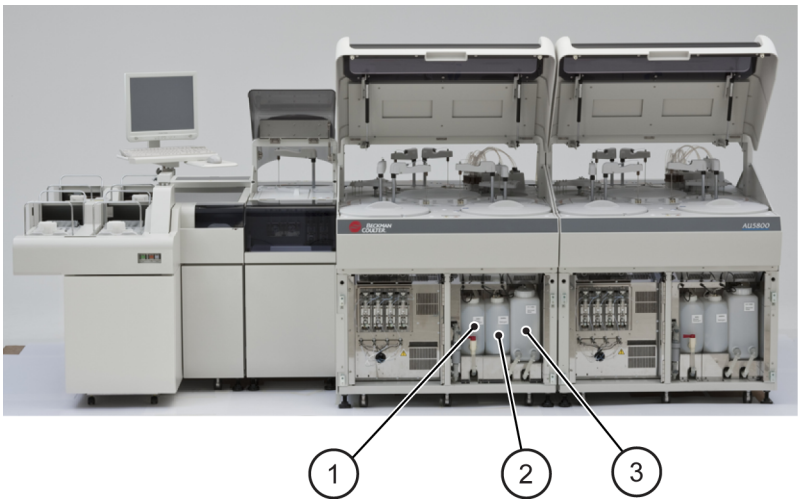
The master wash solution tank has a capacity of 20 liters. The master wash solution tank supplies the wash solution to the wash solution tank located on each analyzer unit.

Tank Storage (Analyzer Unit)

The system has a deionized water tank, a wash solution tank, and a diluted wash solution tank on each analyzer unit.

The system uses diluted wash solution (1%) to clean the cuvettes and mix bars. The system uses deionized water to dilute the wash solution, rinse analyzer components, and make dilutions.

Figure 1.27 Tank Location on Analyzer Unit



1. Diluted wash solution tank
2. Wash solution tank
3. Deionized water tank

Diluted Wash Solution Tank

The diluted wash solution tank has a capacity of 5 liters. A float sensor indicates when the volume in the tank is low. The tank automatically fills with wash solution and deionized water to make the diluted wash solution (1%).

Wash Solution Tank

The wash solution tank has a capacity of 5 liters. A float sensor indicates when the volume in the tank is low and opens a valve to fill the tank automatically from the master wash solution tank located on the rack feeder unit.

Deionized Water Tank

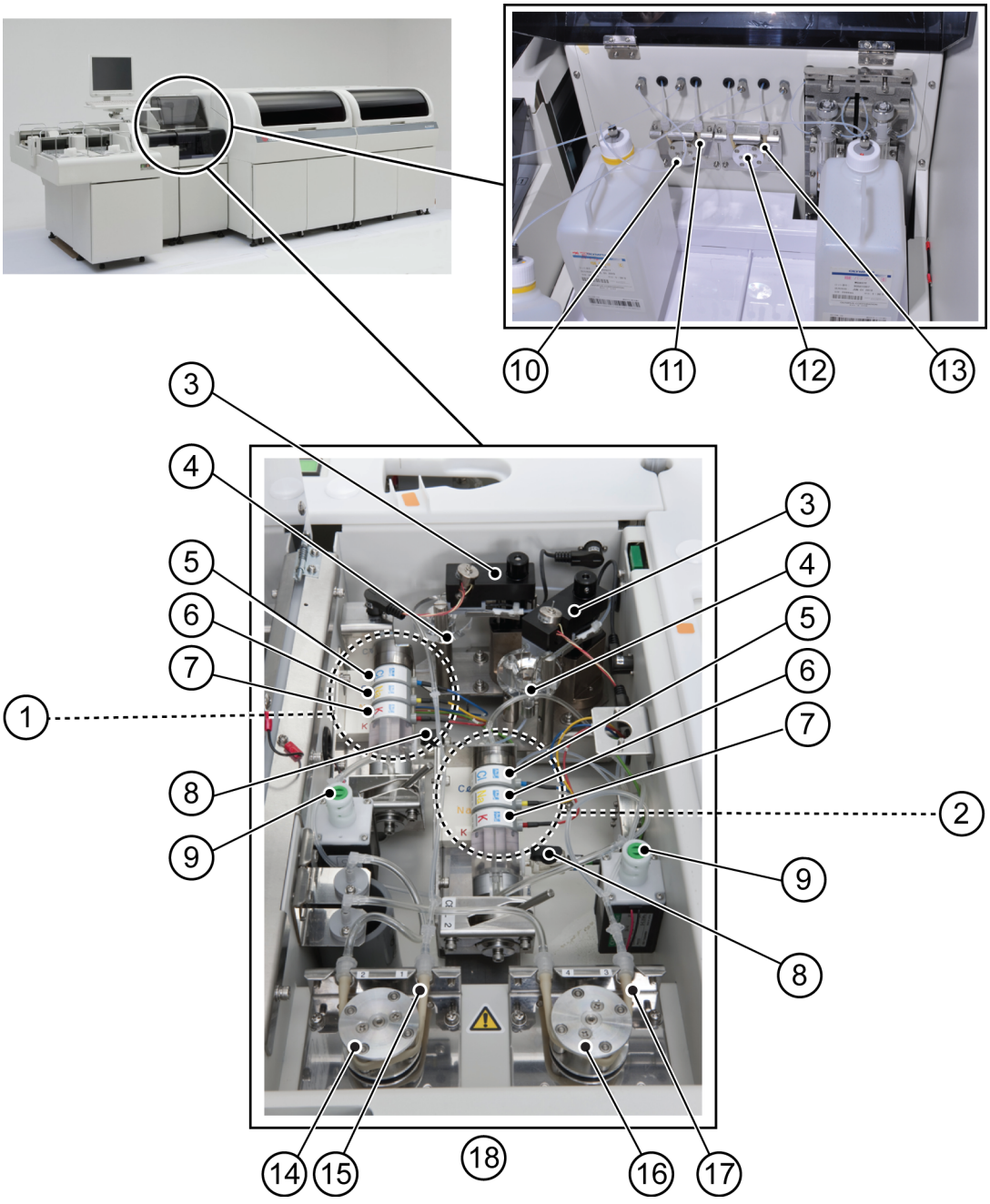
The deionized water tank has a capacity of 10 liters. A float sensor indicates when the volume in the tank is low and opens a valve to fill it automatically. For more information on specifications, refer to Water Supply.

ISE Unit (Optional)

Diluted sample passes through the Na, K, and Cl ion selective electrodes to determine the concentration by comparing the electrical potential difference to the REF electrode.

The system has one or two sets of electrodes. The sets of electrodes are identified as Cell 1 and Cell 2 when a system has two sets of electrodes.

Figure 1.28 ISE Unit



1. Cell 1
2. Cell 2
3. Mixing component
4. Sample pot
5. Cl electrode
6. Na electrode
7. K electrode
8. REF electrode
9. Pinch valve
10. MID Standard roller pump for Cell 1
11. MID Standard roller pump tubing for Cell 1
12. MID Standard roller pump for Cell 2
13. MID Standard roller pump tubing for Cell 2
14. Mixture aspiration roller pump for Cell 1

15. Mixture aspiration roller pump tubing for Cell 1
16. Mixture aspiration roller pump for Cell 2
17. Mixture aspiration roller pump tubing for Cell 2
18. Inside ISE compartment with Cell 1 and Cell 2

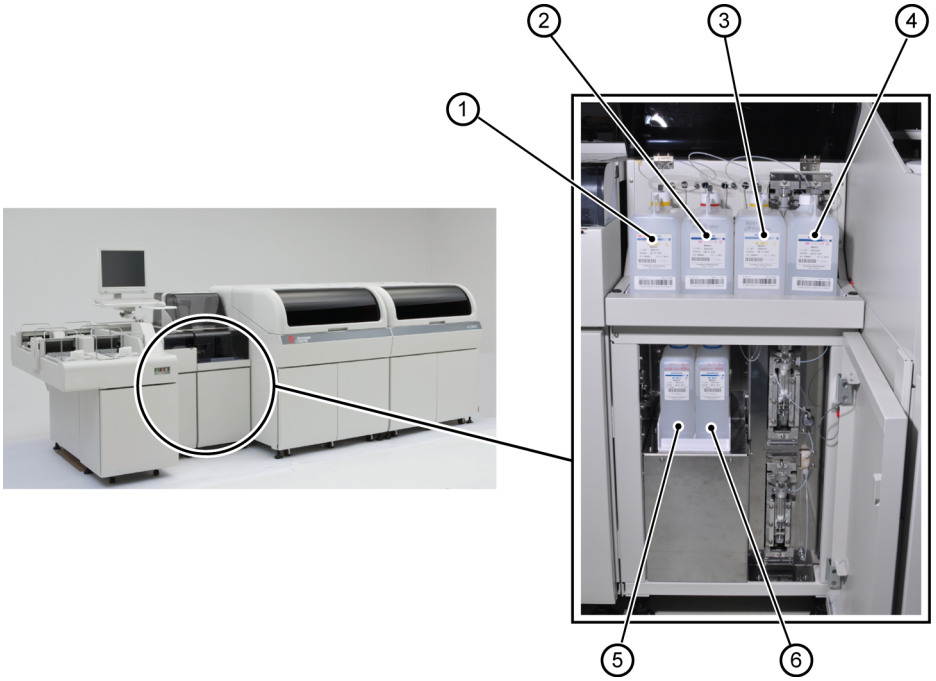
- Mixing component - The mixing component mixes sample and ISE Buffer Solution dispensed into the sample pot. It has two liquid-level sensors to detect correct drainage.
- Sample pot - Sample and ISE Buffer Solution are dispensed into the sample pot and mixed. The volumes dispensed for serum and urine:
  - ISE Buffer Solution: 618 µL (fixed)
  - Sample: 20 µL (fixed)
  - Deionized water: 10 µL (fixed)
- Cl electrode, Na electrode, and K electrode - These electrodes are used for measuring the potential of Cl, Na, and K ions in the sample and ISE MID Standard Solution. The concentrations of individual ions in the sample can be calculated from the potential differences between each ion in the sample and in the ISE MID Standard Solution.
- REF electrode - This electrode is the reference electrode for the Cl, Na, and K electrodes.
- Pinch valve - The pinch valve has two functions:
  - Allows sample in the sample pot to enter the flowcell for measurement.
  - Allows excess sample to pass through the bypass tubing to waste.
- Roller pump

  There are two roller pumps for Cell 1 and Cell 2:
  - Mixture Aspiration Roller Pump (inside the ISE compartment):
    - Aspirates liquid from the sample pot through the flowcell or bypass tubing and out to waste.
    - Aspirates ISE Reference Solution from the ISE Reference Solution bottle past the REF electrode and out to waste.
  - MID Standard Roller Pump (behind the ISE reagent bottles):
    - Aspirates ISE MID Standard Solution from the ISE MID Standard Solution bottle to the sample pot.
- Roller pump tubing - The roller pump tubing is made of rubber and wraps around the roller pump. As the roller pump rotates, the rollers on the pump squeeze the tubing, and solution is supplied or removed.

ISE Reagent Bottles

The ISE has an ISE Buffer Solution bottle, ISE MID Standard Solution bottle, and ISE Reference Solution bottle for each ISE Cell.

Figure 1.29 ISE Reagent Bottles



1. ISE MID Standard Solution bottle (for Cell 1)
2. ISE Buffer Solution bottle (for Cell 1)
3. ISE MID Standard Solution bottle (for Cell 2)
4. ISE Buffer Solution bottle (for Cell 2)
5. ISE Reference Solution bottle (for Cell 1)
6. ISE Reference Solution bottle (for Cell 2)

- ISE Buffer Solution bottle - This bottle stores the ISE Buffer Solution. The system uses the ISE Buffer Solution for diluting the sample. The capacity of this container is 2 liters.
- ISE MID Standard Solution bottle - This bottle stores the ISE MID Standard Solution. The system uses the ISE MID Standard Solution to condition the electrodes between analysis. The capacity of this container is 2 liters.
- ISE Reference Solution bottle - This bottle stores the ISE Reference Solution. The system uses the ISE Reference Solution as a reference point relative to the three electrodes. The capacity of this container is 1 liter.

ISE Sample Dispensing Component

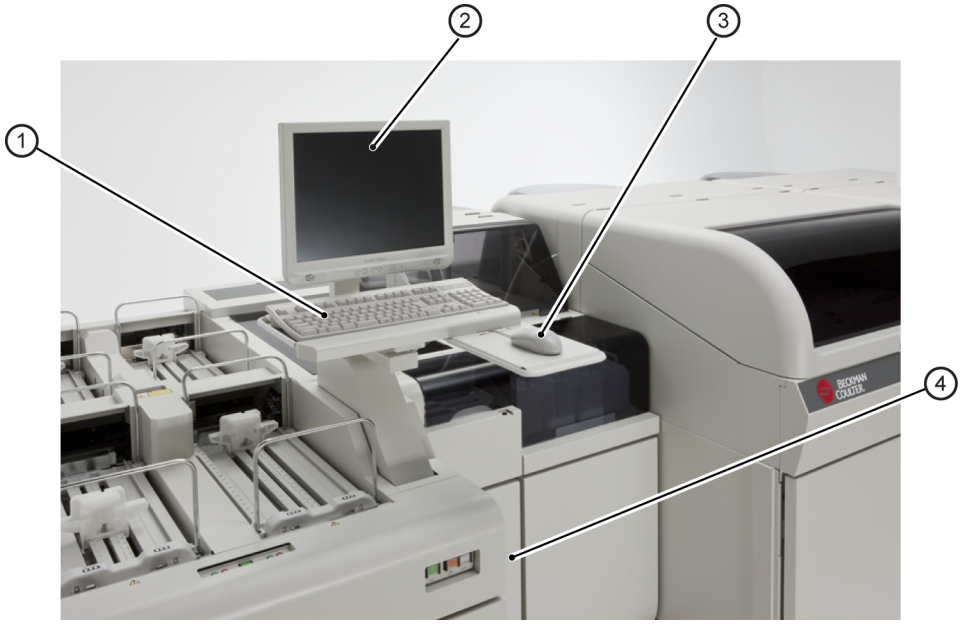
There is one sample probe and one wash well for washing the sample probe. Serum or urine is aspirated by the sample probe and dispensed into the sample pot. The probe is rinsed inside and out between each sample aspiration.

ISE Syringe Component

There is one sample syringe for dispensing serum or urine, one wash syringe for rinsing the inside of the ISE sample probe when it is over the wash well between samples, and one buffer syringe for dispensing buffer.

Data Processing Module (DPR)

Figure 1.30 Data Processing Module (DPR)



1. Keyboard
2. Monitor
3. Mouse
4. Computer (behind door)

Monitor

The monitor displays the operating software, and the keyboard and mouse allow operator input.

Computer

The system uses a personal computer as the data processing component to perform data processing. The computer includes a hard disk to store programs, analysis parameters, an analysis database, USB drives, and a DVD R/W component. An external hard disk option is also available.

Printer (Optional)

You can output results in operator-defined reports or lists.

Hand Scanner (Optional)

The hand scanner reads bar code labels for input to the software. You can scan a sample ID in the Sample ID field in **Home > Rack Requisition**.

Tests programmed with the Master Curve option require a 2-dimensional bar code label that contains calibration information. Use the hand scanner to scan manually the 2-dimensional bar code label located on the R1 bottle label of corresponding AU reagents.

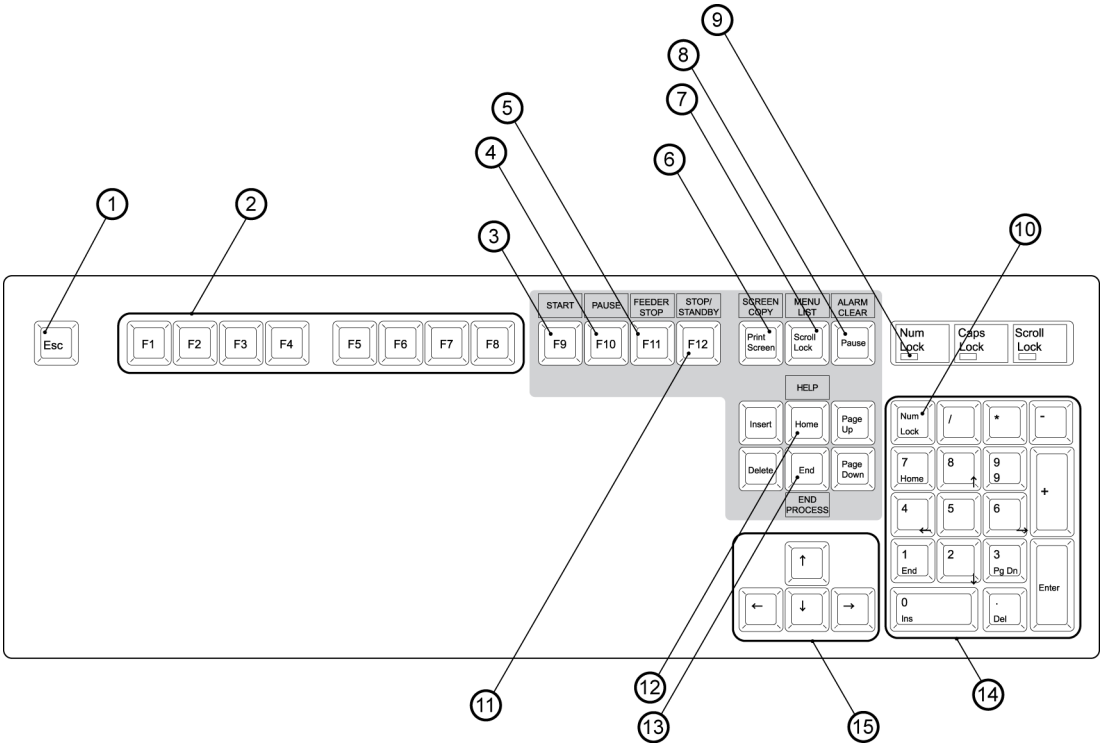
Table 1.6 Hand Scanner Specifications

Item	Specification
Wavelength	630 to 680 nm
Output	1.0 mW
Class	2

Touch Screen, Mouse, and Keyboard

You can operate the system in any combination of the touch screen, mouse, or keyboard.

Figure 1.31 Operation Keys on the Keyboard



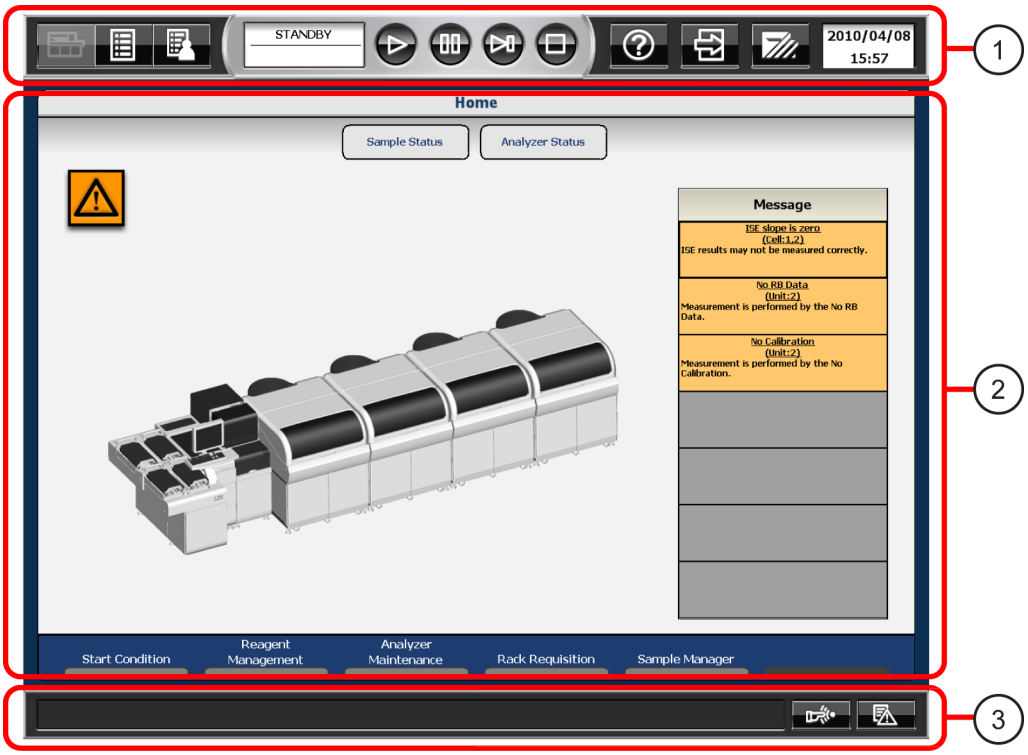
1. ESC key
2. Function keys
3. Start key
4. Pause key
5. Feeder Stop key
6. Print Screen key
7. Menu List key
8. Alarm Clear key
9. Num Lock lamp
10. Num Lock key
11. Stop or Stand-by key
12. Home key
13. End Process key
14. Numeric key pad
15. ↑, ↓, ←, → Key

Software Overview

Organization of Operation Screen

The interface contains three areas, a main button bar, menu area, and alarm area.

Figure 1.32 Home Screen



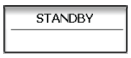
1. Main button area - The display area for the main buttons (**Home**, **Menu List**, and **User Menu**), **Help**, and operation area (**Start**, **Pause**, **Feeder Stop**, **Stop**, and **End**).
2. Menu area - The display and operation area for the selected menu or button.
3. Alarm area - The display area for the alarm messages generated during system operation, and the **Alarm Clear** and **Alarm List** buttons.

Main Button Area

Table 1.7 Main Button Area

Button	Name	Description
	Home	The system displays the Home screen.
	Menu List	The system displays the Menu List screen.

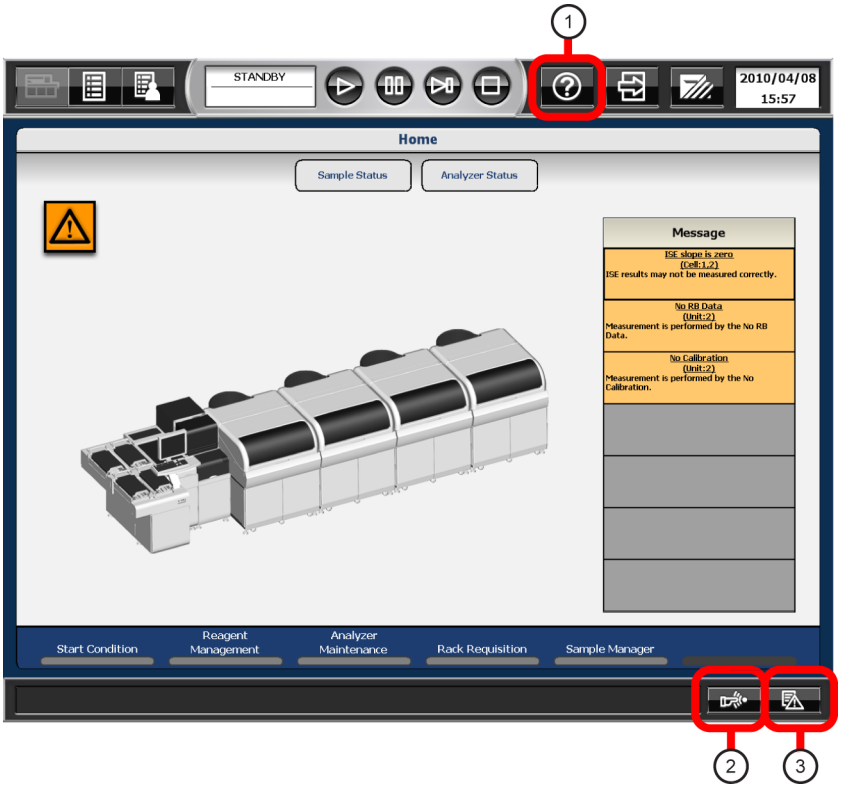
Table 1.7 Main Button Area (Continued)

Button	Name	Description
	User Menu	The system displays the User Menu screen. For more information, refer to Program a User Menu.
	Mode Display area	The system displays the current mode. The system displays the time to completion for some maintenance procedures.
	Start	Starts analysis.
	Pause	Pauses analysis. The system pauses at the first test for which no R1 reagent was dispensed.
	Feeder Stop	Stops the rack input component. The analysis of samples in racks that are loaded continues.
	Stop/ Standby	Stops analysis. In *Stop* mode, select this button to return the system to *Standby* mode.
	Help	The system displays a menu for accessing the operator documentation and maintenance video directory.
	Logout	Logs out and logs in an operator.
	End	Shuts down the system (End Process). Shutting down the system turns off the auxiliary power supply, including the lamp and computer.
12/20/2010 12:49	Time Display area	The system displays the current date and time.

Using the System Help and Alarm List

To have the system display a menu for accessing the operator documentation and maintenance video directory, select **Help**.

Figure 1.33 Help, Alarm Clear, and Alarm List Buttons



1. Help
2. Alarm Clear
3. Alarm List

NOTE

Select **Alarm Clear** to stop the audible alarm. Select **Alarm Clear** a second time to clear the alarm message from the screen.

Table 1.8 Types of Help

Option	Description
Help Button	The system displays the PDF version of the operator documentation and the maintenance video directory.
Alarm List Button	The system displays the Alarm List dialog. To display the alarm description and the corrective actions, select an alarm to display, and then select **Help** on the Alarm List dialog. The system displays an Alarm Help dialog. **NOTE** The alarm help information is only available in the **Alarm List**. The AU5800 Instructions for Use and AU5800 Reference Manual do not contain alarm descriptions and corrective actions.

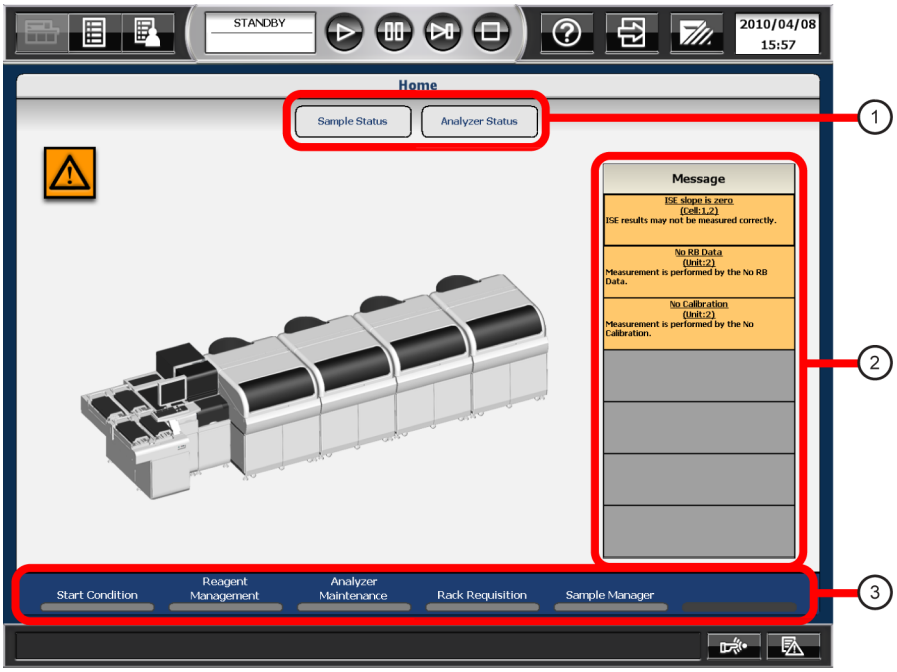
Table 1.8 Types of Help (Continued)

Option	Description
Input Help	The system displays the allowable input information for text fields. Move the cursor over the input area for the system to display the Input Help.
Button Help	The system displays the name of the buttons. Move the cursor over the button for the system to display the name of the button.

Home Outline

Use the Home screen to view system messages regarding sample status and analyzer status. Shortcut buttons provide direct menu access to the most frequently used menus to simplify software access.

Figure 1.34 Home Screen



1. Menu buttons
2. Message area
3. Shortcut buttons

Menu Buttons

Table 1.9 Menu Buttons

Button	Description
Sample Status	The system displays the sample status under analysis, estimated time of completion, and results.
Analyzer Status	The system displays the analyzer status and temperatures.

Message Area

In the message area, the system displays messages regarding system conditions that can affect analysis results. Colors indicate the level of the message.

Table 1.10 Message Area

Color	Definition
Red	You cannot start analysis on the unit until you address the message. **NOTE** A red message or highlight on the analyzer unit picture indicates a condition that prevents you from starting any unit highlighted in red.
Orange	You can start analysis. Review the message carefully and take the corrective action.
Yellow	You can start analysis. Review the message carefully and take the corrective action. The message can shift from yellow to orange status (more critical).
Green	A notification of system status. The system has no operational problems.

If a message is selected, the system displays a dialog with information and the corrective actions for the message. Select **OK** to close the dialog.

Shortcut Buttons

Shortcut buttons provide direct menu access to the most frequently used menus to simplify software access.

Table 1.11 Shortcut Buttons

Button	Description
Start Condition	Sets a new data index, the group of tests in use, the operator name, and start sample numbers.
Reagent Management	The system displays the R1 and R2 reagent status and cleaning solution status.
Analyzer Maintenance	The system displays the analyzer and ISE maintenance schedules. Use this menu to start some maintenance procedures and update the schedule when you perform maintenance.
Rack Requisition	The system displays sample information and test orders (requisitions) for patient samples, calibration, and QC.
Sample Manager	Views, prints, and batch transfers reagent blank, calibration, QC, and sample data to the laboratory information system.

Analyzer Modes

The system displays the modes in the Mode Display Area.

Table 1.12 Analyzer Modes

Mode	Contents
Initial	The system displays *Initial* after you press **ON**. The software loads and the hardware initializes.
Warm up	After the system initializes, the system changes the mode to *Warm up* for approximately 20 minutes to allow the lamp to warm up and stabilize.
Standby	When the system is ready to perform sample analysis, the operation mode changes to *Standby*. You can start analysis.
Measure 1	*Measure 1* mode occurs when you select **Start**. Racks are on the rack input component, and the racks move to the sample aspiration position.
Measure 2	*Measure 2* mode occurs when there are no more racks on the rack input component. To start more racks, select **Start**.
Stop	*Stop* mode occurs when there is a system error, or when the operator selects **Stop/ Standby**. You cannot start the analyzer from *Stop* mode. To return to *Standby* mode, select **Stop/Standby**. The mode displays as *Reset* while the hardware is initializing, then it goes to *Standby*. Repeat all tests that are in progress.
Pause	*Pause* mode occurs when there is a system error or when the operator selects **Pause**. You can restart analysis from *Pause* mode by selecting **Start**. The system completes all tests that are in progress.

Processing Time

The analysis processing time is the time from aspiration of a sample by the sample probe until the end of measurement. The necessary time for analysis is approximately 8 minutes and 40 seconds.

CAUTION

If you perform a stop or emergency stop or a power loss occurs, sample can remain in the sample probe, and reagents can remain in the cuvettes. Perform a W1 to clean the sample probe and cuvettes after you restart the system. For more information, refer to Perform a W1.

CHAPTER 2

Daily Startup

Introduction

These procedures confirm that your system has adequate supplies and calibrated reagent for your patient run, and include maintenance steps and quality control procedures for continued optimal performance.

Startup Procedure

1 Turn on the System.

2 Set a New Index.

3 Perform Analyzer Daily Maintenance.

4 Inspect the Analyzer Status.

5 Perform the ISE Startup (Option).

6 Monitor the Reagent Status.

7 Calibrate Tests.

8 Process Quality Control (QC).

Turn on the System

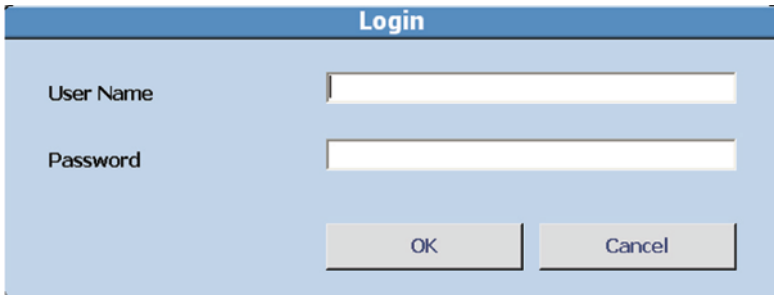
If the system is on, proceed to Set a New Index.

1 Press the green **ON** button on the front of the rack feeder unit.
The computer loads the software and initializes the system. The system goes to *Warm up* mode for approximately 20 minutes, and then goes to *Standby*.

If the system was shut down without an End Process command, the system displays the System Start dialog. Select **OK**.

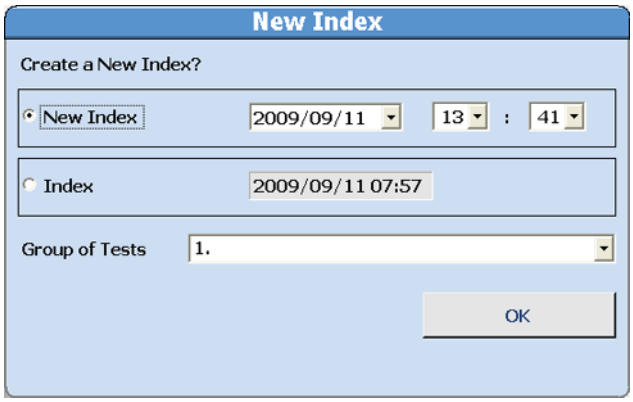
If your laboratory requires an operator to login, the system displays the Login dialog.

Figure 2.1 Login Dialog



2 Enter the user name and password, and select **OK**.
The system displays the New Index dialog.

Figure 2.2 New Index Dialog



3 Select **New Index**, and then select the **Group of Tests** for processing. Select **OK** to close the dialog.

Set a New Index

NOTE

If you set a new index in step 3 of Turn on the System, proceed to Perform Analyzer Daily Maintenance.

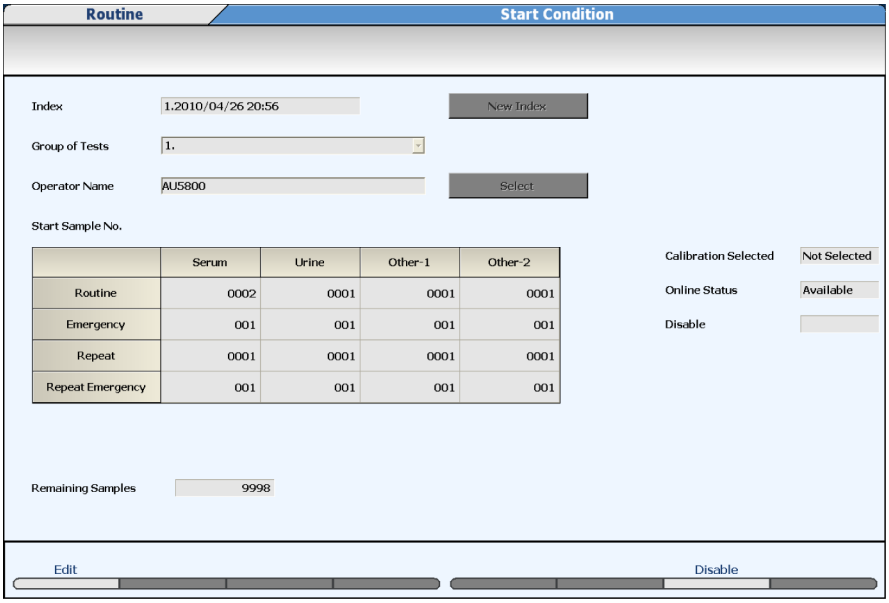
If your system is on, use this procedure to create a new index, select a group of tests for processing, and enter the operator name.

An index, used to retrieve reagent blank, calibration, QC, and patient results, is a data file identified by the date and time. Create a new index daily, each shift, or as needed.

A maximum of 100,000 samples or 300 indexes can be saved on the hard drive. A maximum of 9,999 samples can be processed in an index.

1 Select **Home** > **Start Condition**.
The system displays the Start Condition screen.

Figure 2.3 Start Condition Screen



2 Select **Edit (F1)**.

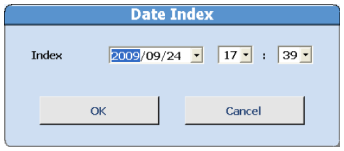
3 Select **New Index**. The system displays the current date and time in the **Index** field.

NOTE

To set a new index by date and time:

1. Select **Date Index (F8)**. The system displays the Date Index dialog.

Figure 2.4 Date Index Dialog



2. In **Index**, select the date and time.
3. Select **OK**.

4 In **Group of Tests**, select the group of tests for processing.

5 (Optional) Enter the operator name in **Operator Name**.

6 Confirm that the **Start Sample No.** is 0001, or the default start number for each sample type and kind.

7 Select **Confirm (F1)**.
The system displays the Start Condition dialog, with a confirmation message.

8 Select **OK** to confirm the selections.

Perform Analyzer Daily Maintenance

Perform Analyzer Daily Maintenance to maintain system performance and safety.

WARNING

Maintenance procedures can expose you to biohazards. Wear appropriate Personal Protective Equipment (PPE) such as gloves, eye shields, and lab coats. Handle and dispose of biohazards according to laboratory procedures.

1 Inspect the Syringes for Leaks.

2 Inspect the Stability of the Upper Cover.

3 Inspect, Clean, and Prime the Sample Probes, Reagent Probes, and Mix Bars.

4 Replace the Deionized Water or Diluent in the Pre-dilution Bottles.

5 Replace the Sample Probe Wash Solutions.

6 Inspect the Printer and Paper.

7 Inspect the Handle on the Diluted Wash Solution Tank is in the Open Position.

Inspect the Syringes for Leaks

Each analyzer unit includes sample syringes, reagent syringes, and wash syringes. If your system includes an ISE unit, the ISE unit includes a sample syringe, a wash syringe, and ISE buffer syringes.

- Two sample syringes and two wash syringes are located on the back of each analyzer unit behind the left door.
- The ISE sample syringe and wash syringe are located on the front of the ISE unit behind the door.
- The ISE buffer syringes are located on the front of the ISE unit behind the ISE reagents.

The sample and reagent syringes measure the volume of sample or reagent to be used in a reaction.

The wash syringes dispense only deionized water for cleaning the interior of the sample probe.

The two types of wash syringes:

- Wash Syringe Type 1
- Wash Syringe Type 2

Use either a Wash Syringe Type 1 or Wash Syringe Type 2 for the analyzer unit. For the ISE unit, only use Wash Syringe Type 1. To view the shape of each type of syringe, refer to Figure 2.8 Sample Syringe, Wash Syringe Type 1, Reagent Syringe, ISE Sample Syringe, ISE Wash Syringe Type 1, and ISE Buffer Syringe Parts and Figure 2.9 Wash Syringe Type 2 Parts.

The ISE buffer syringe measures the correct volume of buffer for the ISE.

If a syringe leaks, the leak causes possible failures to the syringe, probe, and analytes being tested.

Although the syringes are different sizes and serve different functions, you can inspect for correct performance using the same methods.

Inspect all components of the syringes, including the syringe case head, the syringe case body, the fixing nut, and the piston fixing screw for leaks and correct installation.

For more information on materials required, refer to Parts List for Analyzer Maintenance.

Materials Required:

- Clean, dry, lint-free absorbent tissue

The procedure is identical for all syringes.

---

1 Confirm that the system is in *Warm up*, *Standby*, or *Stop* mode.

---

2 Open the front left door to access the reagent syringes and rear left door to access the sample and wash syringes on the analyzer units. Open the top ISE reagent cover to access the buffer syringes, or the front door of the ISE unit to access the ISE sample and wash syringes.

CAUTION

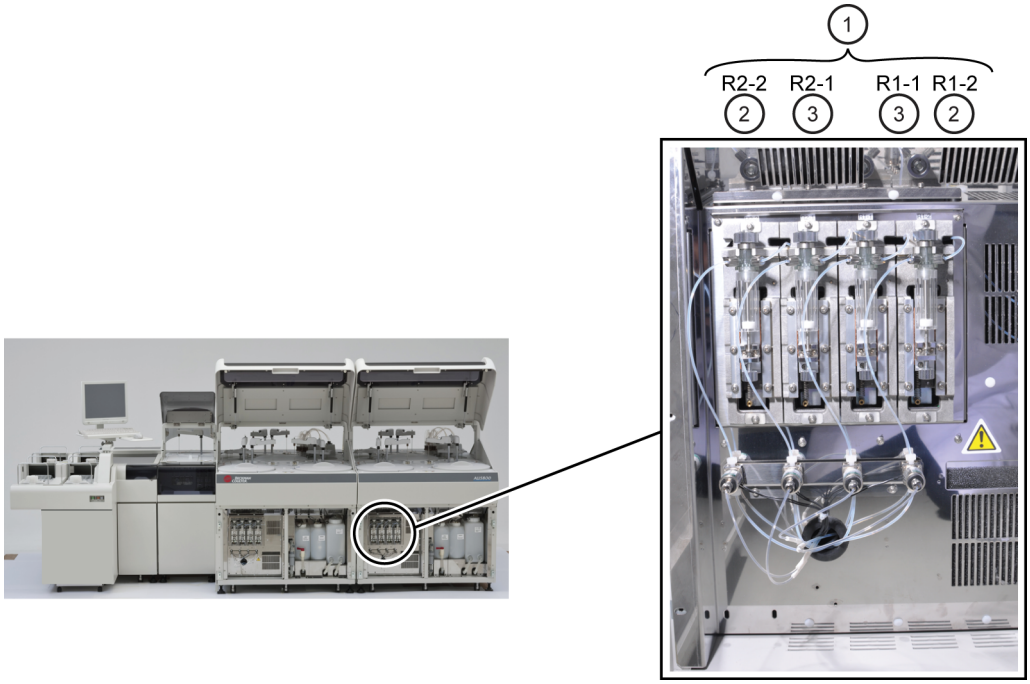
Do not allow a strong alkali, such as the wash solution, to contact the syringe case. If a strong alkali contacts the syringe case, cracks can occur.

If a strong alkali contacts the syringe case, remove the syringe case and rinse it with water.

---

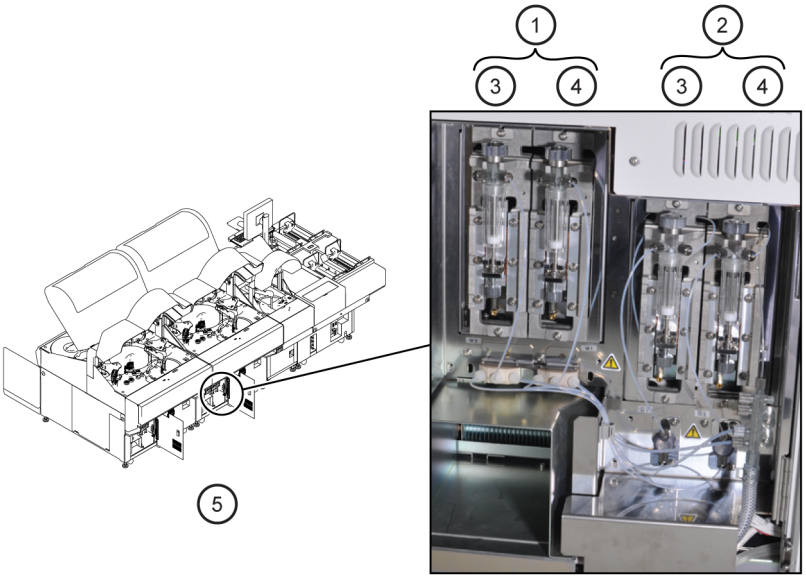
3 Visually inspect each syringe case head for any cracks or leaks. Use the clean, dry, lint-free absorbent tissue to confirm that the top and bottom connections for the syringe case head and the bottom fixing screw have no leaks. If you find a crack or a leak, replace the syringe. For more information, refer to Replace the Sample, Reagent, ISE Sample, or ISE Buffer Syringe.

Figure 2.5 Reagent Syringe Location



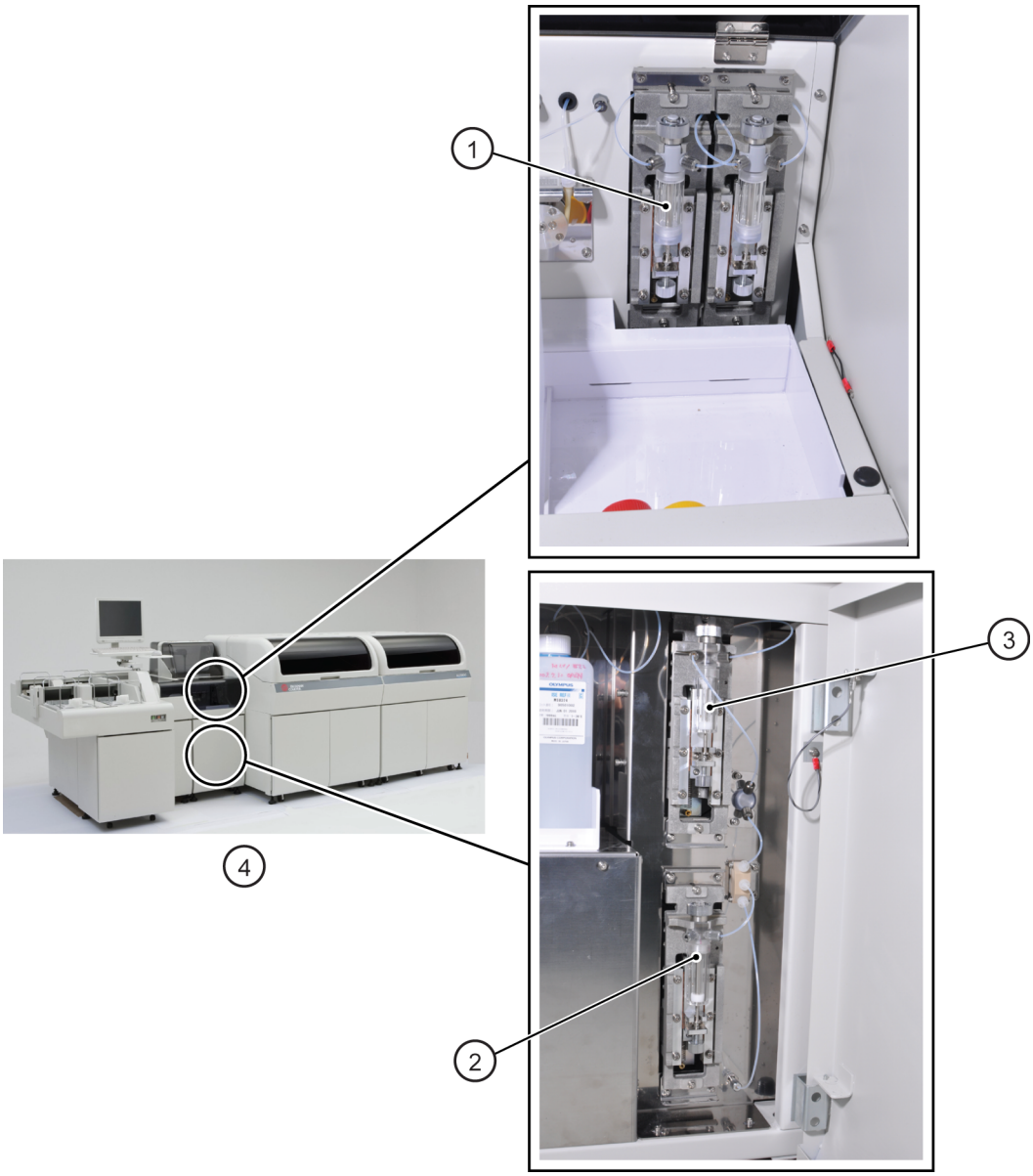
1. Reagent syringe
2. Outer
3. Inner

Figure 2.6 Sample Syringe and Wash Syringe Locations



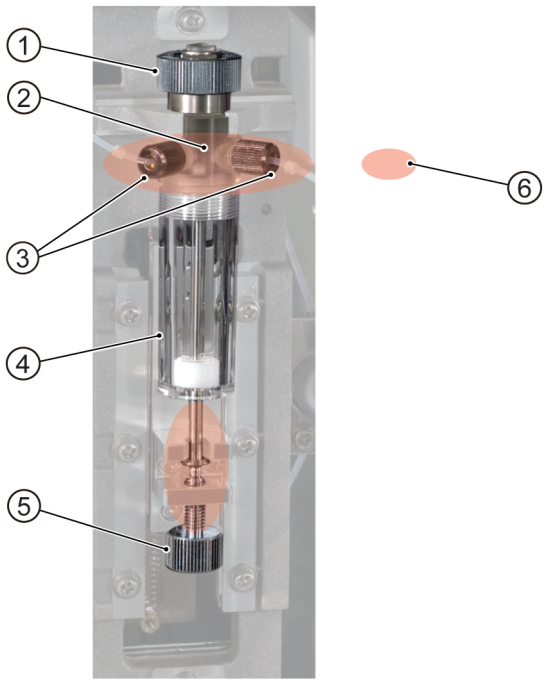
1. Wash syringes
2. Sample syringes
3. Outer
4. Inner
5. Rear of analyzer

Figure 2.7 ISE Syringe Location



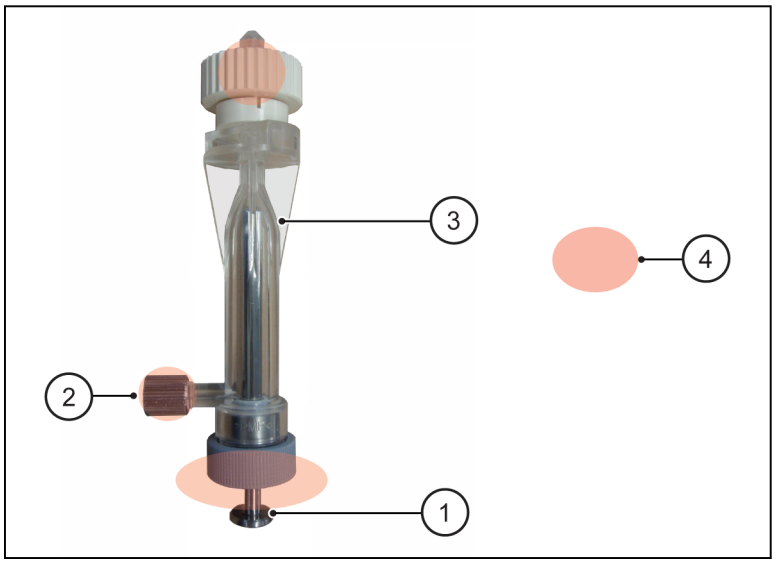
1. ISE Buffer syringes
2. ISE Wash syringe
3. ISE Sample syringe
4. Front of ISE unit

Figure 2.8 Sample Syringe, Wash Syringe Type 1, Reagent Syringe, ISE Sample Syringe, ISE Wash Syringe Type 1, and ISE Buffer Syringe Parts



1. Fixing nut
2. Case head (Syringe case)
3. Fixing screws
4. Case body (Syringe case)
5. Piston fixing screw
6. Possible leakage locations

Figure 2.9 Wash Syringe Type 2 Parts



1. Piston
2. Seal assembly
3. Wash syringe
4. Possible leakage locations

4 Confirm that the fixing nuts and piston fixing screws are tight. If a leak persists after you tighten the screws, replace the syringe.

CAUTION

If your skin, eyes, or mouth contact any liquid, immediately rinse the affected area with water. Follow your laboratory procedure.

5 Close all doors and covers in the Analyzer unit and ISE unit.

6 Update the Maintenance Log. For more information, refer to Update the Maintenance Log.

Inspect the Stability of the Upper Cover

Lift the upper cover of each analyzer unit and confirm that it is stable and remains in the raised position. If the cover starts to descend, contact Beckman Coulter to have the cover supports inspected and replaced.

Inspect, Clean, and Prime the Sample Probes, Reagent Probes, and Mix Bars

The probes deliver precise quantities of reagent or sample to the cuvettes.

The mix bars mix the contents in the cuvettes.

If the mix bars or probes are bent or damaged, or if the probes are clogged, you cannot achieve correct analysis.

Before you begin analysis, inspect the sample probes, reagent probes, and mix bars for damage or deterioration. Confirm that each probe operates correctly.

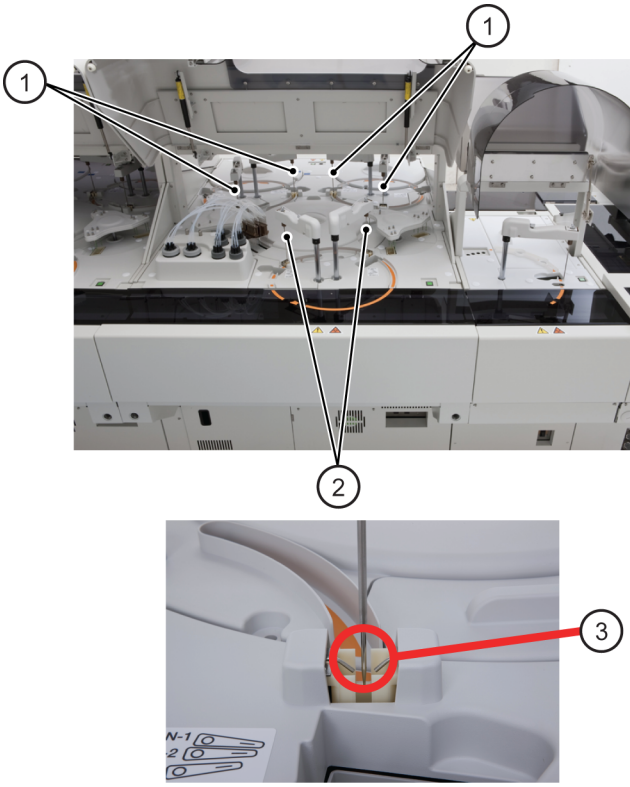
For more information on materials required, refer to Parts List for Analyzer Maintenance.

Materials Required:

- Alcohol prep pads (70% Isopropyl alcohol)

Inspect the Sample Probes and Reagent Probes

Figure 2.10 Sample Probes and Reagent Probes



1. Reagent probe
2. Sample probe
3. Probe wash position

1 Lift the upper covers of each analyzer unit.

2 Visually inspect that each probe is not bent or damaged. If a probe is bent or damaged, replace the probe. For more information, refer to Replace a Sample Probe, or Replace a Reagent Probe.

3 Inspect each probe for contaminants or crystallization. If a probe is dirty, wipe the surface with an alcohol prep pad (70% Isopropyl alcohol).

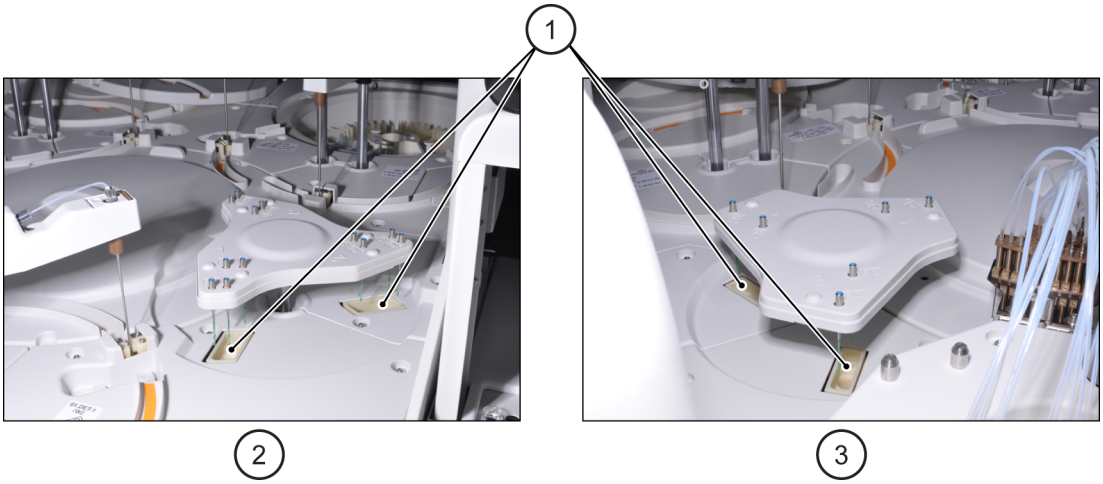
IMPORTANT

Do not bend the probe when cleaning.

4 If a probe is incorrectly aligned, contact Beckman Coulter.

Inspect the Mix bars

Figure 2.11 Mix bar wash wells



1. Mix bar wash wells
2. Mix bar component (R1, S)
3. Mix bar component (R2)

1 Inspect each mix bar. If a mix bar is bent, scratched, or has chips in the fluororesin coating, replace the mix bar. For more information, refer to Replace the Mix Bars.

2 Inspect each mix bar for contaminants or crystallization. If the mix bar is dirty, wipe the mix bar with an alcohol prep pad (70% Isopropyl alcohol).

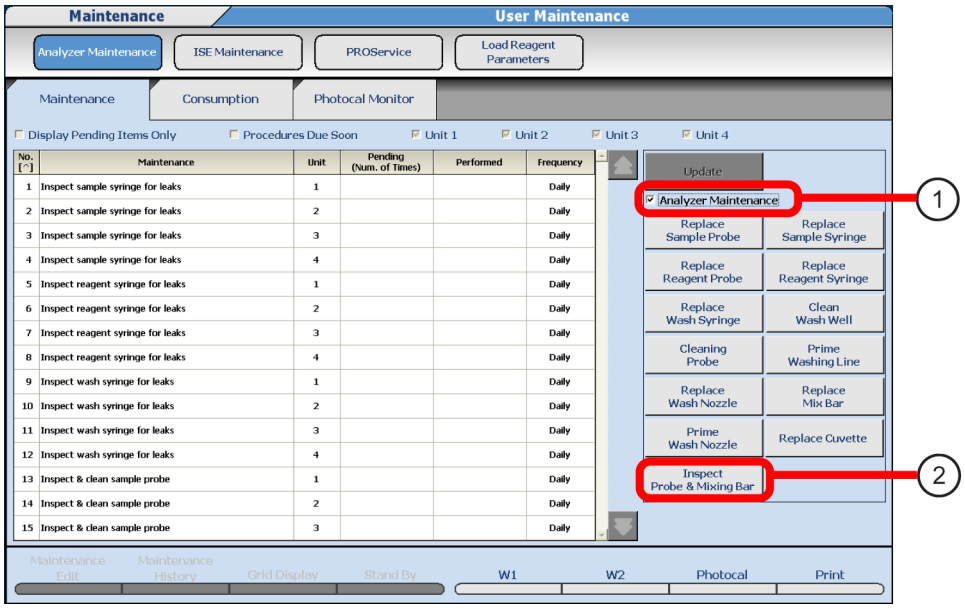
Confirm Operation of the Probes and Mix Bars

Prime the system to inspect the operation of the probes and mix bars.

1 Confirm that the system is in *Warm up* or *Standby* mode.

2 Select **Home** > **Analyzer Maintenance** > **Maintenance**. The system displays the Analyzer Maintenance: Maintenance tab.

Figure 2.12 Analyzer Maintenance: Maintenance tab



1. Analyzer Maintenance
2. Inspect Probe and Mixing Bar

3 Select the **Analyzer Maintenance** box. The system activates the maintenance operation buttons.

4 Select **Inspect Probe & Mixing Bar**. The system displays the Inspect Probe & Mixing Bar dialog.

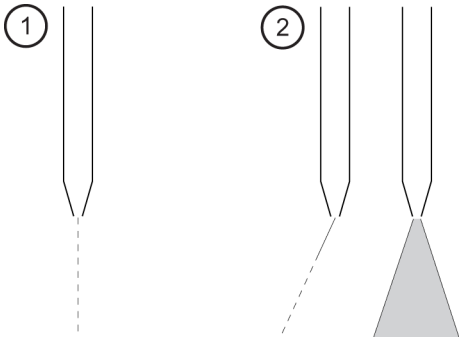
5 Select **OK**.

6 Press the **DIAG** button.
The system initializes the probes and mix bar components, then:

1. Dispenses deionized water from the two sample probes.
2. Dispenses deionized water from the R1 and R2 probes for inner cuvettes.
3. Dispenses deionized water from the R1 and R2 probes for outer cuvettes.
4. Activates the mix bar components.

7 As the system dispenses water, confirm that each probe dispenses a thin, straight stream of water, and that water flows in the wash wells.

Figure 2.13 Sample and Reagent Probes



1. Correct Flow
2. Incorrect Flow

a. If the water is spraying or dispensing at an angle, clean the probe. For more information, refer to Clean the Sample Probes and Mix Bars or Clean the R1 or R2 Reagent Probes.

b. If cleaning does not correct the problem, replace the probe. For more information, refer to Replace a Sample Probe, or Replace a Reagent Probe.

8 As the system activates the mix bar component, confirm that the mix bars align correctly in the wash wells. If a mix bar does not align correctly, contact Beckman Coulter.

9 Repeat steps 6 to 8 as required to inspect all probes and mix bars.

10 Clear the **Analyzer Maintenance** box to deactivate the maintenance operation buttons.

11 Update the Maintenance Log. For more information, refer to Update the Maintenance Log.

Replace the Deionized Water or Diluent in the Pre-dilution Bottles

1 Discard the water or diluent in the pre-dilution bottles, indicated by the 55. Diluent/W2 and 56. Diluent/W2 label close to the R1 refrigerator on each analyzer unit.

2 Rinse the bottles twice with deionized water.

3 Fill the bottles with deionized water or diluent and replace the bottles on the analyzer unit.

Replace the Sample Probe Wash Solutions

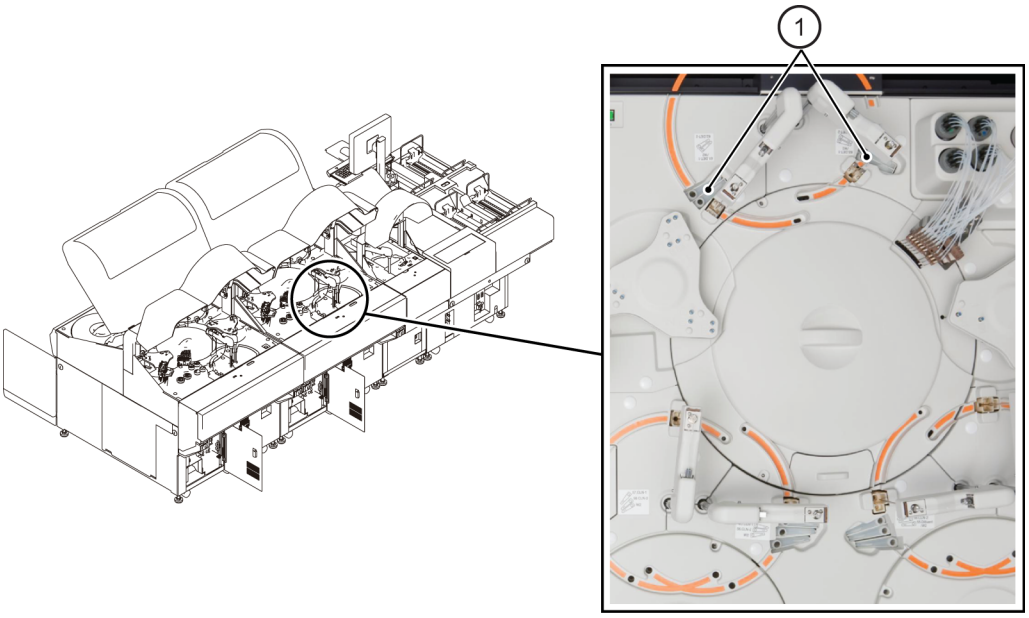
The sample probe wash solution bottles are located in the positions labeled 61. DET-1/W2, 62. DET-2, 63. DET-1/W2 and 64. DET-2 on each analyzer unit, and DET-1/W1 and DET-2 on the ISE unit.

For more information on materials required, refer to Parts List for Analyzer Maintenance.

Materials Required:

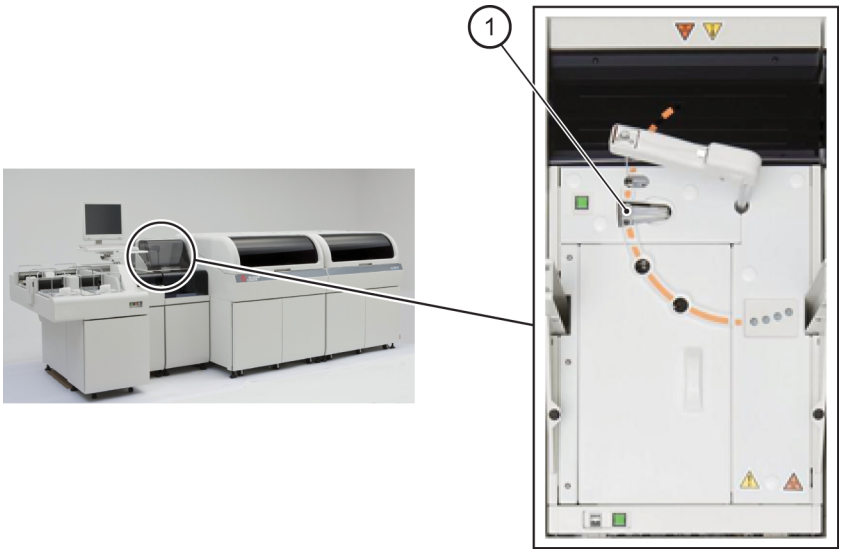
- 2% Wash solution
- Sodium hypochlorite solution (1.0%)
- 60 mL reagent bottles (4 for each analyzer unit and 2 for the ISE unit)

Figure 2.14 Location of Sample Probe Wash Solution for Analyzer Unit



1. Sample probe wash solution set position

Figure 2.15 Location of ISE sample Probe Wash Solution



1. ISE sample probe wash solution set position

NOTE

Sodium hypochlorite solution (1.0%) is only required for laboratories using the AU5800 with high sample volume or dialysis patients.

If you have a normal volume of samples that are not highly viscous, fill the bottles with approximately 50 mL, as follows:

- Position 61. DET-1/W2: 2% wash solution
- Position 62. DET-2: 2% wash solution
- Position 63. DET-1/W2: 2% wash solution
- Position 64. DET-2: 2% wash solution
- (ISE) Position DET-1/W2: 2% wash solution
- (ISE) Position DET-2: 2% wash solution

If you have a high volume of samples or use the analyzer for dialysis patient samples, fill the bottles with approximately 50 mL, as follows:

- Position 61. DET-1/W2: 2% wash solution
- Position 62. DET-2: sodium hypochlorite solution (1.0%)
- Position 63. DET-1/W2: 2% wash solution
- Position 64. DET-2: sodium hypochlorite solution (1.0%)
- (ISE) Position DET-1/W2: 2% wash solution
- (ISE) Position DET-2: sodium hypochlorite solution (1.0%)

For more information on materials required, refer to Parts List for Analyzer Maintenance.

For more information, refer to Dilution Ratios for Maintenance Solutions.

WARNING

Wear Personal Protective Equipment (PPE) such as gloves, eye shields, and lab coats, to handle the solution. If the solution contacts skin or clothes, rinse the affected area thoroughly with water. If the solution contacts the eyes or mouth, immediately flush with water. Seek medical attention. Refer to the Safety Data Sheets (SDS) for more information. Follow your laboratory procedure to wipe up spills immediately.

CAUTION

When using sodium hypochlorite solution (1.0%) as a sample probe wash solution, follow these precautions:

- **Prepare fresh sodium hypochlorite solution and completely replace the solution in the bottle once a day.**
- **If you anticipate not using the analyzer for two days or longer, remove the solution from the system and discard the solution to prevent analyzer corrosion.**
- **If any solution spills on the analyzer, clean the area with an absorbent tissue, and wipe it dry with a clean absorbent tissue.**

- **Do not mix the solution with other chemicals. If the solution becomes contaminated, follow your laboratory procedure to dispose of the solution.**

NOTE

Follow your laboratory procedure for replacing the 2% wash solution in the bottles. Beckman Coulter recommends replacing the 2% wash solution daily.

1. Remove each wash solution bottle and inspect the level of solution.
2. As required, fill each bottle to approximately 50 mL of the solution used in your laboratory.
3. Replace the bottle on the analyzer.
4. Close all analyzer doors and covers.

Inspect the Printer and Paper

The printer is an optional part. Before you begin daily analysis, confirm that the printer is turned on and that there is enough paper in the printer.

For more information, refer to the manual supplied with the printer.

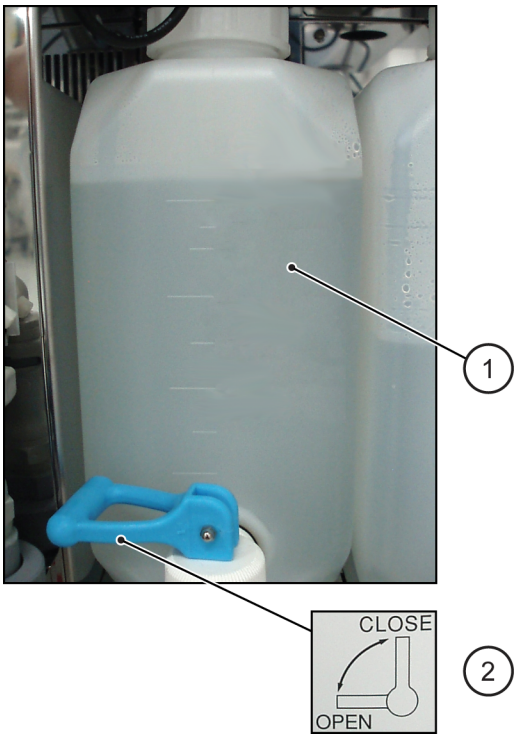
1. Confirm that the printer is on. The printer displays a ready message.
2. Confirm that there is enough paper in the printer.
3. Update the Maintenance Log. For more information, refer to Update the Maintenance Log.

Inspect the Handle on the Diluted Wash Solution Tank is in the Open Position

To be sure that the cuvettes and mix bars are cleaned correctly during analysis, inspect the handle on the diluted wash solution tank is in the OPEN position.

1. Open the right front door of each analyzer unit.
2. Confirm that the handle of each diluted wash solution tank is in the OPEN position. Turn the handle to the OPEN position if the handle is in the CLOSE position.

Figure 2.16 Inspect the Handle on the Diluted Wash Solution Tank in the Analyzer Unit



1. Diluted Wash Solution Tank
2. Handle: OPEN position

3 Close all the analyzer doors and covers.

Inspect the Analyzer Status

The Analyzer Status screen displays a color-coded overview of the system. The system monitors the status of the incubator, reagent refrigerators, rack feeder unit, deionized water tanks, wash solution tanks, waste tanks, printer, and LIS communication.

The system monitors the ISE unit and reagents when the ISE unit is installed.

The colors of the system components indicate the status.

NOTE

For more information on the Analyzer Status screen when the AU5800 is connected to a laboratory automation system, refer to the AU5800 Laboratory Automation Connecting Kit addendum.

Table 2.1 System Status

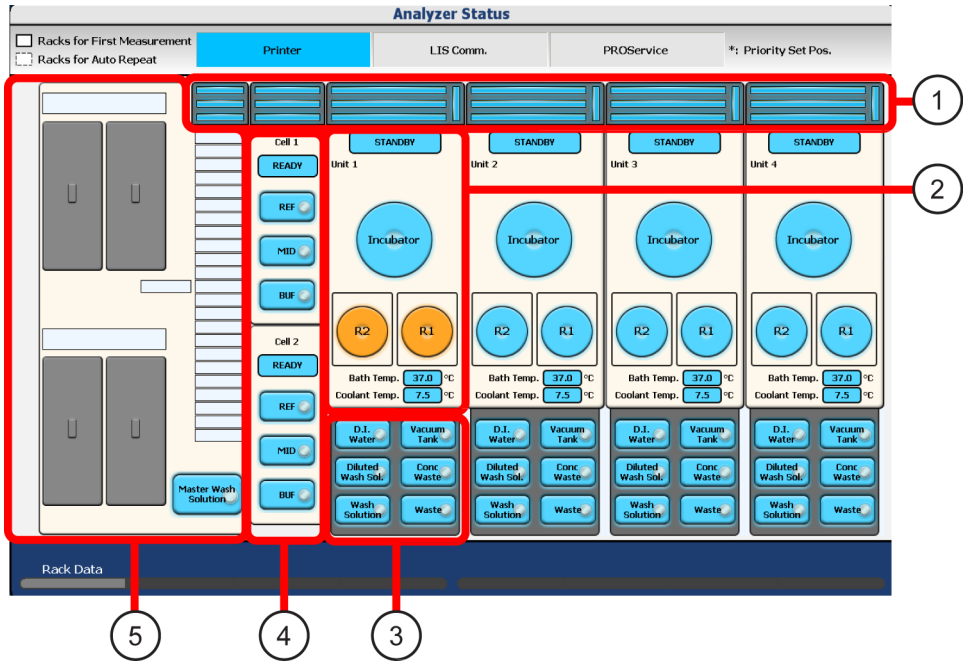
Color	Status
Blue	No errors

Table 2.1 System Status (Continued)

Color	Status
Yellow or Orange	Non-fatal error. You can start the ISE or analyzer unit.
Red	Fatal error. You cannot start the ISE or analyzer unit.

1 Select **Home** > **Analyzer Status**.
The system displays the Analyzer Status screen.

Figure 2.17 Analyzer Status Screen



1. Lane status
2. Analyzer unit top status
3. Analyzer unit front status
4. ISE unit status
5. Rack feeder unit status

NOTE

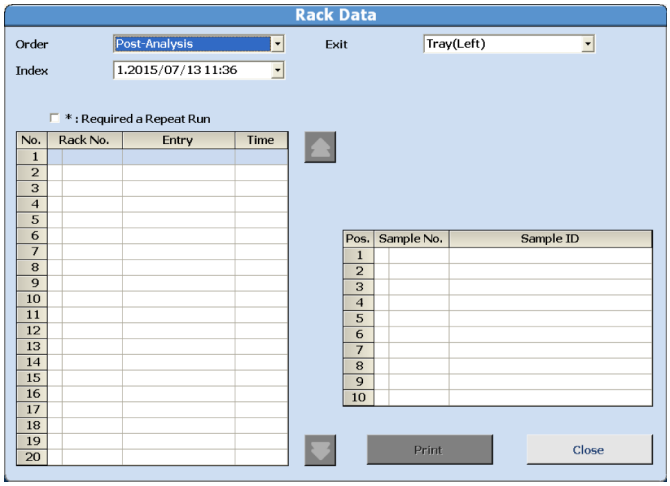
The screen display changes with the number of connected analyzer units. The ISE unit does not display if the ISE unit is not connected.

2 Select **Rack Data (F1)** to view the time a rack was detected on the rack input component (Pre-Analysis), the time the rack moved to the rack output component (Post-Analysis), the rack ID, and the rack entry location. Select a rack in the left table to view the sample No. or sample ID of the samples on the rack in the right table.

NOTE

The system indicates a rack that includes a repeat run sample with an asterisk. If you select **Required a Repeat Run**, the system displays only racks with an asterisk.

Figure 2.18 Rack Data Dialog



3 Confirm that the system components are within the acceptable limits (blue). Investigate any yellow or red conditions.

1. Lane Status. Investigate any yellow or red conditions. For more information, refer to Lane Status.
2. Analyzer Unit Top Status. Investigate any yellow or red conditions. For more information, refer to Analyzer Unit Front Status.
3. Analyzer Unit Front Status. Investigate any yellow or red conditions. For more information, refer to Analyzer Unit Front Status.
4. ISE Unit Status. Investigate any yellow or red conditions. For more information, refer to ISE Unit Status.
5. Rack Feeder Unit Status. Investigate any yellow or red conditions. For more information, refer to Rack Feeder Unit Status.

Perform the ISE Startup (Option)

If your system includes an ISE unit, confirm that sufficient ISE reagent is available and perform the ISE Daily Maintenance.

1 Inspect the ISE Reagents.

2 Replace the ISE Reagents.

3 Perform ISE Daily Maintenance.

a. Inspect, Clean, and Prime the ISE Sample Probe (ISE Option).

b. Clean the ISE (ISE Option).

c. Calibrate the ISE (ISE Option).

Inspect the ISE Reagents

WARNING

If the ISE Buffer Solution, ISE MID Standard Solution, or ISE Reference Solution becomes empty during ISE sample analysis, the system can generate incorrect results.

If a reagent becomes empty during *Measure*, it is necessary to stop the ISE unit. Place the new reagent bottle on the ISE unit, prime the new reagent, and calibrate the ISE for all the sample types in use.

NOTE

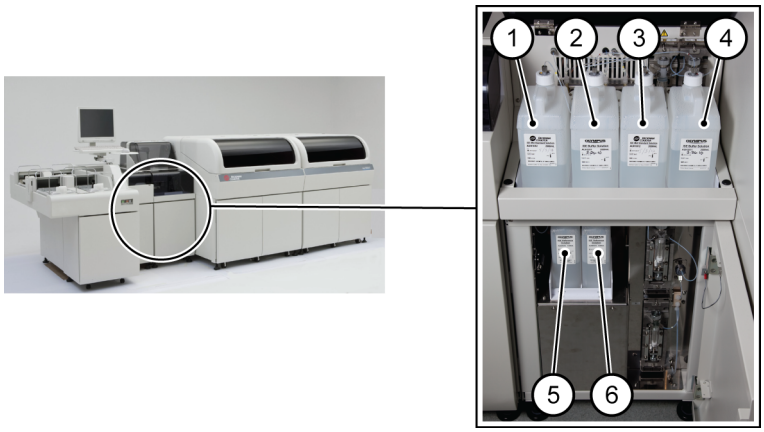
Confirm that the ISE reagent solution levels are sufficient for typical daily analysis before you start the sample processing.

Do not replace the ISE reagent bottles when the ISE unit is in *Measure* status.

1 Open the front door of the ISE unit.

2 Confirm that the ISE reagents are within the 90-day onboard stability limit.

Figure 2.19 ISE Reagents



1. ISE MID Standard solution bottle (for Cell 1)
2. ISE Buffer solution bottle (for Cell 1)
3. ISE MID Standard solution bottle (for Cell 2)
4. ISE Buffer solution bottle (for Cell 2)
5. ISE Reference solution bottle (for Cell 1)
6. ISE Reference solution bottle (for Cell 2)

3 Confirm that the solution level is sufficient for typical daily analysis, or is above the ISE Reagent Short notification level (5.2 cm above the bottom of the bottle).

NOTE

The number of samples the system can run after the alarm occurs for each reagent:

— ISE Buffer Solution - 240 samples
— ISE MID Standard Solution - 180 samples
— ISE Reference Solution - 600 samples

4 Replace reagents as required. For more information, refer to Replace the ISE Reagents.

5 Close all doors and covers of the ISE unit.

Replace the ISE Reagents

Replace the ISE reagents when the on-board stability expires, the reagent expires, or the quantity of reagent is insufficient. The system displays an alarm message when an ISE reagent reaches the ISE Reagent Short notification level (5.2 cm above the bottom of the bottle). Replace the reagent before the bottle empties.

NOTE

These are the number of samples the system can run after the alarm occurs for each reagent:

- ISE Buffer Solution - 240 samples
- ISE MID Standard Solution - 180 samples
- ISE Reference Solution - 600 samples

For on-board stability claims for the ISE, refer to the Chemistry Information Sheet.

NOTE

ISE Reference Solution is highly concentrated. Prevent contact between the ISE Reference Solution (bottle, cap, and aspiration tube) with the ISE Buffer Solution and ISE MID Standard Solution (bottle, cap, and aspiration tube).

NOTE

Do not add new reagent to existing bottles. Adding new reagent to existing bottles can affect results.

For more information on materials required, refer to Parts List for Analyzer Maintenance.

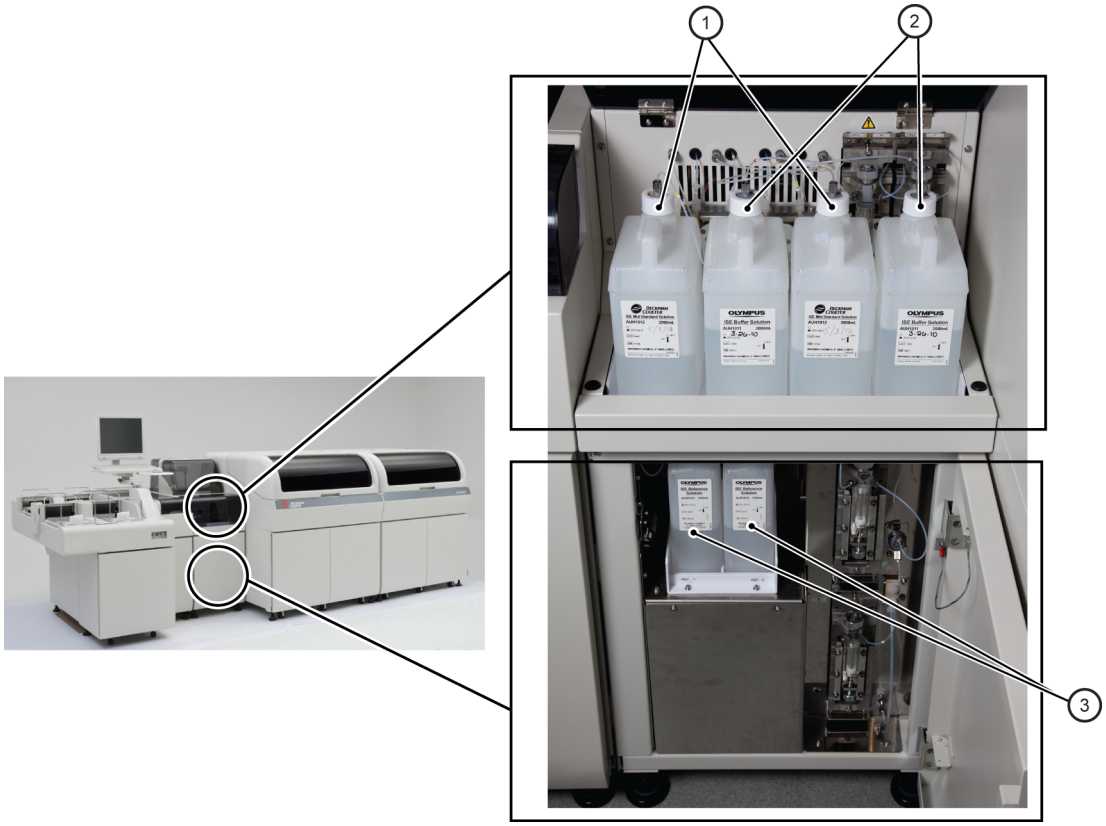
Materials Required:

- ISE Buffer Solution
- ISE MID Standard Solution
- ISE Reference Solution

1 Confirm that the system is in *Warm up* or *Standby* mode.

2 Lift the ISE reagent cover to replace the ISE Buffer solution or ISE MID Standard solution, or open the front door of the ISE unit to replace the ISE Reference solution.

Figure 2.20 ISE Reagent Bottles



1. ISE MID Standard Solution
2. ISE Buffer Solution
3. ISE Reference Solution

3 Place the new bottle of reagent next to the ISE unit and remove the cap.

4 Pull out the reagent bottle to replace it.

5 Loosen the cap of the reagent bottle and remove the aspiration tube.

NOTE

Do not touch the aspiration tube.

Dispose of the old solution according to your laboratory procedure.

6 Place the aspiration tube in the new bottle and tighten the cap.

7 Place the new bottle on the ISE unit and push the bottle into position.

8 Select **Home** > **Analyzer Maintenance** > **ISE Maintenance** > **Maintenance**. The system displays the ISE Maintenance: Maintenance tab.

9 Select the **ISE Maintenance** box. The system activates the maintenance operation buttons.

10 Select one of the following options. If all reagents are being replaced simultaneously, replace the reagents in the following order:

1. To replace ISE Buffer Solution, select **Buffer Prime**
2. To replace ISE MID Standard Solution, select **MID/REF Prime**
3. To replace ISE Reference Solution, select **MID/REF Prime**

The system displays the dialog.

11 Select **OK.**

12 Press the **DIAG** button once. The system moves the ISE sample probe away.

13 Press the **DIAG** button again. The system primes the reagent for approximately 90 seconds.

14 Close all doors and covers of the ISE unit.

15 Clear the **ISE Maintenance** box to deactivate the maintenance operation buttons.

16 Update the Maintenance Log. For more information, refer to Update the Maintenance Log.

17 To confirm that the ISE is working correctly after the maintenance procedure, perform a calibration.

Inspect, Clean, and Prime the ISE Sample Probe (ISE Option)

The ISE sample probe is responsible for delivering precise quantities of sample to the ISE sample pot.

You cannot achieve a correct analysis, if the probe is clogged, bent, or otherwise damaged.

Before you begin analysis, inspect the ISE sample probe for damage or deterioration and confirm correct operation.

For more information on materials required, refer to Parts List for ISE Maintenance.

Inspect the Sample Probe for Damage or Deterioration

Materials Required:

- Alcohol prep pads (70% Isopropyl alcohol)

1 Visually inspect that the probe is not bent or damaged. If the probe is bent or damaged, replace the probe. Refer to Replace a Sample Probe.

2 Confirm that the probe is free of debris. If any contaminants or crystallization adhere to the probe, wipe the outside surface with an alcohol prep pad (70% Isopropyl Alcohol).

CAUTION

Confirm that the ISE sample probe is not bent during cleaning.

3 If there is a problem with the alignment of the probe, contact Beckman Coulter.

Figure 2.21 ISE Sample Probe

1. ISE sample probe wash well

Confirm Correct Operation of the ISE Sample Probe

1 Confirm that the analyzer is in *Warm up* or *Standby* mode.

2 Select **Home** > **Analyzer Maintenance** > **ISE Maintenance** > **Maintenance**. The system displays the ISE Maintenance: Maintenance tab.

3 Select the **ISE Maintenance** box. The system activates the maintenance operation buttons.

4 Select **Replace Sample Probe**. The system displays the Replace Sample Probe dialog.

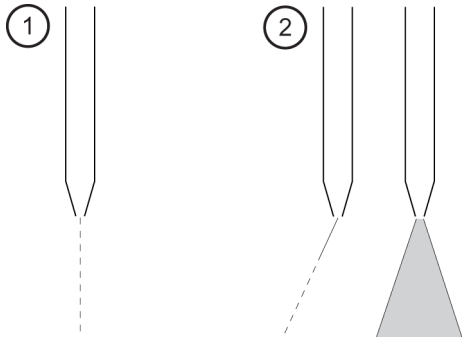
5 For **Times**, enter 3, and then select **OK.**

6 Lift the back upper cover of the ISE unit.

7 Press the **DIAG** button. Deionized water is dispensed from the probe tip. Confirm that the probe dispenses a thin, straight stream of water, and that water flows in the wash well.

— If the water is spraying or dispensing at an angle, clean the probe. For more information, refer to Inspect, Clean, and Prime the ISE Sample Probe (ISE Option).
— If cleaning does not correct the problem, replace the probe. For more information, refer to Replace a Sample Probe.

Figure 2.22 Flow of DI water from the ISE Sample Probe Tip



1. Correct flow
2. Incorrect flow

Clean the ISE (ISE Option)

Clean the sample pot and the electrode lines daily to prevent contamination and inaccurate results. This procedure requires approximately 6 minutes to complete.

WARNING

Wear Personal Protective Equipment (PPE) such as gloves, eye shields, and lab coats, to handle ISE Cleaning Solution. If the ISE Cleaning Solution contacts skin or clothes, rinse the affected area thoroughly with water. If the ISE Cleaning Solution contacts the eyes or mouth, immediately flush with water. Seek medical attention. Refer to the Safety Data Sheets (SDS) for more information. Follow your laboratory procedure to wipe up spills immediately.

NOTE

If the analyzer does not run continuously, clean the ISE as part of the daily shutdown.

NOTE

The system defaults to clean Cell 1 and Cell 2. Always perform the cleaning procedure on Cell 1 and Cell 2 unless performing corrective actions on Cell 1 or Cell 2.

For more information on materials required, refer to Parts List for ISE Maintenance.

Materials Required:

- ISE Cleaning Solution
- Hitachi Cup

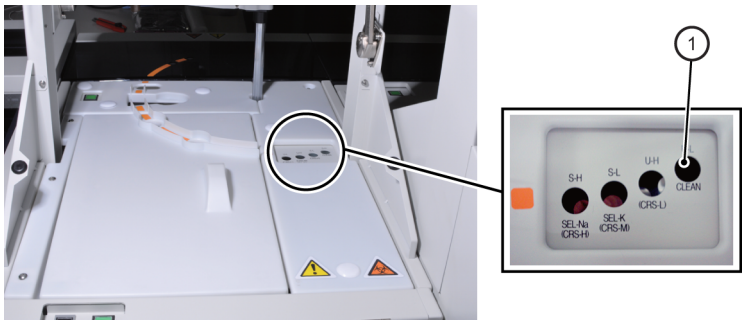
1 Confirm that the system is in *Warm up* or *Standby* mode.

2 Lift the front upper cover of the ISE unit.

3 Fill the Hitachi cup with a minimum of 1 mL of ISE Cleaning Solution.

4 Place the Hitachi cup in the CLEAN position on the ISE solution position area.

Figure 2.23 ISE Solution Position Area



1. CLEAN position

CAUTION

Wipe up ISE Cleaning Solution spills immediately. Follow your laboratory procedure.

5 Select **Home > Analyzer Maintenance > ISE Maintenance > Maintenance**. The system displays the ISE Maintenance: Maintenance tab.

6 Select **Cleaning**. The system displays the Cleaning dialog.

7 Select **OK**. The system starts the cleaning operation.

NOTE

If you need to stop the cleaning operation before completion, select **STOP** on the STANDBY/STOP switch on the ISE unit. The ISE stops the cleaning and goes to *STOP* mode. To return to *Standby* mode, select STANDBY on the STOP/STANDBY switch on the ISE unit.

8 When the cleaning operation is complete, remove the Hitachi cup from the CLEAN position and discard.

9 Close all doors and covers of the ISE unit.

Calibrate the ISE (ISE Option)

Calibrate the ISE every 24 hours, following specific maintenance procedures, and when replacing the ISE reagents.

NOTE

Calibrating only serum or urine requires approximately 4 minutes to complete.
Calibrating serum and urine together requires approximately 7 minutes to complete.

For more information on materials required, refer to Parts List for ISE Maintenance.

Materials Required:

- ISE High Serum Standard
- ISE Low Serum Standard
- ISE Low/High Urine Standard
- Hitachi Cup (4 cups)

1 Confirm that the system is in *Warm up* or *Standby* mode.

2 Perform a total prime. A total prime is required to clear the lines of ISE Cleaning Solution if you calibrate the ISE immediately after the Clean the ISE (ISE Option) procedure.

a. Select **Home > Analyzer Maintenance > ISE Maintenance > Maintenance**. The system displays the ISE Maintenance: Maintenance tab.

b. Select the **ISE Maintenance** box. The system activates the maintenance operation buttons.

c. Select **Total Prime**. The system displays the Total Prime dialog.

d. Select **OK**.

e. Press the **DIAG** button. The ISE sample probe moves away.

f. Press the **DIAG** button to start the prime. The DIAG LED turns on after the priming is complete.

g. Clear the **ISE Maintenance** box to deactivate the maintenance operation buttons.

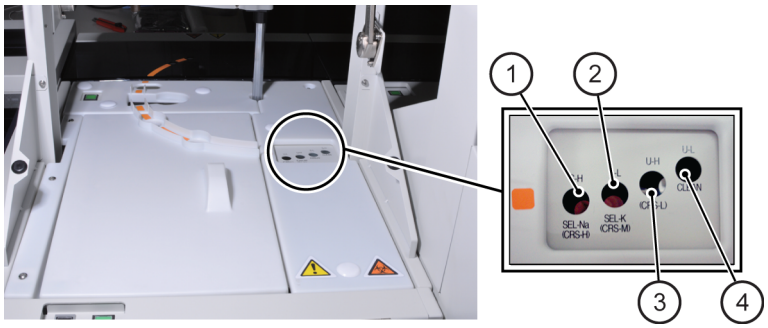
3 Lift the front upper cover of the ISE unit.

4 Fill a Hitachi cup with approximately 500 µL of Standard Solution as required for processing (determined by your laboratory processing serum, urine, or both sample types).

— ISE High Serum Standard
— ISE Low Serum Standard
— ISE High Urine Standard
— ISE Low Urine Standard

5 Place the Hitachi cups into the corresponding positions on the ISE solution position area.

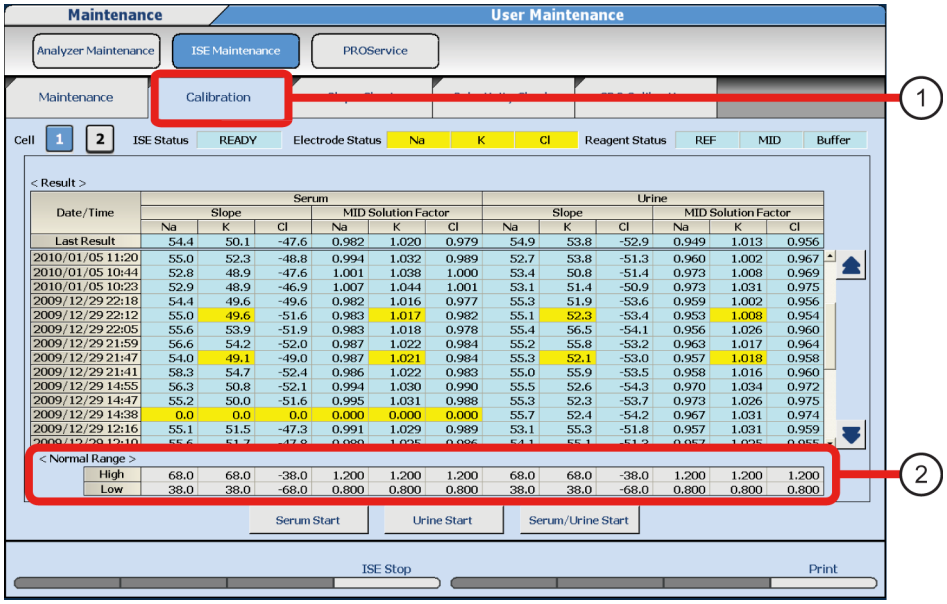
Figure 2.24 ISE Solution Position Area



1. S-H: ISE High Serum Standard
2. S-L: ISE Low Serum Standard
3. U-H: ISE High Urine Standard
4. U-L: ISE Low Urine Standard

6 Select **Home > Analyzer Maintenance > ISE Maintenance > Calibration**. The system displays the ISE Maintenance: Calibration tab.

Figure 2.25 ISE Maintenance: Calibration Tab



1. Calibration tab
2. Normal Range

7 Select **Serum Start**, **Urine Start**, or **Serum/Urine Start** depending on the sample types to calibrate. The system displays the dialog.

8 Select **OK**. The system starts calibration.

9 When calibration is complete, confirm that the result for each electrode is within the ranges for the calibrated sample types.

The system highlights acceptable results in blue and results that exceed the **<Normal Range>** for the calibration slope in yellow.

To determine calibration quality, compare the current results with previous results for consistency.

10 If the ISE unit has two ISE cells, select **Cell 2** to confirm the results for cell 2.

11 Remove the Hitachi cups from the ISE solution position area and discard.

12 Close the front upper cover of the ISE unit.

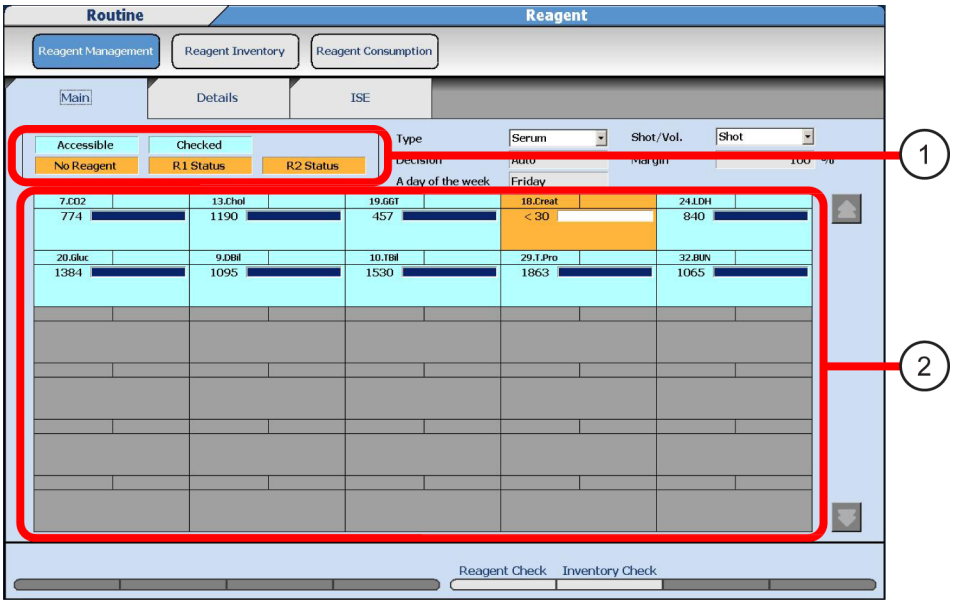
Monitor the Reagent Status

Monitor the reagent status to confirm the presence and status of reagents required for typical daily analysis. Replace reagents as needed.

Monitor the Reagent Status

1 Select **Home > Reagent Management > Main**.
The system displays the Reagent Management: Main tab.

Figure 2.26 Reagent Management: Main Tab



1. Reagent status
2. Test status

2 Select **Reagent Check (F5)**.
The system displays the Reagent Check dialog.

Figure 2.27 Reagent Check Dialog

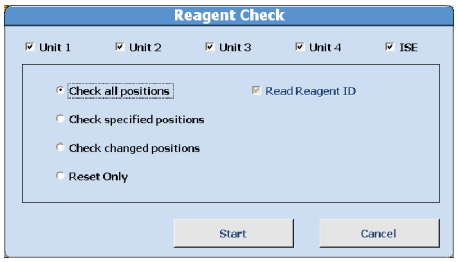


Table 2.2 Reagent Check Dialog Options

Option	Description
Unit 1, Unit 2, Unit 3, Unit 4, ISE	Select each unit for the reagent check. The default is all units selected and the ISE selected if the ISE is not busy.
Check all positions	Determines the remaining volume of reagent at all positions, including the bottle positions outside of the reagent refrigerators, close to the sample and reagent probes, and ISE unit sample probe. Select this option as part of the daily startup, when changing any parameters, changing the Group, and loading numerous reagents.
Check specified positions	Determines the remaining volumes of reagent at the specified positions. Select this option when replacing a reagent bottle. If the reagent is an R1/R2, perform a reagent check for both the R1 and R2 reagent.
Check changed positions	Determines the remaining reagent for any reagent ID that is new or has been moved since the previous reagent check.
Reset Only	Select this option when the reagent refrigerator cover was only opened and closed without changing any reagent. The system resets to the latest volumes (shots) in the system memory.
Read Reagent ID	Select this option for the system to read the reagent bar code label.

NOTE

If contamination prevention parameters are programmed, the prevention parameters are applied during a reagent check. If contamination parameters are not programmed, CLN-1 and CLN-2 positions are yellow because the positions are empty. No corrective action is required. Bottles with DI water can be placed in the CLN-1 and CLN-2 positions to avoid the yellow error indicator. If bottles of DI water are placed in these positions, they should be emptied and replaced with fresh DI water daily, as the bottles are checked during the reagent check procedure.

NOTE

When turning on the system, all tests initially show fewer than 30 shots without a volume indicator bar. Select **Reagent Check (F5)**, and then select **Check all positions** to determine the quantity of tests (shots) remaining.

3 The system defaults to select all units. If a reagent check is not required on a unit, deselect the unit.

4 Select one of the reagent check options (refer to Figure 2.27 Reagent Check Dialog), and then select **Start**.

The system starts the reagent check. As the system progresses in the reagent check, the system indicates the status as Checking in the Reagent Status section (refer to Figure 2.26 Reagent Management: Main Tab), with the progress bar to indicate the progress. When the reagent check is complete, the status changes to Checked.

NOTE

Select **Check all positions** once for daily startup to confirm all required reagents are onboard with sufficient volume for processing.

5 Review the Reagent Status section. For more information, refer to Figure 2.26 Reagent Management: Main Tab and Figure 2.28 Reagent Status. The colors on the screen indicate the status of the reagent refrigerator and reagent check.

If the system displays the status as yellow, orange, or red, review the Comment column in the Details tab.

Figure 2.28 Reagent Status

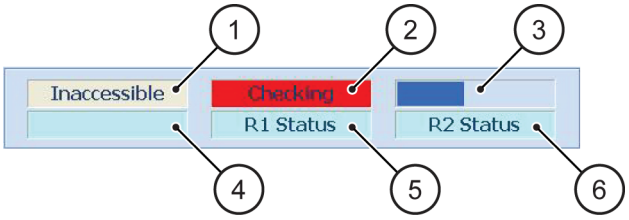


Table 2.3 Reagent Status

	Status	Color	Description
1	Accessible	Light blue	Reagent bottles can be loaded
	Inaccessible	Gray	Reagent bottles cannot be loaded.
2	Unchecked	Red	The status of the reagent check.
	Checking	Red	
	Checked	Light blue	
3	Progress bar	-	The system displays the progress of reagent check. The progress bar displays only when the system is performing the reagent check.

Table 2.3 Reagent Status (Continued)

	Status	Color	Description
4	No Reagent	Orange	A reagent assigned to the Group is missing from the R1 or R2 refrigerator, the on-board stability is expired, the reagent is expired, or the bottle is empty.
	Reagent short	Yellow	Reagent volume is short (low).
	No display	Light blue	Necessary reagents are set.
5	R1 Status	Orange	The error level for reagents in the Reagent 1 refrigerator.
		Yellow	
		Light blue	
6	R2 Status	Orange	The error level for reagents in the Reagent 2 refrigerator.
		Yellow	
		Light blue	

6 Review the Test Status section. For more information, refer to Figure 2.26 Reagent Management: Main Tab and Figure 2.29 Test Status. Confirm that required reagents are available and that all reagents have sufficient volume. Identify reagents to load.

Figure 2.29 Test Status

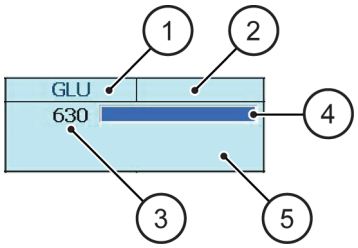


Table 2.4 Test Status

	Item	Description
1	Test name 1	The system displays test names in the output order programmed in the Group. ISE and non-dedicated LIH reagents are not displayed.
2	Test name 2	If you program the same reagent for two tests, the system displays the second test name.
3	Quantity of tests (shots) or volume remaining	The quantity of tests (shots) remaining or volume in mL. Select **Shot/Vol.** to change the display. Select **Type** to view the shots or volume for the specified sample type.

Table 2.4 Test Status (Continued)

	Item	Description
4	Indicator	The remaining reagent volume. If more than one bottle is on the system, the total reagent volume displays. The length of the bar displays the maximum number of tests the system calculates in the Reagent Inventory screen, and estimates the reagent consumption required for the day. Reagent quantity indicator bars: If Advanced Calibration is set to **No** and the Multi-Reagent Switch is set to **No**, the R1 indicator bar displays on top of the R2 indicator bar. In a 3-part reagent, the order of the bars is R1-1, R2-1, R1-2 from top to bottom. If Advanced Calibration is set to **Yes** and Multi-Reagent Switch is set to **Yes**, there is a single indicator bar even for an R1 and R2 test. Beckman Coulter recommends programming Multi-Reagent Switch to **Yes**.
5	Color	— Orange - A reagent assigned to the Group is missing from the R1 or R2, the on-board stability is expired, the reagent is expired, or the bottle is empty. — Yellow - Reagent volume is short (low). — Light Blue - Required reagents are set. — Gray - The test operation is programmed to **No** for the sample type displayed in **Reagent Management > Main**. To change the sample type, select **Type**. — Green - The remaining volume is less than the necessary volume determined by **Reagent Inventory** calculations.

7 Change the **Type** to view each sample type in use from the Main tab.

8 Select **Details** to review the Onboard Remaining, RB Stability Remaining, and Cal Stability Remaining columns for each reagent. The time listed in these columns must be sufficient for the expected processing volume. Identify reagents that are expired or low in volume, and the associated position on the reagent tray. For more information, refer to Replace the Reagents.
Review the Comment column and perform necessary corrective actions.

9 Select **Unit No.** to review the reagent status on each unit.

Figure 2.30 Reagent Management: Details Tab

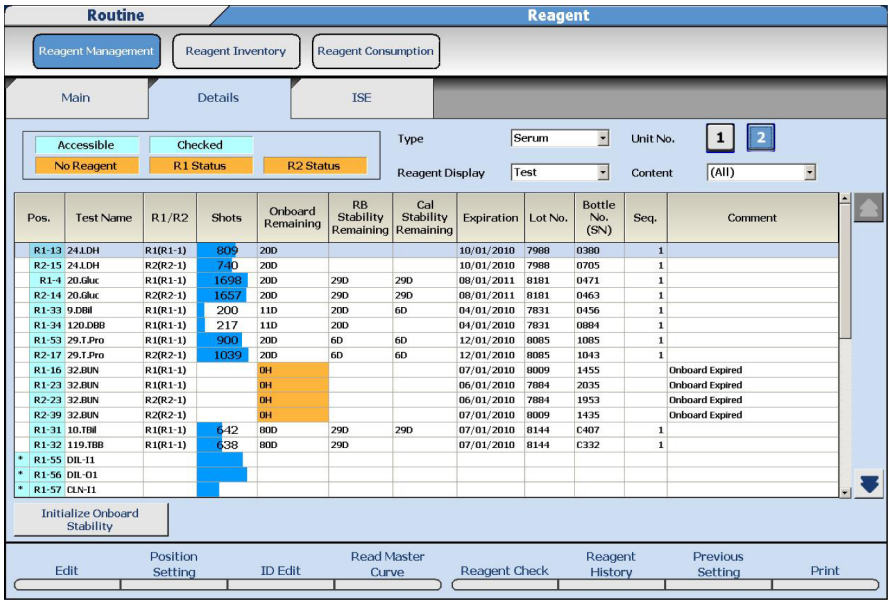


Table 2.5 Reagent Management: Details Tab

Item	Description
Type	Sample type: Serum, Urine, Other-1, Other-2.
Unit No.	Displays a unit number for each analyzer unit on the system. Displays the reagent status of the unit number selected in a blue background. Displays the reagent status of the unit numbers not selected in a white background.
Reagent Display	Displays test by test name (Test) or position (Position).
Content	The display depends on Reagent Display selection: — Test: All or a specific test — Position: R1 or R2
Pos.	R1 or R2 reagent position.
R1/R2	R1-1 and R2-1 are standard. R1-2 is for a 3-part reagent test.
Shots	Quantity of tests remaining in the bottle. The blue indicator bar is proportional to the level in the bottle (0 to 100%).
Onboard Remaining	Hours (H) or Days (D) remaining until the reagent on-board stability expires.
RB Stability Remaining	Hours (H) or Days (D) remaining until the reagent blank stability expires.
Cal Stability Remaining	Hours (H) or Days (D) remaining until the calibration stability expires.
Expiration	The expiration date of the reagent lot number.
Lot No.	A 4-digit alpha-numeric reagent lot number.
Bottle No. (SN)	A unique 4-digit number to identify each bottle of reagent.

Table 2.5 Reagent Management: Details Tab (Continued)

Item	Description
Seq.	Sequence number 1 to 5 of the same reagent in the R1/R2.
Comment	A caution or error message for the reagent.
Edit (F1)	Edits the test name, lot number, bottle number, and bottle size for fixed reagents.
Position Setting (F2)	Assigns a position as Reagent ID or Fixed. The system indicates assigned (fixed) positions with an asterisk highlighted in blue in the column to the left of the Pos. column.
ID Edit (F3)	Edits the 20-digit reagent ID. Use this option to edit the reagent ID after a reagent ID read error.
Read Master Curve (F4)	Scans the 2-dimensional reagent ID for master curve tests.
Reagent Check (F5)	Performs the reagent check.
Reagent History (F6)	Displays the lot number, bottle number, position, and on-board stability (hours) for 100 lines of data for R1 and R2 reagents.
Previous Setting (F7)	Displays the most recent reagent bottle position. Available only in *Pause* mode.
Print (F8)	Prints all the Details tab information. For the sample type selected, change **Type** to print for each of the sample types that is in use.

NOTE

The time remaining displays in hours (H) up to 72 hours, and days (D) over 72 hours.

If two tests are programmed to use one reagent, the RB Stability Remaining and Cal Stability Remaining display as lower Test No./higher Test No.

Selecting **Initialize Onboard Stability** resets the onboard stability for fixed reagents to the Onboard Stability Period programmed in **Parameters > Specific Test Parameters**. Using **Edit (F1)**, enter the **Lot No.** and **Bottle No. (SN)** before the **Initialize Onboard Stability** function is operational.

10 In **Reagent Display**, select **Test**. In **Content**, select **(All)**.

11 Scroll to R1 positions 55 to 64 and R2 positions 55 to 58 for each unit. Confirm that there is sufficient volume of each solution required.

- R1-55 DIL-I1: Deionized water or diluent for a dilution cuvette on the inner positions for Pre-Dilution or Repeat Dilution.
- R1-56 DIL-O1: Deionized water or diluent for a dilution cuvette on the outer positions for Pre-Dilution or Repeat Dilution.
- R1-57 CLN-I1: If you program Contamination Parameters, the system uses cleaning solution 1 for reagent probe (R1-1).

— R1-58 CLN-I2: If you program Contamination Parameters, the system uses cleaning solution 2 for reagent probe (R1-1).
— R1-59 CLN-O1: If you program Contamination Parameters, the system uses cleaning solution 1 for reagent probe (R1-2).
— R1-60 CLN-O2: If you program Contamination Parameters, the system uses cleaning solution 2 for reagent probe (R1-2).
— R2-55 CLN-I1: If you program Contamination Parameters, the system uses cleaning solution 1 for reagent probe (R2-1).
— R2-56 CLN-I2: If you program Contamination Parameters, the system uses cleaning solution 2 for reagent probe (R2-1).
— R2-57 CLN-O1: If you program Contamination Parameters, the system uses cleaning solution 1 for reagent probe (R2-2).
— R2-58 CLN-O2: If you program Contamination Parameters, the system uses cleaning solution 2 for reagent probe (R2-2).
— R1-61 DET-I1: 2% Wash Solution for automatic sample probe (S1) cleaning.
— R1-62 DET-I2: 2% Wash Solution or sodium hypochlorite solution (1.0%) for automatic sample probe (S1) cleaning.
— R1-63 DET-O1: 2% Wash Solution for automatic sample probe (S2) cleaning.
— R1-64 DET-O2: 2% Wash Solution or sodium hypochlorite solution (1.0%) for automatic sample probe (S2) cleaning.

12 Select **Type** from the Details tab to view any additional sample types in use.

13 If reagent or required solution is missing, low, or empty, continue to Replace the Reagents.

Replace the Reagents

Replace any reagent meeting any of the following conditions:

- Insufficient volume for the processing that day
- Onboard stability time remaining less than your laboratory requirements
- Expired

Remove the old reagent bottles and replace with a new set.

If the analyzer is in *Measure* mode and more than one sequence of bottles is on-board, the analyzer switches to the next bottle sequence when the current bottle sequence is empty, and not when the calibration or reagent is expired.

CAUTION

Bubbles in the reagent bottle can interfere with analysis. Inspect the reagent bottles for bubbles. Remove bubbles with a cotton-tipped applicator before loading the reagent.

CAUTION

Do not add new reagent to existing bottles. Adding new reagent to existing bottles can affect results.

IMPORTANT

Condensation can form on refrigerated reagent bottles. Inspect the reagent bottle opening and the bar code label area for condensation. Remove condensation with a clean, dry, lint-free absorbent tissue before loading the reagent.

If the bar code label is dirty or has moisture on it, the system cannot read the label. Inspect the bar code label and wipe off any dirt or moisture. If the system still cannot read the label, enter the reagent ID manually. For more information, refer to Edit a Reagent ID.

IMPORTANT

Insert partitions as needed for 15 mL, 30 mL, 60 mL, and 180 mL bottles.

When placing 30 mL and 15 mL bottles on the reagent tray, use a partition and adapter to secure the bottles correctly. Confirm that the partitions and adapters are correctly inserted in the reagent tray. For more information, refer to Reagents and Add Adapters to the Reagent Tray.

The 180 mL bottles occupy three positions in the reagent trays. Remove the two adjacent partitions for the 180 mL bottle.

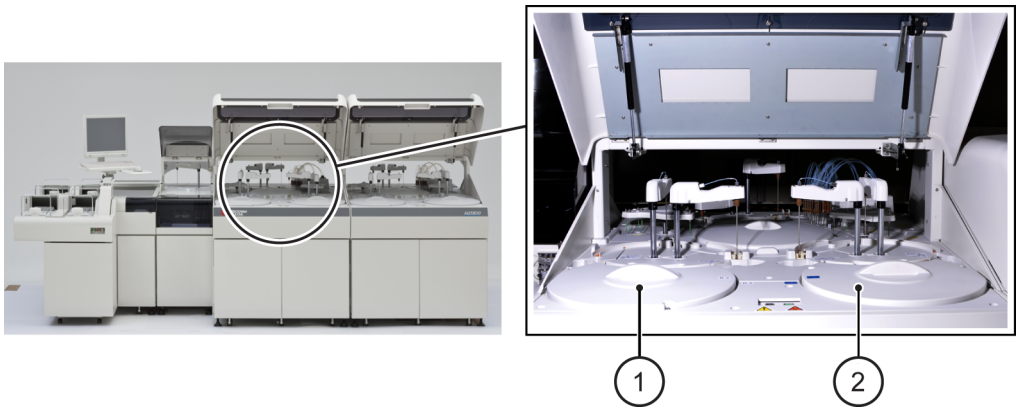
For two-part reagents, the reagent label indicates whether the reagent goes into the R1 or R2 refrigerator.

1 Select **Reagent Management** > **Details**. Then select **Unit No.**

2 Lift the upper front of the analyzer unit.

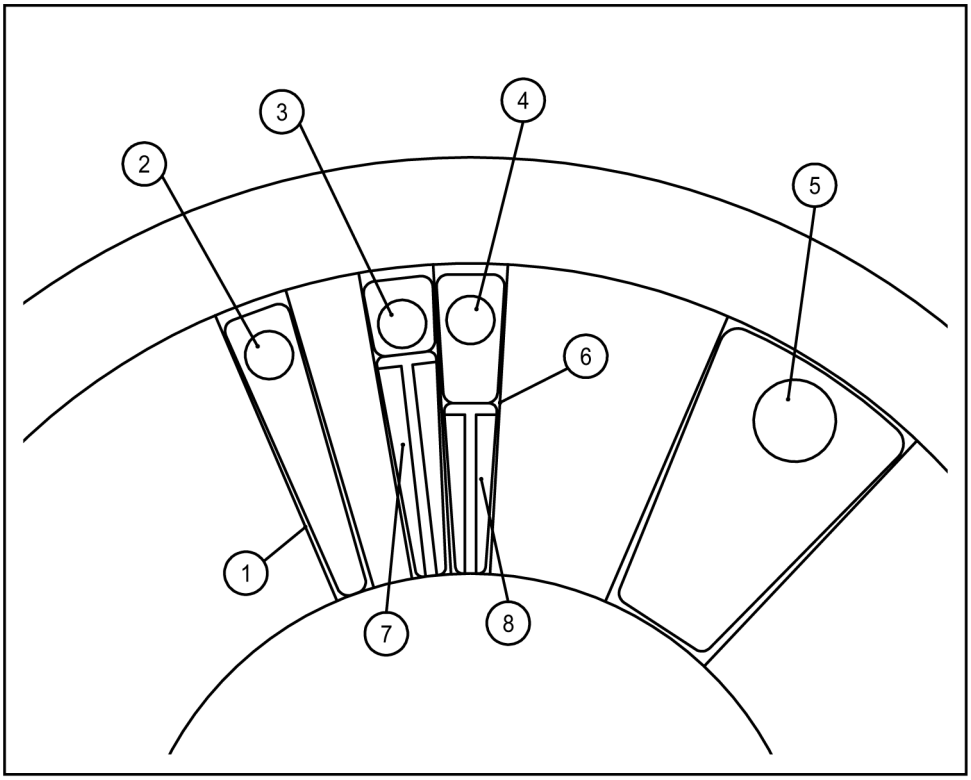
3 Lift and remove the reagent refrigerator covers.

Figure 2.31 Reagent Refrigerator



1. Reagent refrigerator 2 cover
2. Reagent refrigerator 1 cover

Figure 2.32 Reagent Refrigerator Top-down View



1. Removable partition
2. Reagent bottle (60 mL)
3. Reagent bottle (15 mL)
4. Reagent bottle (30 mL)
5. Reagent bottle (180 mL)
6. Fixed partition
7. Adapter for 15 mL bottle
8. Adapter for 30 mL bottle

4 Remove the on-board expired, expired, insufficient volume, and empty reagent bottles from each refrigerator.

The system displays the reagent positions on the Details tab. The system indicates assigned (fixed) positions with an asterisk highlighted in blue in the column to the left of the Pos. column. For more information, refer to Assign a Reagent Position.

5 Place the new bottles in the correct refrigerator. Use adapters and partitions as needed. For more information, refer to Reagents.

CAUTION

Confirm that 15 mL reagent bottles are placed on the reagent tray with the bar code label facing out. Incorrectly loaded bottles can damage the bottle or the reagent probe.

NOTE

Place R1 bottles in the R1 refrigerator and R2 bottles in the R2 refrigerator.

If the bottle has a reagent ID, place the bottle in any available (not assigned) position in the R1 or R2 refrigerator.

If the bottle does not have a reagent ID, place the bottle in the appropriate assigned position. The system indicates assigned (fixed) positions with an asterisk highlighted in blue in the column to the left of the Pos. column. For more information, refer to Assign a Reagent Position.

6 Replace the refrigerator covers.

7 Close the upper cover of the analyzer unit.

8 Repeat steps 2 through 7 for each analyzer unit.

9 After replacing reagents, select **Reagent Check (F5)**, select each **Unit** with replaced reagents, select the appropriate option, and then select **Start**. For more information, refer to Figure 2.27 Reagent Check Dialog.

10 When the reagent check is complete, review the Main and Detail tabs to confirm that all reagents are ready for processing.

Calibrate Tests

The system automatically orders (requisitions) reagent blank and calibration for all tests with:

- Reagent blank or calibration expired
- Reagent blank or calibration expired soon.
- New bottle or lot number for the reagent (if you are using Advanced Calibration)
- Reagent blank or calibration failed

NOTE

The expired-soon period is an operator-defined quantity of hours programmed in System Maintenance. The default setting is 180 minutes. For more information, contact Beckman Coulter.

NOTE

The automatic reagent blank and calibration order (requisition) occurs after a reagent check.

NOTE

After the system performs a reagent check, the QC order (requisition) occurs with the Default QC Profile. Selecting **Auto CAL/QC Requisition (F3)** automatically orders (requisitions) the same tests for QC that are ordered (requisitioned) for calibration.

NOTE

To determine the tests to calibrate, review the Comment column in **Reagent Management > Details**.

Calibration includes a reagent blank and calibration. Perform calibration using the blue and yellow racks.

NOTE

Before a profile is available to order (requisition), program calibration profiles in **Menu List > Parameters > Common Test Parameters > Profile > RB/Calibration**. You can program a maximum of 100 profiles (including daily, weekly, and monthly calibration requirements). For more information, refer to Create a Reagent Blank or Calibration Profile.

NOTE

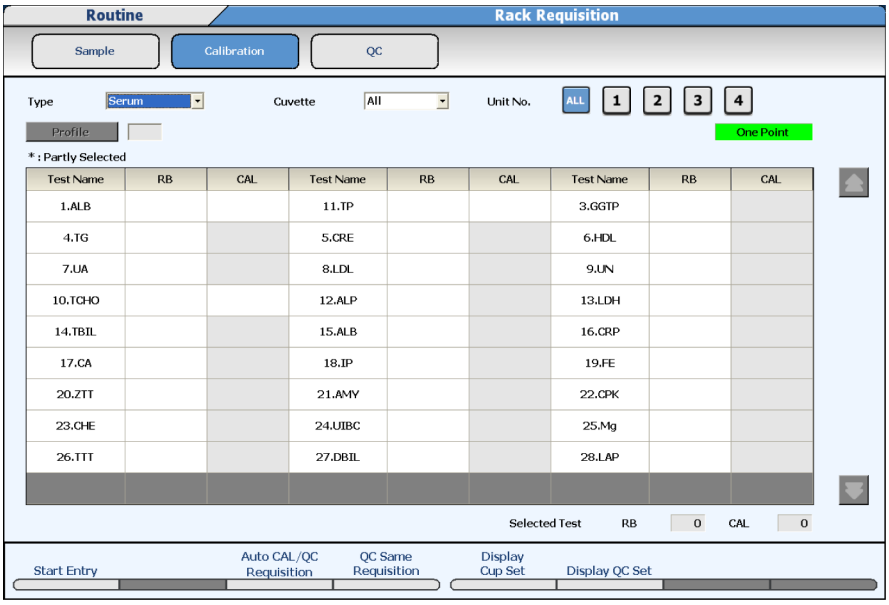
Before a test is available to order (requisition) by bottle sequence number in **Individual Requisition (F3)**, program the test for Advanced Calibration in **Menu List > Parameters > Calibration Parameters > Calibration Specific**. For more information, refer to the AU5800 Reference Manual.

Order (Requisition) and Perform Calibration

1 Select **Home > Rack Requisition > Calibration**.

The system displays the Rack Requisition: Calibration screen.

Figure 2.33 Rack Requisition: Calibration Screen



2 In **Type**, select the sample type.

The system displays the tests automatically ordered (requisitioned) for calibration in yellow and reagent blank in blue for the selected sample type.

NOTE

If you did not perform a reagent check, select **Auto CAL/QC Requisition (F3)** to select the automatic reagent blank and calibration order (requisition). Selecting **Auto CAL/QC Requisition (F3)** automatically orders (requisitions) the same tests for QC that are ordered (requisitioned) for calibration.

3 **Cuvette** defaults to display **All** tests assigned to the inner and outer cuvettes. Select **Inner** or **Outer** to display tests assigned only to the inner or outer cuvettes.

4 **Unit No.** defaults to display **All** analyzer units. Select the unit number **1**, **2**, **3**, or **4** to display tests assigned only to that unit number.

5 Confirm that the automatic order (requisition) is correct for the processing.

— If the order (requisition) is correct, continue to step 6.
— To change the order (requisition):

a. Select **Start Entry (F1)**.

The system changes the screen to editing mode.

— To select a profile, select **Profile**. Select a profile, and then select **OK**.
— To select a specific test, select the test from the RB or CAL column.

NOTE

Selecting from the RB column orders (requisitions) only a reagent blank. Selecting from the CAL column orders (requisitions) a reagent blank and calibration.

— To order (requisition) sequential bottles of the same test, select **Individual Requisition (F3)**.

— To select a specific test and bottle sequence, select the RB or CAL column.
— To order (requisition) all bottles for the selected test, select **Select All by Test**.
— To order (requisition) all bottles for all tests, select **Select All**.
— To save the order (requisition), select **Close**.
— To cancel the order (requisition), select **Cancel**.

b. Select **Entry (F1)** to save the order (requisition). Select **Exit (F2)** to cancel the order (requisition).

6 Select **Display Cup Set (F5)** to display the reagent blank, calibrators, racks, and positions required for reagent blank and calibrators.

Load the reagent blanks and calibrators according to the list in the blue and yellow racks. Select **Close** to close the dialog.

NOTE

In the Display CAL Racks dialog, the Volume (µL) is the sample volume determined by the ordered (requisitioned) tests. The dead volume is not included.

NOTE

If calibrator Barcode Operation is enabled, the system does not display a rack ID for the calibrator racks.

7 Load the racks on the rack input trays on the rack feeder unit. Load the blue rack first, followed by the yellow racks.

8 Select **Start** .

Process Quality Control (QC)

Perform Quality Control on the schedule determined by your laboratory protocol. Run control materials with each new calibration, with each new reagent lot, and after specific maintenance or troubleshooting activities. If you find any trends or sudden shift in results, review all operating settings. Follow your laboratory guidelines for corrective action if the QC results do not recover within the specified limits.

- Order (Requisition) and Perform Quality Control (QC)

NOTE

After the system performs a reagent check, the system automatically orders (requisitions) the default QC profile.

NOTE

Program a QC order (requisition) profile in **Menu List > Parameters > Common Test Parameters > Profile > QC**. For more information, refer to Create a QC Profile. The following specific profile numbers are designated as default QC profiles for each sample type and Group.

Table 2.6 Default QC Order (Requisition) Profile Numbers

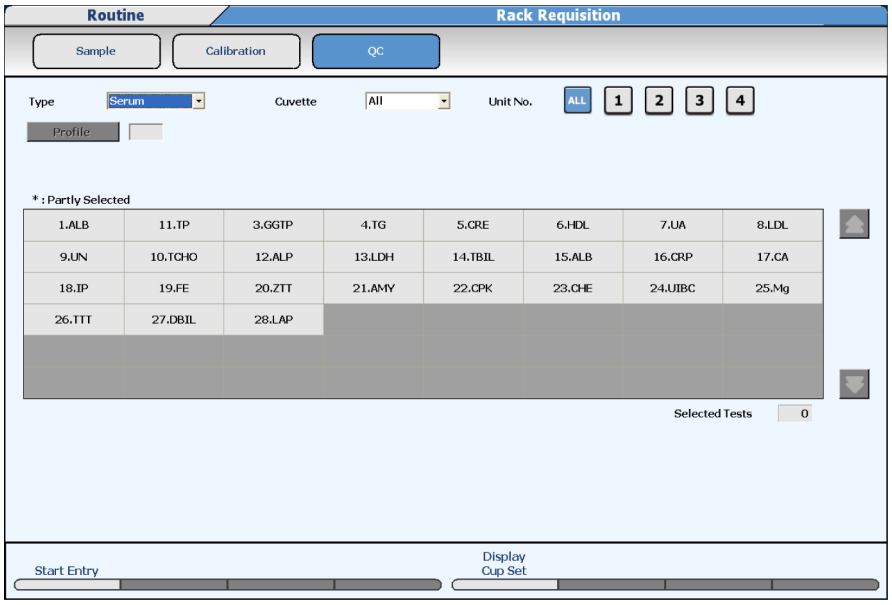
Profile Number	Sample Type	Group
87	Serum	1
88	Serum	2
89	Serum	3
90	Urine	1
91	Urine	2
92	Urine	3
93	Other-1	1
94	Other-1	2
95	Other-1	3
96	Other-2	1
97	Other-2	2
98	Other-2	3

Order (Requisition) and Perform Quality Control (QC)

1 Select **Home > Rack Requisition > QC**.

The system displays the Rack Requisition: QC screen.

Figure 2.34 Rack Requisition: QC Screen



2 In **Type**, select the sample type.
The system displays the tests automatically ordered (requisitioned) for QC in blue.

NOTE

Tests are automatically ordered (requisitioned) for QC after the following:

- You perform a reagent check. This orders (requisitions) the Default QC profile.
- You select **Auto CAL/QC Requisition (F3)** or **QC Same Requisition (F4)** in the Calibration screen. This orders (requisitions) the same QC tests as were ordered (requisitioned) for reagent blank or calibration.

3 **Cuvette** defaults to display **All** tests assigned to the inner and outer cuvettes. Select **Inner** or **Outer** to display tests assigned only to the inner or outer cuvettes.

4 **Unit No.** defaults to display **All** analyzer units. Select the unit number **1**, **2**, **3**, or **4** to display tests assigned only to that unit number.

5 Confirm that the automatic QC order (requisition) is correct for the processing.

- If the order (requisition) is correct, continue to step 6.
- To change the order (requisition):

a. Select **Start Entry (F1)**.

The system changes the screen to editing mode.

- To clear the tests for the default QC profile orders (requisitions), select **Deselect All Tests (F6)**.
- To select a profile, select **Profile**. Select a profile, and then select **OK**.
- To select a specific test, select the test.

— To order (requisition) sequential bottles of the same test, select **Individual Requisition (F3)**.

— To select a specific test and bottle sequence, select the test.
— To order (requisition) all bottles for the selected test, select **Select All by Test**.
— To order (requisition) all bottles for all tests, select **Select All**.
— To save the order (requisition), select **Close**.
— To cancel the order (requisition), select **Cancel**.

b. Select **Entry (F1)** to save the order (requisition). Select **Exit (F2)** to cancel the order (requisition).

6 Select **Display Cup Set (F5)** to display the required control materials, racks, and positions.

7 Load the control materials in the green racks according to the list. Select **Close**.

NOTE

In the Display QC Racks dialog, the Volume (µL) is the required sample volume determined by the ordered (requisitioned) tests. The dead volume is not included.

NOTE

If QC Barcode Operation is enabled, the system does not display a rack ID for the QC racks.

8 Load the racks on the rack input trays on the rack feeder unit.

9 Select **Start** .

Start Analysis

The reaction time is approximately 8 minutes and 40 seconds for the first result to be obtained after the sample is dispensed. The system can sample another two tests every 3.6 seconds. Each analyzer unit has a maximum throughput of 2,000 tests per hour.

You can print and view results on the monitor.

1 Load sample racks (white, red, or orange) on the rack input trays on the rack feeder unit.

2 To display the Start dialog with an error list, select **Start**. Review any errors carefully and perform necessary corrective actions before you start analysis. If an error is in red, it is necessary to perform the corrective actions before you can start the analyzer unit.

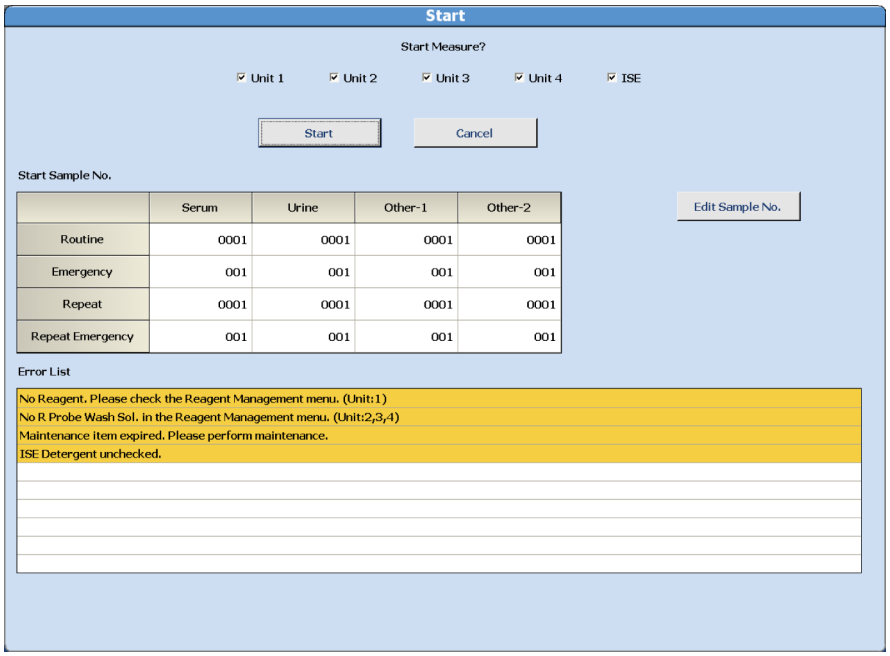
NOTE

Select **Edit Sample No.** to edit the starting sample number. Editing the starting sample number is only necessary in Sequential analysis.

3 Confirm that all units are selected. If the box is grayed out, review the error list and perform necessary corrective actions before you start. Deselect the **Unit** that you do not operate.

4 Select **Start**. If the system does not detect any errors, the system initializes and analysis starts. The mode changes from *Standby* to *Measure 1*.

Figure 2.35 Start Dialog



CHAPTER 3
System Setup

Program a New Test

Program the new test using the chemistry setting sheet. For more information, refer to the AU5800 Reference Manual.

Test numbers 1 to 120 are pre-programmed as closed or open test numbers.

- Closed Test Numbers - Beckman Coulter test parameters are available on a validated CD that a Beckman Coulter Representative loads during installation. The Beckman Coulter tests are loaded onto closed test numbers. Closed test numbers reduce manual programming time and possible programming errors.
- Open Test Numbers - The system supports the ability to add tests not from Beckman Coulter. Open test numbers are available for reagents not from Beckman Coulter.

---

1 Select **Menu List** > **Parameters** > **Common Test Parameters** > **Test Name**.

a. Select **Edit (F1)**.

b. In **Test Name**, enter the name (maximum of 6 characters).

Changing the test name affects all results associated with that test number. Any previously reported results (with the old test name) are assigned the new test name. Use caution when changing the test name.

Do not change the test name without noting the time and date that the change occurred and then confirming any results printed before this time are reviewed and correctly identified.

Tests are processed on a sample in the test number order (1 to 120) displayed, with some exceptions. For information on contamination prevention, refer to the AU5800 Reference Manual.

c. (Optional) In **Long Name**, enter the name (maximum of 20 characters).

d. For all markets except Japan: In **Reagent ID**, enter the first 3 digits of the reagent ID, or refer to the chemistry setting sheet for the reagent ID 3-digit code.

For the Japan market, the reagent ID includes the manufacturer ID and test code. In **Manufacturer ID**, enter the first 3 digits of the reagent ID. In **Test Code**, enter the 2 digits of the reagent ID following the first 3 digits. Refer to the chemistry setting sheet for the manufacturer ID and test code.

e. In **Alarm Shots**, enter the remaining test number to generate a `Reagent Short` alarm. The default is 32.

f. In **Multi Reagent Switch**, select **Yes**. The Multi Reagent Switch allows the analyzer to switch to a new sequence of R1 or R2 when either the R1 or R2 of a sequence becomes empty.

g. In **Cuvette**, select **Inner**, **Outer**, or **Both.**

h. Confirm that the information is correct, and then select **Confirm (F1)**.

---

2 Select **Group of Tests**.

a. In **Group**, select Group 1, 2, or 3.

b. Select **Edit (F1)**.

c. Select **Test Setting (F5)**. Select **Unit No.** to add the test. The default is **Unit No. 1**.

d. Select the test to add to the Group. The system displays the test name in blue. Select **Close**.

e. To change the print order:

1. Select a test to enable **Forward (F2)** and **Backward (F3)**.
2. Move the test in the Group to change the print order.

f. Confirm that the information is correct, and then select **Confirm (F1)**.

---

3 (Optional) Select **Profile**.

a. Select **Edit (F1)**.

b. Select **Sample, RB/Calibration**, and **QC** to add the test to any required profile.

c. In **Type**, select the sample type.

Confirm the sample type for each profile.

NOTE

In the Sample tab, you can program an operator-defined default profile (number 0) for each sample type. The system uses the sample default profile when there is no order (requisition) available for a sample, for example with a sample ID read error. In the QC tab, you can program default QC profiles (numbers 87 to 98) for each sample type and Group. The default QC profile is the automatic QC order (requisition) made after a reagent check.

d. In **Profile Name**, select a profile.

e. Select the test. The system displays the selected tests in blue.

f. Confirm that the information is correct, and then select **Confirm (F1)**.

---

4 Select **Menu List** > **Parameters** > **Specific Test Parameters** > **General**.

a. Select **Edit (F1)**.

b. In **Test Name**, select the test name.

c. In **Type**, select the sample type.

d. In **Operation**, confirm that **Yes** is selected for the sample type.

e. Enter the specific test parameters from the chemistry setting sheet.

f. Confirm that the information is correct, and then select **Confirm (F1)**.

NOTE

The system can display the parameters for a maximum of 6 tests at a time for verification. Select **List Display (F7)**. In **Type**, select the sample type. Select a maximum of 6 tests from the test list, and then select **Display**. The parameters for the selected tests display. Clear the tests in blue in the List Display dialog to select and display other tests.

---

5 Select **Range**.

a. In **Test Name**, select the test name.

b. In **Type**, select the sample type.

c. Select **Edit (F1)**.

d. Select **Set Decimal Places (F5)**, and then select **0** to **4** for the decimal place for the results.

e. Select **Close**.

f. In **Value/Flag**:

— Select **Value** to access **Specific Ranges** to set the high (H flag) and low ranges (L flag).
— Select **Flag** to access **Level** to set a positive limit (P flag) or negative limit (N flag). This setting is typically used for drugs of abuse testing.

g. Use **Specific Ranges** to set a reference range to generate high (H) and low (L) flags.

— In 1 to 6, enter a range determined by sex and age.
— In 7, **Standard demographics**, enter a generic reference range. The system uses the generic reference range for samples without patient demographic information (age and sex).
— In 8, **Not within expected values**, the system uses the **Not within expected values** reference range for a sample with patient demographic information (age or sex), but the age or sex information did not meet the age and sex defined in the specific range 1 to 6.

h. (Optional) Use **Panic Value** to set a range to generate a panic alarm and pl or ph flags.

i. In **Unit**, enter the units. If the units are formatted on the report, the system prints the units.

j. Confirm that the information is correct, and then select **Confirm (F1)**.

---

6 Select **Menu List** > **Parameters** > **Calibration Parameters** > **Calibrators**.

— If it is not necessary to program a new calibrator, continue to step 7.
— If it is necessary to program a new calibrator:

a. Select **Edit (F1)**.

b. Select an available **No.** or **Cup Position** by **Type**.

c. Enter the **Calibrator Name**, **Calibrator ID**, **Lot No.**, **Expiration** and **Multi Rack**.

NOTE

Multi Rack is an option for the systems with multiple analyzer units. Refer to Multi-rack ID Option.

NOTE

If Barcode Operation is not enabled, enter the **Calibrator Name**. If Barcode Operation is enabled, enter the **Calibrator Name** and **Calibrator ID**. The **Lot No.**, **Expiration**, and **Multi Rack** are optional fields.

d. Confirm that the information is correct, and then select **Confirm (F1)**.

---

7 Select **Calibration Specific**.

a. In **Test Name**, select the test name.

b. In **Type**, select the sample type.

c. Select **Edit (F1)**.

d. Refer to the chemistry setting sheet to determine if the **Calibration Type** is **AB** or **MB**, and enter calibration-specific parameters.

— If the **Calibration Type** is **AB**:

— Refer to the chemistry setting sheet for the parameters for **Formula**, **Slope Check**, **Factor Range**, **Allowable Range Check**, **Advanced Calibration**, **Lot Calibration**, and **Stability**.
— For **Counts** (replicates), enter a number from 1 to 4. For more information, refer to the AU5800 Reference Manual.
— Select the calibrator from **Calibrator**.
— For **Conc**, enter the calibrator concentration from the calibrator insert (available in the calibrator kit).

IMPORTANT

Program Slope Check according to the chemistry setting sheet for all tests with multi-point calibrations. For more information, refer to Calibration Specific Menu in the AU5800 Reference Manual.

— If the Calibration Type is **MB**:

— Refer to the chemistry setting sheet for the settings for **Formula**, **Allowable Range Check**, **Advanced Calibration**, **MB Type Factor**, and **Stability**.
— For **Counts** (replicates), enter a number from 1 to 4. For more information, refer to the AU5800 Reference Manual.
— The **MB Type Factor** is specific to the unit number and cuvette positions (inner or outer) on the cuvette wheel. For **Unit No.**, select **1**, **2**, **3**, or **4**. For **Cuvette**, select **Inner** or **Outer.**

e. Confirm that the information is correct, and then select **Confirm (F1)**.

---

8 Select **Menu List** > **Parameters** > **QC Parameters** > **Controls**.

— If it is not necessary to program a new QC sample, continue to step 9.

— If it is necessary to program a new QC sample:

a. Select **Edit (F1)**.

b. Select an available **No.** or **Cup Position** by **Type**.

c. Enter the **Control Name**, **ID**, **Lot No.**, **Expiration**, and **Multi Rack**.

NOTE

If Barcode Operation is not enabled, enter the **Control Name**. If Barcode Operation is enabled, enter the **Control Name** and **Control ID**. The **Lot No.**, **Expiration**, and **Multi Rack** are optional fields.

d. Confirm that the information is correct, and then select **Confirm (F1)**.

---

9 Select **QC Specific**.

a. Select **Preset**.

b. In **Test Name**, select the test name.

c. In **Type**, select the sample type.

d. Select **Edit (F1)**.

e. In **Control**, select the QC sample.

f. In **Multi/Single**, select **Multi** or **Single.**

g. Use the QC package insert or known values to enter the **Mean**, **SD**, and **Range**. The system determines that QC is in or out of these preset ranges when the QC Mode is set to **Preset** (on the Check tab).

1. In **Mean**, enter the QC mean.
2. In **SD**, enter a 1 SD value.
3. In **Range**, enter the value of the range. The range is the high value minus the low value.

h. Confirm that the information is correct, and then select **Confirm (F1)**.

---

10 Select **Menu List** > **System** > **Format** > **List Format**.

IMPORTANT

Do not change any parameters for items in **Basic Condition**, **Print Information**, or **Layout**. These parameters affect the format of the printout.

---

11 Select **Printed Test**.

a. Select **Edit (F1)**.

b. In **List Name**, select the required report or list. Select the test to add it to the report or list. When the test is selected, the system displays the test in blue.

NOTE

Before the tests print on the printout, add the new test to any required real-time printouts (reagent blank, calibration, QC, and samples).

c. Confirm that the information is correct, and then select **Confirm (F1)**.

---

12 Select **Menu List** > **Parameters** > **Misc.** > **Contamination Parameters**.

Contact Beckman Coulter for test-specific contamination parameters information.

a. Select **Edit (F1)**.

b. Program the Contamination Avoidance Parameters as required for the **Preceding Test Name**, **Following Test Name**, **Reagent Probe Cleaner Kind**, **Wash Count**, **Effective of Water Cleaning**, **Mixer**, and **Cuvette**.

c. Confirm that the information is correct, and then select **Confirm (F1)**.

---

13 If the system is using online communication with a laboratory information system, program an online test number. Select **Menu List** > **System** > **Online** > **Online Test No**.

a. Select **Edit (F1)**.

b. Enter the **Online Test No**. The combination of the online test number and test must be the same as the laboratory information system. Set the number as a blank when online communication is not required.

IMPORTANT

When the test number on the laboratory information system and the online test number are different, the data cannot transmit correctly.

c. Confirm that the information is correct, and then select **Confirm (F1)**.

---

14 Run the test to confirm the programming.

a. Load the reagent and any required cleaning solution on the analyzer.

b. Perform a reagent check.

c. Confirm that the system orders (requisitions) calibration for the new test.

d. If the test is not added to the default QC order (requisition), order (requisition) QC on the new test.

e. Perform a reagent blank, calibration, and QC on the new test.

f. Review the printout and confirm that the reagent blank, calibration, and QC data are correct.

Create a Profile

A profile is a group of tests that are typically ordered (requisitioned) at the same time. Using a profile reduces the quantity of selections needed, as a single profile is selected instead of multiple tests. A maximum of 100 profiles (Number 0 to Number 99) can be programmed for samples, reagent blank, calibration, and QC. A maximum of 120 tests can be programmed in a profile. The quantity of sample blank tests, LIH, sample type, and number of analyzer units limits the quantity of tests that can be programmed in a profile.

Each profile is assigned a profile name.

You cannot select unavailable tests.

Create a Sample Profile

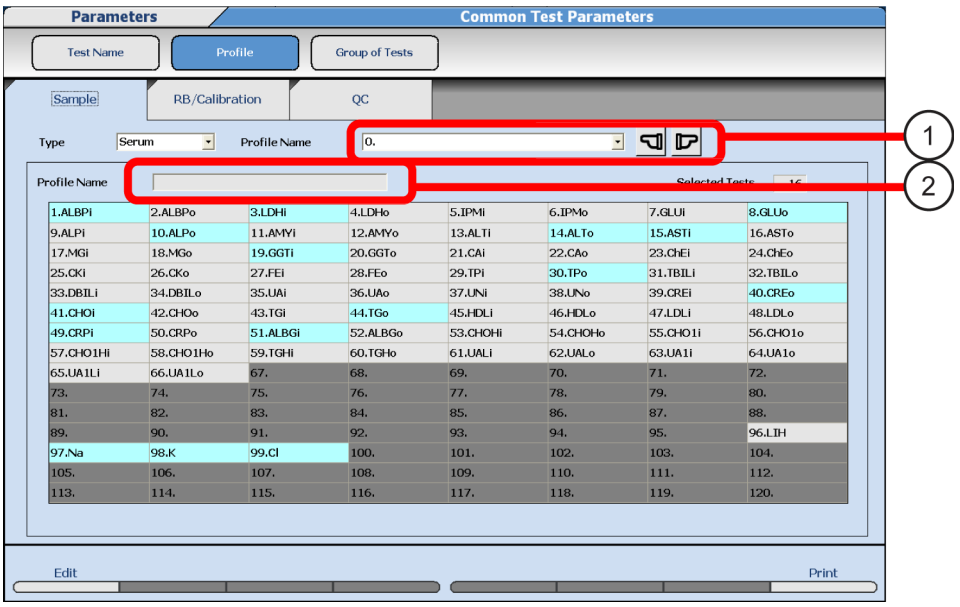
Profile 0 is the default profile in the Sample tab. Profile 0 is automatically performed in the following situations:

- A bar code label read error occurs.
- No order (requisition) found for a sample.
- Online errors.

You can only select ISE tests when the sample type is **Serum** or **Urine**.

1 Select **Menu List > Parameters > Common Test Parameters > Profile > Sample**.

Figure 3.1 Profile: Sample Tab



1. Select a Profile Number
2. Enter a Profile Name

2 Select **Edit (F1)**.

3 In **Type**, select the sample type.

4 In **Profile Name**, select a profile number from 0 to 99.

5 For **Profile Name**, enter a profile name with a maximum of 20 characters.

6 Select the tests to include in the profile. The system displays selected tests in blue.

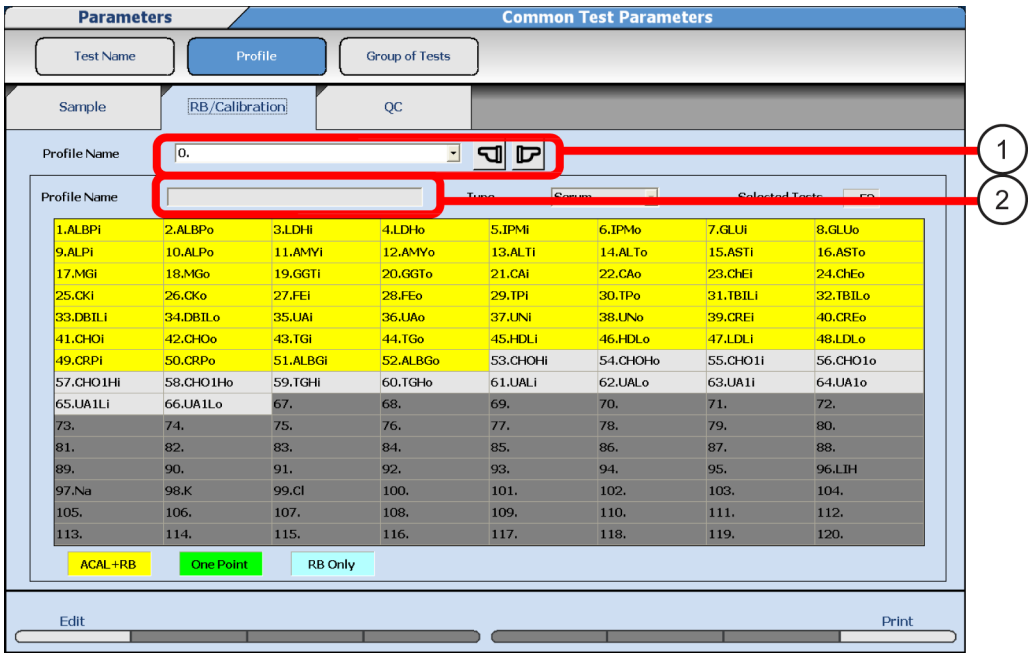
7 Confirm that the information is correct, and then select **Confirm (F1)**.

Create a Reagent Blank or Calibration Profile

You can select ISE tests when the ISE calibration type is **ACAL**.

1 Select **Menu List > Parameters > Common Test Parameters > Profile > RB/Calibration.**

Figure 3.2 Profile: RB/Calibration Tab



1. Select a Profile Number
2. Enter a Profile Name

2 Select **Edit (F1)**.

3 In **Type**, select the sample type.

4 In **Profile Name**, select a profile number from 0 to 99.

5 For **Profile Name**, enter a profile name with a maximum of 20 characters.

6 Select the tests to include in the profile. The system displays the test in blue (RB Only), yellow (ACAL + RB), or green (One Point) determined by programming in the Calibration Specific screen. Select **Calibration Options (F5)** to change between the available options.

NOTE

The programming in the Calibration Specific screen determines the calibration options available in **Calibration Options (F5)**.

7 Confirm that the information is correct, and then select **Confirm (F1)**.

Create a QC Profile

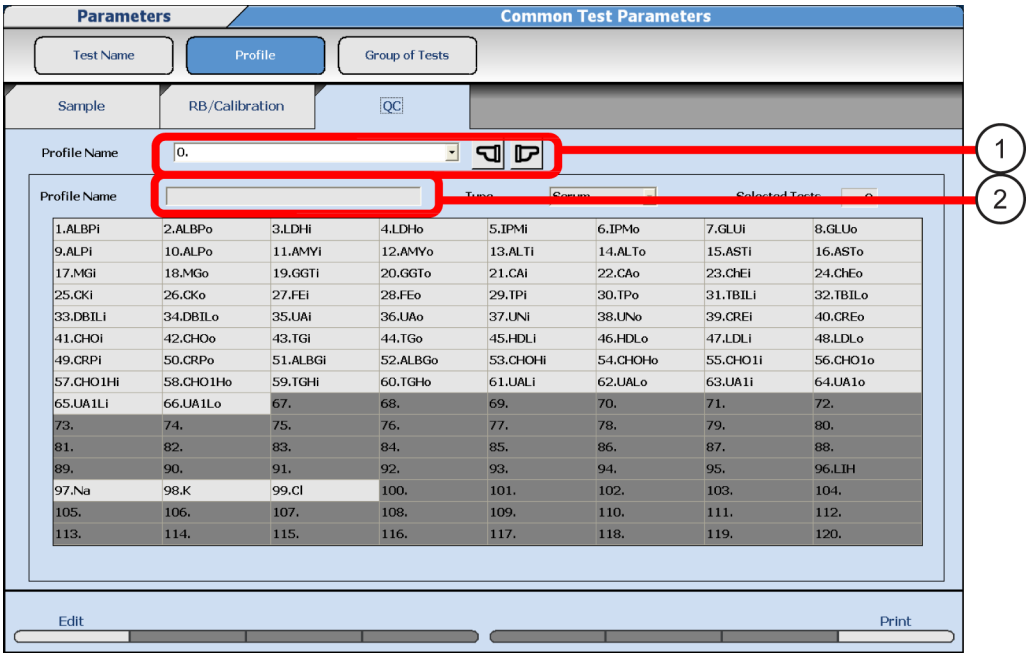
QC profiles 87 to 98 are the default QC profiles that are automatically ordered (requisitioned) in **Home > Rack Requisition > QC**. The QC profile numbers 87 to 98 correspond to a specific Group and sample type:

- Number 87: Serum: For Group 1
- Number 88: Serum: For Group 2
- Number 89: Serum: For Group 3
- Number 90: Urine: For Group 1
- Number 91: Urine: For Group 2
- Number 92: Urine: For Group 3
- Number 93: Other-1: For Group 1
- Number 94: Other-1: For Group 2
- Number 95: Other-1: For Group 3
- Number 96: Other-2: For Group 1
- Number 97: Other-2: For Group 2
- Number 98: Other-2: For Group 3

You can only select ISE tests when the sample type is **Serum** or **Urine**.

1 Select **Menu List > Parameters > Common Test Parameters > Profile > QC**.

Figure 3.3 Profile: QC Tab



1. Select a Profile Number
2. Enter a Profile Name

2 Select **Edit (F1)**.

3 In **Type**, select the sample type.

4 In **Profile Name**, select a profile number from 0 to 98.

5 For **Profile Name**, enter a profile name with a maximum of 20 characters.

6 Select the tests to include in the profile. The system displays selected tests in blue.

7 Confirm that the information is correct, and then select **Confirm (F1)**.

Program Calibrator Concentrations and a New Calibrator Lot Number

Use this function to review or change calibrator concentrations for all tests ordered for a calibrator in a single dialog. Use this function to change all concentrations when the calibrator lot number changes.

IMPORTANT

Confirm the calibrator concentration value in the Calibration Specific screen. It is critical that all calibrator values are entered correctly.

For more information, refer to the AU5800 Reference Manual.

1 Select **Menu List** > **Parameters** > **Calibration Parameters** > **Calibrators**.

2 Select **Edit (F1)**.

3 Select the calibrator name to edit from **Calibrator**.

4 Enter the calibrator **Name**, **ID**, **Lot No.**, and **Expiration**.

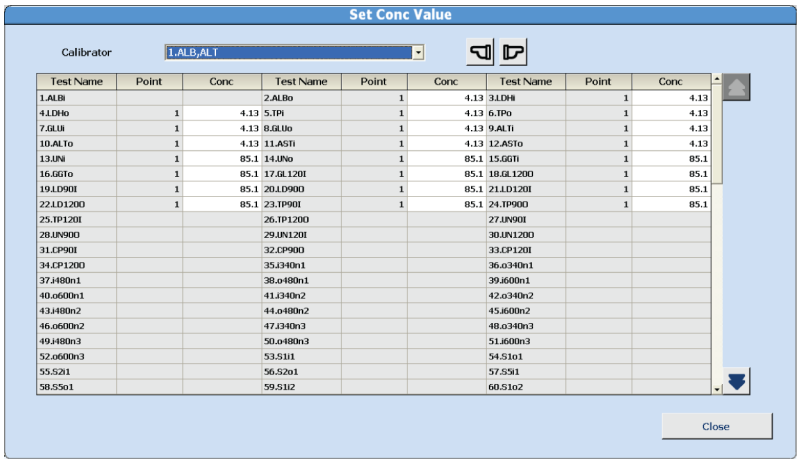
NOTE

You can only enter a new lot number for an existing calibrator.

5 Select **Set Conc Value (F5)**.

The system displays the concentration values of the selected calibrator.

Figure 3.4 Set Conc Value Dialog



6 To display or edit a different calibrator, select the calibrator name from **Calibrator**.

7 Enter the concentration values (**Conc**) for each test (**Test Name**) for the calibrator. You can only enter concentration values for tests programmed to the calibrator in the Calibration Specific screen.

8 Select **Close**.

9 To change the concentration for any other calibrator, repeat steps 3 to 8.

10 If a calibrator concentration changes, the system displays a confirmation message. Select **OK**.

11 Confirm that the information is correct, and then select **Confirm (F1)**.

Program Preset QC Mean and Range

Use this procedure to review and change the QC mean, standard deviation, and range. For detailed information, refer to the AU5800 Reference Manual.

1 Select **QC > QC Setup > Preset**.

2 In **Test Name**, select the test name.

3 In **Type**, select the sample type.

4 Select **Edit (F1)**.

5 In **Control**, select the QC sample.

6 In **Multi/Single**, select **Multi** or **Single**.

7 Use the QC package insert or known values to enter the **Mean**, **SD**, and **Range**. The system determines that QC is in or out of these preset ranges when the QC Mode is set to **Preset** (on the Check tab).

a. In **Mean**, enter the QC mean.

b. In **SD**, enter a 1 SD value.

c. In **Range**, enter the value of the range. The range is the high value minus the low value.

8 Confirm that the information is correct, and then select **Confirm (F1)**.

Program a User Menu

The User Menu function allows the selection of up to 16 menus most frequently used by the operator. Operator-defined menu names can be programmed. Menus selected from the **User Menu** button have direct access to the menu to save time.

The system displays the original menu name below the main button bar even when you access menus using the **User Menu** button.

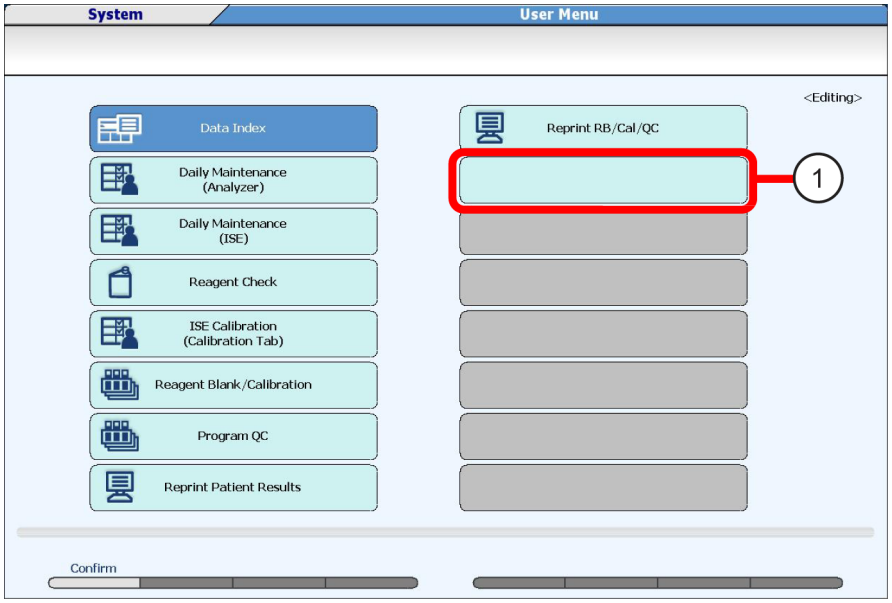
Edit the User Menu

1 Select **Menu List > System > User Menu**.

2 Select **Edit (F1)**.

The system changes the next available menu from a gray box to a blue button.

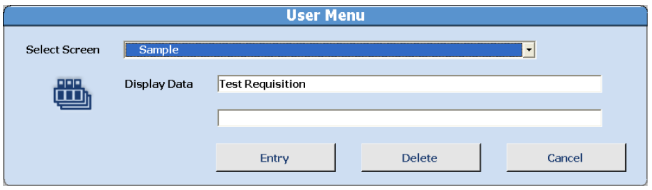
Figure 3.5 User Menu Screen



1. Blue button

3 Select the blue button.

Figure 3.6 User Menu Dialog



4 In **Select Screen**, select the menu to place in the User Menu list.

5 In **Display Data**, enter the operator-defined menu name. You can enter up to 28 characters on each line.

6 Select **Entry**.

7 Confirm that the information is correct, and then select **Confirm (F1)**.

CHAPTER 4

Sample Programming and Processing

Sample Preparation

Confirm that there is sufficient sample for analysis along with the dead volume. To display the volume needed for the required tests, select **Home > Rack Requisition > Sample**. The system displays the sample volume required for ordered (requisitioned) tests at the bottom right-hand side of the screen. The sample volume does not include the dead volume.

The minimum dead volume required for sample detection varies depending on the sample cup or tube.

After centrifuging sample tubes, confirm that there is sufficient volume of serum or plasma. If the serum or plasma level is too low, transfer it to a smaller cup or cup nested (inserted) in a tube. For more information, refer to Cups or Tubes Specifications for validated cups and nested cups.

Follow your laboratory procedure to dispense the sample into the center of the cup or tube. Confirm that the sample surface is level without bubbles present before analysis.

Prevent sample evaporation and contamination before analysis.

WARNING

If the following requirements are not met, results are affected and system errors occur.

- **Do not have fibrous material or fibrin in the sample.**
- **Confirm that no air bubbles are in the samples, including samples transferred to the AU5800 from a laboratory automation system.**
- **Dispense sample volume in the quantity required for analysis and the dead volume. For information about dead volumes for tubes and cups, refer to Cups or Tubes Specifications.**
- **In Specific Test Parameters, you can set the sample volume dilution to 0 µL (default) or 10 µL. When you set the Dilution to 0 µL, the system adds an extra 5 µL per test to the sample volume to ensure dispensing accuracy. For example, if the sample volume of a test is 3 µL, the system aspirates 8 µL per test. If 10 tests are ordered (requisitioned) on a sample, the system adds a total of 50 µL to the sample volume. When you set the Dilution to 10 µL, the system does not add any extra sample volume per test.**
- **After sample aspiration, the sample probe is rinsed in the wash well, and a small amount of water is transferred to the sample when the sample probe aspirates sample for the next test. If the initial sample volume is small, and 20 tests or more are analyzed on the sample, add an extra 200 µL to the required sample volume to avoid diluting the sample.**

- **Confirm that a volume of serum or plasma sufficient for analysis plus the needed dead volume is in a primary tube. For information about dead volumes for tubes and cups, refer to Cups or Tubes Specifications.**
- **When the serum quantity is small, perform analysis after transferring the sample to a smaller cup or cup nested (inserted) in a tube. For more information, refer to Cups or Tubes Specifications.**
- **When the serum quantity is small, the system can aspirate blood cells below the serum and results can be affected.**

WARNING

Assays with a sample volume of less than 1.8 µL should use a 10 or higher pre-dilution rate for the automatic repeat with pre-dilution option.

CAUTION

Beckman Coulter adjusts the sample probes for optimal dispensing with the cup or tubes selected for use by each laboratory at installation. If you change the cup or tubes in use on the system, contact Beckman Coulter to make any required adjustments.

IMPORTANT

- Do not fill the cup or tube completely to the top with sample. The sample surface in the cup or tube should be lower than 15 mm from the top of the cup or tube.
- Carefully place the cups or tubes filled with sample into the racks to avoid sample spilling from the cup or tube onto the rack.
- Carefully place the racks containing the sample cups or tubes onto the rack tray to avoid sample spilling from the cup or tube onto the rack tray.
- Carefully place the rack trays on the rack input component and remove the racks from the rack output component to avoid sample spilling from the cup or tube onto the rack input component or rack output component.

If there is a height difference between tubes processed on a laboratory automation system, use the tube with the bottom that is furthest from the surface of the track to define the maximum probe stroke. This tube difference causes tubes with bottoms closer to the track surface to require a higher dead volume to have correct operation with the shallowest tube.

Place the Sample Cups or Tubes in the Rack

Rack Preparation

Before you start analysis, dispense a sample into sample cups or tubes and set these cups or tubes in the correct rack. The racks come in six different colors. Each rack color has a specified purpose or application. Racks are placed on the rack input trays. A maximum of 20 racks, or 200 samples can be placed on a rack input tray. Two rack input trays for a maximum of 40 racks can be placed on the rack input component.

CAUTION

Confirm that racks are clean. If the rack is dirty or sticky, clean the rack. Refer to Clean the Rack.

Rack Types

The system identifies the rack type from the combination of magnets set into the rack bottom. The rack colors, applications, and magnet combinations are shown in the following table.

Table 4.1 Rack Color, Application, and Magnet Position

Color	Rack Application	Magnet 1, 2, 3
White	Used to analyze routine samples and Auto Repeat run samples.	● ○ ○
White + Light Blue Adapter	Used to analyze routine and emergency samples from the Beckman Coulter laboratory automation system.	● ○ ○
Blue	Used to calculate reagent blanks for creating calibration curves.	● ○ ●
Yellow	Used to create calibration curves.	● ● ○
Green	Used to analyze QC samples.	○ ○ ●

Table 4.1 Rack Color, Application, and Magnet Position (Continued)

Color	Rack Application	Magnet 1, 2, 3
Orange 	Used to analyze Manual Repeat run samples.	● ● ●
Red 	Used to analyze emergency samples.	○ ● ○

The rack positions are numbered 1 to 10. The magnets are located on the bottom of the rack at the position number 1 end.

Adapter

Adapters are necessary to hold smaller diameter tubes (approximately 11.5 to 13.5 mm) firmly in position in the racks. Larger diameter tubes (approximately 13.6 to 16 mm) do not require adapters. To confirm that a tube fits correctly, place the tube into a rack with and without an adapter and determine which option holds the tube most securely.

For more information on adapters, refer to *Use Adapters on Sample Racks* in the AU5800 Reference Manual.

CAUTION

Supply only the white racks with the light blue adapters to the Beckman Coulter laboratory automation system. Rack jam errors can occur if the white racks with the black adapters are supplied to the Beckman Coulter laboratory automation system.

Place Samples into each Rack Type

The system designates white, red, and orange racks for Serum, Urine, Other-1, or Other-2 sample types in **Menu List > System > System Condition > Analysis Mode**. Place samples in the correct rack for sample type.

White Rack (Routine Analysis)

NOTE

- Bar coded calibrators and QC can be programmed for analysis in white racks.
- Different sample types (serum, urine, other) can be programmed for analysis in the same white rack.

For more information, contact Beckman Coulter.

Set the sample cups or tubes according to the analysis mode.

- **Barcode analysis** - Samples can be placed in any order.
- **Sequential analysis** - Place cups or tubes in numeric order according to the order (requisition) without leaving empty spaces in the rack.
- **Rack No. analysis** - Place samples in sample number order according to the rack ID and sample position (1 to 10) in the rack. The sample number equals (rack ID -1) x 10 + position. For example:

Table 4.2 Sample Number according to the Rack ID and Position

Sample Number	Rack ID	Position
1	1	1
12	2	2
25	3	5

WARNING

In sequential analysis, place samples in numeric sample number order according to the requisitioned order without leaving any empty positions in the racks. If there are empty positions in the racks, the ordered (requisitioned) sample number and the sample number determined during analysis do not coincide, and concordance errors can occur. Beckman Coulter does not recommend running patient samples in sequential mode as positive patient identification cannot be maintained.

IMPORTANT

In Rack No. analysis mode, the maximum Rack ID of White Rack is up to 999. If the rack ID is used over 999, the samples on the white rack are not analyzed.

For more information, refer to the AU5800 Reference Manual.

Blue Rack (Reagent Blank)

Place a sample cup or tube filled with deionized water or diluent in position 1 or 2 in the blue rack.

Assign deionized water or diluent to position 1 or 2 in the blue reagent blank rack in **RB Sample Information** for each sample type in **Parameters** > **Calibration Parameters** > **Calibrators**. For more information, refer to the AU5800 Reference Manual.

Yellow Rack (Calibrators)

In **Calibration Parameters**, calibrator material is programmed to a calibrator number (1 to 200).

The system identifies calibrator numbers 1 to 200 by the rack ID and position. For example, calibrator numbers 1 to 10 are placed in rack ID 0001, calibrator numbers 11 to 20 are placed in rack ID 0002, and so on.

For more information, refer to the AU5800 Reference Manual.

If you enable calibrator Barcode Operation, assign a calibrator ID to the calibrator material. Place calibrators with bar code labels in any position in the yellow racks.

Green Rack (Quality Control)

In **QC Parameters**, a control material is programmed to a QC number (1 to 100).

The system identifies control numbers 1 to 100 by the rack ID and position. For example, control numbers 1 to 10 are placed in rack ID 0001, control numbers 11 to 20 are placed in rack ID 0002, and so on.

For more information, refer to the AU5800 Reference Manual.

If you enable QC Barcode Operation, assign a QC ID to the control material. Place controls with bar code labels in any position in the green racks.

Orange Rack (Manual Repeats)

For sequential analysis, place samples in numeric sample number order according to the repeat run order (requisition) without leaving empty positions in the racks. Use a rack that is programmed for the correct sample type.

For barcode analysis, place samples in any position in the rack programmed for the correct sample type.

Red Rack (Emergency Analysis)

For sequential analysis, place samples in sequential order by their order (requisition) number. The system automatically assigns sample numbers from the tubes or cups detected, so you can leave empty spaces in the rack.

For example, if you order (requisition) three samples and place the samples in positions 1, 3, and 5, the system assigns E001 to the sample in position 1, E002 to the sample in position 3, and E003 to the sample in position 5.

Use a rack programmed for the correct sample type.

For barcode analysis, place samples in any position in the rack programmed for the correct sample type.

WARNING

When you use red racks for sequential analysis, use a worklist to confirm that the results correspond to the samples as processed in the rack.

WARNING

Beckman Coulter recommends using bar code labels for samples to guarantee positive patient identification.

Place the Sample Cups or Tubes in a Rack

1 Place each sample in the correct rack.
Racks are color-coded. Each rack color indicates a different type of analysis. If you program racks for different sample types (serum, urine, other-1, other-2), place the sample in the correct rack for the sample type.

For more information, refer to the AU5800 Reference Manual.

WARNING

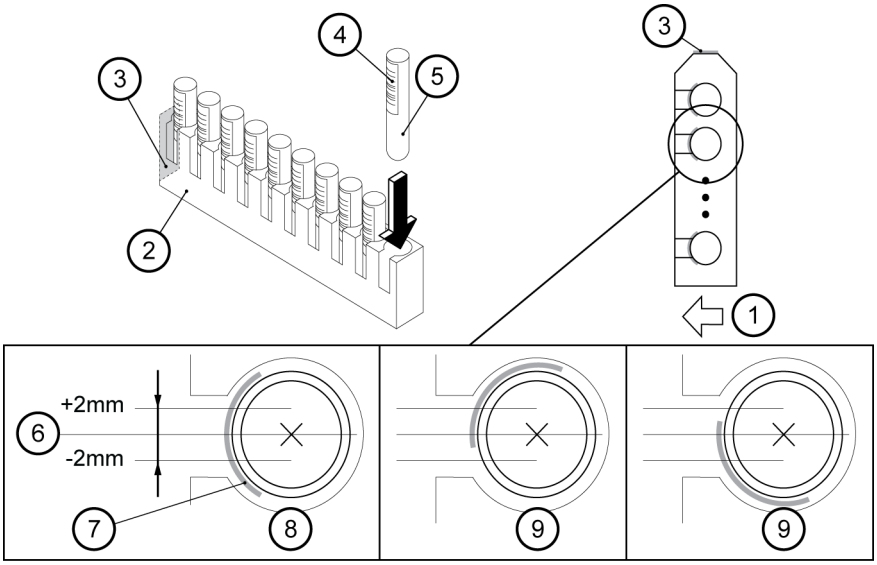
Insert the sample tubes or cups correctly into the rack. If the tube or cup is not pushed down to the bottom of the rack, cup detection does not work correctly and rack jams can occur.

2 Look at each opening in the rack and confirm that you align the bar code label in the center. The bar code label can only deviate 2 mm from the center. If the bar code label is not aligned with the opening in the rack, lift it out and place it in correctly.

WARNING

For sample tubes with bar code labels, do not rotate the tube while it is in the rack. Rotating can cause bar code label contamination or damage, resulting in bar code label read errors. Rotate sample tubes after they have been removed from the racks.

Figure 4.1 Placing a Sample Cup or Tube in a Rack

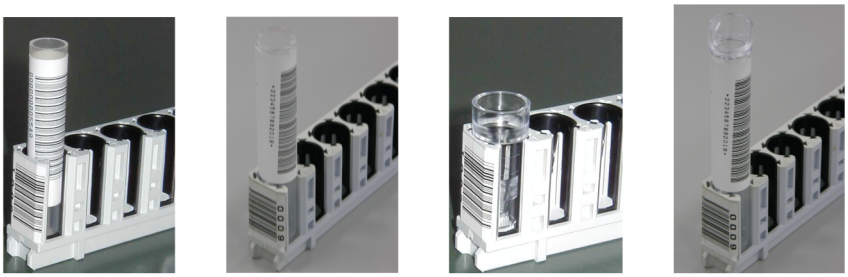


1. Direction that rack moves
2. NE rack
3. The rack ID label is applied to this surface.
4. Bar code label
5. Sample cup
6. Center
7. Bar code label
8. Correct
9. Incorrect

WARNING

Use only NE racks. An NE rack has a window on the side to facilitate setting different sample cup types in the rack and not compromise bar code label readability.

Figure 4.2 Examples of Tubes and Cups Correctly Placed in Racks



1. Small diameter tube with ID
2. Large diameter tube with ID
3. Hitachi cup
4. Large diameter tube with ID and Hitachi cup

Prepare Racks for Analysis

Multi-rack ID Option

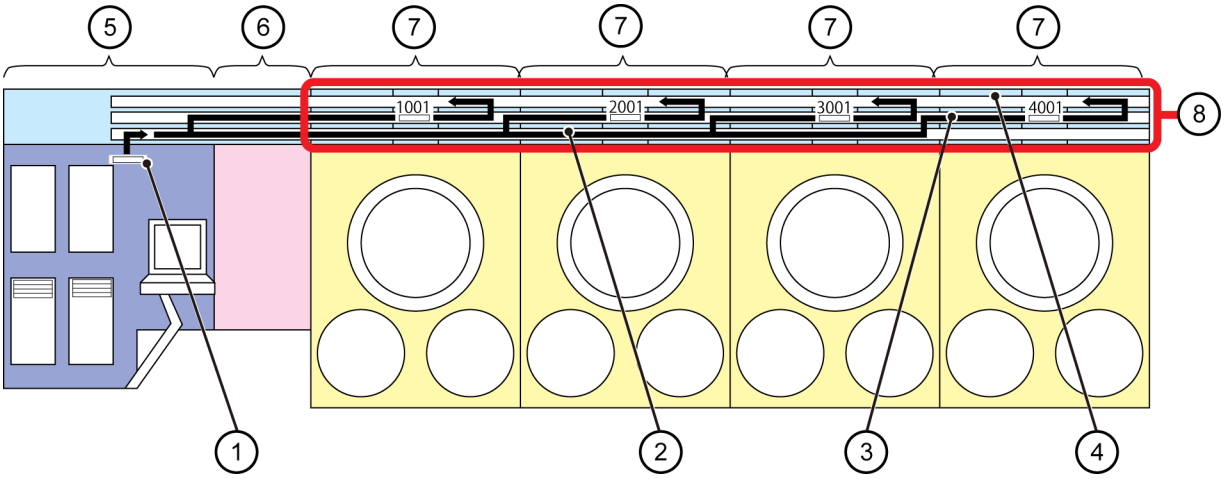
Multi-rack ID is a rack ID label that identifies the analyzer unit by the first digit of the rack ID label. Multi-rack ID labels can be used for reagent blank, calibrator, and QC racks.

When using multi-rack ID, reagent blank, calibration, and QC analysis takes place on multiple analyzer units at the same time which can decrease the time for completion of results.

To use the multi-rack ID option, it is necessary to pour multiple sample cups of calibrator and QC for analysis in the multiple calibration and QC racks.

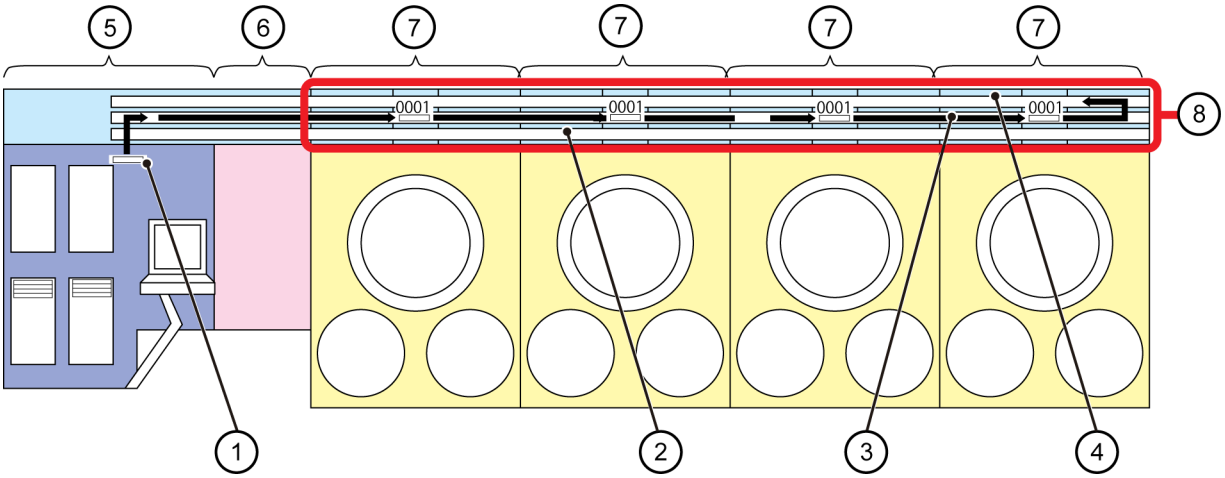
Racks with the multi-rack ID label and regular rack ID label can be processed at the same time.

Figure 4.3 Example of Multi-rack ID Analysis with Four Analyzer Units



1. Rack
2. Bypass lane
3. Primary sample transport lane
4. Return lane
5. Rack feeder unit
6. ISE unit (option)
7. Analyzer unit
8. Reagent blank, calibration, or QC rack with multi-rack ID label

Figure 4.4 Example of Normal ID Rack Analysis (Rack ID 0001) with Four Analyzer Units



1. Rack
2. Bypass lane
3. Primary sample transport lane
4. Return lane
5. Rack feeder unit
6. ISE unit (option)
7. Analyzer unit
8. Routine, Reagent blank, calibration, or QC Rack with normal rack ID label (Rack ID 0001) progresses sequentially through analyzer units 1, 2, 3, and 4

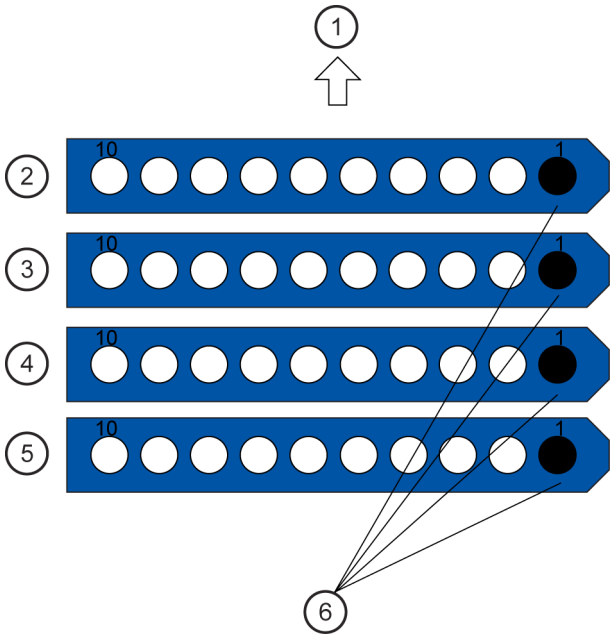
Label Racks

Apply the multi-rack ID label that identifies the analyzer unit number with the first digit to reagent blank (blue), calibration (yellow), or QC (green) racks.

Place Multi-ID Labeled Racks on the Rack Input Trays

1 Place the racks on the rack input tray in the sequence shown in Figure 4.5, so that the rack IDs are in ascending order.

Figure 4.5 Reagent Blank Racks with Multi-rack ID



1. Rack feed direction
2. Blue rack with rack ID 1001 for analyzer unit 1
3. Blue rack with rack ID 2001 for analyzer unit 2
4. Blue rack with rack ID 3001 for analyzer unit 3
5. Blue rack with rack ID 4001 for analyzer unit 4
6. Place a cup filled with deionized water or diluent in position 1 of each blue rack

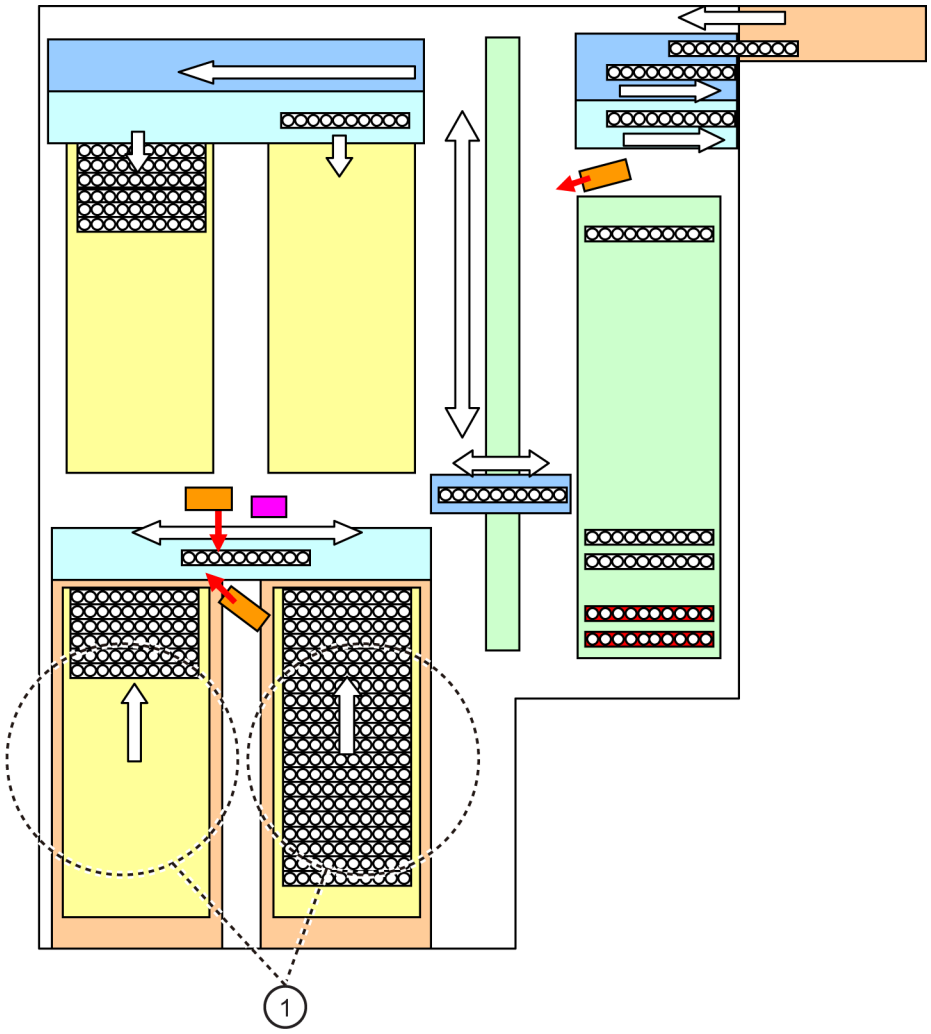
TIP

If the rack ID starts with 0, it is not a multi-rack ID. Place these racks after multi-racks when loading both types of racks on the rack input tray.

Assign deionized water or diluent to position 1 or 2 in the blue reagent blank rack in **RB Sample Information** for each sample type in **Parameters** > **Calibration Parameters** > **Calibrators**.

2 Place the multi-racks on the rack input tray.

Figure 4.6 Rack Input Trays on Rack Feeder Unit



1. Rack input tray

WARNING

If the racks are placed in an incorrect sequence, the intended analysis results cannot be obtained. If analysis is started when the racks are placed in an incorrect sequence, place the racks in the correct sequence, and repeat the calibration or QC analysis.

TIP

The sequence that the racks are placed and the positions of the sample cups can be confirmed by selecting **Display Cup Set (F5)** in **Home** > **Start Condition** and **Home** > **Rack Requisition** > **Calibration**.

If reagent blank is not required on a specific analyzer unit, it is not necessary to place a multi-rack ID blue rack for that analyzer unit.

For example, when reagent blank analysis is not required on analyzer unit 2, place a blue rack with label 1001 followed by a blue rack with label 3001 on the rack input tray.

Placing a Rack on the Rack Input Tray

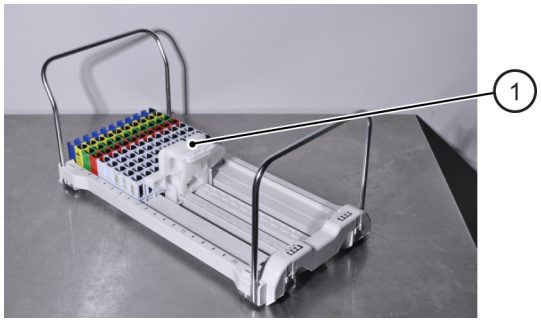
Four identical trays are provided with the system. Use two trays on the rack input component as a rack input tray, and use the other two trays on the rack output component as a rack output tray.

You can place up to 20 racks on the rack input tray.

Use the following procedure to place a rack on the rack input tray.

1 Grasp the rack stabilizing bar and slide it to the back of the tray.

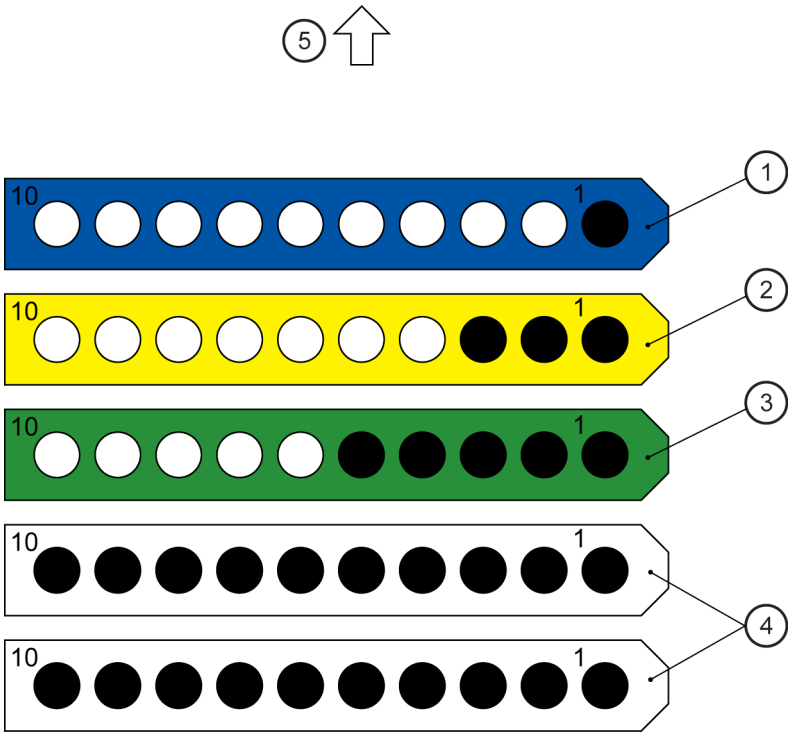
Figure 4.7 Rack Input Tray



1. Rack stabilizing bar

2 Place the racks in color order.

Figure 4.8 Place Racks on the Rack Input Trays



1. Place a cup filled with deionized water or diluent in position 1 or 2
2. Place in any order
3. Place in any order
4. Place in any order
5. Direction that racks move on the rack input trays

Assign deionized water or diluent to position 1 or 2 in the blue reagent blank rack in **RB Sample Information** for each sample type in **Parameters** > **Calibration Parameters** > **Calibrators**.

IMPORTANT

— When several yellow racks are required for creation of calibration curves, set the yellow racks one after the other.
— When several green racks are required for QC analysis, set the green racks one after the other.

NOTE

In Barcode and Rack Number analysis, white and red racks can be processed from the priority input component and rack input component.

In Sequential analysis:

— White racks can only be processed from the rack input component.

— Red racks can be processed from the priority input component (default), or the rack input component. For more information, contact Beckman Coulter.

For more information, refer to Multi-rack ID Option.

3 Slide the rack stabilizing bar forward to the rack.

WARNING

— **Secure the rack with the rack stabilizing bar. If the tray is set when the rack stabilizing bar is loose, the rack might topple over.**

— **Place the rack in the direction indicated on the rack input tray. The rack does not fit (one end of the rack is not in contact with the tray) if placed in the incorrect direction. This can cause the rack to topple over, or a rack jam error if the rack is started. In addition, the rack type cannot be identified, and the rack supply pauses until the error is corrected.**

— **Set the rack stabilizing bar towards the front of the rack input tray.**

Place a Rack Input Tray or Rack Output Tray on the Rack Feeder Unit

You can place two trays on the rack input component and two trays on the rack output component.

TIP

For information on placing a rack input tray on the rack input component when the AU5800 is connected to the Beckman Coulter laboratory automation system, refer to the AU5800 Laboratory Automation Connecting Kit addendum.

1 Confirm that the amber LEDs on the rack feeder unit are not blinking.

Figure 4.9 LEDs on Rack Feeder Unit

1. Rack output component amber LED
2. Rack input tray 1 amber LED
3. Rack input tray 2 amber LED

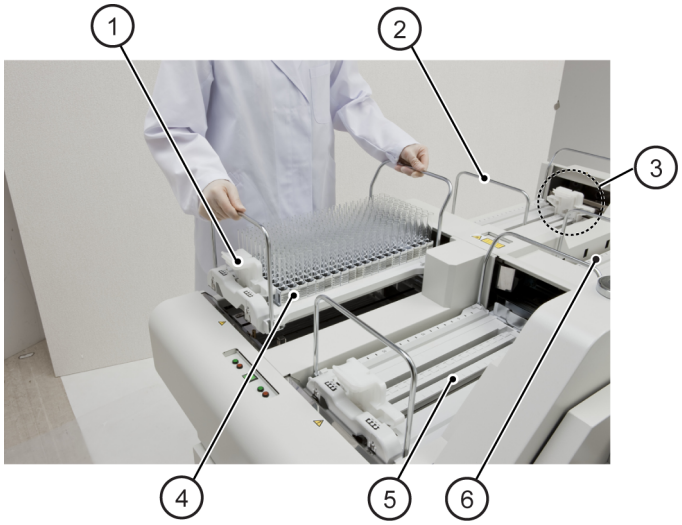
WARNING

Before removing a tray from the rack output component during operation, confirm that the amber LED is off. If the tray is removed while the amber LED is blinking, an injury can result, or the rack can topple over.

For details of LED functions, refer to LEDs and RACK SET/DIAG Buttons (Rack Feeder Unit and Priority Rack Input Component).

2 Place the rack input trays with racks on the rack input component, and the empty rack output trays on the rack output component. Slide the rack stabilizing bar forward on the rack output trays.

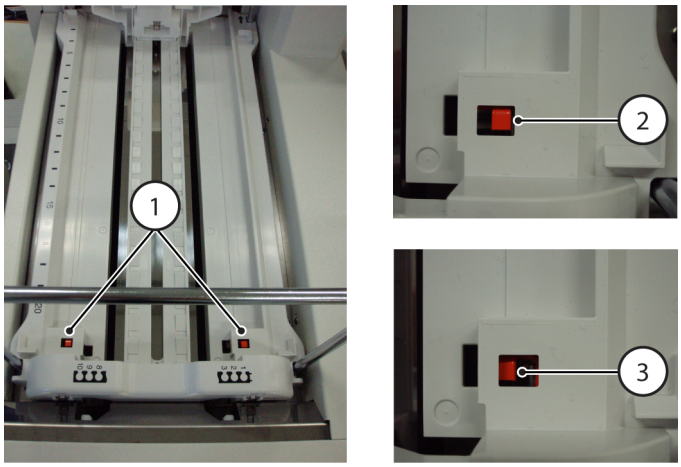
Figure 4.10 Placing a Rack Input Tray or Rack Output Tray



1. Rack stabilizing bar
2. Rack output tray 1
3. Slide the rack stabilizing bar forward (present location) on the output tray
4. Rack input tray 1
5. Rack input tray 2
6. Rack output tray 2

3 Confirm that the tray set indicator is in the correct position. Refer to Figure 4.11.

Figure 4.11 Tray Set Indicator



1. Tray set indicator.
2. Correct tray set indicator position: A flat orange square indicates the orange switch is completely up and the tray is flat on the rack input component or rack output component.
3. Incorrect tray set indicator position: An orange square at an angle indicates the orange switch is not completely up, and the tray is not flat on the rack input component or rack output component.

Adding Racks Directly to the Trays on the Rack Input Component

TIP

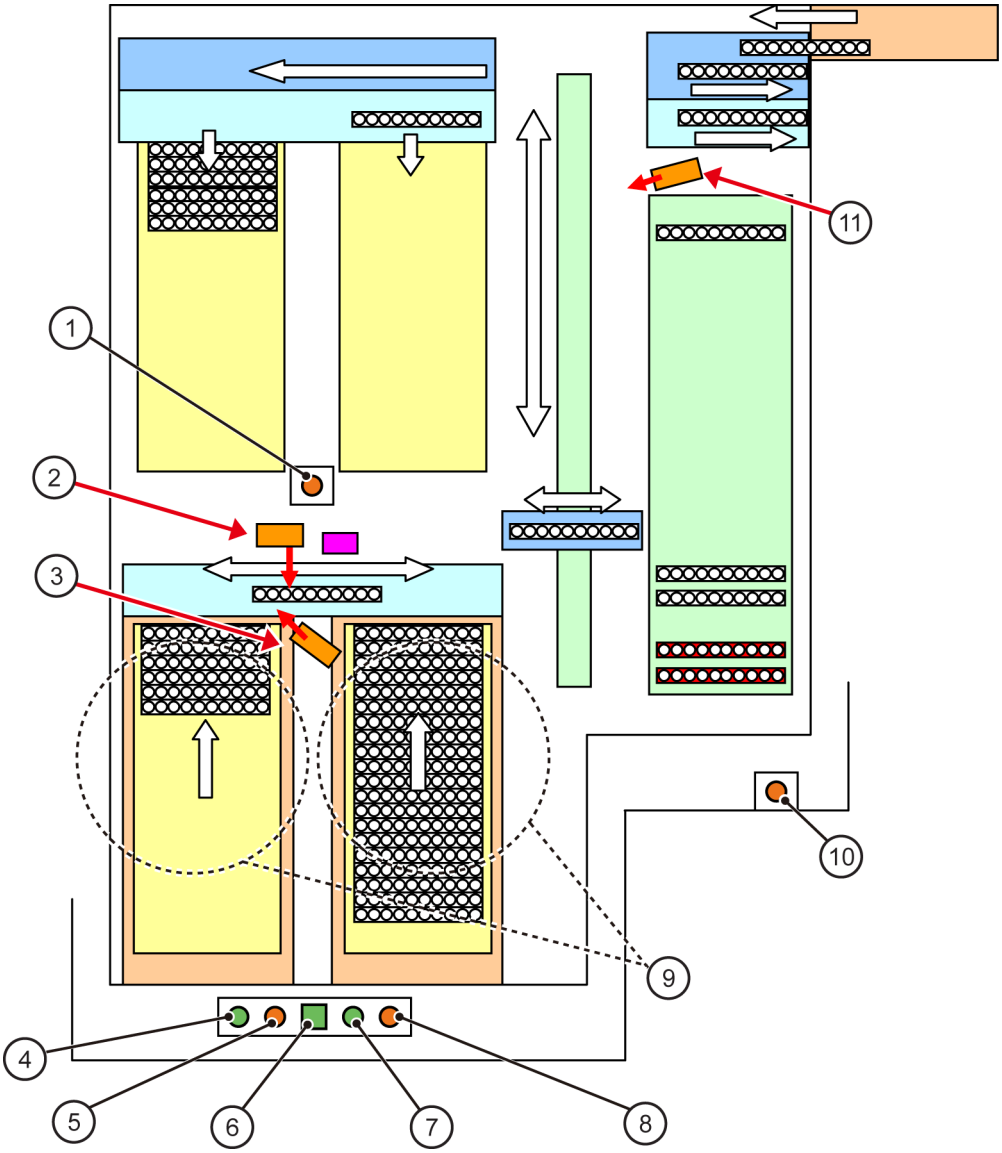
For information on adding racks directly to the trays on the rack input component when the AU5800 is connected to the Beckman Coulter laboratory automation system, refer to the AU5800 Laboratory Automation Connecting Kit addendum.

When adding racks directly to the system, set them using the following procedure. Confirm that the racks are set in the correct direction.

WARNING

Never look directly into the bar code readers. The laser light can cause serious eye damage.

Figure 4.12 Placing a Rack on the Rack Input Tray on the Rack Input Component



1. Rack output component amber LED
2. Sample ID bar code reader for rack input
3. Rack ID bar code reader for rack input
4. Rack input tray 1 green LED
5. Rack input tray 1 amber LED
6. RACK SET/DIAG button
7. Rack input tray 2 green LED
8. Rack input tray 2 amber LED
9. Rack input tray
10. Priority rack input component LED
11. Rack ID bar code reader for rack output

1 Add racks to the rack input tray when the green LED is on.

2 If the rack input tray amber LED is blinking, press the **RACK SET/DIAG** button to stop moving existing racks. You can load new racks when the amber LED is off (the RACK SET/DIAG button is blinking).

3 Press the **RACK SET/DIAG** button again to start racks moving.

Adding Racks to the Priority Rack Input Component

Racks placed on the priority rack input component are analyzed at a higher priority than racks placed on the rack input component.

In Barcode and Rack Number analysis, white and red racks can be processed from the priority rack input component and rack input component.

In Sequential analysis:

- White racks can only be processed from the rack input component.
- Red racks can be processed from the priority input component (default), or the rack input component. For more information, contact Beckman Coulter.

If an error occurs, and the rack cannot be processed, remove the rack by opening the small door on the left side of the rack input component.

CAUTION

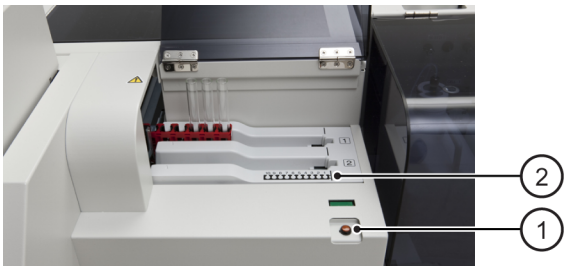
Do not process calibration or QC racks from the priority rack input component if three or more yellow or green racks are required. Calibration and QC errors can result because only two racks can be processed from the priority rack input component at one time, which causes an interruption of calibration or QC analysis that requires three or more yellow or green racks.

WARNING

- **Place the rack according to the rack direction label below position 2 on the priority rack input component.**
- **When the priority rack input component LED is flashing, more racks cannot be processed from the priority rack input component. Wait until the LED stops flashing.**

1 Confirm that the amber LED on the priority rack input component is not flashing. The flashing indicates that racks are in progress. Wait until the LED stops flashing.

Figure 4.13 Priority Rack Input Component



1. Priority rack input component amber LED
2. Rack direction label

2 Open the cover of the priority rack input component.

3 Place prepared rack(s) in positions 1 and/or 2 according to the rack direction label. If racks are placed in positions 1 and 2, the rack in position 1 is processed first.

4 Close the cover.

5 Select **Start** to begin processing the rack.

Order (Requisition) for Routine and Emergency Samples

For each sample to analyze, enter the sample information and the order (requisition).

The system uses these orders to process each sample.

To run an emergency sample, order (requisition) the sample as **Emergency**, and place the sample in a red rack. These samples are processed with a higher priority than routine samples by moving to the sample aspiration positions on the analyzer units on the bypass lane. Racks can also be loaded on the priority rack input component to be processed faster than if loaded on the rack input component.

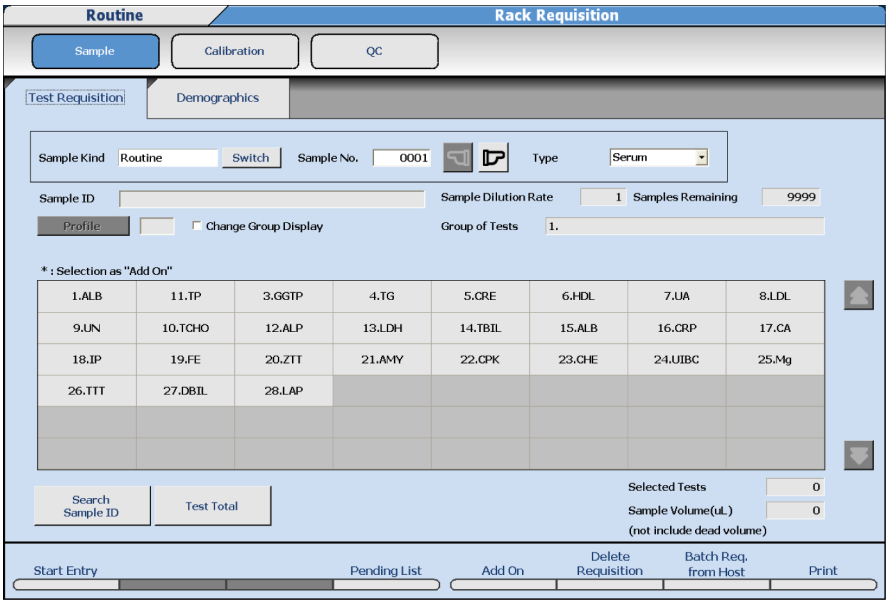
Enter Manual Orders (Requisitions) for Routine and Emergency Samples

NOTE

The following operations are not necessary when LIS programming is available. When the AU5800 connects to a laboratory automation system, create orders from the laboratory information system.

1 Select **Home** > **Rack Requisition** > **Sample** > **Test Requisition**. The system displays the group of tests from the selected **Group** in the Start Condition screen.

Figure 4.14 Sample: Test Requisition Tab



2 In **Sample Kind**, select **Switch** to select **Routine** or **Emergency**.

— Routine - Analysis in a white rack
— Emergency - Analysis in a red rack

3 In **Type**, select the sample type.

4 Select **Start Entry (F1)**.

The system changes the tab to editing mode.

NOTE

When a test that you want to select is not available in the current Group, select the **Change Group Display**. The system displays tests for all Groups in the list.

5 In **Sample ID**, enter the sample bar code number.

6 If a manual dilution was made on the sample, select **Sample Dilution (F7)** and enter the sample dilution rate.

7 Select the tests to run on the sample. The system displays the tests in blue when it is ordered (requisitioned). Select the test again to cancel the order (requisition). The system displays tests in gray that are not available for the selected sample type.

When selecting a profile, either:

— Select **Profile** to open the profile dialog and select a profile (or multiple profiles).
— Use the keyboard to enter a profile number in **Profile**, and then select **Enter**.

NOTE

Before a profile is available to order (requisition), it is necessary to program profiles in **Menu List** > **Parameters** > **Common Test Parameters** > **Profile** > **Sample**. You can create a maximum of 99 profiles for each sample type. For more information, refer to Create a Sample Profile.

Each time you select a test, the system updates the **Selected Tests** and **Sample Volume** fields.

CAUTION

The Sample Volume (µL) indicates the sample dispensing volume that the system uses for analysis. The Sample Volume (µL) does not include the dead volume.

8 Select the Demographics tab to enter any required patient demographic information.

9 Select **Entry (F2)**.

10 Repeat steps 5 to 9 to requisition more samples in the same Sample Kind and Type. To change the Sample Kind or Type, select **Exit (F1)** and repeat steps 2 to 9.

11 Select **Exit (F1)**.

NOTE

Select **Pending List (F4)** to view a list of samples that have been ordered (requisitioned), but not yet processed on the analyzer. Select a **Sample No.** or **Sample ID** number, then select **Go** to view the specific sample order (requisition).

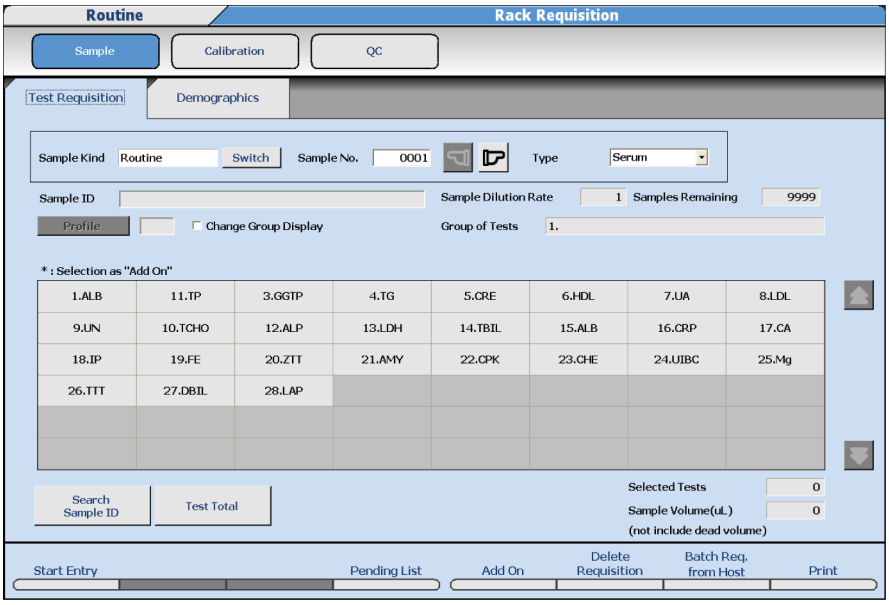
Enter Batch Orders (Requisitions)

To perform the same tests on a group of samples, enter the orders (requisitions) in a single batch.

If you order tests for one sample, the system orders the tests for all of the samples in the batch. If you enter patient information for a single sample in the Demographics tab, the system orders (requisitions) the patient information for all samples in the batch. If using bar code analysis, the Sample ID entered for the first sample automatically increases by one digit for subsequent samples.

1 Select **Home** > **Rack Requisition** > **Sample** > **Test Requisition**. The system displays the group of tests from the selected **Group** in the Start Condition screen.

Figure 4.15 Sample: Test Requisition Tab



2 In **Sample Kind**, select **Switch** to select **Routine** or **Emergency.**

— Routine - Analysis in a white rack
— Emergency - Analysis in a red rack

3 In **Type**, select the sample type.

4 Select **Start Entry (F1)**.

The system changes the screen to editing mode.

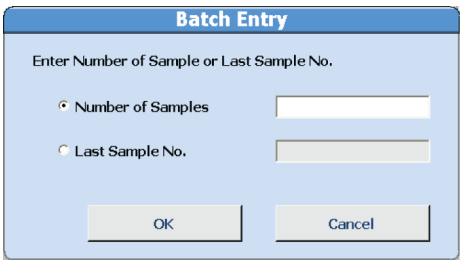
5 Select the tests or profile for batch order (requisition) for one sample.

NOTE

If bar code analysis is in use, enter the first sample ID in the batch.

6 Select **Batch Entry (F3)**.

Figure 4.16 Batch Entry Dialog



7 Select **Number of Samples** to enter the number of samples required in the batch, or select **Last Sample No.** to enter the last sample number in the batch.

8 Select **OK**.

9 Select **Exit (F1)**.

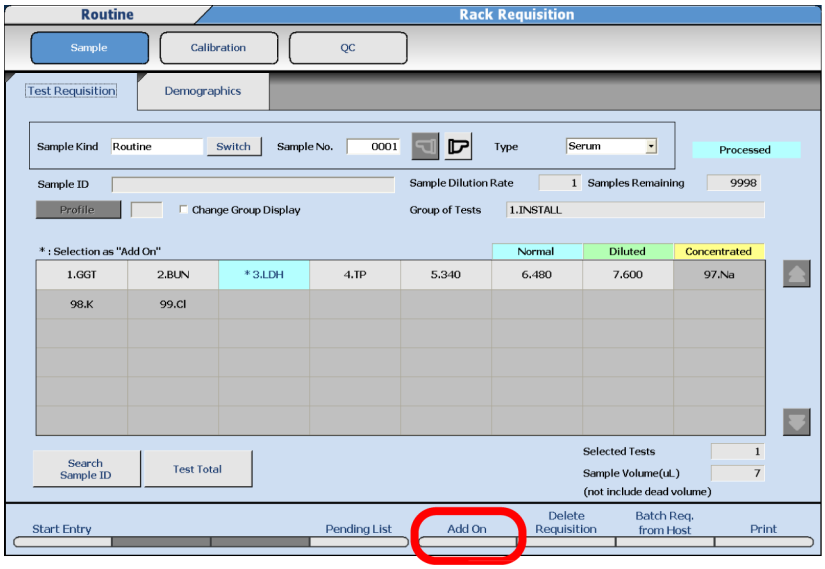
Add On a Test for Rerun

To add on one or more tests or rerun a test on a previously processed sample in a white or red rack, use the **Add On (F5)** button.

Depending on the laboratory information system options programmed, the system generates a `Measure Completed for Read Sample ID` alarm when the system reads a duplicate sample ID in the same index after adding on a test. This alarm is for information only. Confirm the sample is processing from the Sample Status screen.

1 Select **Home** > **Rack Requisition** > **Sample** > **Test Requisition**.

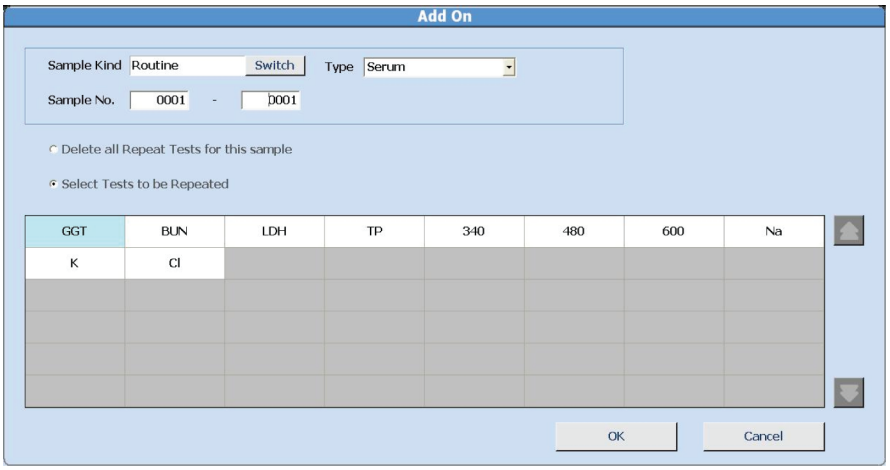
Figure 4.17 Sample: Test Requisition Tab



2 Select the **Sample Kind**, **Sample No.** and **Type** to reanalyze.

3 Select **Add On (F5)**.

Figure 4.18 Add On Dialog



4 Confirm that the displayed **Sample Kind** and **Type** are for the sample being reanalyzed. If necessary, select **Switch** for **Sample Kind** to select **Routine** or **Emergency** samples, and select the sample type from **Type**.

5 In **Sample No.**, enter the sample number (not the sample ID) or the starting and ending sample numbers to add on a test. To add on a test to one sample, enter the same sample number in the starting and ending **Sample No.** fields. If the starting and ending sample numbers are entered in the **Sample No.** fields, the system programs the same test order (requisition) for all sample numbers within the specified range.

6 Select the tests to add on. You can select tests whether they are processed in the original run or not.

NOTE

To delete all tests ordered (requisitioned) in the Add On dialog, select **Delete all Repeat Tests** for this sample.

7 Select **OK.**

8 Confirm the order (requisition) by entering the sample number in **Sample No.** The system displays previously processed tests in blue font. The system displays add on test orders (requisitions) in black font with an asterisk. The system displays the rerun test orders (requisitions) in blue font with an asterisk. The system only processes the tests with an asterisk.

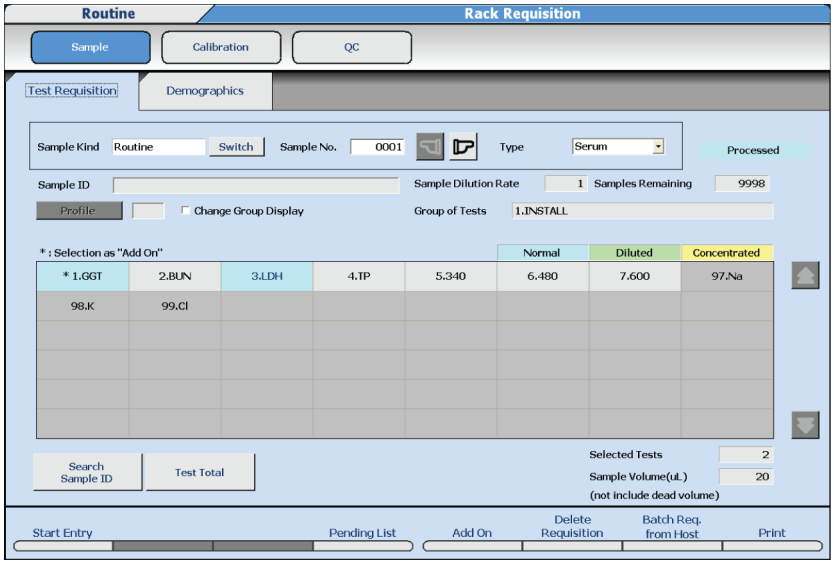
CAUTION

If you select the processed test in the original run for reanalysis, the system automatically overwrites the result.

CAUTION

The Sample Volume (µL) indicates the sample dispensing volume that the system uses for analysis. The Sample Volume (µL) does not include the dead volume.

Figure 4.19 Confirm Add On Order (Requisition)

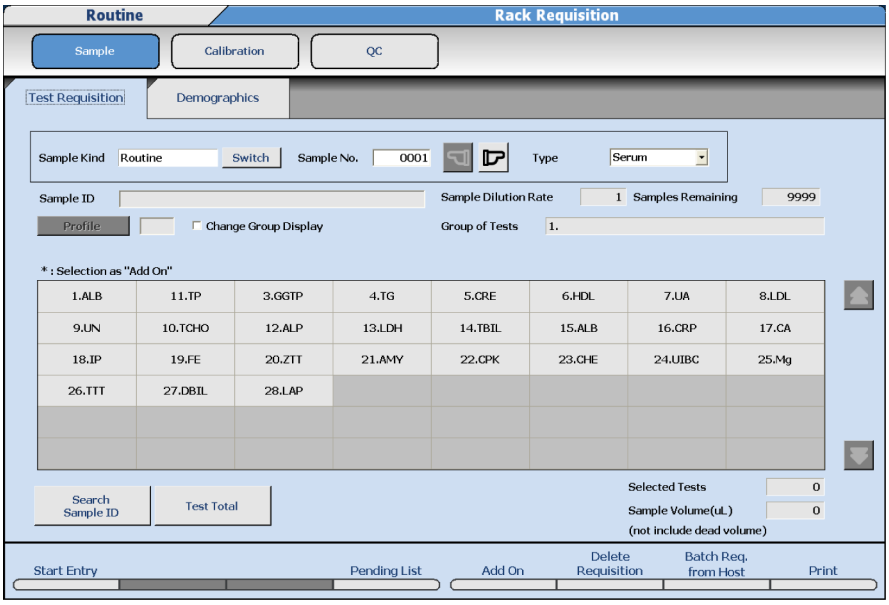


Delete an Order (Requisition)

You can delete an order (requisition) before the system processes the sample.

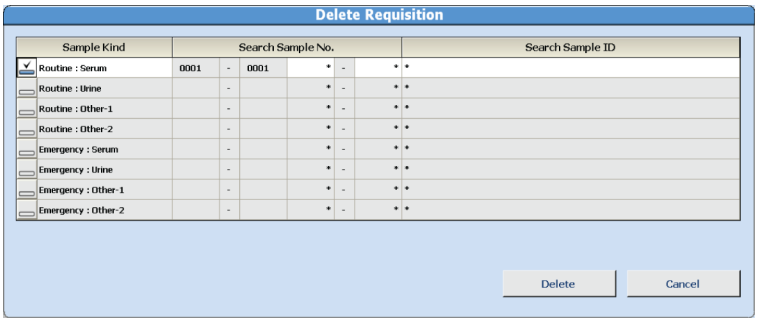
1 Select **Home > Rack Requisition > Sample > Test Requisition**.

Figure 4.20 Sample: Test Requisition Tab



2 Select **Delete Requisition (F6)**.

Figure 4.21 Delete Requisition Dialog



3 To delete orders (requisitions), select the **Sample Kind**. Enter the **Search Sample No.**, **Search Sample ID**, or leave the asterisk to delete all orders (requisitions) for the selected sample kind.

NOTE

If a processed sample is included in the **Search Sample No.** or **Search Sample ID**, the system does not delete the order (requisition) for that **Sample Kind**. If the system does not delete the order (requisition), the system generates a `Failed to delete sample` alarm.

4 Select **Delete**.

Download Orders (Requisitions) from a Laboratory Information System

You can download orders (requisitions) from a laboratory information system. Downloading can be:

- Realtime - The system downloads and executes orders (requisitions) automatically.
- Batch - The system waits for an operator to instruct it to download and execute orders (requisitions).

For more information, refer to the AU5800 Reference Manual.

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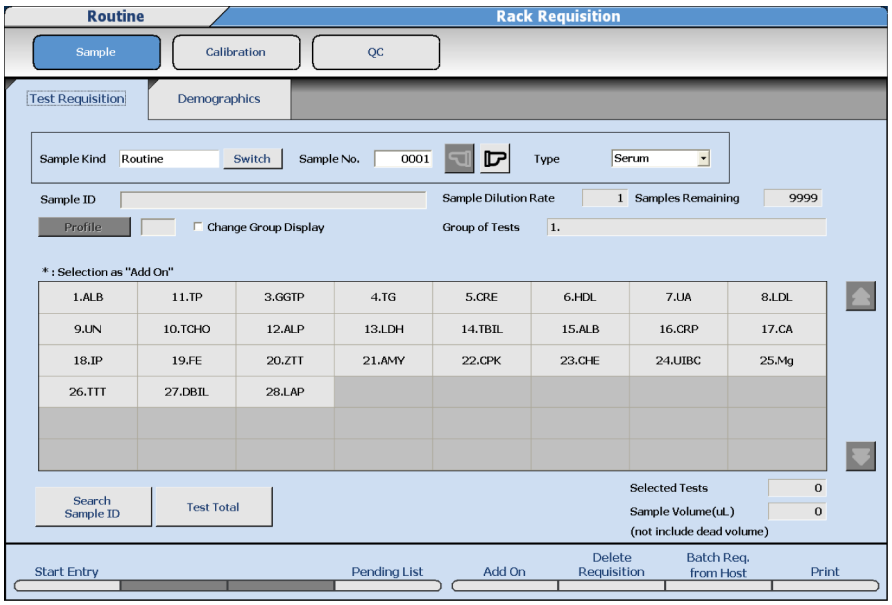
1 Select **Home > Rack Requisition > Sample > Test Requisition**.

Figure 4.22 Sample: Test Requisition Tab



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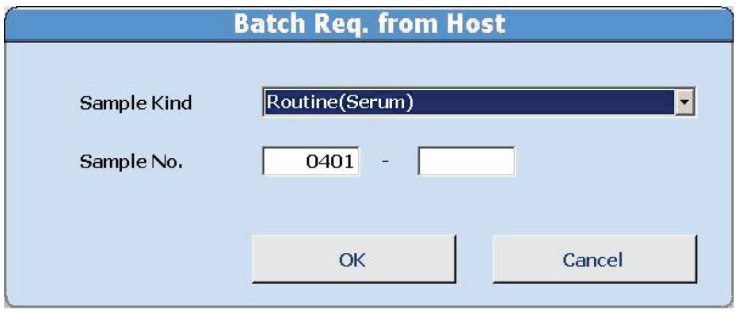
2 Select **Batch Req. from Host (F7)**.

Figure 4.23 Batch Req. from Host Dialog



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3 In **Sample Kind**, select the sample kind and type to download from the laboratory information system.

---

4 In **Sample No.**, enter the starting and ending sample numbers to download from the laboratory information system.

5 Select **OK**.

A message displays while the system downloads the orders (requisitions). When the download is complete, the system closes the message dialog.

Processing Emergency Samples

The system uses red racks for analysis of emergency samples. Red racks are processed on the bypass lane for priority over routine samples. An E sample number prefix in the order (requisition) and sample results identifies an emergency sample.

- Place a red rack on position 1 or 2 of the priority rack input component and press **Start**. For more information, refer to Adding Racks to the Priority Rack Input Component.
- Place a red rack on the rack input tray on the rack input component and press **Start**. For more information, refer to Placing a Rack on the Rack Input Tray.

Performing a Repeat Run

You can perform a repeat for samples using two methods:

- Manual - Program repeat run criteria in **Parameters > Repeat Parameters > Repeat Common** and **Repeat Specific** to generate repeat run orders (requisitions). View or print a repeat run worklist, and place the samples to repeat in the orange racks.
- Automatic - Program repeat run criteria in **Parameters > Repeat Parameters > Repeat Common** and **Repeat Specific** to generate repeat run orders (requisitions). The system performs the repeat run automatically on samples in white or red racks.

The operator is allowed to program whether the system rewrites the original data automatically with the result data of the repeat test.

For more information, refer to the AU5800 Reference Manual.

Auto Repeat

The Auto Repeat feature is enabled in **Menu List > System > System Condition > Analysis Mode**. For more information, refer to the AU5800 Reference Manual.

The routine or emergency rack moves back to the rack buffer component until original test analysis is complete. If any tests generated a repeat order (requisition), the rack moves to the bypass lane for repeat analysis, then to the rack output tray. The system only performs the tests that generated a repeat order (requisition). If no repeat orders (requisitions) were generated, the rack moves directly to the rack output tray.

⚠ CAUTION

Do not use labels with the same rack ID on more than one rack. Using duplicate rack IDs can cause concordance errors between samples.

You cannot modify the repeat orders (requisitions). Repeats are automatic.

Repeat Orders (Requisitions) for Manual Repeat

The system generates repeat run orders (requisitions) automatically from the repeat criteria programmed in **Parameters > Repeat Parameters > Repeat Common** and **Repeat Specific**. Confirm the samples to repeat using a repeat run worklist. Make changes to the worklist in the Repeat Order screen as required.

Modify a Repeat Order (Requisition)

1 Select **Menu List > Routine > Repeat Run > Repeat Order**.

Figure 4.24 Repeat Order Screen

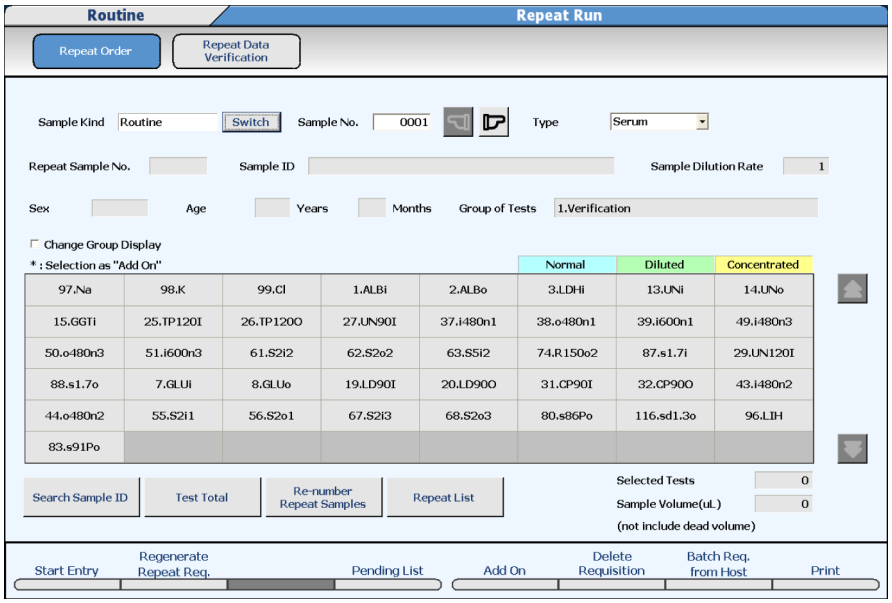


Table 4.3 Repeat Order (Requisition) Options

Option	Description
Search Sample ID	Search for samples using the sample ID.
Test Total	The system displays the test total for repeat runs.
Re-number Repeat Samples	If you delete repeat samples from the worklist , the repeat sample numbers are not sequential. Select **Re-number Repeat Sample** to renumber the repeat samples sequentially.
Repeat List	The system displays the repeat run candidate samples for which the system performed repeat run batch extraction. Repeat run candidate samples are samples for which the system has not established a repeat run sample number. If programmed in System Maintenance, the system automatically generates repeat run sample numbers. If the system is not automatically generating repeat sample numbers, contact Beckman Coulter.

Table 4.3 Repeat Order (Requisition) Options (Continued)

Option	Description
Regenerate Repeat Req. (F2)	The system manually generates the repeat orders (requisitions) from the flags programmed in **Repeat Parameters > Repeat Common > Data Flag**. Use this option if you did not turn on the **Auto Repeat Requisition** option in **Repeat Parameters > Repeat Common > Data Flag**.
Initialize Repeat Data (F3)	The system deletes all repeat order (requisition) information.
Pending List (F4)	The system displays a list of pending repeat samples. Place the samples in an orange rack for repeat analysis.

2 In **Sample Kind**, select **Switch** to select **Routine** or **Emergency**.

3 Enter the sample number of the sample to perform the repeat test.

4 In **Type**, select the sample type.

5 Select **Start Entry (F1)**.

The system changes the screen to editing mode.

6 If the sample is manually diluted, select **Sample Dilution (F7)**. The system displays the Sample Dilution Rate dialog. Enter the dilution rate (1 to 999), and make a manual dilution of the sample. The system calculates the result according to the dilution rate. Select **OK**. The system changes the sample dilution rate.

7 To repeat specific tests in the sample, select a test. Select **Test Dilution (F8)** to change from normal (blue), diluted (green), or concentrated (yellow) analysis, according to the settings in the Repeat Specific screen.

8 Select **Entry (F2)**. After the settings have been entered, the system displays the order (requisition) for the next sample number.

9 To modify more repeat sample orders (requisitions) of the same sample kind or type, repeat steps 6 to 8.

10 Select **Exit (F1)**.

11 To modify more repeat sample orders (requisitions) with a different sample kind or type, repeat steps 2 to 10.

12 If you changed the repeat order (requisition), select **Pending List (F4)** or print a repeat worklist. For more information, refer to Print and Confirm the Repeat Run Worklist.

Delete a Repeat Order (Requisition)

1 Select **Menu List > Routine > Repeat Run > Repeat Order**.

2 Select **Delete Requisition (F6)**.

3 In **Sample Kind**, select the sample kind and type to delete.

4 Enter a specific sample number or Sample ID to delete. To delete all sample numbers, leave the asterisk.

5 Select **Delete**.

6 To renumber the repeat sample numbers sequentially, select **Re-number Repeat Samples**.

7 Print a repeat worklist. For more information, refer to Print and Confirm the Repeat Run Worklist.

Print and Confirm the Repeat Run Worklist

1 Select **Menu List > Routine > Repeat Run > Repeat Order**.

CAUTION

The Sample Volume (µL) indicates the sample dispensing volume that the system uses for analysis. The Sample Volume (µL) does not include the dead volume.

2 In **Sample Kind**, select **Switch** to select **Routine** or **Emergency**.

3 Select **Print (F8)**. The system displays the Print dialog.

4 In **Print Type**, select any print worklist. Before the list is available to print, format the list as a **Repeat List** in **System > Format > List Format**.

5 In **List Format**, select the list format to print.

In **Reporter**, the system displays the **Operator Name** entered in the Start Condition screen. If necessary, enter a new name or use **Select** to enter a pre-programmed comment. Reporter is an option that can be added to a list format, and only prints if it is formatted.

6 Select **Print**. The system prints the repeat run worklist.

7 Confirm the contents of the printed repeat run worklist. Process the repeat run samples from the worklist contents.

Perform a Manual Repeat in an Orange Rack

Orange racks are defined for sample type (serum, urine, other-1, or other-2) and sample kind (routine or emergency) in **System > System Condition > Analysis Mode**.

1 Obtain the samples for the repeat run using the repeat run worklist.

2 Place the repeat samples in the correct orange rack for sample type and kind according to the repeat run order (requisition) in the worklist.

3 Place the orange racks on the rack input component.

4 To start repeat analysis, select **Start**.

Print Results

Print results in a report or data log list.

NOTE

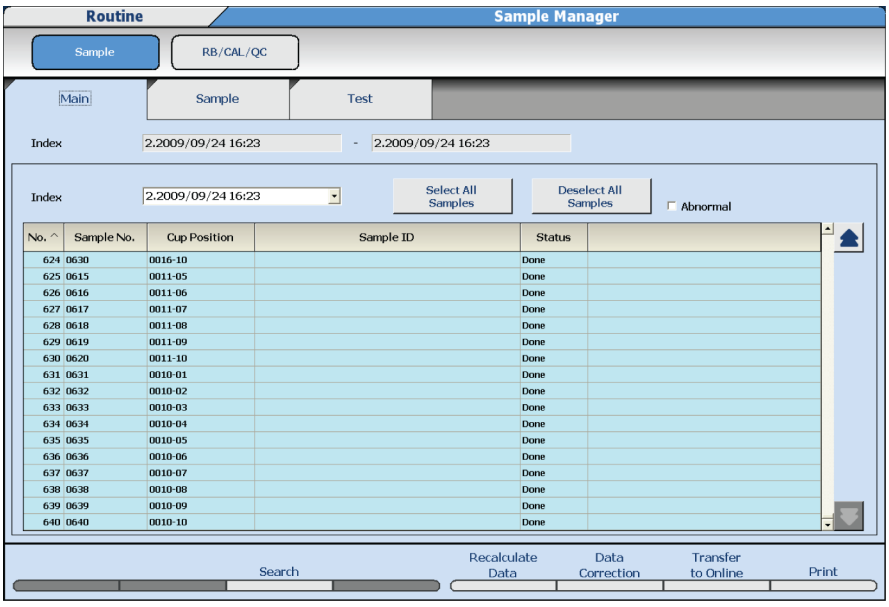
Reports and lists are formatted for your laboratory during installation and as needed. For additional help with formatting a new or existing report or list, contact Beckman Coulter.

For more information on format and print options, refer to the AU5800 Reference Manual.

Print Sample Data Reports

1 Select **Home > Sample Manager > Sample > Main**.

Figure 4.25 Sample: Main Tab



2 The system displays the data from the current index with all samples selected (highlighted in blue).

— Select **Deselect All Samples** to clear the selection of all samples from the list. You can then select specific samples to print from the list.
— Select **Select All Samples** to select all samples the system displays in the list.
— Select **Abnormal** to select only samples with a flag.

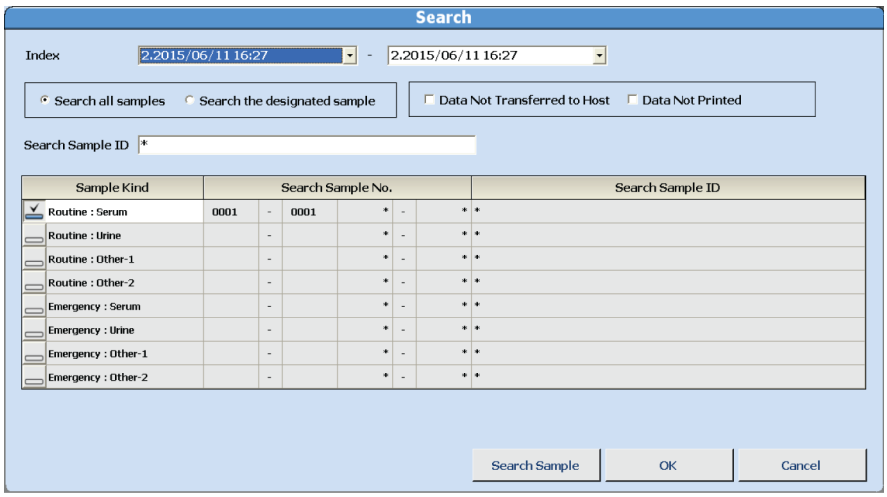
Continue to step 4 to print the selected data from the current index. If the system does not display the desired sample data to print on the list, continue to step 3.

3 Select **Search (F3)** to search for data by an index range, sample numbers, sample ID, patient demographics, data not transferred to LIS, or data not printed.

— To search for data in a specific index or index range, for **Index**, enter the starting and ending index, and then select **OK.**

— To search for data by more criteria in the index range, select **Search Sample**, enter the additional criteria, and then select **OK**.

Figure 4.26 Search Dialog



4 Select **Print (F8)**. The system displays the Print dialog.

5 In **List Format**, select the report to print.

In **Reporter**, the system displays the **Operator Name** entered in the Start Condition screen. If necessary, enter a new name or use **Select** to enter a pre-programmed comment. Reporter is an option that can be added to a list format, and only prints if it is formatted.

TIP

Operators can select and print any available predefined report.

6 Select **OK**. The system prints the report.

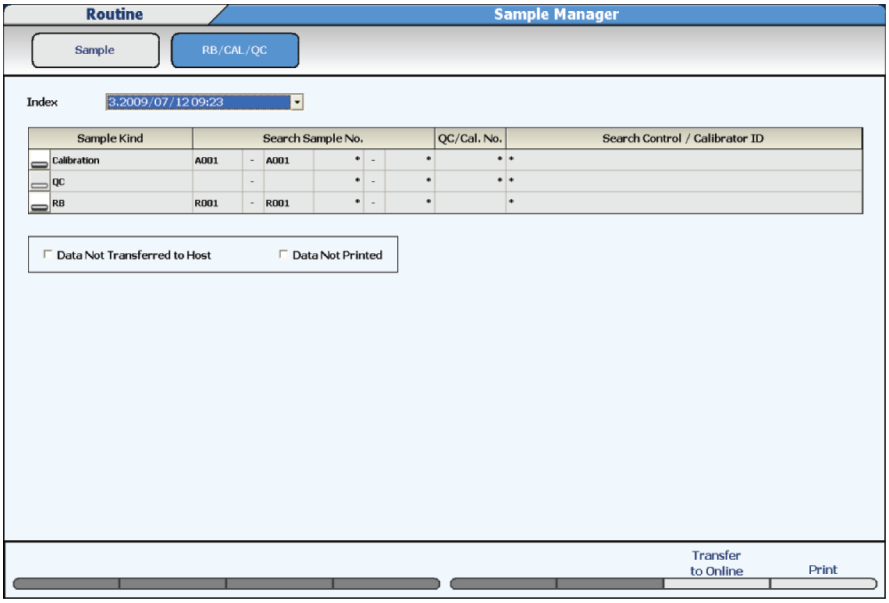
NOTE

To cancel printing, select **Cancel Print (F8)**.

Print Reagent Blank, Calibration, and QC Results

1 Select **Home > Sample Manager > RB/CAL/QC**.

Figure 4.27 Sample Manager: RB/CAL/QC Screen



2 In **Index**, select the index of the reagent blank, calibration, or QC data to search.

3 Select the **Sample Kind** to print.

— In **Search Sample No.**, enter the sample number range to print. To print all samples, leave the asterisk.

NOTE

If **Search Sample No.** is empty, the system does not use search criteria for the search.

— In **QC/Cal No.**, enter the QC number (1 to 100) or the calibrator number (1 to 200). To print all QC and calibrator numbers, leave the asterisk.

— To print samples with a specific QC or calibrator ID, in **Search Control/Calibrator ID**, enter the QC or calibrator bar code number.

— To print only the reagent blank, calibrator, and QC samples that the system has not transferred to the laboratory information system, select **Data Not Transferred to Host**. To print only the reagent blank, calibrator, and QC samples that the system has not printed, select **Data Not Printed**.

4 Select **Print (F8)**.

5 In **List Format**, select the report to print.

In **Reporter**, the system displays the Operator Name entered in the Start Condition screen. If necessary, enter a new name or use **Select** to enter a pre-programmed

comment. Reporter is an option that can be added to a list format, and only prints if it is formatted.

6 Select **OK**. The system prints the report.

NOTE

To cancel printing, select **Cancel Print (F8)**.

Batch Transfer Data to the Laboratory Information System

IMPORTANT

Before transferring data to the laboratory information system, confirm that the AU5800 is online and connected to a laboratory information system.

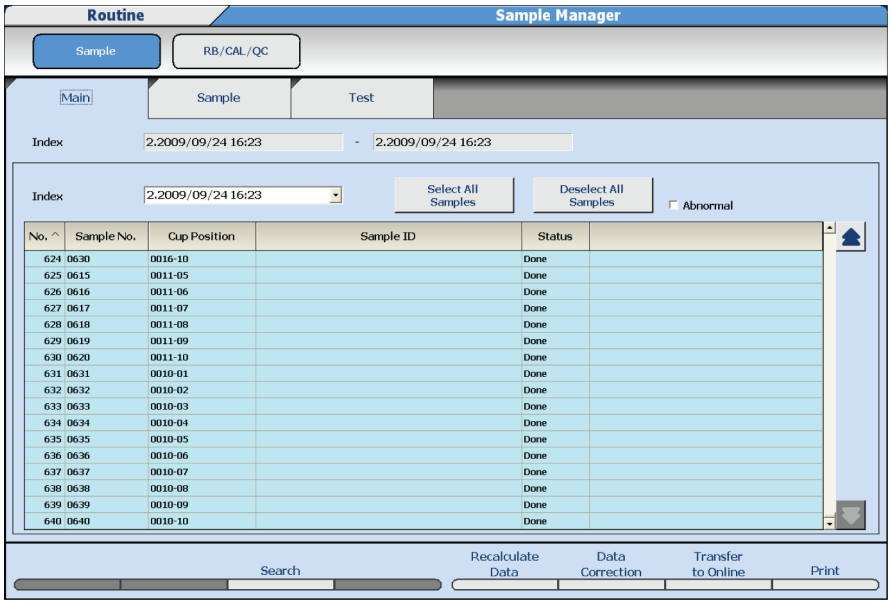
Sample Data

If the data does not automatically transfer to the laboratory information system, you can manually batch transfer the sample data to the laboratory information system.

The **Transfer to Online (F7)** option is only available when **Realtime** or **Batch** for **Results Transfer** is programmed in **Menu List** > **System** > **Online**. If the system is programmed to Realtime, you can only transfer data in *Standby* mode.

1 Select **Home > Sample Manager > Sample > Main**.

Figure 4.28 Sample: Main Tab



2 The system displays the data from the current index with all samples selected (highlighted in blue).

— Select **Deselect All Samples** to clear the selection of all samples from the list. You can then select specific samples to transfer from the list.
— Select **Select All Samples** to select all samples the system displays on the list.
— Select **Abnormal** to select only samples with a flag.

Continue to step 4 to transfer the selected data from the current index. If the system does not display the desired sample data to transfer on the list, continue to step 3.

3 Select **Search (F3)** to search for data by an index range, sample numbers, sample ID, patient demographics, data not transferred to LIS, or data not printed.

— To search for data in a specific index or index range, for **Index**, enter the starting and ending index, and then select **OK**.
— To search for data by additional criteria in the index range, select **Search Sample**, enter the additional criteria, and then select **OK**.

4 Select **Transfer to Online (F7)**. The system opens the Online Transfer dialog.

5 Select **OK**. The system transfers the data.

The system attaches an r flag to data that was transferred to the laboratory information system.

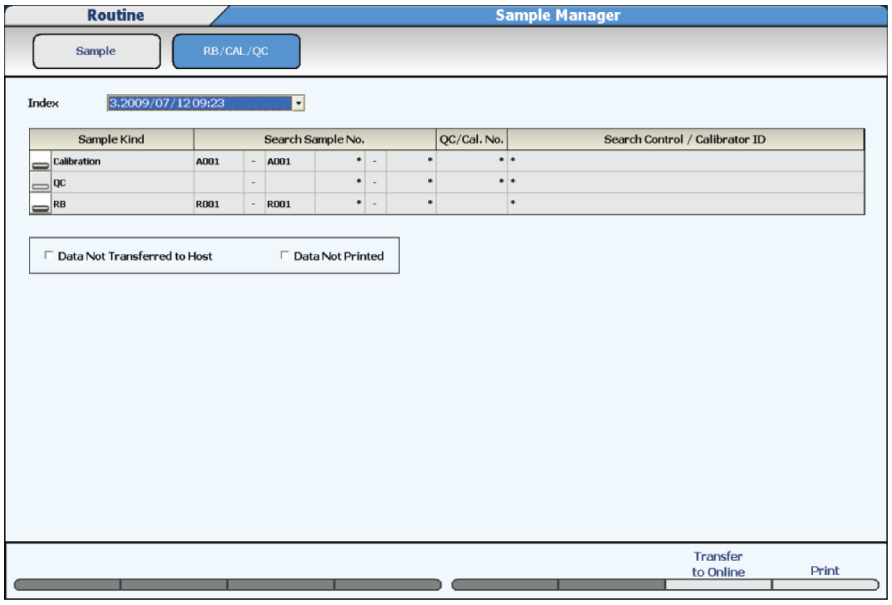
Reagent Blank, Calibration, and QC Data

You can transfer reagent blank, calibration, and QC data to a laboratory information system.

The **Online Transfer (F7)** option is only available when **Realtime** or **Batch** for **Results Transfer** is programmed in **Menu List** > **System** > **Online**. If the system is programmed to **Realtime**, you can only transfer data in *Standby* mode.

1 Select **Home > Sample Manager > RB/CAL/QC**.

Figure 4.29 Sample Manager: RB/CAL/QC Screen



2 In **Index**, select the index of the reagent blank, calibration, or QC data to search.

3 Select **Sample Kind** to transfer.

— In **Search Sample No.**, enter the sample number range to transfer. To transfer all samples, leave the asterisk.

NOTE

If **Search Sample No.** is empty, the system does not use search criteria for the search.

— In **QC/Cal No.**, enter the QC number (1 to 100) or the calibrator number (1 to 200). To transfer all QC and calibrator numbers, leave the asterisk.

— To transfer samples with a specific QC or calibrator ID, in **Search Control/Calibrator ID**, enter the QC or calibrator bar code number.

— To transfer only the reagent blank, calibrator, and QC samples that the system has not transferred to the laboratory information system, select **Data Not Transferred to Host**. To transfer only the reagent blank, calibrator, and QC samples that the system has not printed, select **Data Not Printed**.

4 Select **Transfer to Online (F7)**.

5 Select **OK**. The system performs the online transfer.

NOTE

To stop the transfer, select **Online Transfer Stop (F7)**.

CHAPTER 5

System Monitoring and Results

Monitoring Analysis

The system status is continuously updated while the system is operating. Progress is constantly monitored.

Monitor Results

Confirm that daily reagent blank, calibration, and QC results are acceptable before reporting sample results. Review all results including reagent blank, calibration, QC, and samples for flags. Take corrective actions before reporting any results with flags. Review the **Alarm List** and take corrective actions for any generated alarms.

For more information on monitoring the results, refer to the AU5800 Reference Manual.

For more information on troubleshooting and corrective actions, refer to Troubleshooting Reagents, Calibrators, Quality Control, and Samples.

Identifying Sample Kinds and Types by Sample Data Prefix

NOTE

The system displays the sample data prefix in front of the sample number.

Table 5.1 Sample Data Prefix

Type		Normal Run	Repeat Run
Routine	Serum	(None)	H
	Urine	U	HU
	Other-1	X	HX
	Other-2	Y	HY
Emergency Sample	Serum	E	HE
	Urine	UE	HUE
	Other-1	XE	HXE
	Other-2	YE	HYE
QC		Q	
CAL		A	
RB		R	

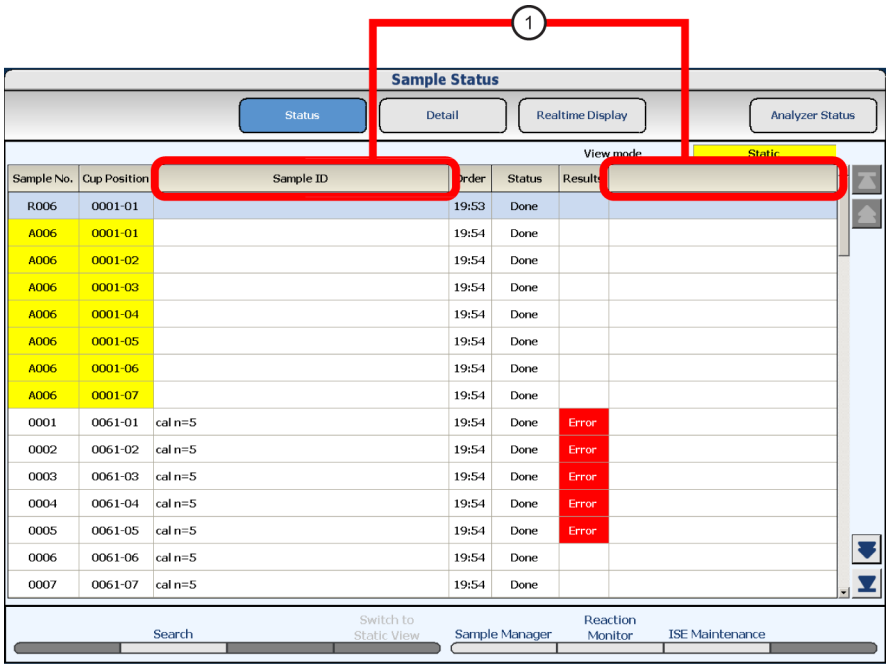
Sample Status Screen

Select **Sample Status** to view sample information, estimated time of completion, and results.

1 Select **Home > Sample Status > Status**.

The system displays the Status screen.

Figure 5.1 Sample Status: Status Screen



1. Program operator-defined patient demographics

Table 5.2 Status Screen Description

Item	Description
Sample No.	The sample number highlighted in the rack color.
Cup Position	The rack ID and cup position highlighted in the rack color.
Sample ID	The sample ID (number on the bar code label).
Order	The time the cup in the rack passed the cup detector on the rack input component.
Status	In Process during sample analysis, or Done after analysis is complete.
Results	The estimated completion time during sample analysis, or Error if the results have a flag.
Search (F2)	Enter a sample ID to search and display sample status.

Table 5.2 Status Screen Description (Continued)

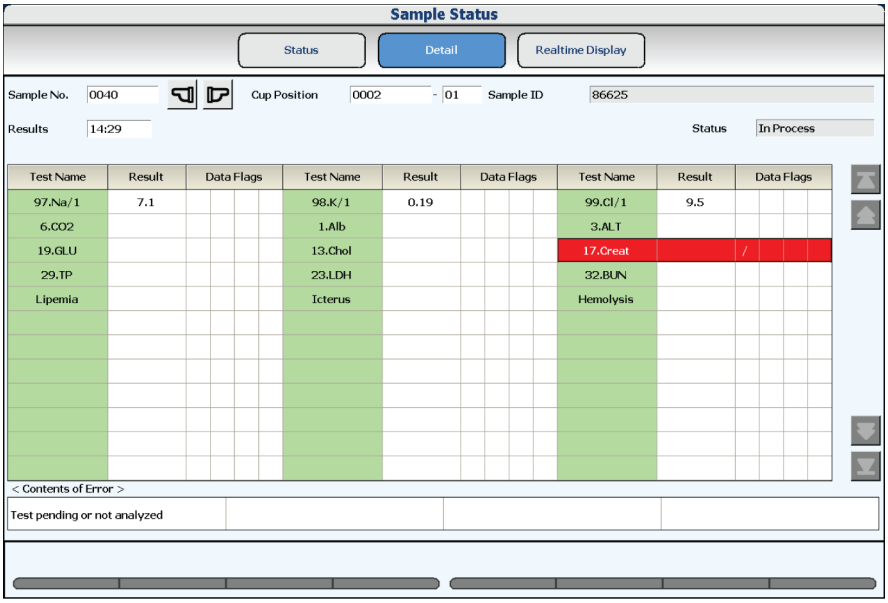
Item	Description
Switch to Static View (F4)	Changes the **View mode** from **Realtime** to **Static** to prevent the display from automatically scrolling the results. Select **Switch to Realtime View (F4)** to return to realtime display.
Sample Manager (F5)	Goes to the Sample Manager screen.
Reaction Monitor (F6)	Goes to the Reaction Monitor screen.
ISE Maintenance (F7)	Goes to the ISE Maintenance screen.

NOTE

You can program two operator-defined patient demographic items. For more information, refer to the AU5800 Reference Manual.

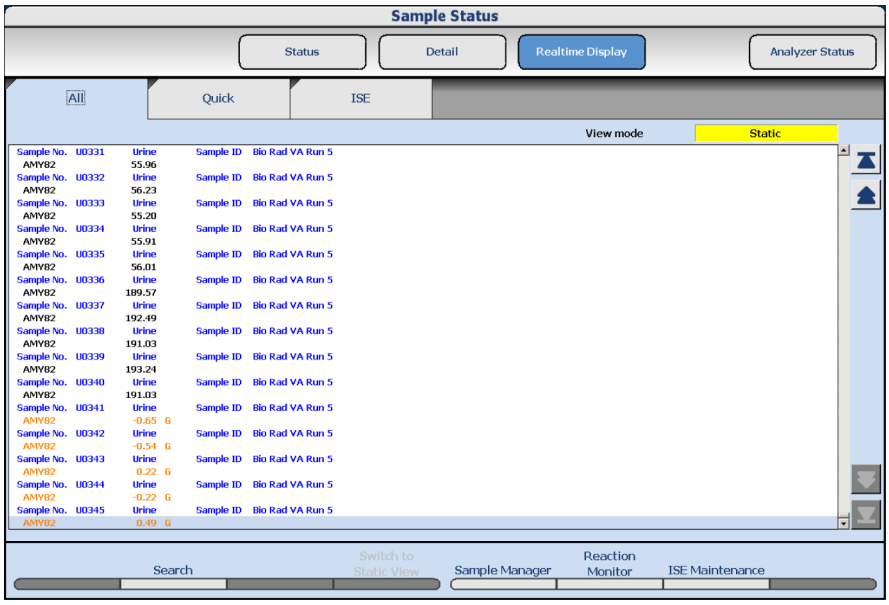
2 Select a sample, and then select **Detail** to view detailed sample information. The system displays the test name with the result or the test result time to completion. If the result does not have any flags, the test is highlighted in green, or if the result has a flag, the test is highlighted in red. Select a test with a flag to view the flag description in **<Contents of Error>**.

Figure 5.2 Sample Status: Detail Screen



3 Select **Realtime Display** to view the sample results. The system displays tests without flags in black, and tests with flags in red. The All tab displays the samples in completion order when all tests ordered (requisitioned) on the sample are complete. The Quick tab displays results from the red racks only. The Quick tab displays the ISE tests, and tests with only an R1 reagent with read points before P10, when the tests are complete. The ISE tab displays the ISE tests when the ISE tests are complete.

Figure 5.3 Sample Status: Realtime Display Screen



Inspect the Analyzer Status

The Analyzer Status screen displays a color-coded overview of the system. The system monitors the status of the incubator, reagent refrigerators, rack feeder unit, deionized water tanks, wash solution tanks, waste tanks, printer, and LIS communication.

The system monitors the ISE unit and reagents when the ISE unit is installed.

The colors of the system components indicate the status.

NOTE

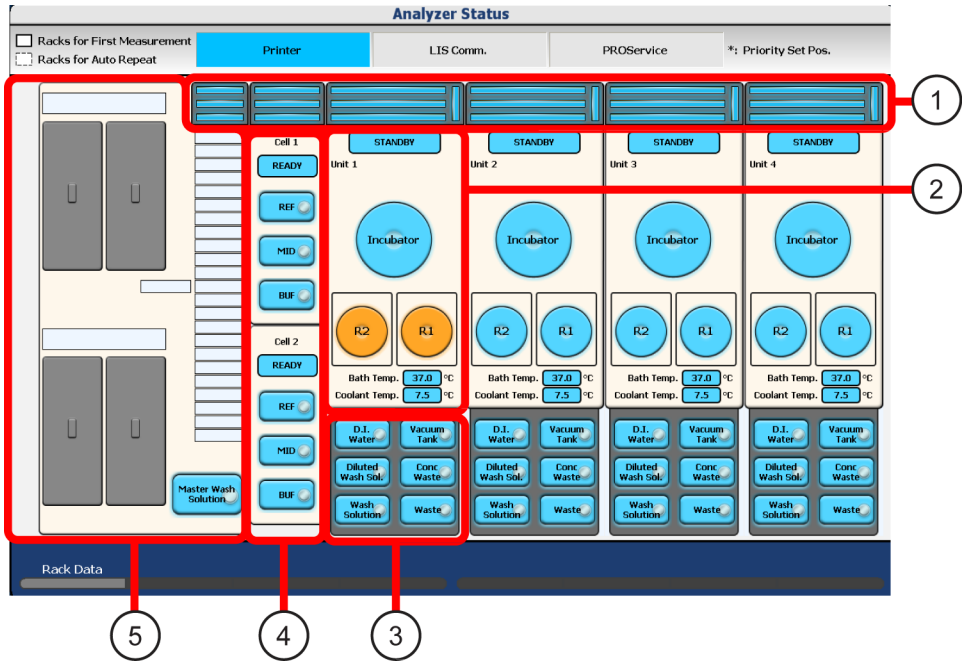
For more information on the Analyzer Status screen when the AU5800 is connected to a laboratory automation system, refer to the AU5800 Laboratory Automation Connecting Kit addendum.

Table 5.3 System Status

Color	Status
Blue	No errors
Yellow or Orange	Non-fatal error. You can start the ISE or analyzer unit.
Red	Fatal error. You cannot start the ISE or analyzer unit.

1 Select **Home** > **Analyzer Status**.
The system displays the Analyzer Status screen.

Figure 5.4 Analyzer Status Screen



1. Lane status
2. Analyzer unit top status
3. Analyzer unit front status
4. ISE unit status
5. Rack feeder unit status

NOTE

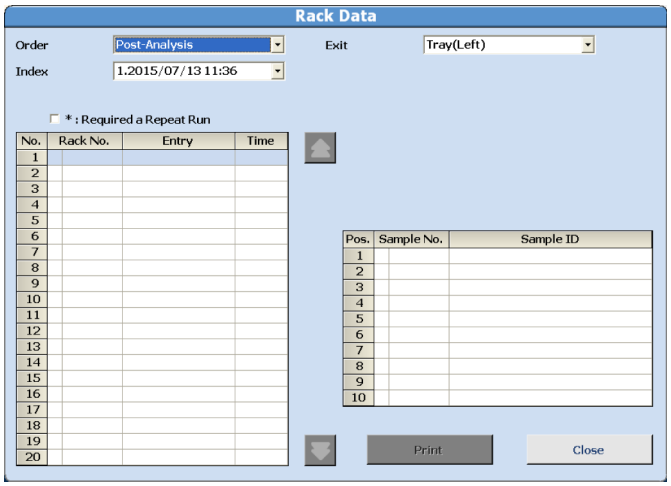
The screen display changes with the number of connected analyzer units. The ISE unit does not display if the ISE unit is not connected.

2 Select **Rack Data (F1)** to view the time a rack was detected on the rack input component (Pre-Analysis), the time the rack moved to the rack output component (Post-Analysis), the rack ID, and the rack entry location. Select a rack in the left table to view the sample No. or sample ID of the samples on the rack in the right table.

NOTE

The system indicates a rack that includes a repeat run sample with an asterisk. If you select **Required a Repeat Run**, the system displays only racks with an asterisk.

Figure 5.5 Rack Data Dialog



3 Confirm that the system components are within the acceptable limits (blue). Investigate any yellow or red conditions.

1. Lane Status. Investigate any yellow or red conditions. For more information, refer to Lane Status.
2. Analyzer Unit Top Status. Investigate any yellow or red conditions. For more information, refer to Analyzer Unit Front Status.
3. Analyzer Unit Front Status. Investigate any yellow or red conditions. For more information, refer to Analyzer Unit Front Status.
4. ISE Unit Status. Investigate any yellow or red conditions. For more information, refer to ISE Unit Status.
5. Rack Feeder Unit Status. Investigate any yellow or red conditions. For more information, refer to Rack Feeder Unit Status.

Lane Status

Table 5.4 Lane Status

Color	Status
Blue	Normal
Red	An error has occurred

Table 5.5 Rack Information that Displays on Screen

Rack	Information
Position	Display the position of the rack on the rack feeder unit or transport lanes.
Color	Display the sample kind of the rack. Refer to Table 5.6.
Number	Display the rack ID.
*****	Racks loaded from the priority rack input component.

NOTE

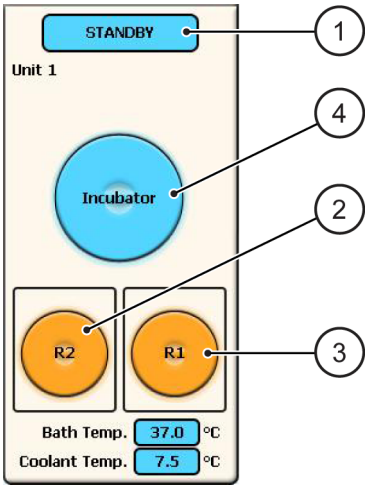
Select a rack to display **Sample Status**.

Table 5.6 Sample Kind and Rack Color

Sample Kind		Rack Color	Comment
Original run	**Routine**	White	
	Emergency	Red	
Manual Repeat	**Routine**	Orange	
	Emergency	Orange	
Auto Repeat	**Routine**	White	
	Emergency	Red	
Calibrator		Yellow	
		White	Enabling the white rack for calibration requires settings by Beckman Coulter. For more information, contact Beckman Coulter.
Reagent blank		Blue	
QC		Green	
		White	Enabling the white rack for QC requires settings by Beckman Coulter. For more information, contact Beckman Coulter.

Analyzer Unit Top Status

Figure 5.6 Analyzer Unit Top Status



1. Unit Status
2. R2 Reagent Refrigerator Status
3. R1 Reagent Refrigerator Status
4. Incubator Status

- When you select **R1** or **R2**, the system displays **Reagent Management**.
- When you select **Incubator**, the system displays **Analyzer Maintenance** > **Photocal Monitor**.

Table 5.7 Unit Status

Color	Status
Blue	*Measure*, *Standby*, *Pause*
Yellow	*Initialize*, *Warm Up*
Red	*Stop*, W1, W2, Photocal
Gray	Not connected

Table 5.8 Incubator Status

Color	Status
Blue	Normal
Red or **Orange**	A cuvette or lamp error exists. For more information, refer to Perform a Photocal. The red or orange status is determined by system programming by Beckman Coulter at installation. Contact Beckman Coulter for more information.

Reagent Refrigerator (R1, R2):

Table 5.9 R1 and R2 Reagent Refrigerator Status

Color	Status
Blue	Normal

Table 5.9 R1 and R2 Reagent Refrigerator Status (Continued)

Color	Status
Yellow	A caution exists in the Reagent Management screen. For example: Calibration Expires Soon.
Orange	A warning exists in the Reagent Management screen. For example: Calibration Expired.
Red	The reagent refrigerator cover has been opened, a reagent check is in progress, or a reagent check has not been performed.

Bath Temp. (displays the temperature of the incubator)

Table 5.10 Incubator Temperature Status

Color	Status
Blue	Normal
Red	Exceeds temperature specification

Coolant Temp. (displays the temperature of the reagent refrigerator)

Table 5.11 R1 and R2 Refrigerator Temperature Status

Color	Status
Blue	Normal
Orange	Exceeds temperature specification

Analyzer Unit Front Status

Figure 5.7 Analyzer Unit Front Status

Deionized (DI) water, Diluted Wash Solution (Det.), and Wash Solution (Master Det.):

The status of the liquid quantity in the deionized water tank (D.I. Water), diluted wash solution tank (Det.), and wash solution (Master Det.) for each analyzer unit.

Table 5.12 Deionized Water, Diluted Wash Solution, and Wash Solution Tank Status

Color	Status
Blue	Normal

Table 5.12 Deionized Water, Diluted Wash Solution, and Wash Solution Tank Status (Continued)

Color	Status
Yellow	Over-full
Red	Insufficient

NOTE

The status becomes over-full when the top float sensor in the tank moves to the maximum up position. The status becomes Insufficient when the bottom float sensor in the tank moves to the maximum down position.

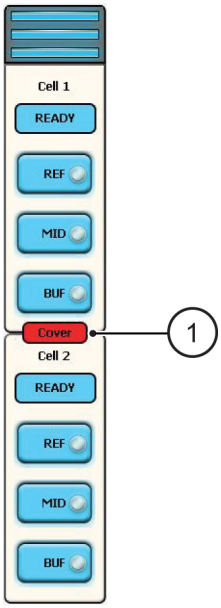
The status of the vacuum tank, concentrated waste tank, and waste tank for each analyzer unit.

Table 5.13 Vacuum Tank, Concentrated Waste Tank, and Waste Tank Status

Color	Status
Blue	Normal
Red	Full

ISE Unit Status

Figure 5.8 ISE Unit Status



1. ISE cover is open

ISE Unit (Option)

Table 5.14 Cell 1 and Cell 2 Status

Color	Status
Blue	Ready or Measure
Yellow	Stop or Initialize
Red	Busy
Gray	Not connected

ISE Reagents

Table 5.15 ISE Reference Solution (REF), ISE MID Standard Solution (MID), and ISE Buffer Solution (BUF) Status

Color	Status
Blue	Normal
Yellow	Insufficient

ISE Cover

Table 5.16 ISE Cover Status

Color	Status
Red	ISE cover is open

NOTE

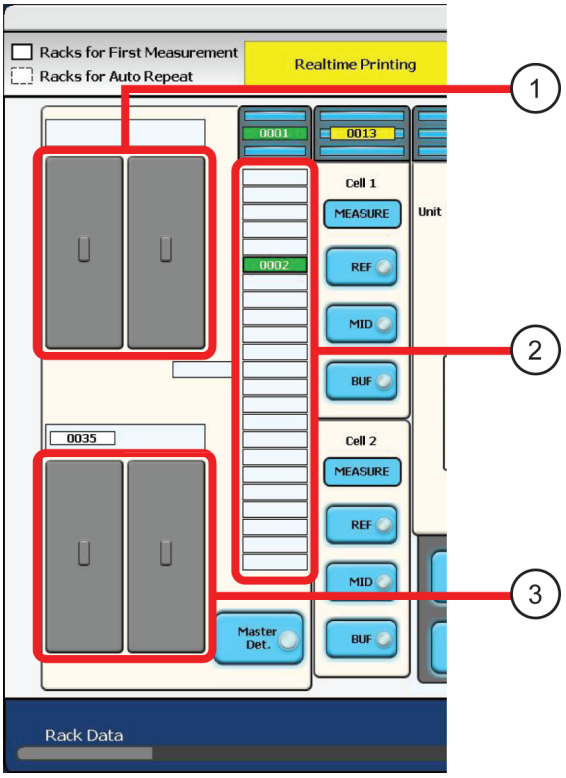
The ISE cover status only displays when the ISE cover is open.

Rack Feeder Unit Status

NOTE

For more information on the Analyzer Status screen when the AU5800 is connected to a laboratory automation system, refer to the AU5800 Laboratory Automation Connecting Kit addendum.

Figure 5.9 Rack Feeder Unit Status



1. Rack Output Tray
2. Rack Buffer Component
3. Rack Input Tray

The rack color and ID displays for the rack currently moving from the rack input tray to the rack buffer component, and the rack moving from the return lane to the rack output tray.

The rack output tray is red if the tray is full.

Rack Buffer Component

The rack line type indicates the status of the rack on the rack buffer component.

Table 5.17 Rack Status

Line Type	Status
Normal line frame	A rack is not present, or the rack has been analyzed and is waiting to move to the rack output tray.
Bold line frame	The rack is waiting to move to the bypass lane or primary sample transport lane for the original run.
Dotted line frame	The rack is waiting to move to the bypass lane for an auto repeat run.

Table 5.18 Rack Output Tray Status

Color	Status
Red	Rack is full

Table 5.18 Rack Output Tray Status (Continued)

Color	Status
Gray	Rack is not full

Master Wash Solution Tank

The status of the liquid quantity of wash solution in the master wash solution tank (Master Det.).

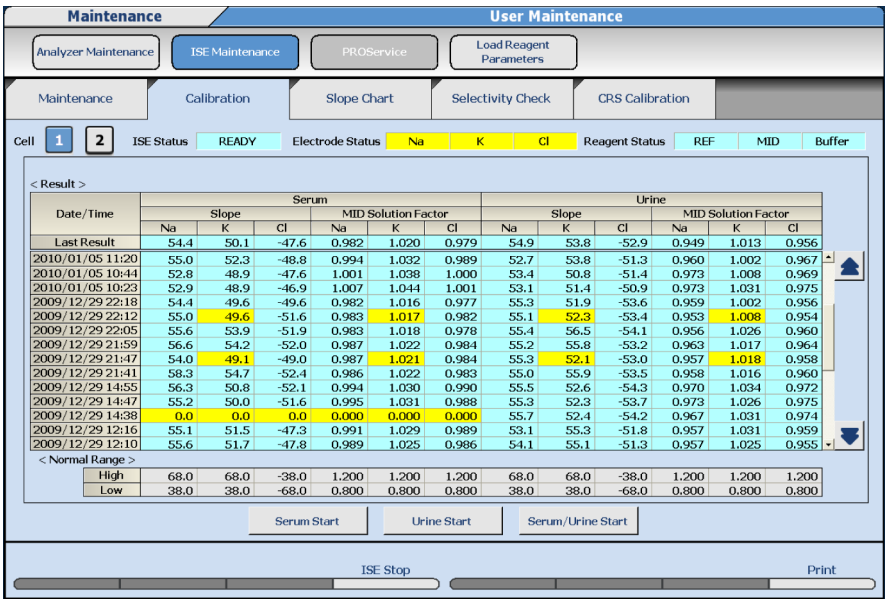
Table 5.19 Master Wash Solution Tank Status

Display Color	Status
Blue	Normal
Yellow	Insufficient

Confirm the ISE Status

1 Select **Home > Analyzer Maintenance > ISE Maintenance > Calibration**.

Figure 5.10 ISE Maintenance: Calibration Tab



2 Review the Calibration tab.

a. Inspect the ISE status.

NOTE

If there are two flowcells, select **Cell 1** or **Cell 2** to view the status of each flowcell.

Table 5.20 ISE Status

Status	Color	Description
READY	Blue	Ready to start analysis or maintenance.
BUSY	Red	Operating.
MEASURE	Blue	Analysis is in progress (ISE).
PAUSE	Blue	Analysis is going to *Pause.*
STOP	Yellow	The ISE is in *Stop* status. Select **ISE Ready (F4)** to return the ISE status to *Ready*.
UNCONNECT	Gray	The ISE is not communicating with the DPR when you turn on the system.
INITIAL	Yellow	The ISE is initializing.

b. Inspect the electrode status. The electrode status indicates if the most recent slope value is in range for Na, K, and Cl.

NOTE

If there are two flowcells, select **Cell 1** or **Cell 2** to view the status of each flowcell.

Table 5.21 Electrode Status

Color	Description
Blue	The slope value is within the acceptable range, and ISE calibration was performed within 24 hours.
Yellow	— The slope value is not within the acceptable range. — ISE calibration has not been performed within 24 hours. The system uses the most recent ISE calibration results.
Gray	No calibration data exists for the electrode.

c. Inspect the reagent status. The reagent status indicates if the reagent level is short for ISE Buffer Solution, ISE MID Standard Solution, and ISE Reference Solution.

NOTE

If there are two flowcells, select **Cell 1** or **Cell 2** to view the status of each flowcell.

Table 5.22 Reagent Status

Color	Description
Blue	The reagent level is above the reagent short level sensor, indicating reagent is sufficient.

Table 5.22 Reagent Status (Continued)

Color	Description
Yellow	The reagent is below the reagent short level sensor, indicating reagent is not sufficient.

d. The **Date/Time** indicates the date and time the system performs the calibration.

e. The **Slope** indicates the calibration slope for Na, K, and Cl. A larger slope value indicates a steeper slope (a larger potential).

f. The **MID Solution Factor** indicates the value that the system obtained from the concentration of the ISE MID Standard Solution to establish a reference for measuring Na, K, and Cl ion concentrations.

---

3 Inspect the slope chart. The slope chart contains records of slope values that the system obtained from calibration. You can view slope charts in graph form for Na, K, and Cl.

a. Select **Slope Chart**.

Figure 5.11 ISE Maintenance: Slope Chart Tab

b. In **Type**, select **Switch** to select **Serum** or **Urine.**

The system displays the 30 most recent slope values in a chart. Identify the Na, K, and Cl slope by color. In the **Min Slope** and **Max Slope** fields, the system displays the maximum and minimum Na, K, and Cl slope values.

Although Cl slope values are negative values, the slope chart displays their absolute values.

Disable a Test

You can select specific tests to prevent analysis (the test is unavailable for patient analysis) even when the test has an order (requisition). If the calibration failed for that test, or QC fails and samples are in process, it can be useful to make a test unavailable.

You can make a test unavailable (disabled) or available (enabled) during *Measure* mode. Analysis of the test stops or restarts after you select **Disable (F7)**.

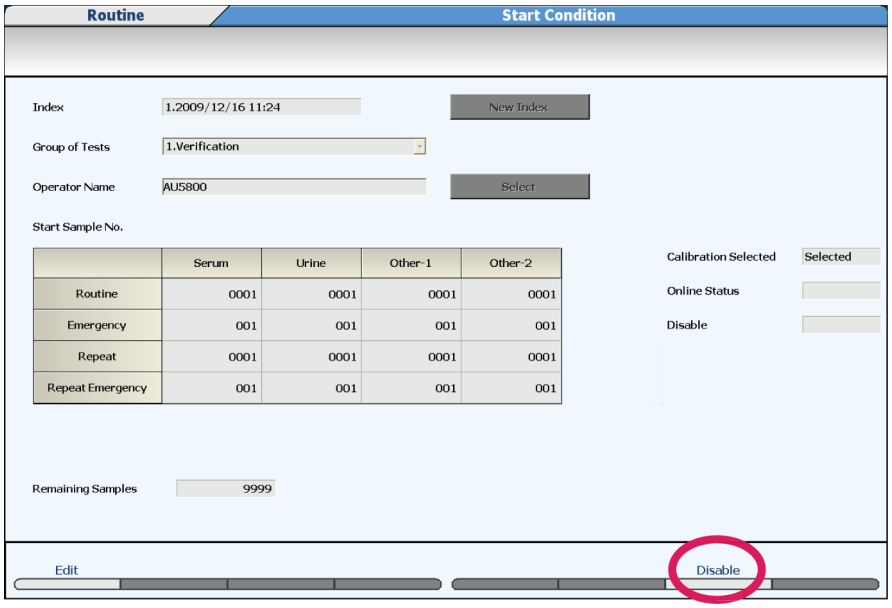
Reagent blank, calibration, and QC samples for the disabled tests remain available for analysis.

The system displays and prints tests that are unavailable (disabled) with a / flag, indicating that the test was ordered (requisitioned) but not performed.

Settings in the Disable dialog are in effect until a new index is set, or you shut down the system (End Process).

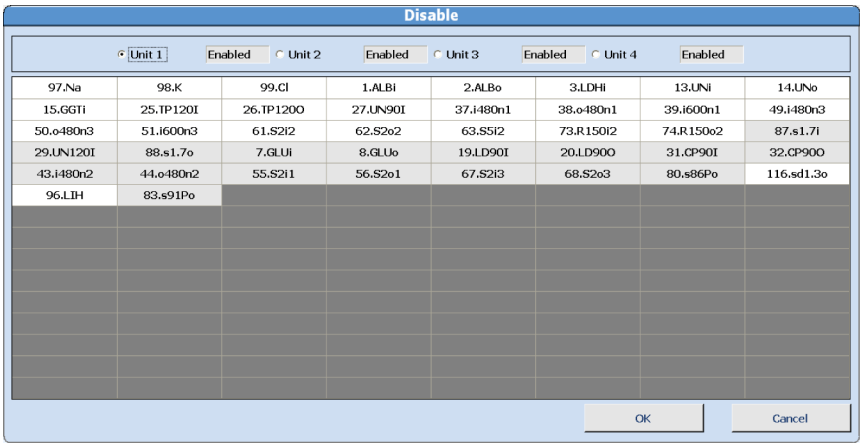
1 Select **Home > Start Condition**.

Figure 5.12 Start Condition Screen



2 Select **Disable (F7)**. The system opens the Disable dialog, and displays a list of tests to make unavailable (disable).

Figure 5.13 Disable Dialog



3 Select the **Unit**.

4 Select the tests to make unavailable (disable). The system highlights tests that are unavailable (disabled) in orange. The Unit displays **Disabled**.

5 Select **OK** to save the settings. The system returns to the Start Condition screen.

NOTE

The system displays a message if one or more tests are disabled on the Message Display on the Home screen.

Review Results for Flags and Alarms

After the system generates results, review them for analytical validity.

Review the results using the Sample Status screen or the printout. For more information, refer to Sample Status Screen.

Review Results for Flags

If a problem occurred during analysis, the system appends a flag to the analysis results. Review all results carefully for flags and take the correct action.

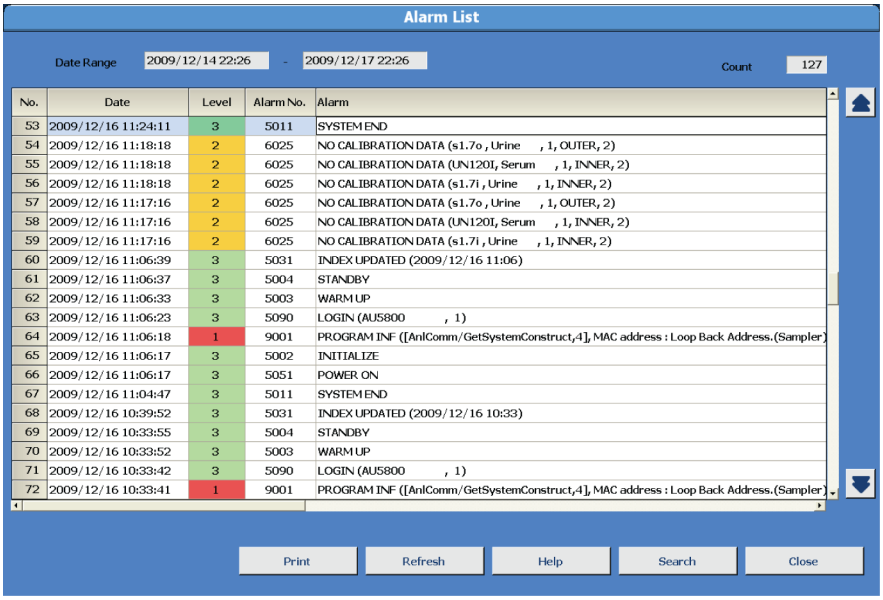
For more information, refer to Flags.

Review Alarms

Review for alarms that occurred during analysis:

To display alarms, select **Alarm List** (the button on the lower-right corner of the screen).

Figure 5.14 Alarm List Screen



The **Level** column displays the alarm level (numbers and color).

Table 5.23 Alarm Level

Level	Color	Description
Level 1	Red	A fatal system abnormality exists.
Level 2	Yellow	An abnormality influencing the data exists.
Level 3	Green	No system abnormality. The system displays the operation log.

The **Count** (at the top-right) indicates the quantity of alarms within the specified date range. The system can store and display a maximum of 4,096 cases. You can scroll using the scroll bar.

From the Alarm List screen, you can select:

- **Print** - Prints a list of all alarms.
- **Refresh** - The system returns the screen to the most recent alarms.
- **Help** - The system displays a description of the alarm and the corrective actions.
- **Search** - Search for alarms by date, alarm number, or alarm level.
- **Close** - The system closes the Alarm List screen.

NOTE

The alarm help information is only available in the **Alarm List**. The AU5800 Instructions for Use and AU5800 Reference Manual do not contain alarm descriptions and corrective actions.

Interpreting Lipemia, Icterus, and Hemolysis (LIH) Results

Sample Specific LIH

Each sample prints with a flag for Normal (N) through Abnormal (ABN) for levels of:

- Lipemia (LIP)
- Icterus (ICT)
- Hemolysis (HEM)

The system generates each flag determined by the parameters in **Parameters > Specific Test Parameters > LIH** for the LIH test.

Table 5.24 Sample Specific LIH Flags

Name	Flags
LIP (lipemia)	N + ++ +++ ++++ +++++ ABN
ICT (icterus)	N + ++ +++ ++++ +++++ ABN
HEM (hemolysis)	N + ++ +++ ++++ +++++ ABN

A result of ABN (abnormal) means the mathematical logic in determining the amount of interference failed one or more internal evaluations. Visually inspect the sample to determine the amount of lipemia, icterus, and hemolysis present in the sample.

Test Specific LIH

When the level of interfering substances exceeds the criteria programmed for a specific test in **Specific Test Parameters**, the system attaches an l, i, or h flag to the result affected by lipemia, icterus, or hemolysis.

When LIH testing is not performed on a sample, the system attaches an n flag to the result. The n flag differentiates LIH testing not being performed, and LIH not influencing the test. The system typically generates an n flag when the LIH reagent is empty, or the LIH test was not ordered (requisitioned).

Na, K, and Cl tests are not evaluated for assay specific LIH criteria and do not generate the n flag.

LIH Reagent IFU

WARNING

The concentrations listed in the table are for reference. Depending on the matrix effect with an individual serum sample, some results may not meet the listed concentrations.

Table 5.25 Approximate Concentration of Chromatic Substance

Flag	LIP (mg/dL Intralipid)	ICT (mg/dL Bilirubin)	HEM (mg/dL Hemoglobin)
N	<40	<2.5	<50
+	40 to 99	2.5 to 4.9	50 to 99

Table 5.25 Approximate Concentration of Chromatic Substance (Continued)

Flag	LIP (mg/dL Intralipid)	ICT (mg/dL Bilirubin)	HEM (mg/dL Hemoglobin)
++	100 to 199	5.0 to 9.9	100 to 199
+++	200 to 299	10.0 to 19.9	200 to 299
++++	300 to 500	20 to 40	300 to 500
+++++	>500	>40	>500

Figure 5.15 Example of LIH Evaluation

S.No. 0001 0003-01 S.ID 123456
CRE 0.6 CHOL 280 TBIL 0.3 DBIL 0.3 h
LIP + ICT N HEM ++

According to the Direct Bilirubin IFU (example), Interfering Substances are:

- Hemolysis: No significant interference up to 10 mg/dL Hemolysate
- Lipemia: No significant interference up to 300 mg/dL Intralipid

NOTE

The interference information from the Direct Bilirubin IFU (example) is provided as an example. For the current interference information on direct bilirubin, refer to the Direct Bilirubin IFU.

According to the LIH Reagent IFU Table:

- A hemoglobin rating of ++ is equivalent to 100 to 199 mg/dL in the sample. Since the Direct Bilirubin IFU indicates no significant interference only up to 10 mg/dL, the system attaches an h flag in the printout to the DBIL result to indicate that the performance of this test could have been affected by hemolysis.
- A lipemia rating of + is equivalent to 40 to 99 mg/dL of Intralipid in the sample. Since the Direct Bilirubin IFU indicates no significant interference up to 300 mg/dL, the system does not attach an l flag to the DBIL result.

Reagent Management

Reagents

Most Beckman Coulter reagents are liquid and ready to place in the reagent refrigerator after removing the cap. If a reagent requires preparation, refer to the Chemistry Information Sheet before loading the reagent into the reagent refrigerator.

The system can use four sizes of reagent bottles:

- 15 mL
- 30 mL
- 60 mL

- 180 mL

Table 5.26 Adapter and Partition Part Numbers

Part Name	Part Number
15 mL reagent bottle adapter	MU852700 (2pcs), MU852900 (20pcs)
30 mL reagent bottle adapter	MU852700 (2pcs), MU853000 (20pcs)
Removable Partition	MU856200 (20pcs)

The reagent tray in the R1 and R2 refrigerators uses partitions between the 15 mL, 30 mL, 60 mL, and 180 mL bottles, and adapters to hold 15 mL and 30 mL reagent bottles securely in position. 180 mL bottles occupy three positions on the reagent tray. If necessary, remove two partitions to load a 180 mL bottle on the tray.

Replace adapters when the pins are damaged, or when the adapter no longer clicks into place on the reagent tray.

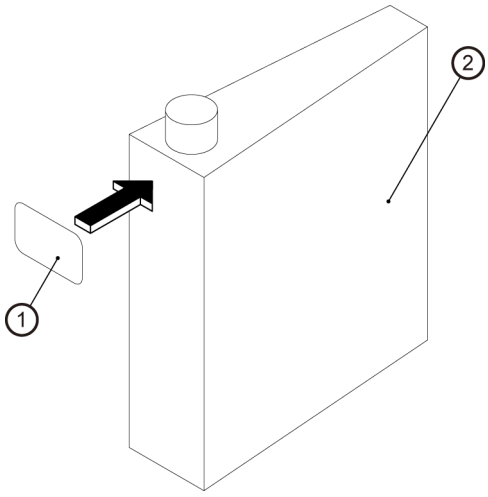
Each of the R1 and R2 refrigerators holds up to 54 reagent bottles. 180 mL reagent bottles occupy three positions on the reagent tray, and reduce the maximum quantity of bottles respectively.

Commercial Reagent Bottles

Commercial reagent bottles not sold by Beckman Coulter are available in the Japan and Asia markets.

If the color of the commercial reagent bottle is too light for the bottle sensor to detect, apply a label as shown in Figure 5.16 Apply a Label to a Reagent Bottle. The part number for the labels is MU987900.

Figure 5.16 Apply a Label to a Reagent Bottle



1. Label
2. Reagent bottle

When you use commercial reagent bottles, the test count displayed on the Reagent Management screen can differ from the remaining test count. The system uses the liquid

level in the bottle to calculate the test count. Because the bottle is different from the Beckman Coulter reagent bottles, the calculation can be incorrect.

Fill Reagent Bottles

CAUTION

Bubbles in the reagent bottle can interfere with analysis. Inspect the reagent bottles for bubbles. Remove bubbles with a cotton-tipped applicator before loading the reagent.

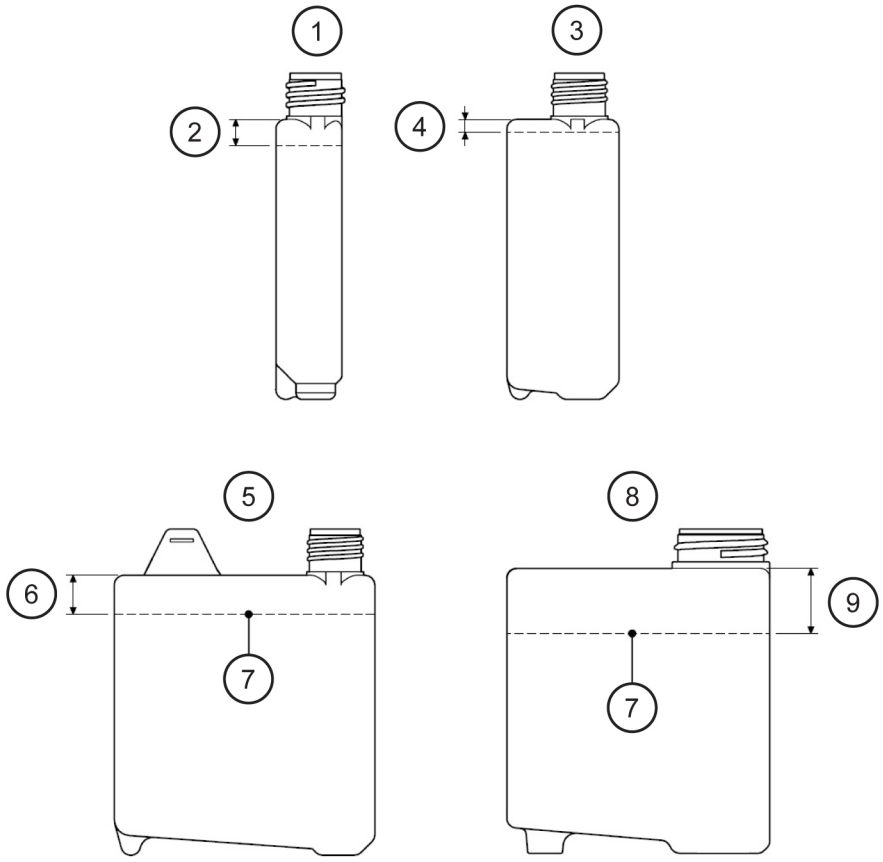
CAUTION

Do not add new reagent to existing bottles. Adding new reagent to existing bottles can affect results.

CAUTION

When you fill AU bottles with reagent, wash solution, or deionized water, do not exceed the maximum volume. The maximum volume depends on the bottle size. If a reagent bottle is filled over the maximum liquid level limit, bubbles can occur and cause a level detection error.

Figure 5.17 Maximum Liquid Level



1. 15 mL bottle
2. 8 mm
3. 30 mL bottle
4. 4 mm
5. 60 mL bottle
6. 12 mm
7. Maximum liquid level
8. 180 mL bottle
9. 20 mm

Add Adapters to the Reagent Tray

The 30 mL and 15 mL bottles require reagent tray adapters.

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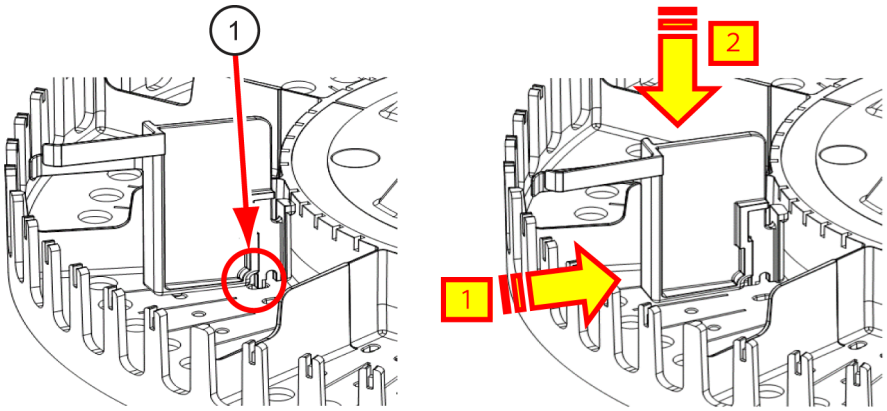
1 Insert the long pin of the adapter into the elongated hole in the reagent tray.

Figure 5.18 Insert Adapter



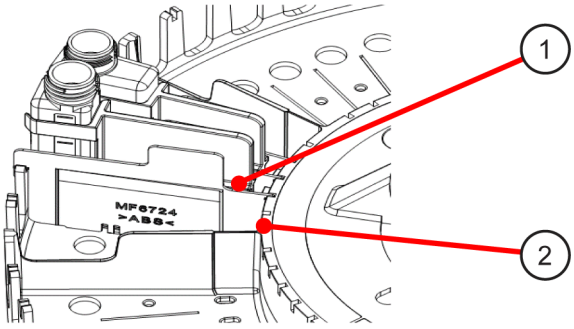
1. Elongated Hole

2 Push the adapter toward the center of the tray. Refer to arrow 1 in Figure 5.18 Insert Adapter.

3 Press the adapter down until it clicks into the other hole on the reagent tray. Refer to arrow 2 in Figure 5.18 Insert Adapter.

4 Confirm that the adapter is secure on the reagent tray. The top of the reagent tray (with the position numbers) must be level with the top of the adapter protrusion.

Figure 5.19 Confirm Adapter Placement in Reagent Tray



1. Adapter protrusion
2. Top of the reagent tray with the position number

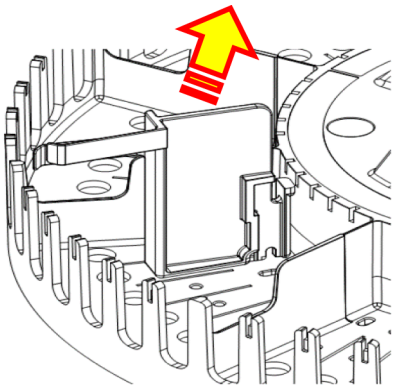
Remove Adapters from the Reagent Tray

Replace adapters when the pins appear damaged, or the adapter no longer clicks when you place it on the reagent tray.

1 Hold the reagent tray so that reagents do not spill.

2 Lift the adapter in the direction shown in Figure 5.20 Remove Adapter from the Reagent Tray .

Figure 5.20 Remove Adapter from the Reagent Tray



Assign a Reagent Position

You can place reagents that have bar code labels in any available (not assigned) position on the reagent tray. For reagents without bar code labels, assign the reagent to a fixed position. Place reagents without a bar code label in the correct assigned position.

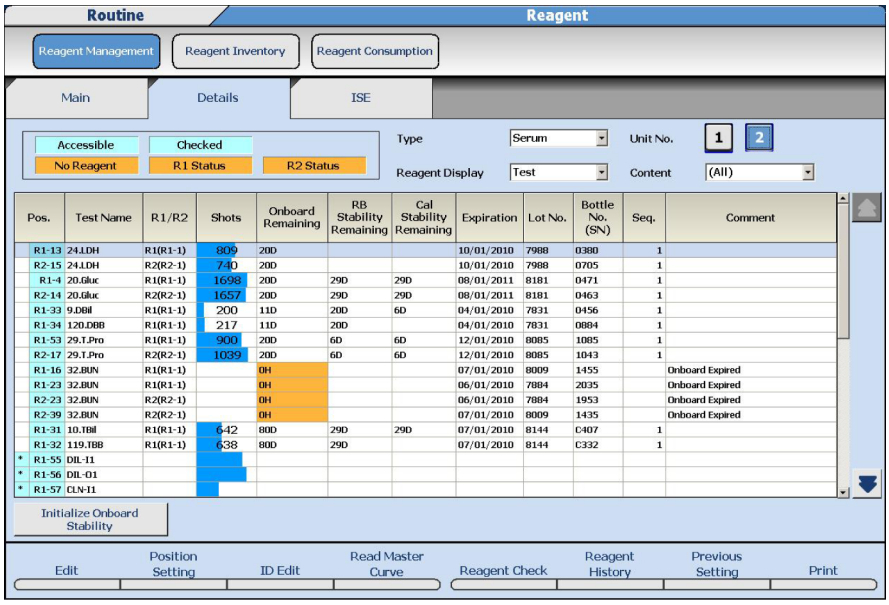
1 Select **Home > Reagent Management > Details**.

The system indicates assigned (fixed) positions with an asterisk highlighted in blue in the column to the left of the Pos. column.

NOTE

Before assigning a position, confirm that the reagent status is **Checked**. If the reagent status is **Unchecked**, select **Reagent Check (F5)**, and then select **Reset**.

Figure 5.21 Reagent Management: Details Tab



2 Select **Unit No.**

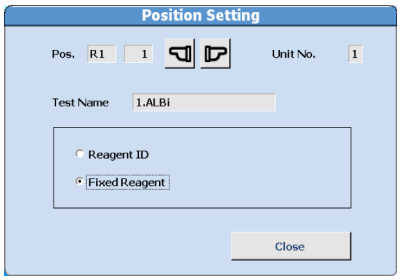
3 In **Reagent Display**, select **Position**.

4 In **Content**, select **R1** to assign a position in the R1 refrigerator, or **R2** to assign a position in the R2 refrigerator.

5 Select an open position to assign to the reagent.

6 Select **Position Setting (F2)**.

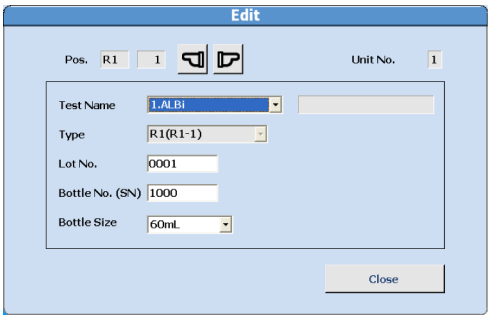
Figure 5.22 Position Setting Dialog



7 Select **Fixed Reagent**, and then select **Close**.
The system indicates assigned (fixed) positions with an asterisk highlighted in blue in the column to the left of the Pos. column.

8 Select **Edit (F1)**.

Figure 5.23 Edit Dialog



a. In **Test Name**, select the test name.

b. In **Type**, the system displays **R1 (R1-1)** or **R2 (R2-1)**. If necessary, select **R1 (R1-2)** or **R2 (R2-2)**.

c. In **Lot No.**, enter a lot number according to your laboratory procedure.

d. In **Bottle No.(SN)**, enter a bottle number according to your laboratory procedure.

e. In **Bottle Size**, select the reagent bottle size.

f. Select **Close**.

9 If the reagent has an R2 bottle, repeat steps 4 to 8 with **Content** selected for **R2**.

10 Confirm that the system indicates assigned (fixed) positions with an asterisk highlighted in blue in the column to the left of the Pos. column.

11 Select **Reagent Check (F5)**.

The system displays the Reagent Check dialog.

12 Select the unit number that you assigned.
Unit number does not display for a one-unit system.

13 Select **Check specified positions**, and then select the positions that you assigned.

14 Select **Start**.
The system performs a reagent check at the specified positions, and updates the test count on the Details tab.

Edit a Reagent ID

Edit the reagent ID after a reagent ID read error occurs on a bar code labeled reagent bottle.

A notification alarm occurs during the reagent check (`Reagent ID Read Error`), and the system displays the comment **ID Edit** until the reagent bottle is removed from the refrigerator.

1 Select **Home > Reagent Management > Details**.

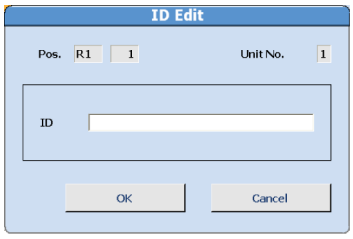
2 Select **Unit No.**

3 In **Reagent Display**, select **Position**.

4 Place the cursor on the position with the reagent ID read error.

5 Select **ID Edit (F3)**.

Figure 5.24 ID Edit Dialog



6 Type in the 20-digit reagent ID from the reagent bottle. Select **OK**.
The system updates the onboard stability, expiration, lot number, and bottle number with a `No Volume to Process` comment.

7 Select **Reagent Check (F5)**, and then select **Check specified positions** to update the test count. The system displays a `Reagent ID Read Error` alarm and `ID Edit` comment. The system updates the RB stability and cal stability.

System Shutdown (End Process)

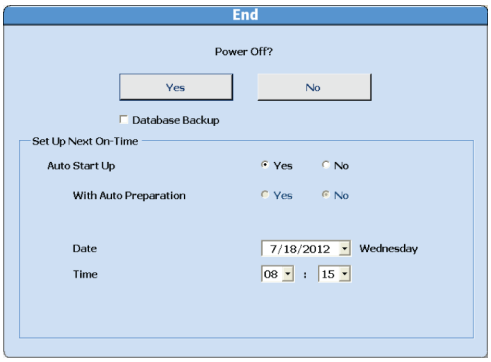
Shutting down the system (an End Process) turns off the analyzer lamp(s) and the computer. The system maintains the refrigerator and incubator temperatures. The ISE unit performs an automatic prime with ISE MID Standard Solution every hour to keep the electrodes conditioned.

You can initiate a system shutdown after you start a W2 or photocal. If you initiate a system shutdown after you start a W2 or photocal, the W2 or photocal completes, and then the system shuts down. For more information, refer to Perform a W2 or Perform a Photocal.

1 Select **Home**.

2 Select **End**  .

Figure 5.25 End Dialog



3 Review the next auto on time.

a. To set an auto on time, select **Yes** in **Auto Start Up**.

b. In **Date** and **Time**, select the date and time for the system to turn on.

c. To turn off the auto on time, in **Auto Start Up** select **No**.

NOTE

Beckman Coulter programs Auto Preparation in the System Maintenance menu during installation. Programming options in the Auto Power On screen include a daily time for Auto On and Auto Preparation. The Auto Preparation is the weekly photocal.

For more information, refer to the AU5800 Reference Manual.

NOTE

A Beckman Coulter Representative uses **Database Backup** in specific, limited situations.

If you select **Database Backup**, the system requires up to 40 minutes to complete the data backup.

4 Select **Yes**. The system shuts down.

IMPORTANT

Follow your laboratory procedure for turning off the deionized water supply.

Pause Analysis

You can pause the analyzer to add reagent and then resume analysis.

CAUTION

Do not leave the system paused for an extended time. When you pause the analyzer for an extended time, the concentration of the samples in the sample cups increases from evaporation and the evaporation can affect results.

CAUTION

Do not remove or add racks while the system is paused, as it can cause concordance errors.

1 Select **Pause** . The system displays the Pause dialog.

The system selects all units to go to *Pause.*

2 To continue analysis on a unit, cancel the selection on the unit.

TIP

The unit number does not display for a one-unit system.

3 Select **OK**.

The system displays the analyzer unit mode as *=> PAUSE* until analysis completes for all samples in progress on each unit selected for *Pause*. When the system changes the analyzer unit mode to *Pause*, you can add reagent and perform a reagent check. Analysis continues on units that were not selected for *Pause* mode, and the racks move to the rack output trays. Tests that were not processed on units in *Pause* mode display with the / flag.

CAUTION

To avoid injury or damage to the reagent probes, confirm that the analyzer unit is in *Pause* mode before adding reagents or performing a reagent check.

Resuming Analysis from *Pause* Mode

Analysis starts at the next test for analysis after you selected **Pause.**

1 Select **Start**. The system displays the Start dialog.

2 Confirm that all units are selected to start analysis.

3 Select **Start**. The system restarts analysis.

Rack Feeder Stop

You can stop the rack feeder to insert an emergency or routine rack before other racks during analysis.

When you stop the rack feeder, analysis continues for the racks that moved from the rack input trays.

CAUTION

Do not leave the rack feeder stopped for an extended time. When you stop the rack feeder for an extended time, the concentration of the samples in the sample cups increases from evaporation and can affect results.

Stop the Rack Feeder

1. Select **Feeder Stop**  . The system displays the Feeder Stop dialog.
2. Select **OK**. The system displays the rack feed operation stop message. Racks that were moved from the rack input trays continue analysis.

Restart Analysis After Rack Feeder Stop

1. When the rack feeder is stopped, use normal ordering (requisition) procedures. For more information, refer to Order (Requisition) for Routine and Emergency Samples.
2. Select **Start**. The system displays the Start dialog.
3. Select **Start**. The system restarts analysis.

Stop Analysis

To stop analysis immediately, perform a system stop.

CAUTION

If you stop the system during *Measure* mode, any data that is not complete is lost and you must reanalyze the samples.

CAUTION

If you perform a stop or emergency stop or a power loss occurs, sample can remain in the sample probe, and reagents can remain in the cuvettes. Perform a W1 to clean

the sample probe and cuvettes after you restart the system. For more information, refer to Perform a W1.

1. Select **Stop/Standby** during analysis operation. The system displays the Stop dialog with a confirmation message.
2. Select **OK**. All analysis operation stops, and the system changes to *Stop* mode.
3. Remove all racks from the system except for racks on the rack input trays, priority rack input component, and rack output trays.

Return to *Standby* Mode from *Stop* Mode

1. In *Stop*, select **Stop/Standby**. The system displays the Warmup/Standby dialog with a confirmation to reset the analyzer to *Standby* mode or *Warm up* mode.
2. Select **OK**. The system performs the reset operation. After the system completes the reset operation, the system changes to *Standby* mode or *Warm up* mode.
3. Perform a W1. For more information, refer to Perform a W1.

Perform an Emergency Stop

An emergency stop turns off power immediately to the analyzer and ISE units.

1. Press the **EM STOP** button (orange button on the front-right of the rack feeder unit). All power to the analyzer and ISE units turns off immediately. The computer remains on. To turn off the computer, press **[Ctrl] + [ALT] + [Delete]**. The computer displays a Windows Security dialog. Select **Shut Down**.
2. Remove all racks from the system except for racks on the rack input trays, priority rack input component, and rack output trays.

Return to *Standby* Mode After an Emergency Stop

1. Press the **RESET** button (white button on the front-right of the rack feeder unit) to turn on the main power, and then wait 5 seconds.
2. Press the **ON** button (green button on the front-right of the rack feeder unit). The lamp turns on and the software loads. The system displays a dialog to confirm retrieving the database.
3. Select **OK**.
4. In the New Index dialog, select **Current Index** to continue analysis in the current index.

5 The system is in *Warm up* mode for 1.5 hours. After the required 20-minute lamp warm up time, wait until the temperature of the cuvette wheel is 37 °C, and then select **Home > Analyzer Maintenance**. Select **Stand By (F4)** to return to *Standby* mode.

6 Perform a W1. For more information, refer to Perform a W1.

Using Beckman Coulter PROService (Option)

Beckman Coulter PROService allows operators to transmit parameters and data of the AU5800 to Beckman Coulter manually. Beckman Coulter can confirm operating status and provide help for troubleshooting issues with this information.

Transmittable parameters and data on the PROService menu include the following:

- Files such as analysis parameters and system settings in the parameter menu.
- Analysis data.
- Files such as the operation and alarm logs.
- Other files specific to the system, such as the program version.

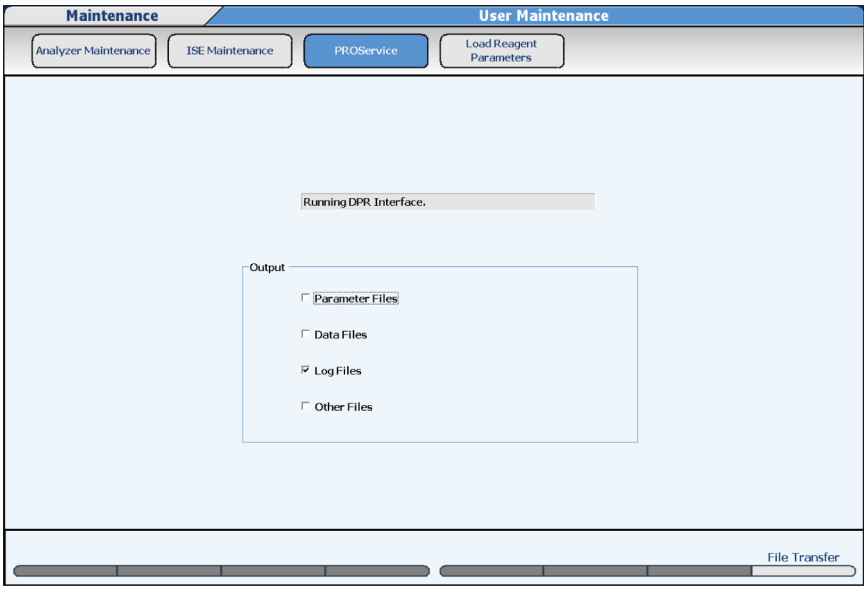
TIP

The PROService function does not transmit personal information such as patient information. PROService is an option requiring a separate support contract. Contact Beckman Coulter for more information.

Transmitting files with PROService

1 Select **Home** > **Analyzer Maintenance** > **PROService**.

Figure 5.26 User Maintenance: PROService Screen



2 Select the **Output** for the data to be transmitted.

3 Select **File Transfer (F8)**. A transmission start confirmation dialog appears.

4 Select **OK** to transmit the files.
The transmission is complete when the dialog “Please wait” disappears.

Identifying and Reanalyzing Samples after a Cuvette Overflow

A cuvette overflow could have occurred 60 minutes before the system generates the `Photometry Error During Cuvette Wash (A, B, C) [Unit x]` alarm. The results measured during the 60 minutes before the alarm are invalid and must be reanalyzed.

The analyzer changes to *Stop* mode immediately after the system generates the `Photometry Error During Cuvette Wash (A, B, C) [Unit x]` alarm.

NOTE

Photometry Error During Cuvette Wash (A, B, C) [Unit x]:

- A, B: Cuvette numbers with a photometric error. The photometry error check occurs every 41 cuvettes. If the error is detected on two successive cuvettes, the Photometry Error During Cuvette Wash (A, B, C) [Unit x] is generated.
- C: 1 indicates the inner cuvettes and 2 indicates the outer cuvettes.
- x: The unit number with the photometric error.

WARNING

The tests performed during the 60 minutes before the Photometry Error During Cuvette Wash (A, B, C) [Unit x] alarm can have an incorrect result caused by the overflow. The results are invalid and must be reanalyzed. If you have reported results or transferred the results to the laboratory information system, take corrective actions according to your laboratory procedure.

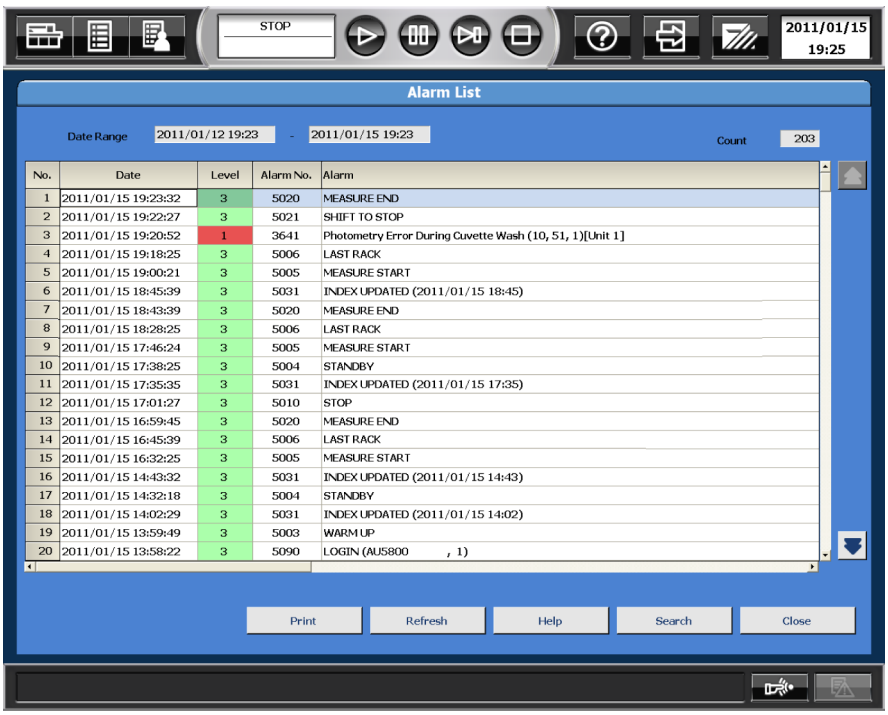
The 60-minute timeframe is the time that the analyzer was in *Measure* mode. If the analyzer went into *Standby* mode and did not remain in *Measure* mode for 60 consecutive minutes before the alarm, add *Standby* mode time to the 60-minute timeframe. For example, if the analyzer was in *Standby* mode for 20 minutes total, add 20 minutes to the 60 minutes and search for samples affected by the overflow in the past 80 minutes.

The overflow occurs either in the inner cuvettes or the outer cuvettes, or both in the inner and outer cuvettes depending on the failure mode. The code (1 or 2) only indicates the location where the cuvette overflow is first detected. The cuvette overflow can spread over both the inner and outer cuvettes. Inspect all results generated from both the inner and outer cuvettes within the 60-minute timeframe.

Search for samples affected by the overflow.

1 Select **Home > Alarm List**.

Figure 5.27 Alarm List



2 Search for the alarm message `Photometry Error During Cuvette Wash (A, B, C) [Unit x]`.

3 Note the date, time, and unit number of the alarm.

For example: `2011/01/15 19:20:52 Photometry Error During Cuvette Wash (10, 51, 1) [Unit 1]`

4 Search for the `MEASURE START` messages. Calculate the time between the `Photometry Error During Cuvette Wash (A, B, C) [Unit x]` alarm and the most recent `MEASURE START` message.

- If the time between the alarm and measure message is 60 minutes or longer, the timeframe for searching samples with invalid data is 60 minutes.
- If the time between the alarm and the measure message is shorter than 60 minutes, determine the time in *Measure* mode, and add it to the next time in *Measure* mode, and continue adding the time until the total time in *Measure* mode is 60 minutes. Add the total time in *Standby* between the *Measure* modes and the `Photometry Error During Cuvette Wash (A, B, C) [Unit x]` alarm, and add it to 60 minutes. The result is the timeframe for searching samples with invalid data.

5 Specify the start date and time for the search to identify all the affected indexes. In the following example, the timeframe for the search is 77 minutes (17 minutes of *Standby* time between 18:43:39 and 19:00:21 is added to 60 minutes of *Measure* time). Calculate backwards from the `Photometry Error During Cuvette Wash (A, B, C) [Unit x]` alarm (`2011 19:20:52`) by 77 minutes to obtain the starting date and time for the search. The starting date and time for the search is then `2011/01/15 18:03:52`.

The affected indexes include the index that was generated immediately before the starting date and time and all the indexes after the starting date and time. In this example, the two indexes in bold type are the affected indexes.

2011/01/15	19:20:52	Photometry Error During Cuvette Wash (10,51,1) [Unit 1]
2011/01/15	19:00:21	Measure Start
2011/01/15	**18:45:39**	**INDEX UPDATED (2011/01/15 18:45)**
2011/01/15	18:43:39	Measure End
2011/01/15	17:46:24	Measure Start
2011/01/15	**17:35:35**	**INDEX UPDATED (2011/01/15 17:35)**
2011/01/15	14:43:32	INDEX UPDATED (2011/01/15 14:43)

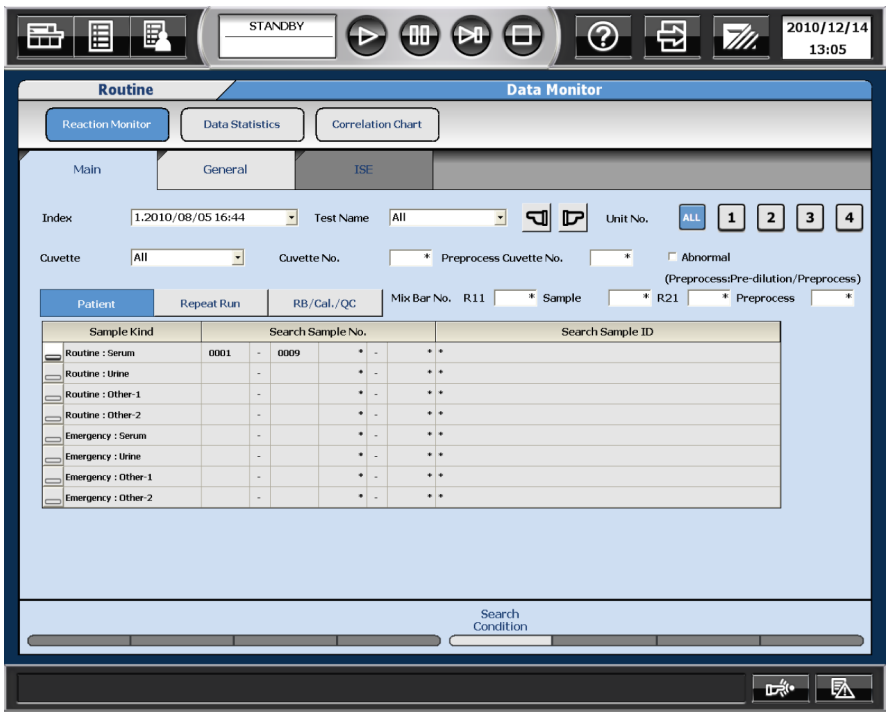
NOTE

This information is only an example. Typically, a new index is created once a day or once a shift.

The ending search date and time is the time when the system generated the `Photometry Error During Cuvette Wash (A, B, C) [Unit x]` alarm. In this example, the time the system generated the alarm is `2011/01/15 19:20:52`.

6 Select **Menu List > Routine > Data Monitor > Reaction Monitor > Main**.

Figure 5.28 Reaction Monitor: Main Tab



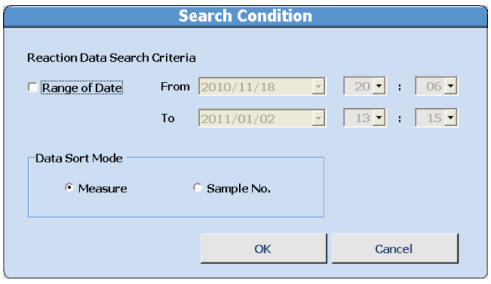
7 Select the **Unit No.** with the cuvette overflow.

8 In **Index**, select the affected index or the oldest index among the affected indexes obtained in step 5. In this example, select **2011/01/15 17:35**

9 Select all of the available boxes for sample types and kinds that the system has processed.

10 Select **Search Condition (F5).**

Figure 5.29 Search Condition Dialog



11 Select **Range of Date** to specify the dates and times in **From** and **To** determined by steps 12 and 13. If you do not specify the date range, the system selects all samples within the index.

12 Enter the starting date and time for search obtained in step 5 in **From**. In this example, enter **2011/01/15 17:46:24**.

13 Enter the ending date and time for search obtained in step 5 in **To**. In this example, enter **2011/01/15 18:43:39**.

14 Select **Sample No**.

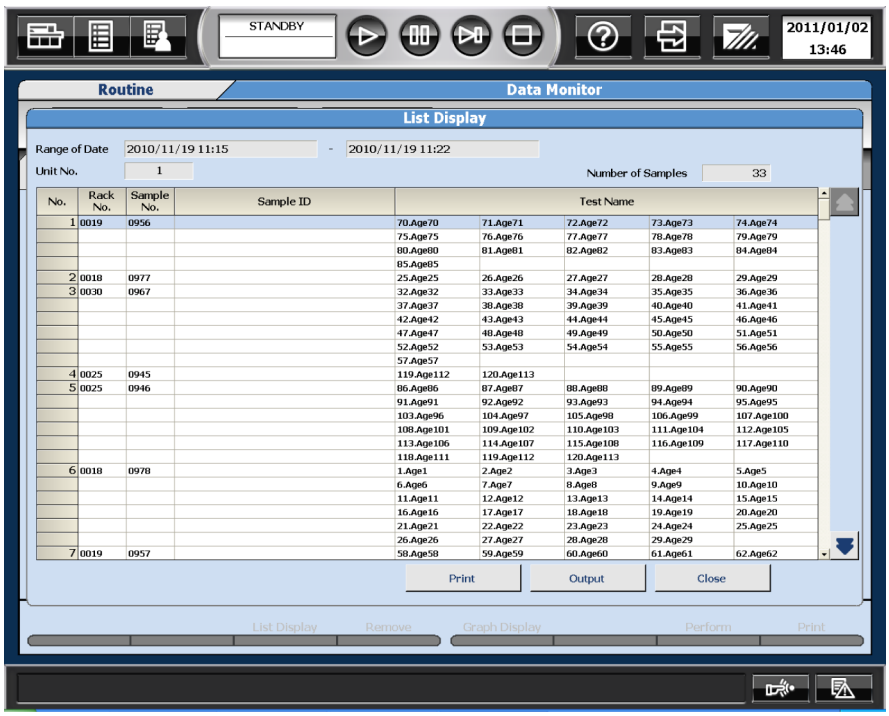
15 Select **OK**.

16 Select the **General** tab.

Figure 5.30 Reaction Monitor: General Tab

17 Select **List Display (F3)**. The system displays a list of samples with invalid data. Reanalyze these samples.

Figure 5.31 List Display Dialog



18 Repeat steps 6 through 17 for all affected indexes.

Output the List to Media

Precautions for using external storage:

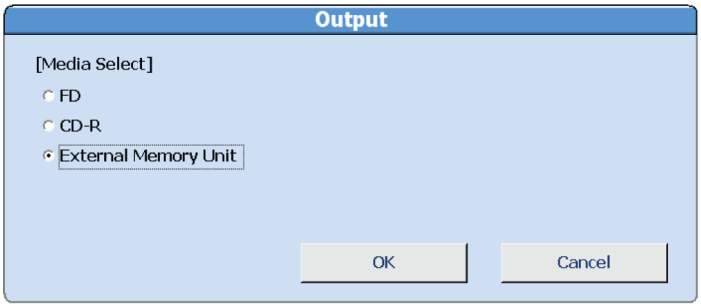
- Inspect for viruses on a separate computer for CD-Rs or USB flash drives and confirm that no viruses are detected after saving data.
- When using a CD-R, write data on the CD-R and set it to unrecordable.

NOTE

Virus pattern files are information files necessary for virus detection. Update antivirus software with the latest virus pattern files from the antivirus software manufacturer regularly. Contact the antivirus manufacturer if needed.

1 Select **Output** from the List Display dialog.

Figure 5.32 Output Dialog



2 In **[Media Select]**, select the media.

3 Select **OK**. The system displays the Data Output dialog.

4 Select **OK**. The Data Output dialog displays the save progress. The name of the saved file is `MeasureList_YYYYMMDD_HHMM.csv`, with `YYYYMMDD_HHMM` as the name of the index.

NOTE

The system does not include pending samples in this list.

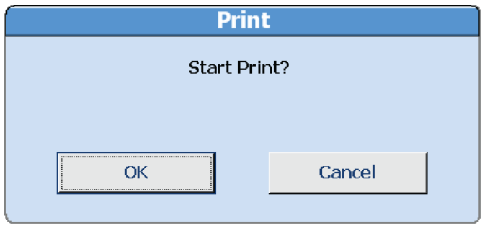
5 Select **OK** to return to the List Display dialog. Remove the media.

6 Data is saved as a csv file. Use a separate computer to open the file and view or print the list of samples with invalid data.

Print the List

1 Select **Print** from the List Display dialog.

Figure 5.33 Print Dialog



2 Select **OK**.

3 Select **Close**.

CHAPTER 6

Maintenance

Maintenance Introduction

The maintenance frequency described in this chapter is determined by analysis of 10,000 or less tests per analyzer unit per day.

Increase the amount of maintenance required depending on the quantity of tests and local environmental conditions.

Manage the ISE maintenance schedule for biweekly or longer periodic maintenance either periodically or by the quantity of samples analyzed. The ISE maintenance frequency described in this chapter is determined by analysis of 200 ISE samples per day.

Calibration may be required after replacement of key parts such as syringes or probes. After any part replacement or significant maintenance, Beckman Coulter recommends that you perform QC analysis. If you observe any shifts, calibrate all onboard tests.

Only Beckman Coulter is authorized to replace the fuse close to the breaker on the back of the rack feeder unit.

IMPORTANT

When the AU5800 is connected to the Beckman Coulter laboratory automation system, *Measure 1* mode continues even when no more racks are supplied from the rack loader unit. To return the system to *Standby* to perform maintenance procedures, select **Feeder Stop**. The analyzer moves to *Measure 2*, then *Standby*.

Maintenance Warnings and Cautions

WARNING

Operate the system with the covers down. If you need the covers up during maintenance, keep all body parts away from the probes and other moving parts of the system. Serious injury can occur and you can damage the system.

WARNING

Wear Personal Protective Equipment (PPE) such as gloves, eye shields, and lab coats when performing any procedure. To avoid injury, observe and follow all the warnings and cautions throughout this manual.

CAUTION

Failure to perform maintenance according to the instructions within this manual can cause problems with system performance and invalidate the service agreement.

CAUTION

When you press the DIAG button the first time after you select a maintenance procedure option, the unit initializes. To avoid injury, do not touch any moving parts until the system indicates that the system is ready (as indicated by alarms, modes, and LEDs).

CAUTION

The sample probe moves to the ISE CLEAN cup position after selecting Home > Analyzer Maintenance > ISE Maintenance, then any of the ISE Maintenance buttons (Total Prime, Prime Bypass, Buffer Prime, MID/REF Prime, Drain Flowcell, Drain Bypass), and then pressing the DIAG button. If the ISE cover is open, an ISE Cover Open [ISE] alarm is generated. Select Alarm Clear to clear the ISE Cover Open audible alarm. The ISE sample probe initializes when you clear the ISE Maintenance box or select Update or Cancel after performing ISE maintenance. Keep all body parts out of the way of the ISE sample probe.

Maintenance Schedule

The AU5800 has 1, 2, 3, or 4 analyzer units and an optional ISE unit. Mark procedures off for each unit as you complete the maintenance procedure.

IMPORTANT

For the Japan market, refer to the Maintenance Schedule in the ISE Addendum.

Table 6.1 Daily Maintenance

Daily Maintenance		Month and Year:
Inspect the Syringes for Leaks	Unit 1	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	Unit 2	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	Unit 3	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	Unit 4	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	ISE	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
Inspect the Stability of the Upper Cover	Unit 1	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	Unit 2	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	Unit 3	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	Unit 4	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

Table 6.1 Daily Maintenance (Continued)

Daily Maintenance		Month and Year:
Inspect, Clean, and Prime the Sample Probes, Reagent Probes, and Mix Bars	Unit 1	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	Unit 2	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	Unit 3	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	Unit 4	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
Replace the Deionized Water or Diluent in the Pre-dilution Bottles	Unit 1	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	Unit 2	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	Unit 3	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	Unit 4	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
Replace the Sample Probe Wash Solutions	Unit 1	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	Unit 2	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	Unit 3	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	Unit 4	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	ISE	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
Inspect the Printer and Paper	Option	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

Table 6.1 Daily Maintenance (Continued)

Daily Maintenance		Month and Year:
Inspect the Handle on the Diluted Wash Solution Tank is in the Open Position	Unit 1	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	Unit 2	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	Unit 3	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	Unit 4	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
Inspect, Clean, and Prime the ISE Sample Probe (ISE Option)	ISE	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
Clean the ISE (ISE Option)	ISE	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
Calibrate the ISE (ISE Option)	ISE	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

Table 6.2 Weekly Maintenance

Weekly Maintenance		Month and Year:
Clean the Sample Probes and Mix Bars	Unit 1	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	Unit 2	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	Unit 3	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	Unit 4	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	ISE	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

Table 6.2 Weekly Maintenance (Continued)

Weekly Maintenance		Month and Year: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
Perform a W2	Unit 1	
	Unit 2	
	Unit 3	
	Unit 4	
Perform a Photocal	Unit 1	
	Unit 2	
	Unit 3	
	Unit 4	
Clean the Pre-dilution Bottles	Unit 1	
	Unit 2	
	Unit 3	
	Unit 4	
Selectivity Check for the Na and K Electrodes (ISE Option)	ISE	
Enhanced Cleaning of Electrode Line (ISE Option)	Option	

Table 6.3 Every Other Week or 3,000 Samples (ISE Option)

Every Other Week or 3,000 Samples (ISE Option)		Month and Year:
Manually Clean the ISE Mix Bar, Liquid Level Sensors, Sample Pot, and Sample Pot Tubing (ISE Option)	ISE	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

Table 6.4 Monthly Maintenance

Monthly Maintenance		Month and Year:
Clean the Sample Probe and Reagent Probe Wash Wells	Unit 1	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	Unit 2	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	Unit 3	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	Unit 4	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	ISE	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
Clean the Mix Bar Wash Wells	Unit 1	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	Unit 2	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	Unit 3	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	Unit 4	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

Table 6.4 Monthly Maintenance (Continued)

Monthly Maintenance		Month and Year:
Clean the Wash Nozzle Component and Inspect the Tube Mounting Joints	Unit 1	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	Unit 2	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	Unit 3	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	Unit 4	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
Clean the Deionized Water Tank, Deionized Water Filter, and Sample Probe Filter	Unit 1	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	Unit 2	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	Unit 3	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	Unit 4	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

Table 6.5 Every Other Month or Every 20,000 Samples (ISE Option)

Every Other Month or Every 20,000 Samples (ISE Option)		Month and Year:
Inspect and Add ISE Internal Reference Solution (ISE Option)	ISE	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

Table 6.6 Quarterly Maintenance

Quarterly Maintenance		Month and Year:
Clean the Air Filters	Unit 1	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	Unit 2	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	Unit 3	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	Unit 4	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
Inspect and, if Needed, Replace the Deionized Water Filter, Sample Probe Filter, and Replace the O-Ring	Unit 1	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	Unit 2	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	Unit 3	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	Unit 4	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

Table 6.7 Quarterly or Every 20,000 Samples (ISE Option)

Quarterly or Every 20,000 Samples (ISE Option)		Month and Year:
Replace the Mixture Aspiration and MID Standard Roller Pump Tubing (ISE Option)	ISE	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
Replace the Tubing between the Sample Pot, Electrode Block, and T-Connector (ISE Option)	ISE	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

Table 6.7 Quarterly or Every 20,000 Samples (ISE Option) (Continued)

Quarterly or Every 20,000 Samples (ISE Option)		Month and Year:
Replace the REF Electrode Block-side Drain Tube and Pinch Valve Tubing (ISE Option)	ISE	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
Manually Clean the Drain Well and, if Needed Replace the Drain Tube (ISE Option)	ISE	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
Enhanced ISE Cleaning (Manual) (ISE Option)	ISE	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

Table 6.8 Every 6 Months

Every 6 Months		Month and Year:
Clean the Cuvettes and the Cuvette Wedges	Unit 1	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	Unit 2	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	Unit 3	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	Unit 4	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

Table 6.9 Every 6 Months or Every 40,000 Samples (ISE Option)

Every 6 Months or Every 40,000 Samples (ISE Option)		Month and Year:
Replace the Na, K, or Cl Electrode (ISE Option)	ISE	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

Table 6.10 Every Two Years or Every 150,000 Samples (ISE Option)

Every Two Years or Every 150,000 Samples (ISE Option)		Month and Year:
Replace the ISE REF Electrode and Packing (ISE Option)	ISE	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

Table 6.11 Yearly Maintenance

Yearly Maintenance		Month and Year:
Replace the O-rings in the Water Supply Tube Mounting Joints	Unit 1	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	Unit 2	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	Unit 3	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	Unit 4	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

Table 6.12 As Needed Maintenance

As Needed Maintenance		Month and Year:
Clean the R1 or R2 Reagent Probes	Unit 1	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	Unit 2	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	Unit 3	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	Unit 4	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
Replace a Sample Probe	Unit 1	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	Unit 2	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	Unit 3	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	Unit 4	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	ISE	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
Replace a Reagent Probe	Unit 1	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	Unit 2	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	Unit 3	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	Unit 4	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

Table 6.12 As Needed Maintenance (Continued)

As Needed Maintenance		Month and Year:
Replace the Mix Bars	Unit 1	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	Unit 2	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	Unit 3	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	Unit 4	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
Replace the Packing in the Wash Nozzle Tube Mounting Joints	Unit 1	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	Unit 2	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	Unit 3	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	Unit 4	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
Replace the Sample, Reagent, ISE Sample, or ISE Buffer Syringe	Unit 1	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	Unit 2	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	Unit 3	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	Unit 4	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	ISE	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

Table 6.12 As Needed Maintenance (Continued)

As Needed Maintenance		Month and Year: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
Replace the Wash Syringe Type 1 or Replace the Wash Syringe Type 2	Unit 1	
	Unit 2	
	Unit 3	
	Unit 4	
	ISE	
Clean the Interior of the Reagent Refrigerators	Unit 1	
	Unit 2	
	Unit 3	
	Unit 4	
Clean or Replace the Anti-static Brushes	Rack Feeder Unit	
Replace the Sample or Reagent Probe Tubing	Unit 1	
	Unit 2	
	Unit 3	
	Unit 4	
	ISE	

Table 6.12 As Needed Maintenance (Continued)

As Needed Maintenance		Month and Year:
Replace the Photometer Lamp	Unit 1	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	Unit 2	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	Unit 3	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
	Unit 4	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

Table 6.13 As Needed Maintenance (ISE Option)

As Needed Maintenance (ISE Option)		Month and Year:
Replace the Sample Pot	ISE	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
Clean the ISE Electrode Block (Inlet Side)	ISE	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
Manually Clean the ISE K Electrode	ISE	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
Manually Clean and Replace the ISE REF Electrode Block	ISE	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
Replace the ISE Mix Bar	ISE	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
Replace the ISE Reagents	ISE	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

Maintenance Log

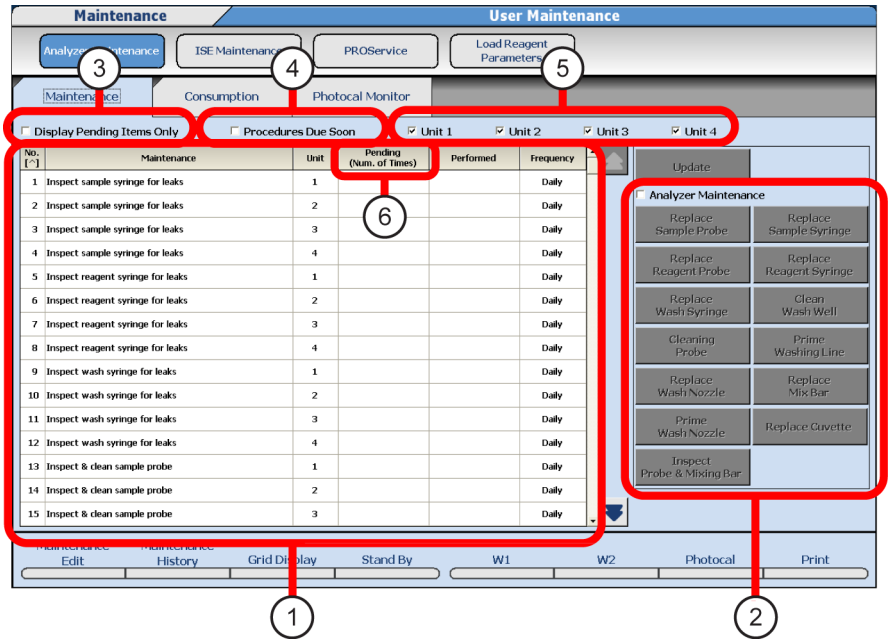
The Maintenance Log displays the maintenance frequency, the maintenance procedure, the date the maintenance was performed, and the next date the maintenance is due.

Confirm the Maintenance Schedule

To confirm the maintenance schedule:

1 Select **Home** > **Analyzer Maintenance** > **Maintenance**. The system displays the Analyzer Maintenance: Maintenance tab.

Figure 6.1 Analyzer Maintenance: Maintenance Tab



1. Maintenance log
2. Maintenance operation buttons
3. Display pending items only
4. Procedures due soon
5. Unit number box (displayed on multi-unit system)
6. Pending (Num. of Times)

The system displays any maintenance procedures that are overdue or about to expire:

— Orange - overdue
— Yellow - about to expire

The system displays the number of times some components have been used in the Pending (Num. of Times) column. Select **Update** to reset the count after the component has been replaced.

NOTE

The system displays daily procedures with a yellow background three hours before the maintenance is due.

2 Confirm the maintenance procedure to perform. Identify maintenance procedures that are overdue or about to expire:

— To display the overdue procedures, select **Display pending Items only**.
— To display the maintenance procedure about to expire, select **Procedures due soon**.
— To display the specified unit, select the required **Unit** number box.

NOTE

If you select either **Display pending Items only** or **Procedures due soon**, the system does not list the unscheduled and as needed procedures.

NOTE

The system lists the maintenance procedures for the selected units. All unit boxes are selected by default. The **Unit** number box does not display for a single unit system.

Add a Maintenance

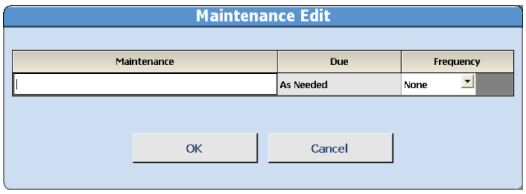
Operators can add procedures to the Maintenance Log.

The system is preprogrammed with maintenance procedures specified by Beckman Coulter.

1 Select a blank row from the Maintenance Log.

2 Select **Maintenance Edit (F1)**. The system displays the Maintenance Edit dialog.

Figure 6.2 Maintenance Edit Dialog



3 For **Maintenance**, enter the procedure name.

4 In **Unit**, select the unit number.

5 In **Frequency**, select the performance interval (Day, Week, Month, or Year). Enter the interval value from 1 to 180.

6 Select **OK**. The system displays the added maintenance procedure in the Maintenance Log according to the frequency selected.

Delete a Maintenance

Operators can delete maintenance procedures programmed by operators.

You cannot delete maintenance procedures preprogrammed by Beckman Coulter.

If you delete any maintenance procedure, the system deletes the history data also.

1 Select the maintenance procedure to delete.

2 Select **Maintenance Edit (F1)**. The system displays the Maintenance Edit dialog.

3 Delete the maintenance name in the Maintenance column.

4 Select **OK**. The system displays a confirmation message dialog.

5 Select **OK**.

Update the Maintenance Log

After you perform maintenance, update the Maintenance Log.

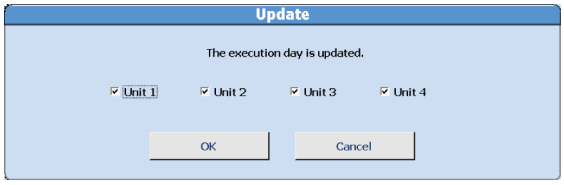
1 Select **Home** > **Analyzer Maintenance** > **Maintenance**. The system displays the Analyzer Maintenance: Maintenance tab.

or

Select **Home** > **Analyzer Maintenance** > **ISE Maintenance**. The system displays the ISE Maintenance: Maintenance tab.

2 Select the maintenance procedure on the list, and select **Update**.
The system displays the Update dialog.

Figure 6.3 Update Dialog



All units are selected by default.

3 If it is not necessary to update a unit, deselect the **Unit** box.

4 Select **OK**.

View Maintenance History

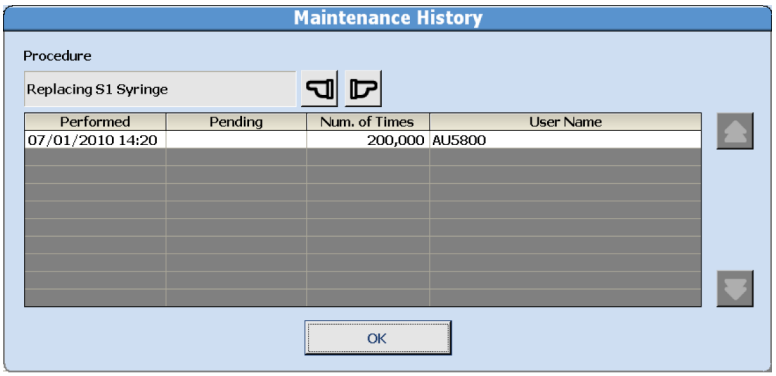
The system maintains a list of the 30 most recently completed maintenance procedures.

1 Select **Unit 1**, **Unit 2**, **Unit 3**, or **Unit 4**.

2 Select the maintenance procedure to view from the Maintenance Log.

3 Select **Maintenance History (F2)**.
The system opens the Maintenance History dialog for the selected maintenance procedure and unit. The system displays the last 30 maintenance dates, the next due date, and the user name. The user name is the name that you used to log into the system.

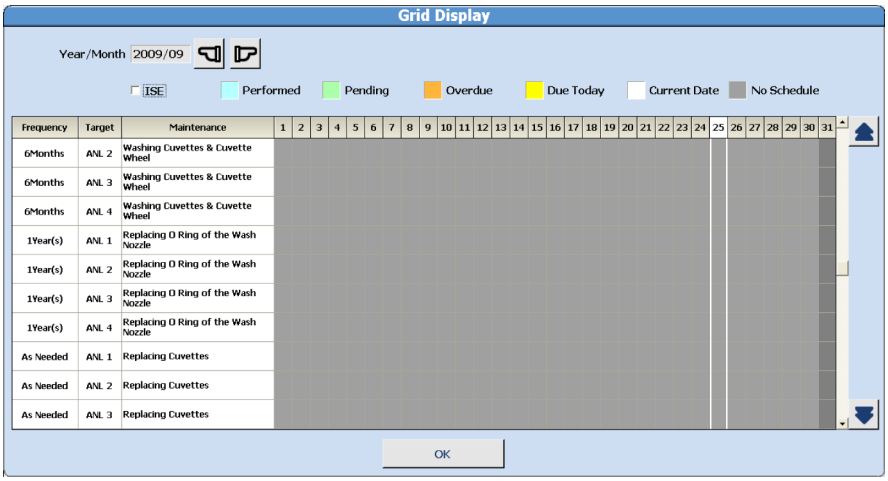
Figure 6.4 Maintenance History Dialog



4 Select **OK**.

5 Select **Grid Display (F3)** to confirm the maintenance history date as a list.

Figure 6.5 Grid Display Dialog



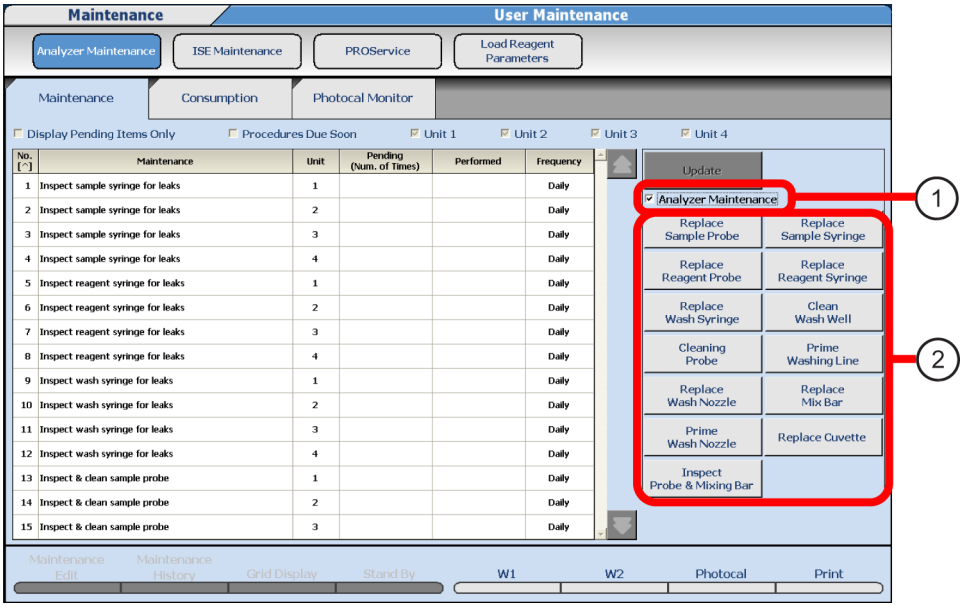
The Grid Display dialog displays scheduled maintenance procedures and status for the current month, preceding month, and following month.

If you select **ISE**, the dialog also displays the ISE maintenance procedures. The colors on the grid indicate the status of the maintenance procedure.

Accessing Maintenance Operations

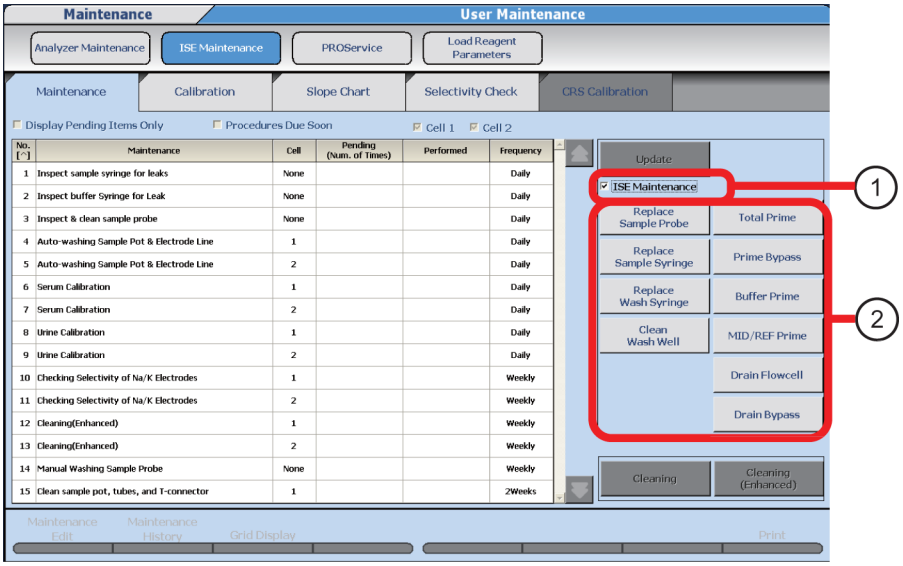
To perform many of the analyzer and ISE maintenance procedures, use the maintenance operation buttons. The overall process is the same for all maintenance procedures, and the maintenance procedure specifies which maintenance operation button is required.

Figure 6.6 Analyzer Maintenance Operation Buttons



1. Analyzer Maintenance box
2. Maintenance operation buttons

Figure 6.7 ISE Maintenance Operation Buttons



1. ISE Maintenance box
2. Maintenance operation buttons

---

1 Select **Home** > **Analyzer Maintenance** > **Maintenance**. The system displays the Analyzer Maintenance: Maintenance tab.

or

Select **Home > Analyzer Maintenance > ISE Maintenance > Maintenance**. The system displays the ISE Maintenance: Maintenance tab.

---

2 Select the **Analyzer Maintenance** box. The system activates the maintenance operation buttons.

or

Select the **ISE Maintenance** box. The system activates the maintenance operation buttons.

---

3 Select the maintenance operation button for the maintenance procedure.

NOTE

On systems with more than one analyzer unit, the system displays the Unit box as selected by default in the dialog. If it is not necessary to update a unit, deselect **Unit** box.

Parts List for Analyzer Maintenance

Table 6.14 Daily Analyzer Maintenance

Maintenance Procedure	Part	Part Number
Inspect the Syringes for Leaks	Clean, dry, lint-free absorbent tissue	Commercial item
Inspect the Stability of the Upper Cover	-	-
Inspect, Clean, and Prime the Sample Probes, Reagent Probes, and Mix Bars	Alcohol prep pads (70% Isopropyl alcohol)	Commercial item
Replace the Deionized Water or Diluent in the Pre-dilution Bottles	Deionized water or diluent	-
Replace the Sample Probe Wash Solutions	2% Wash solution or Sodium hypochlorite solution (1.0%) • 5% Sodium Hypochlorite Solution diluted 1:5 (US) • Cleaning Solution diluted 1:5 (Outside US and Japan) • Sodium hypochlorite solution (5%) diluted 1:5 (Japan)	• ODR2000 (4x5L) or OSR0001 (6x2L) (Outside Japan) • MS028400 (Japan) or • A32319 (US) • 66039 (Outside US and Japan) • Commercial item (Japan)
	60 mL reagent bottle (6 bottles)	MU960500
Inspect the Printer and Paper	-	-
Inspect the Handle on the Diluted Wash Solution Tank is in the Open Position	-	-

Table 6.15 Weekly Analyzer Maintenance

Maintenance Procedure	Part	Part Number
Clean the Sample Probes and Mix Bars	Alcohol prep pads (70% Isopropyl alcohol)	Commercial item
	Stylet 0.2ϕ (diameter)	MU941300

Table 6.15 Weekly Analyzer Maintenance (Continued)

Maintenance Procedure	Part	Part Number
Perform a W2	1N hydrochloric acid	Commercial item
	Sodium hypochlorite solution (0.5%) • 5% Sodium Hypochlorite Solution diluted 1:10 (US) • Cleaning Solution diluted 1:10 (Outside US and Japan) • Sodium hypochlorite solution (5%) diluted 1:10 (Japan)	• A32319 (US) • 66039 (Outside US and Japan) • Commercial item (Japan)
	60 mL reagent bottle (6 bottles per analyzer unit and 1 bottle for ISE unit)	MU960500
	ISE Cleaning Solution • ISE Cleaning Solution (US) • Cleaning Solution (Outside US)	• AUH1019 (US) • 66039 (Outside US) • For the Japan market, refer to the ISE Addendum.
	Hitachi Cup	MU853200
Perform a Photocal	-	-
Clean the Pre-dilution Bottles	Sodium hypochlorite solution (0.5%) • 5% Sodium Hypochlorite Solution diluted 1:10 (US) • Cleaning Solution diluted 1:10 (Outside US and Japan) • Sodium hypochlorite solution (5%) diluted 1:10 (Japan)	• A32319 (US) • 66039 (Outside US and Japan) • Commercial item (Japan)
	60 mL reagent bottle	MU960500

Table 6.16 Monthly Analyzer Maintenance

Maintenance Procedure	Part	Part Number
Clean the Sample Probe and Reagent Probe Wash Wells	Sodium hypochlorite solution (0.5%) • 5% Sodium Hypochlorite Solution diluted 1:10 (US) • Cleaning Solution diluted 1:10 (Outside US and Japan) • Sodium hypochlorite solution (5%) diluted 1:10 (Japan)	• A32319 (US) • 66039 (Outside US and Japan) • Commercial item (Japan)
	Cotton-tipped applicator	Commercial item
	Disposable pipette	Commercial item
Clean the Mix Bar Wash Wells	Sodium hypochlorite solution (0.5%) • 5% Sodium Hypochlorite Solution diluted 1:10 (US) • Cleaning Solution diluted 1:10 (Outside US and Japan) • Sodium hypochlorite solution (5%) diluted 1:10 (Japan)	• A32319 (US) • 66039 (Outside US and Japan) • Commercial item (Japan)
	Cotton-tipped applicator	Commercial item
	Disposable pipette	Commercial item
Clean the Wash Nozzle Component and Inspect the Tube Mounting Joints	Clean, dry, lint-free absorbent tissue	Commercial item
	Sonicator filled with deionized water	Commercial item

Table 6.16 Monthly Analyzer Maintenance (Continued)

Maintenance Procedure	Part	Part Number
Clean the Deionized Water Tank ,Deionized Water Filter, and Sample Probe Filter	Clean, dry, lint-free absorbent tissue	Commercial item
	Basin	Commercial item
	Sonicator filled with deionized water	Commercial item
	Extra deionized water tank, filled with 5 L of deionized water	MU959600
	Sodium hypochlorite solution (1.0%) • 5% Sodium Hypochlorite Solution diluted 1:5 (US) • Cleaning Solution diluted 1:5 (Outside US and Japan) • Sodium hypochlorite solution (5%) diluted 1:5 (Japan)	• A32319 (US) • 66039 (Outside US and Japan) • Commercial item (Japan)

Table 6.17 Quarterly Analyzer Maintenance

Maintenance Procedure	Part	Part Number
Clean the Air Filters	Air filters	MU959300 (140 x 140 mm)
	Vacuum	Commercial item
Inspect and, if Needed, Replace the Deionized Water Filter, Sample Probe Filter, and Replace the O-Ring	Sample Probe Filter	ZM307900
	Deionized Water Filter	ZM307900
	O-rings	MU963700

Table 6.18 Six-Month Analyzer Maintenance

Maintenance Procedure	Part	Part Number
Clean the Cuvettes and the Cuvette Wedges	2% Wash solution	• ODR2000 (4x5L) or OSR0001 (6x2L) (Outside Japan) • MS028400 (Japan)
	Cotton-tipped applicator	Commercial item
	Clean, dry, lint-free absorbent tissue	Commercial item
	Sonicator	Commercial item
	Plastic containers to hold cuvettes in the sonicator	Commercial item

Table 6.19 Yearly Analyzer Maintenance

Maintenance Procedure	Part	Part Number
Replace the O-rings in the Water Supply Tube Mounting Joints	O-rings	MU963800
	Clean, dry, lint-free absorbent tissue	Commercial item
	Pair of tweezers	Commercial item

Table 6.20 As Needed Analyzer Maintenance

Maintenance Procedure	Part	Part Number
Replenish the Wash Solution	Wash solution	• ODR2000 (4x5L) or OSR0001 (6x2L) (Outside Japan) • MS028400 (Japan)
Clean the R1 or R2 Reagent Probes	Alcohol prep pads (70% Isopropyl alcohol)	Commercial item
	Stylet ϕ0.3 (diameter)	ZM022700
Replace a Sample Probe	Sample probe	MU993400
Replace a Reagent Probe	Reagent probe	MU858100
Replace the Mix Bars	R1/S: Spiral shape mix bar	MU855400
	R2: L shape mix bar	MU855500
Replace the Packing in the Wash Nozzle Tube Mounting Joints	Packing	B03860
	Pair of tweezers	Commercial item
Replace the Sample, Reagent, ISE Sample, or ISE Buffer Syringe	Sample syringe (S syringe)	ZM011100
	Reagent syringe (R syringe)	ZM011200
	S syringe case	ZM022900
	R syringe case	MU837000
	ISE buffer syringe case	ZM136200
	Clean, dry, lint-free absorbent tissue	Commercial item
Replace the Wash Syringe Type 1	Clean, dry, lint-free absorbent tissue	Commercial item
	Wash Syringe Type 1 (R syringe)	ZM011200
	R syringe case	MU837000
	Seal assembly	B21251

Table 6.20 As Needed Analyzer Maintenance (Continued)

Maintenance Procedure	Part	Part Number
Replace the Wash Syringe Type 2	Clean, dry, lint-free absorbent tissue	Commercial item
	Wash Syringe Type 2	B16554
	Seal Assembly	B21251
	Piston	B16681
	Alcohol prep pads (70% Isopropyl alcohol)	Commercial item
Clean the Interior of the Reagent Refrigerators	Clean, dry, lint-free absorbent tissue	Commercial item
	Alcohol prep pads (70% Isopropyl alcohol)	Commercial item
Clean or Replace the Anti-static Brushes	Anti-static brushes (2 pieces)	MU852500
	Alcohol prep pads (70% Isopropyl alcohol)	Commercial item
Replace the Sample or Reagent Probe Tubing	Sample probe tubing	MU856000
	Reagent probe tubing	MU855900
	(ISE) Sample probe tubing	MU851900
Perform a W1	-	-
Replace Rack ID Labels	Rack ID labels	MU906600 to MU908500
Clean or Replace Individual Cuvettes	Cuvette (4 x 5 mm)	MU855200
	Cotton-tipped applicator	Commercial item
	Clean, dry, lint-free absorbent tissue	Commercial item
	2% Wash solution	• ODR2000 (4x5L) or OSR0001 (6x2L) (Outside Japan) • MS028400 (Japan)
	Plastic container	Commercial item
	Sonicator	Commercial item
Replace the Photometer Lamp	Photometer lamp	MU855000
Clean the Rack	Clean, dry, lint-free absorbent tissue	Commercial item
Clean the Rack Tray	Clean, dry, lint-free absorbent tissue	Commercial item
Clean the Rack Transfer Lanes	Clean, dry, lint-free absorbent tissue	Commercial item

Table 6.20 As Needed Analyzer Maintenance (Continued)

Maintenance Procedure	Part	Part Number
Save Parameters	-	-

Dilution Ratios for Maintenance Solutions

Table 6.21 Sodium Hypochlorite Solution

Effective Chlorite Concentration for Maintenance Solutions	Dilution Ratio of 5% chlorite concentration: 5% Sodium Hypochlorite Solution (US) ISE Cleaning Solution (Outside US and Japan) Sodium hypochlorite solution (5%) (Japan)
0.5%	1:10
1.0%	1:5

Table 6.22 Wash Solution

Dilution for Maintenance Solutions	Dilution Ratio (Wash Solution)
1%	1:100
2%	1:50

Daily Maintenance

Perform the following procedures daily.

- Inspect the Syringes for Leaks
- Inspect the Stability of the Upper Cover
- Inspect, Clean, and Prime the Sample Probes, Reagent Probes, and Mix Bars
- Replace the Deionized Water or Diluent in the Pre-dilution Bottles
- Replace the Sample Probe Wash Solutions
- Inspect the Printer and Paper
- Inspect the Handle on the Diluted Wash Solution Tank is in the Open Position

Inspect the Syringes for Leaks

Each analyzer unit includes sample syringes, reagent syringes, and wash syringes. If your system includes an ISE unit, the ISE unit includes a sample syringe, a wash syringe, and ISE buffer syringes.

- Two sample syringes and two wash syringes are located on the back of each analyzer unit behind the left door.
- The ISE sample syringe and wash syringe are located on the front of the ISE unit behind the door.
- The ISE buffer syringes are located on the front of the ISE unit behind the ISE reagents.

The sample and reagent syringes measure the volume of sample or reagent to be used in a reaction.

The wash syringes dispense only deionized water for cleaning the interior of the sample probe.

The two types of wash syringes:

- Wash Syringe Type 1
- Wash Syringe Type 2

Use either a Wash Syringe Type 1 or Wash Syringe Type 2 for the analyzer unit. For the ISE unit, only use Wash Syringe Type 1. To view the shape of each type of syringe, refer to Figure 6.11 Sample Syringe, Wash Syringe Type 1, Reagent Syringe, ISE Sample Syringe, ISE Wash Syringe Type 1, and ISE Buffer Syringe Parts and Figure 6.12 Wash Syringe Type 2 Parts.

The ISE buffer syringe measures the correct volume of buffer for the ISE.

If a syringe leaks, the leak causes possible failures to the syringe, probe, and analytes being tested.

Although the syringes are different sizes and serve different functions, you can inspect for correct performance using the same methods.

Inspect all components of the syringes, including the syringe case head, the syringe case body, the fixing nut, and the piston fixing screw for leaks and correct installation.

For more information on materials required, refer to Parts List for Analyzer Maintenance.

Materials Required:

- Clean, dry, lint-free absorbent tissue

  The procedure is identical for all syringes.

---

1 Confirm that the system is in *Warm up*, *Standby*, or *Stop* mode.

---

2 Open the front left door to access the reagent syringes and rear left door to access the sample and wash syringes on the analyzer units. Open the top ISE reagent cover to access the buffer syringes, or the front door of the ISE unit to access the ISE sample and wash syringes.

⚠ CAUTION

Do not allow a strong alkali, such as the wash solution, to contact the syringe case. If a strong alkali contacts the syringe case, cracks can occur.

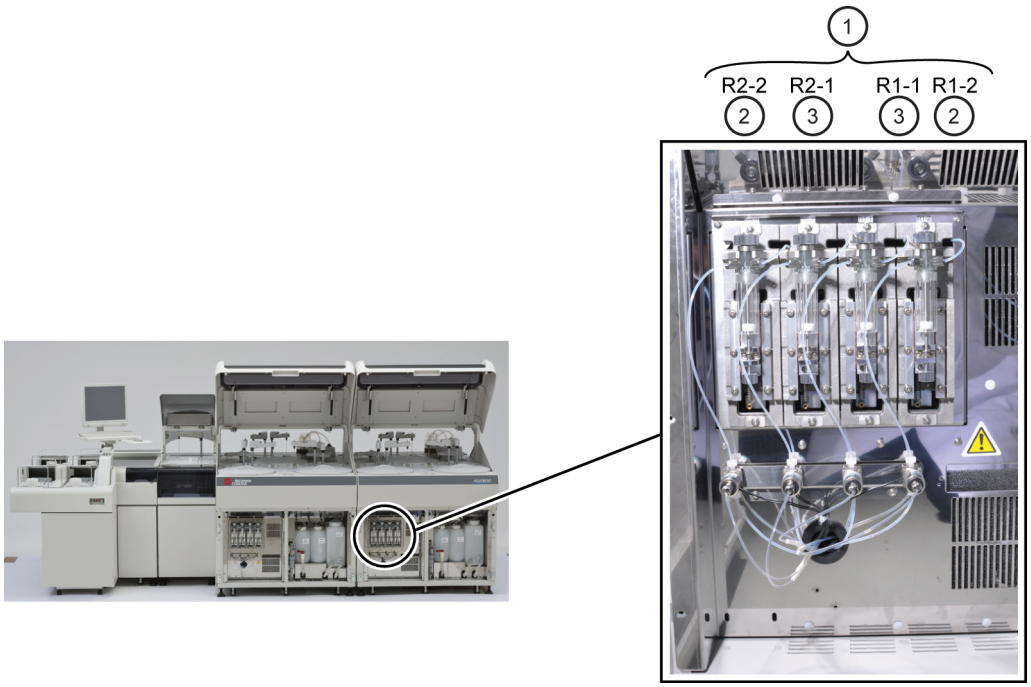
If a strong alkali contacts the syringe case, remove the syringe case and rinse it with water.

---

3 Visually inspect each syringe case head for any cracks or leaks. Use the clean, dry, lint-free absorbent tissue to confirm that the top and bottom connections for the syringe case head and the bottom fixing screw have no leaks. If you find a crack or a leak,

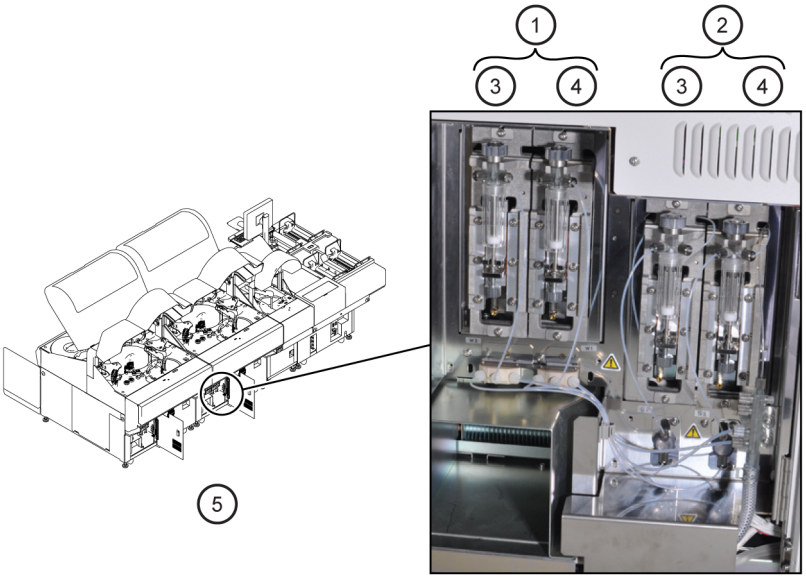
replace the syringe. For more information, refer to Replace the Sample, Reagent, ISE Sample, or ISE Buffer Syringe.

Figure 6.8 Reagent Syringe Location



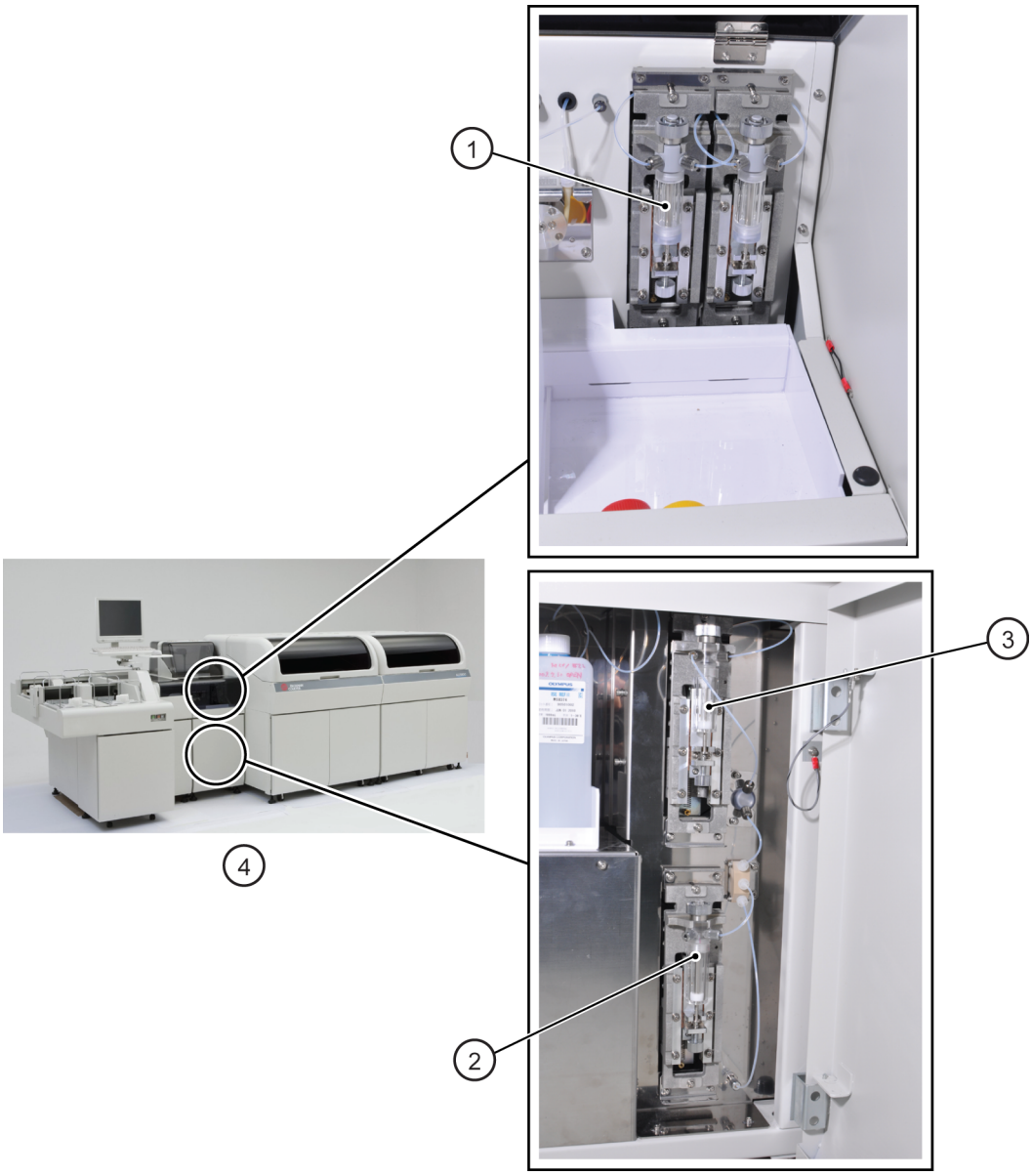
1. Reagent syringe
2. Outer
3. Inner

Figure 6.9 Sample Syringe and Wash Syringe Locations



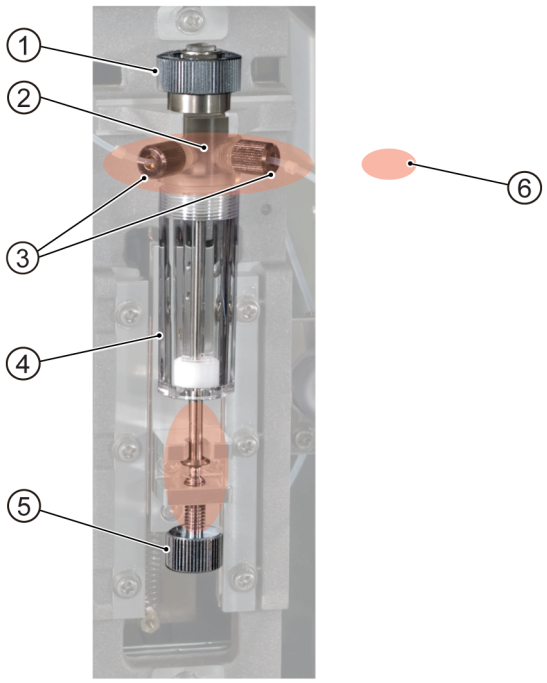
1. Wash syringes
2. Sample syringes
3. Outer
4. Inner
5. Rear of analyzer

Figure 6.10 ISE Syringe Location



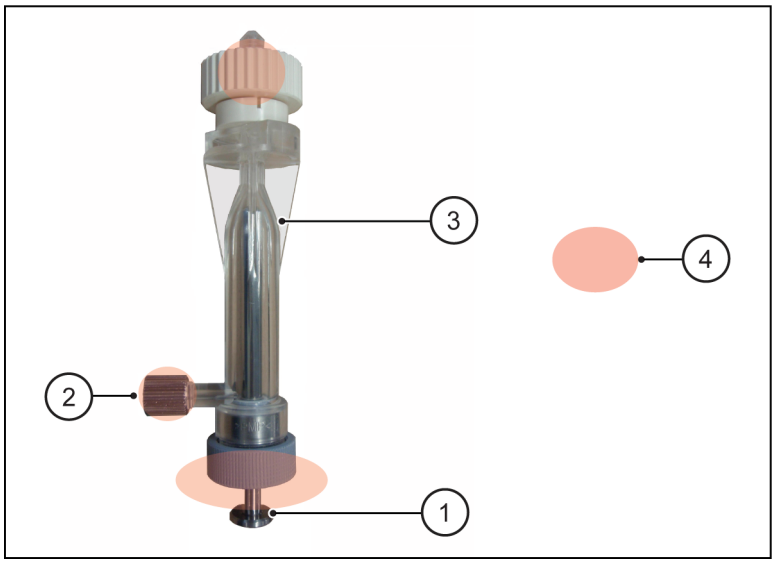
1. ISE Buffer syringes
2. ISE Wash syringe
3. ISE Sample syringe
4. Front of ISE unit

Figure 6.11 Sample Syringe, Wash Syringe Type 1, Reagent Syringe, ISE Sample Syringe, ISE Wash Syringe Type 1, and ISE Buffer Syringe Parts



1. Fixing nut
2. Case head (Syringe case)
3. Fixing screws
4. Case body (Syringe case)
5. Piston fixing screw
6. Possible leakage locations

Figure 6.12 Wash Syringe Type 2 Parts



1. Piston
2. Seal assembly
3. Wash syringe
4. Possible leakage locations

4 Confirm that the fixing nuts and piston fixing screws are tight. If a leak persists after you tighten the screws, replace the syringe.

CAUTION

If your skin, eyes, or mouth contact any liquid, immediately rinse the affected area with water. Follow your laboratory procedure.

5 Close all doors and covers in the Analyzer unit and ISE unit.

6 Update the Maintenance Log. For more information, refer to Update the Maintenance Log.

Inspect the Stability of the Upper Cover

Lift the upper cover of each analyzer unit and confirm that it is stable and remains in the raised position. If the cover starts to descend, contact Beckman Coulter to have the cover supports inspected and replaced.

Inspect, Clean, and Prime the Sample Probes, Reagent Probes, and Mix Bars

The probes deliver precise quantities of reagent or sample to the cuvettes.

The mix bars mix the contents in the cuvettes.

If the mix bars or probes are bent or damaged, or if the probes are clogged, you cannot achieve correct analysis.

Before you begin analysis, inspect the sample probes, reagent probes, and mix bars for damage or deterioration. Confirm that each probe operates correctly.

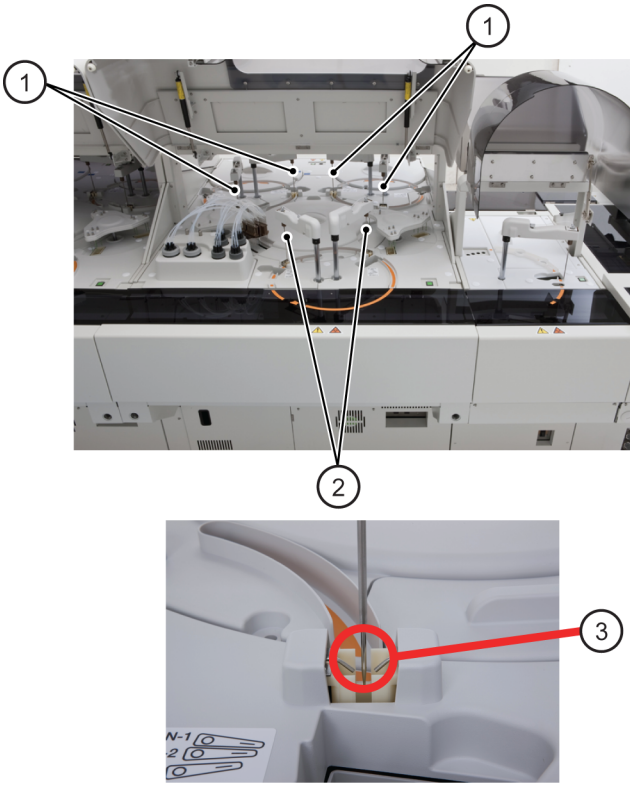
For more information on materials required, refer to Parts List for Analyzer Maintenance.

Materials Required:

- Alcohol prep pads (70% Isopropyl alcohol)

Inspect the Sample Probes and Reagent Probes

Figure 6.13 Sample Probes and Reagent Probes



1. Reagent probe
2. Sample probe
3. Probe wash position

1 Lift the upper covers of each analyzer unit.

2 Visually inspect that each probe is not bent or damaged. If a probe is bent or damaged, replace the probe. For more information, refer to Replace a Sample Probe, or Replace a Reagent Probe.

3 Inspect each probe for contaminants or crystallization. If a probe is dirty, wipe the surface with an alcohol prep pad (70% Isopropyl alcohol).

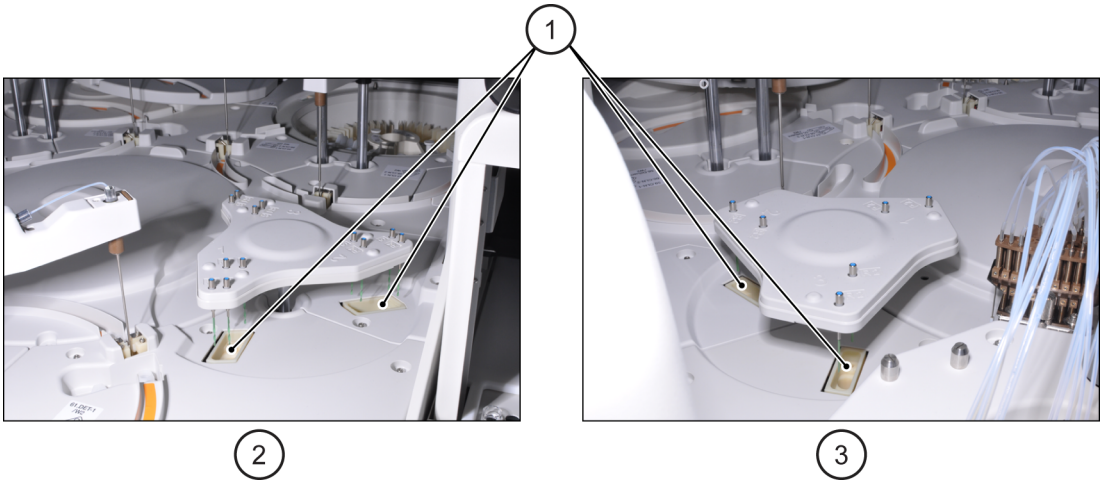
IMPORTANT

Do not bend the probe when cleaning.

4 If a probe is incorrectly aligned, contact Beckman Coulter.

Inspect the Mix bars

Figure 6.14 Mix bar wash wells



1. Mix bar wash wells
2. Mix bar component (R1, S)
3. Mix bar component (R2)

1 Inspect each mix bar. If a mix bar is bent, scratched, or has chips in the fluororesin coating, replace the mix bar. For more information, refer to Replace the Mix Bars.

2 Inspect each mix bar for contaminants or crystallization. If the mix bar is dirty, wipe the mix bar with an alcohol prep pad (70% Isopropyl alcohol).

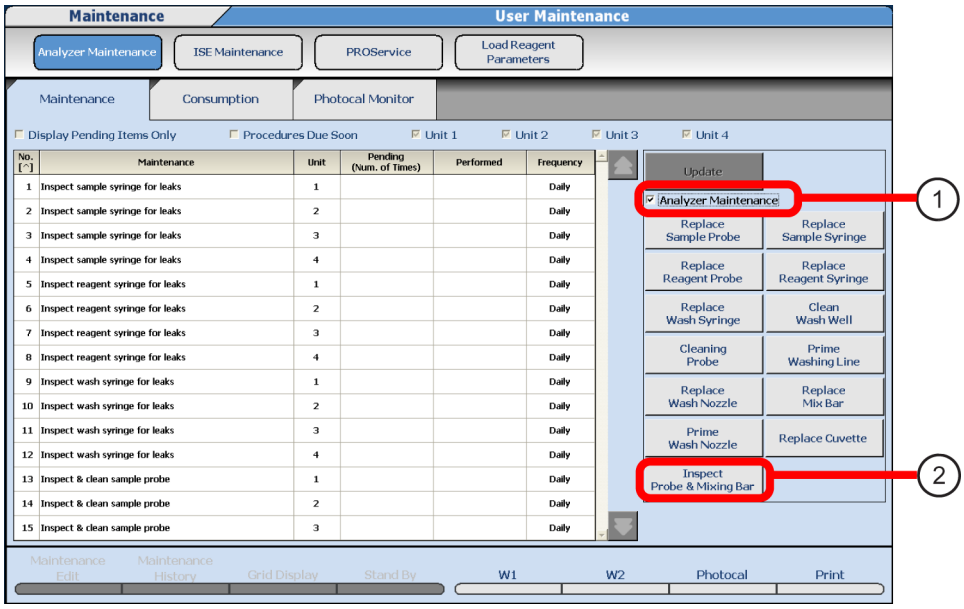
Confirm Operation of the Probes and Mix Bars

Prime the system to inspect the operation of the probes and mix bars.

1 Confirm that the system is in *Warm up* or *Standby* mode.

2 Select **Home** > **Analyzer Maintenance** > **Maintenance**. The system displays the Analyzer Maintenance: Maintenance tab.

Figure 6.15 Analyzer Maintenance: Maintenance tab



1. Analyzer Maintenance
2. Inspect Probe and Mixing Bar

3 Select the **Analyzer Maintenance** box. The system activates the maintenance operation buttons.

4 Select **Inspect Probe & Mixing Bar**. The system displays the Inspect Probe & Mixing Bar dialog.

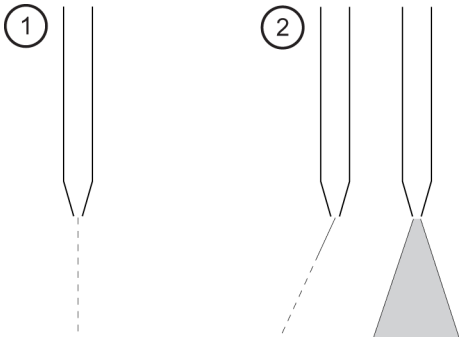
5 Select **OK**.

6 Press the **DIAG** button.
The system initializes the probes and mix bar components, then:

1. Dispenses deionized water from the two sample probes.
2. Dispenses deionized water from the R1 and R2 probes for inner cuvettes.
3. Dispenses deionized water from the R1 and R2 probes for outer cuvettes.
4. Activates the mix bar components.

7 As the system dispenses water, confirm that each probe dispenses a thin, straight stream of water, and that water flows in the wash wells.

Figure 6.16 Sample and Reagent Probes



1. Correct Flow
2. Incorrect Flow

a. If the water is spraying or dispensing at an angle, clean the probe. For more information, refer to Clean the Sample Probes and Mix Bars or Clean the R1 or R2 Reagent Probes.

b. If cleaning does not correct the problem, replace the probe. For more information, refer to Replace a Sample Probe, or Replace a Reagent Probe.

8 As the system activates the mix bar component, confirm that the mix bars align correctly in the wash wells. If a mix bar does not align correctly, contact Beckman Coulter.

9 Repeat steps 6 to 8 as required to inspect all probes and mix bars.

10 Clear the **Analyzer Maintenance** box to deactivate the maintenance operation buttons.

11 Update the Maintenance Log. For more information, refer to Update the Maintenance Log.

Replace the Deionized Water or Diluent in the Pre-dilution Bottles

1 Discard the water or diluent in the pre-dilution bottles, indicated by the 55. Diluent/W2 and 56. Diluent/W2 label close to the R1 refrigerator on each analyzer unit.

2 Rinse the bottles twice with deionized water.

3 Fill the bottles with deionized water or diluent and replace the bottles on the analyzer unit.

Replace the Sample Probe Wash Solutions

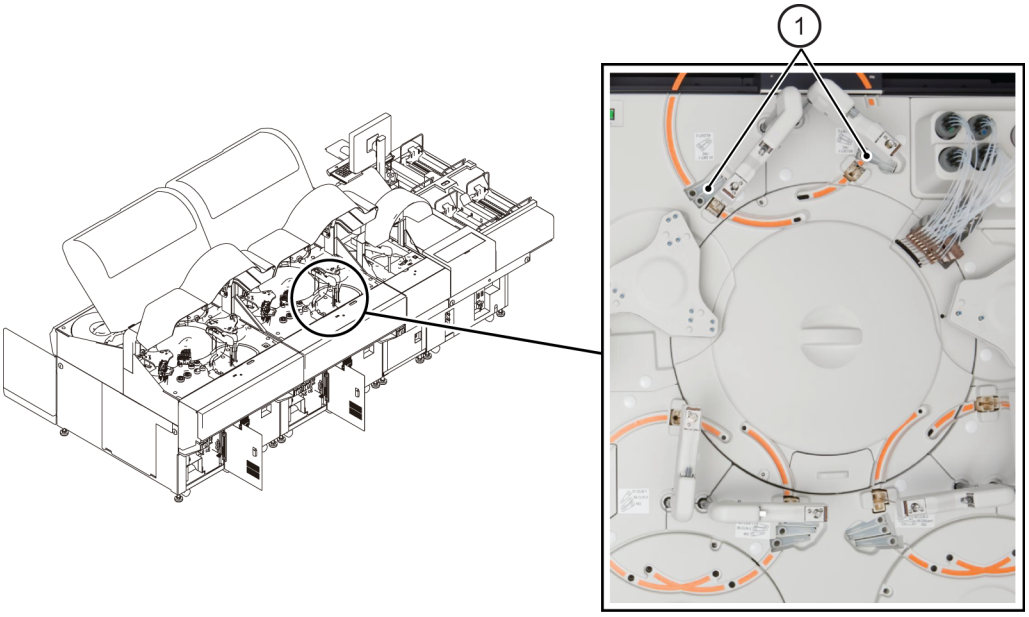
The sample probe wash solution bottles are located in the positions labeled 61. DET-1/W2, 62. DET-2, 63. DET-1/W2 and 64. DET-2 on each analyzer unit, and DET-1/W1 and DET-2 on the ISE unit.

For more information on materials required, refer to Parts List for Analyzer Maintenance.

Materials Required:

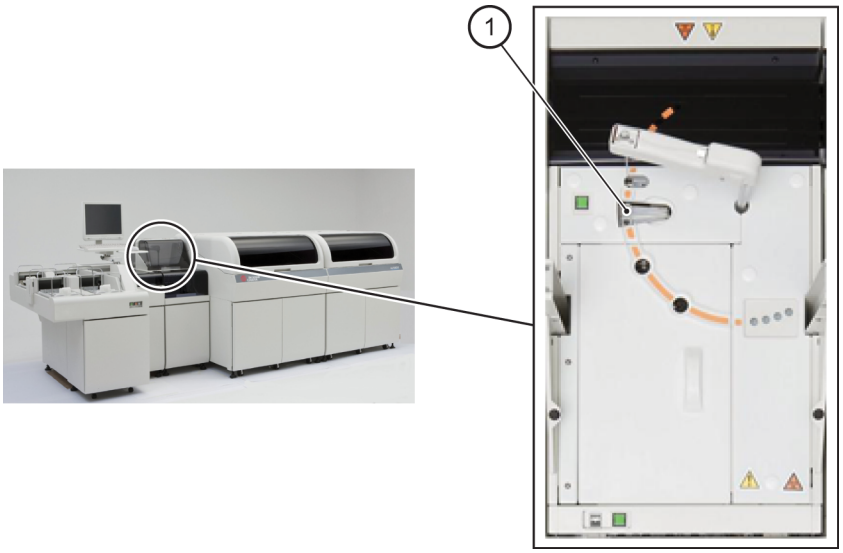
- 2% Wash solution
- Sodium hypochlorite solution (1.0%)
- 60 mL reagent bottles (4 for each analyzer unit and 2 for the ISE unit)

Figure 6.17 Location of Sample Probe Wash Solution for Analyzer Unit



1. Sample probe wash solution set position

Figure 6.18 Location of ISE sample Probe Wash Solution



1. ISE sample probe wash solution set position

NOTE

Sodium hypochlorite solution (1.0%) is only required for laboratories using the AU5800 with high sample volume or dialysis patients.

If you have a normal volume of samples that are not highly viscous, fill the bottles with approximately 50 mL, as follows:

- Position 61. DET-1/W2: 2% wash solution
- Position 62. DET-2: 2% wash solution
- Position 63. DET-1/W2: 2% wash solution
- Position 64. DET-2: 2% wash solution
- (ISE) Position DET-1/W2: 2% wash solution
- (ISE) Position DET-2: 2% wash solution

If you have a high volume of samples or use the analyzer for dialysis patient samples, fill the bottles with approximately 50 mL, as follows:

- Position 61. DET-1/W2: 2% wash solution
- Position 62. DET-2: sodium hypochlorite solution (1.0%)
- Position 63. DET-1/W2: 2% wash solution
- Position 64. DET-2: sodium hypochlorite solution (1.0%)
- (ISE) Position DET-1/W2: 2% wash solution
- (ISE) Position DET-2: sodium hypochlorite solution (1.0%)

For more information on materials required, refer to Parts List for Analyzer Maintenance.

For more information, refer to Dilution Ratios for Maintenance Solutions.

WARNING

Wear Personal Protective Equipment (PPE) such as gloves, eye shields, and lab coats, to handle the solution. If the solution contacts skin or clothes, rinse the affected area thoroughly with water. If the solution contacts the eyes or mouth, immediately flush with water. Seek medical attention. Refer to the Safety Data Sheets (SDS) for more information. Follow your laboratory procedure to wipe up spills immediately.

CAUTION

When using sodium hypochlorite solution (1.0%) as a sample probe wash solution, follow these precautions:

- **Prepare fresh sodium hypochlorite solution and completely replace the solution in the bottle once a day.**
- **If you anticipate not using the analyzer for two days or longer, remove the solution from the system and discard the solution to prevent analyzer corrosion.**
- **If any solution spills on the analyzer, clean the area with an absorbent tissue, and wipe it dry with a clean absorbent tissue.**

- **Do not mix the solution with other chemicals. If the solution becomes contaminated, follow your laboratory procedure to dispose of the solution.**

NOTE

Follow your laboratory procedure for replacing the 2% wash solution in the bottles. Beckman Coulter recommends replacing the 2% wash solution daily.

1. Remove each wash solution bottle and inspect the level of solution.
2. As required, fill each bottle to approximately 50 mL of the solution used in your laboratory.
3. Replace the bottle on the analyzer.
4. Close all analyzer doors and covers.

Inspect the Printer and Paper

The printer is an optional part. Before you begin daily analysis, confirm that the printer is turned on and that there is enough paper in the printer.

For more information, refer to the manual supplied with the printer.

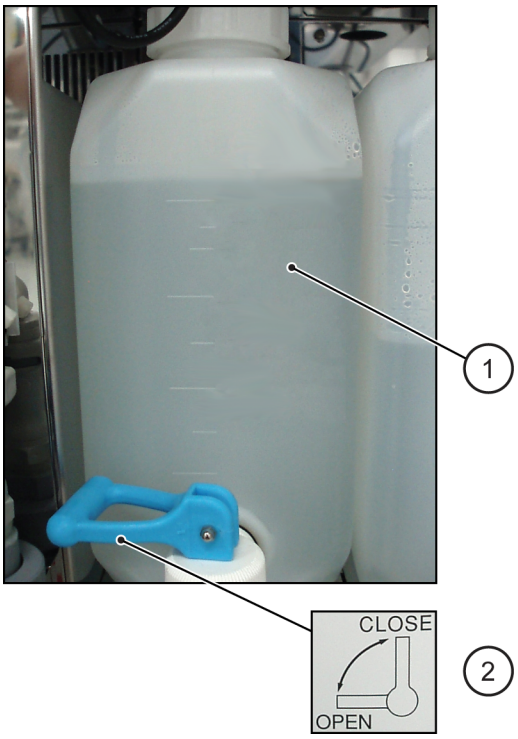
1. Confirm that the printer is on. The printer displays a ready message.
2. Confirm that there is enough paper in the printer.
3. Update the Maintenance Log. For more information, refer to Update the Maintenance Log.

Inspect the Handle on the Diluted Wash Solution Tank is in the Open Position

To be sure that the cuvettes and mix bars are cleaned correctly during analysis, inspect the handle on the diluted wash solution tank is in the OPEN position.

1. Open the right front door of each analyzer unit.
2. Confirm that the handle of each diluted wash solution tank is in the OPEN position. Turn the handle to the OPEN position if the handle is in the CLOSE position.

Figure 6.19 Inspect the Handle on the Diluted Wash Solution Tank in the Analyzer Unit



1. Diluted Wash Solution Tank
2. Handle: OPEN position

3 Close all the analyzer doors and covers.

Weekly Maintenance

Perform the following procedures weekly.

- Clean the Sample Probes and Mix Bars
- Perform a W2
- Perform a Photocal
- Clean the Pre-dilution Bottles

Clean the Sample Probes and Mix Bars

CAUTION

If the sample probes or mix bars are contaminated or stained, carryover between samples can occur. Clean the sample probes and mix bars weekly to prevent contamination and to provide correct analysis and results.

Clean the Sample Probes

For more information on materials required, refer to Parts List for Analyzer Maintenance.

Materials Required:

- Alcohol prep pads (70% Isopropyl alcohol)
- Stylet 0.2φ (diameter)

1 Confirm that the system is in *Warm up* or *Standby* mode.

2 Lift the rear upper cover of each analyzer unit and ISE unit.

3 Unscrew the connector above the sample probe.

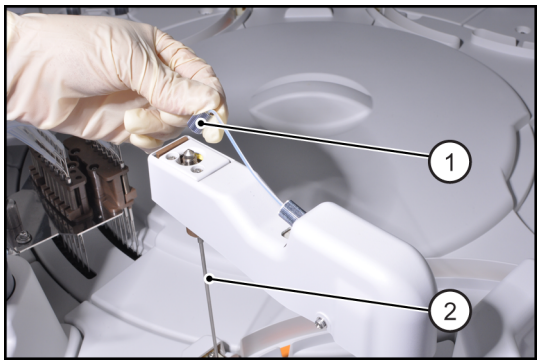
CAUTION

Replace one sample probe at a time to avoid problems if a sample probe was replaced on for the inner/outer cuvettes, or a different unit.

IMPORTANT

Do not bend or damage the sample probe when you replace it.

Figure 6.20 Remove the Sample Probe for Cleaning



1. Connector
2. Sample probe

4 After all the liquid drips from the probe, lift the probe from the arm.

5 Wipe the tip of the probe with an alcohol prep pad (70% Isopropyl alcohol).

6 Carefully insert the stylet into the probe to remove any potential obstruction.

7 Reinstall the probe into the arm, attach the connector to the top of the probe, and tighten the connector.

8 Select **Home** > **Analyzer Maintenance** > **Maintenance**. The system displays the Analyzer Maintenance: Maintenance tab. Or select **Home** > **Analyzer Maintenance** > **ISE Maintenance** > **Maintenance**. The system displays the ISE Maintenance: Maintenance tab.

9 Select the **Analyzer Maintenance** box. The system activates the Analyzer maintenance operation buttons. Or select the **ISE Maintenance** box. The system activates the ISE maintenance operation buttons.

10 Select **Replace Sample Probe**. The system displays the Replace Sample Probe dialog.

11 For analyzer units, for **Cuvette**, select **Inner** for the S1 probe, **Outer** for the S2 probe or **Both**.

For **Times**, enter **3**, and then select **OK**.

12 Press the **DIAG** button. Confirm that a thin straight stream of water is dispensed from the probe, and that the water does not spray or dispense at an angle. If the water sprays or dispenses at an angle occurs, replace the probe. For more information, refer to Replace a Sample Probe.

13 Repeat for all sample probes on the analyzer and ISE units, and confirm that all sample probes are on each analyzer unit and ISE unit.

14 Clear the **Analyzer Maintenance** box or the **ISE Maintenance** box to deactivate the maintenance operation buttons.

15 Update the Maintenance Log. For more information, refer to Update the Maintenance Log.

Clean the Mix Bars

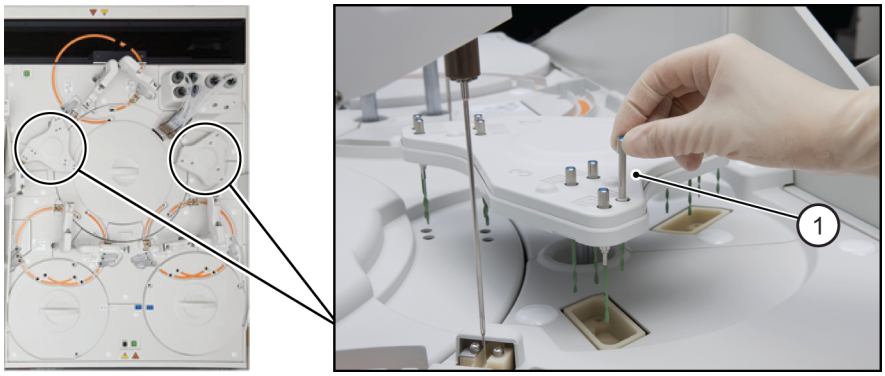
For more information on materials required, refer to Parts List for Analyzer Maintenance.

Materials Required:

- Alcohol prep pads (70% Isopropyl alcohol)

1 Lift the mix bars up to remove them and wipe them with an alcohol prep pad (70% Isopropyl alcohol).

Figure 6.21 Remove the Mix Bars for Cleaning



1. Mix bar

CAUTION

When cleaning the mix bars, confirm that the mix bars are not bent and that the coating is not scratched. Replace the mix bars if they are damaged. When inserting the mix bars into the mix bar component, do not scratch the mix bars. Scratched or damaged mix bars can cause sample carryover and affect results.

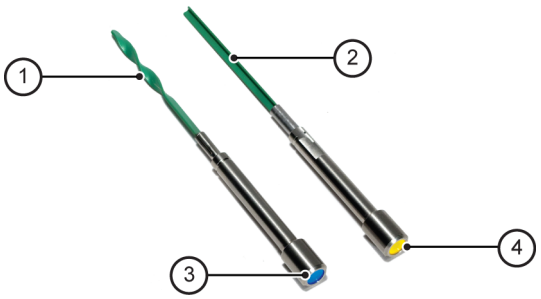
2 Insert the 12 spiral-shape mix bars (blue top) in the positions labeled R1/S and the 6 L-shape mix bars (yellow top) in the positions labeled R2 for each mix bar component on each analyzer unit.

CAUTION

Do not scratch the mix bar when inserting the mix bar into the mix bar component. Scratched or damaged mix bars can cause sample carryover and affect results.

Rotate each mix bar slightly in order to insert completely.

Figure 6.22 Mix Bars



1. Spiral-shaped mix bar
2. L-shaped mix bar
3. Blue
4. Yellow

CAUTION

The shapes of the mix bars differ between mix types. If the spiral and L-shaped mix bars are not placed in the correct mix bar component, analysis results can be affected. The placement of each mix bar shape:

- **R1 and S positions: Spiral-shaped mix bar**
- **R2 positions: L-shaped mix bar**

3 Select the **Analyzer Maintenance** box. The system activates the maintenance operation buttons.

4 Select **Prime Washing Line**. The system displays the Prime Washing Line dialog.

5 For **Times**, enter **1**, and then select **OK.**

6 Press the **DIAG** button. Watch the mix bar component perform a sequence to confirm correct operation. If an abnormal noise occurs during mixing, replace the mix bar. For more information, refer to Replace the Mix Bars.

7 Close all analyzer doors and covers.

8 Clear the **Analyzer Maintenance** box to deactivate the maintenance operation buttons.

9 Update the Maintenance Log. For more information, refer to Update the Maintenance Log.

Perform a W2

To obtain correct analysis results, clean the cuvettes once a week. The sample probes, reagent probes, mix bars, and waste lines are thoroughly cleaned during the W2 process.

The W2 prepares the cuvettes for the photocal by thoroughly cleaning them. The sample probes, reagent probes, mix bars, and waste lines also benefit from the cleaning procedure.

Perform a photocal to inspect the integrity of the cuvettes. Clean or replace cuvettes that show an abnormal value during a photocal. For more information, refer to Perform a Photocal.

The W2 is accomplished by running 1N hydrochloric acid or sodium hypochlorite solution (0.5%) through the system.

- Each week, alternate the cleaning solution that you use.
- The 1N hydrochloric acid removes stains formed by protein deposits left in the cuvettes.
- The sodium hypochlorite solution (0.5%) removes a small quantity of inorganic substances such as metallic ions and any bacterial contamination.

A W2 takes about 30 minutes to complete from start to finish.

WARNING

The mixing of sodium hypochlorite solution (0.5%) and hydrochloric acid causes the formation of chlorine gas, which is highly toxic. Do not mix sodium hypochlorite solution (0.5%) and hydrochloric acid. Confirm that all W2 cleaning solution containers on the analyzer contain the same cleaning solution. Clearly label containers designated for sodium hypochlorite solution (0.5%) and hydrochloric acid and confirm that all positions requiring W2 cleaners contain the same cleaning solution.

WARNING

Wear Personal Protective Equipment (PPE) such as gloves, eye shields, and lab coats, to handle hydrochloric acid or sodium hypochlorite solution (0.5%). If the hydrochloric acid or sodium hypochlorite solution (0.5%) contacts skin or clothes,

rinse the affected area thoroughly with water. If the hydrochloric acid or sodium hypochlorite solution (0.5%) contacts the eyes or mouth, immediately flush with water. Seek medical attention. Refer to the Safety Data Sheets (SDS) for more information. Follow your laboratory procedure to wipe up spills immediately.

WARNING

Do not spill any cleaning solution on the system. If cleaning solution is spilled on the system, follow your laboratory procedure to wipe up spills immediately.

CAUTION

For each procedure, prepare a fresh sodium hypochlorite solution (0.5%). Prepare a fresh solution to maintain effective cleaning. Without effective cleaning, analysis results can be affected.

The ISE Enhanced Cleaning procedure is optional during the W2. To run the ISE Enhanced Cleaning procedure separately from the W2, refer to Enhanced Cleaning of Electrode Line.

For more information on materials required, refer to Parts List for Analyzer Maintenance.

Materials required for each analyzer unit:

- Six 60 mL bottles:
  - Six 60 mL bottles labeled 1 N hydrochloric acid

    or
  - Six 60 mL bottles labeled sodium hypochlorite solution (0.5%).
- Cleaning Solutions:
  - Approximately 360 mL of 1N hydrochloric acid or 360 mL of sodium hypochlorite solution (0.5%)

Materials required for the ISE (optional unit).

For W2:

- One 60 mL bottle:
  - One 60 mL bottle labeled 1 N hydrochloric acid

    or
  - One 60 mL bottle labeled sodium hypochlorite solution (0.5%)
- Cleaning solution:
  - Approximately 60 mL of 1N hydrochloric acid or 60 mL of sodium hypochlorite solution (0.5%)

For Enhanced Cleaning:

- Hitachi Cup
- ISE Cleaning Solution

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1 Confirm that the system is in *Warm up* or *Standby* mode.

2 Fill the 60 mL bottles with approximately 60 mL of the cleaning solution selected for the procedure of the week. If sodium hypochlorite solution was used previously for the W2, use hydrochloric acid for the current procedure.

Do not fill past the neck of the bottle.

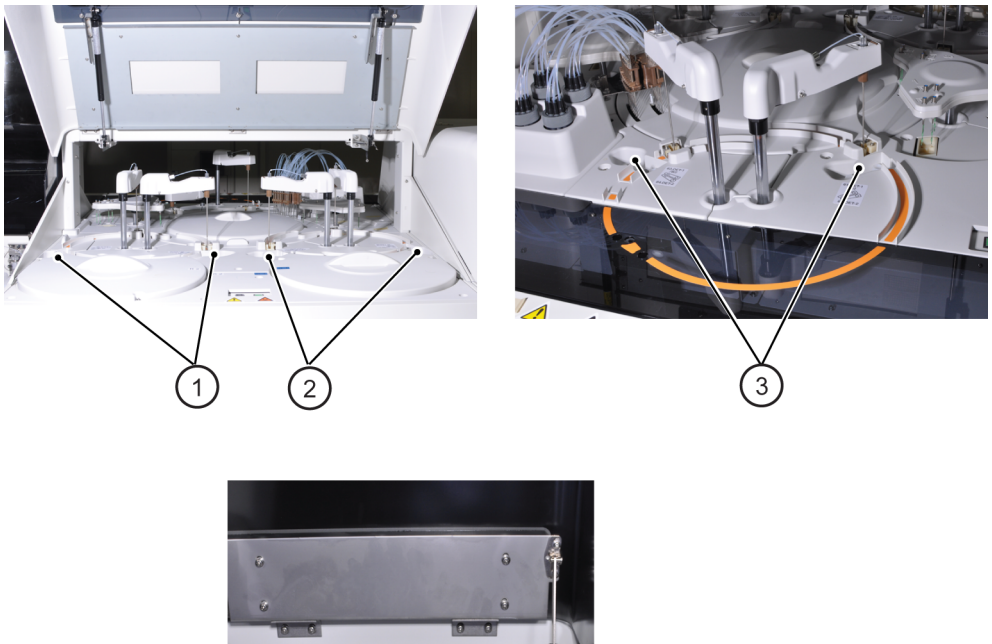
WARNING

The mixing of sodium hypochlorite solution (0.5%) and hydrochloric acid causes the formation of chlorine gas, which is highly toxic. Do not mix sodium hypochlorite solution (0.5%) and hydrochloric acid. Confirm that all W2 cleaning solution containers on the analyzer contain the same cleaning solution. Clearly label containers designated for sodium hypochlorite solution (0.5%) and hydrochloric acid and confirm that all positions requiring W2 cleaners contain the same cleaning solution.

3 Lift the upper covers of each analyzer unit and ISE unit.

4 Place the bottles in the positions labeled W2 on each analyzer unit and ISE unit. Remove diluent and cleaning bottles as needed when placing the W2 bottles. If a photocal is also selected, close the upper cover.

Figure 6.23 W2 Positions



1. R2: Two positions labeled W2
2. R1: Two positions labeled 55.Diluent/W2 and 56.Diluent/W2
3. Sample: Two positions labeled 61.DET-1/W2 and 63.DET-1/W2
4. ISE sample probe: One position labeled Det-1/W2

WARNING

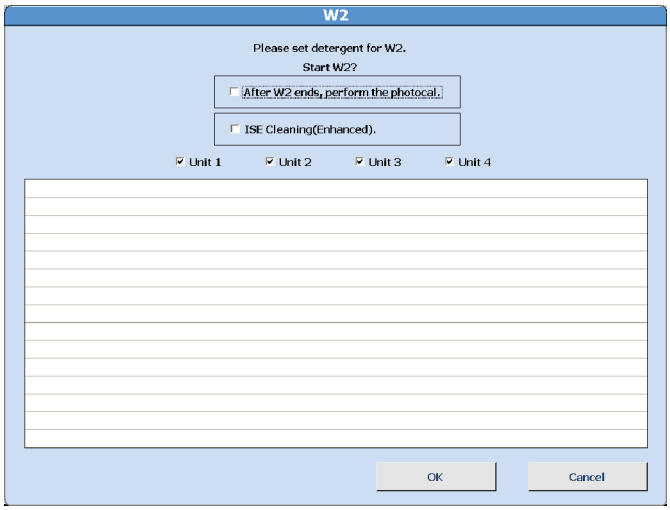
Do not spill any cleaning solution on the system. If cleaning solution is spilled on the system, follow your laboratory procedure to wipe up spills immediately.

5 Fill a Hitachi cup with 1.5 mL ISE Cleaning Solution if **ISE Cleaning (Enhanced)** is selected. Place the cup in the CLEAN position on the ISE unit.

6 Select **Home** > **Analyzer Maintenance** > **Maintenance**. The system displays the Analyzer Maintenance: Maintenance tab.

7 Select **W2 (F6)**. The system displays the W2 dialog.

Figure 6.24 W2 Dialog



8 Decide whether to start the photocal immediately when the W2 is complete, without operator input. Also, the weekly ISE Cleaning (Enhanced) procedure can be run with the W2 without adding any time to the procedure.

- If you want to start the photocal after the W2 completes, select **After W2 ends, perform the photocal**.
- To start the ISE cleaning procedure during the W2, select **ISE Cleaning (Enhanced)**.
- The system selects all units by default. If a unit is not required, deselect the **Unit**.

9 Select **OK**. The W2 starts and takes 30 minutes to complete. You can view the time countdown in the mode display area. If you selected **After W2 ends, perform the photocal** in step 8, the photocal starts automatically. If you did not select **After W2 ends, perform the photocal**, when the W2 completes, the analyzer enters *Standby* mode.

CAUTION

The cleaning solution bottles can generate gas. After the W2 is complete, immediately remove the W2 cleaning solution bottles from the system.

10 Remove all maintenance materials used for the W2 procedure. Replace the diluent and cleaning bottles into the corresponding positions on the analyzer.

11 The Maintenance Log is automatically updated.

Perform a Photocal

When the W2 is finished, perform a photocal. You can start the photocal from the W2 Start dialog. If you selected the photocal in the W2 procedure, refer to View the Photocal Results.

The photocal confirms the integrity of the cuvettes. The photocal detects dirt, stains, or scratches and identifies cuvettes that require cleaning or replacing.

If you did not select the photocal with the W2 procedure, you can start the photocal using the following procedure.

IMPORTANT

For optimal results, only perform a photocal measurement when the photometer lamp is stabilized after the system starts up. The photometer lamp needs approximately 20 minutes to stabilize (warm up) after the system starts up.

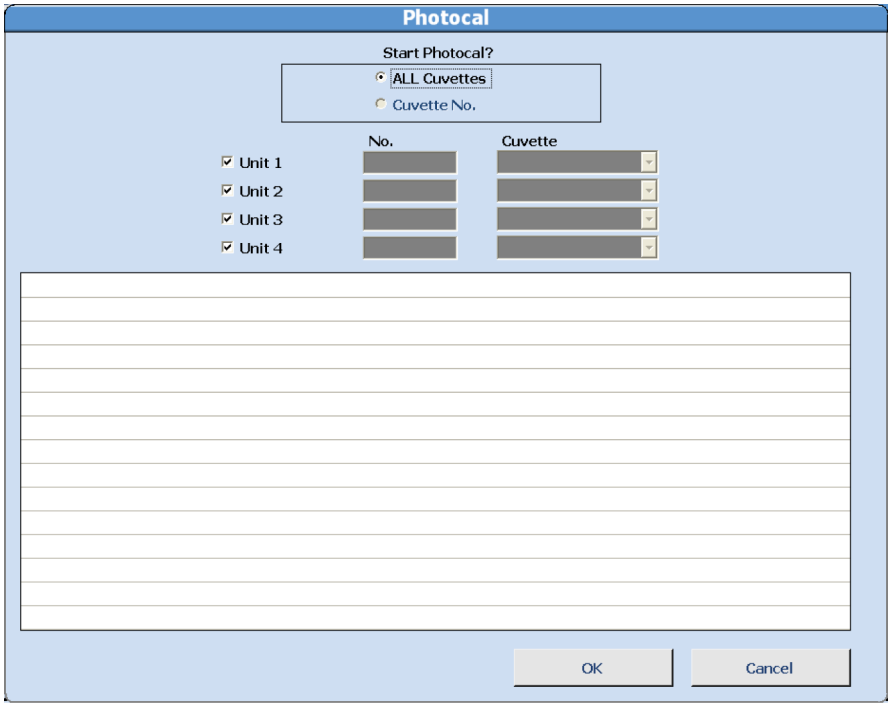
1 Confirm that the system is in *Standby* mode.

2 Confirm that all covers and doors are closed.

3 Select **Home** > **Analyzer Maintenance** > **Maintenance**. The system displays the Analyzer Maintenance: Maintenance tab.

4 Select **Photocal (F7)**. The system displays the Photocal dialog.

Figure 6.25 Photocal Dialog



5 Select **ALL Cuvettes** to perform the photocal.

NOTE

The system selects all units by default. If a unit is not required, deselect the **Unit**.

NOTE

If individual cuvettes fail, the cuvette might need cleaning or replacement. To perform a photocal on an individual cuvette after it was cleaned or replaced, select **Cuvette No.** Select the **Unit**, then for **No.**, enter the cuvette number and for **Cuvette,** enter **Inner** or **Outer**.

6 Select **OK**. The photocal starts. The photocal takes 30 minutes to complete. The system automatically moves to *Standby* mode after the photocal is complete. The Maintenance Log is automatically updated.

NOTE

For a specific cuvette, the photocal takes approximately 8 minutes.

NOTE

The system automatically saves the first photocal value after you update Replacing Photocal Lamp in the Consumption tab. The system uses this photocal value as the reference value in **Photocal Monitor** > **Detail (F5)** > **Graph**.

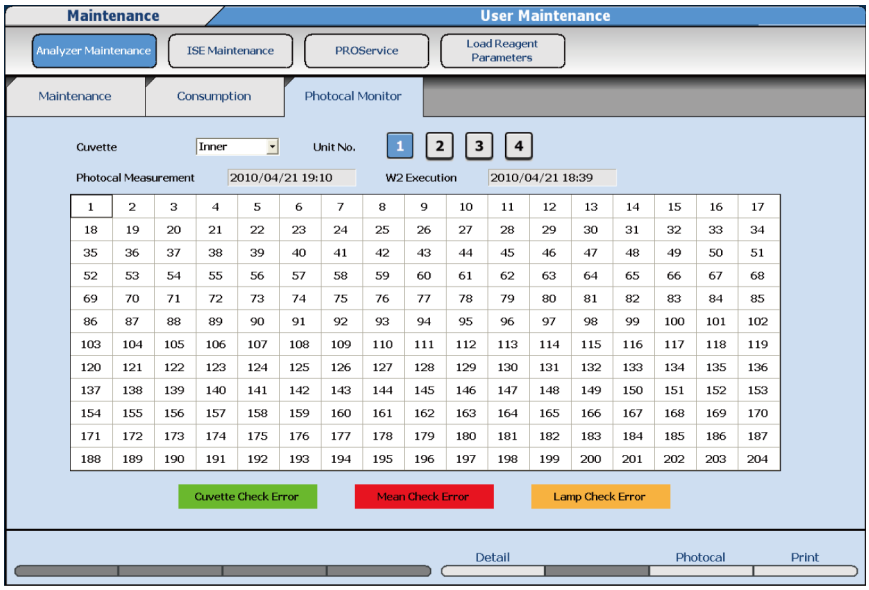
View the Photocal Results

If a cuvette fails the photocal, the system generates an audible alarm. Perform the following corrective action.

1 Select **Home > Analyzer Maintenance > Photocal Monitor**. If the cuvette fails the photocal, the system highlights the cuvette number.

2 Select the **Unit No.** and **Cuvette** for **Inner** or **Outer**.

Figure 6.26 Analyzer Maintenance: Photocal Monitor Tab



3 Clean or replace any cuvettes failing the Mean Check or Cuvette Check.

— The system displays cuvettes with a Mean Check Error in red. The cuvette is probably dirty and can be cleaned. For more information, refer to Clean or Replace Individual Cuvettes.

— The system displays cuvettes with a Cuvette Check Error in green. The cuvette is probably scratched and needs replacement. For more information, refer to Clean or Replace Individual Cuvettes.

4 Replace the photometer lamp if any cuvettes failed the Lamp Check.

— The system displays cuvettes with a Lamp Check Error in orange. The photometer lamp is deteriorating and needs replacement. For more information, refer to Replace the Photometer Lamp.

5 Select the **Maintenance** tab.

6 Select **Photocal (F7)**. The system displays the Photocal dialog.

— Repeat the photocal on each cuvette that fails the Mean Check or Cuvette Check. Select **Cuvette No.** first, then select the **Unit**, enter the cuvette number for **No.** and select **Inner** or **Outer** in **Cuvette**. The photocal takes approximately 8 minutes to complete.

— Repeat the photocal on all cuvettes if any cuvettes fail the Lamp Check and the lamp was replaced, or numerous cuvettes failed the Mean Check or Cuvette Check. Select **All Cuvettes** in the Photocal dialog. The photocal takes 30 minutes to complete.

7 If any cuvettes fail the photocal again, repeat steps 1 to 6.

8 To print photocal results, go to the Photocal Monitor tab. Select **Print (F8)** and then **OK**.

NOTE

The system only prints data for cuvettes that fail the photocal.

NOTE

If a cuvette fails the photocal after cleaning, replace the cuvette with a new cuvette and repeat the photocal.

9 Confirm that all cuvettes have passed the photocal and run QC before processing samples.

Clean the Pre-dilution Bottles

When the pre-dilution bottles remain on each analyzer unit without being periodically cleaned, bacterial contamination can occur.

To maintain the reliability of the analyzer and prevent contamination, clean the pre-dilution bottles once each week.

For more information on materials required, refer to Parts List for Analyzer Maintenance.

Materials Required for each Analyzer Unit:

- Sodium hypochlorite solution (0.5%)
- Two extra 60 mL bottles (optional)

1 Confirm that the system is in *Warm up* or *Standby* mode.

2 Lift the back upper cover of each analyzer unit.

3 Remove the pre-dilution bottles from the analyzer and discard the deionized water. The pre-dilution bottles are located outside of the R1 refrigerator in the position labeled 55.Diluent/W2 and 56.Diluent/W2.

4 Wash the pre-dilution bottle by filling it with sodium hypochlorite solution (0.5%).

5 Rinse well with deionized water.

6 If extra 60 mL bottles are available, fill them with deionized water and place them on the analyzer while you rinse and air dry the original bottles. Alternate the weekly use of each bottle. If extra bottles are not available, thoroughly rinse the bottles to remove any sodium hypochlorite solution (0.5%) residue which affects analysis results.

7 Select **Home** > **Analyzer Maintenance** > **Maintenance**. The system displays the Analyzer Maintenance: Maintenance tab.

8 Update the Maintenance Log. For more information, refer to Update the Maintenance Log.

Monthly Maintenance

Perform the following procedures monthly.

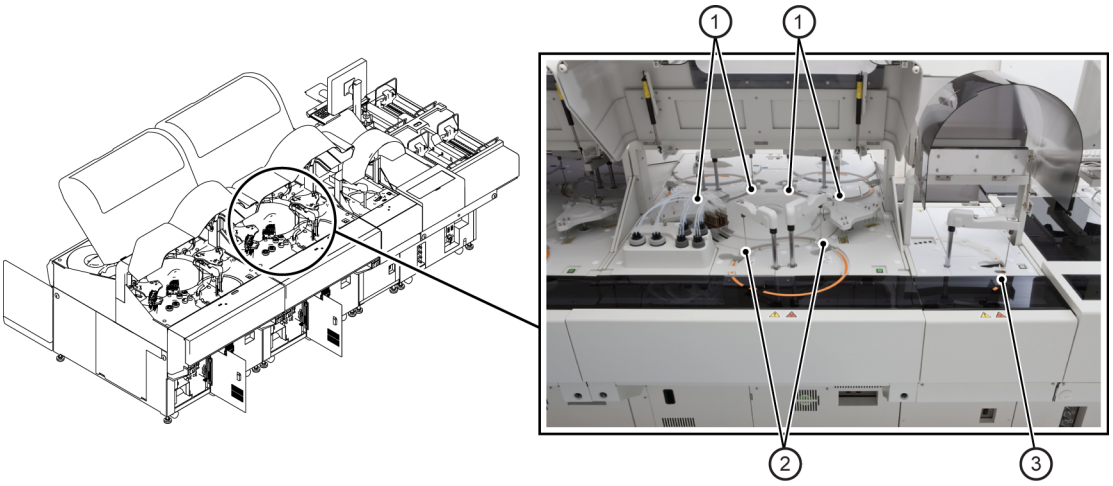
- Clean the Sample Probe and Reagent Probe Wash Wells
- Clean the Mix Bar Wash Wells
- Clean the Wash Nozzle Component and Inspect the Tube Mounting Joints
- Clean the Deionized Water Tank Deionized Water Filter and Sample Probe Filter

Clean the Sample Probe and Reagent Probe Wash Wells

Dirty wash wells can cause incorrectly cleaned probes, which can then contaminate reagents or samples.

To maintain the reliability of the analyzer and prevent contamination, clean the wash wells monthly.

Figure 6.27 Reagent and Sample Probe Wash Wells



1. Reagent probe wash wells
2. Sample probe wash wells
3. Sample probe wash well (ISE option)

For more information on materials required, refer to Parts List for Analyzer Maintenance.

Materials Required:

- Sodium hypochlorite solution (0.5%)
- Cotton-tipped applicator
- Disposable pipette

1 Confirm that the system is in *Warm up* or *Standby* mode.

2 Lift the front and back upper covers of each analyzer unit.

3 Select **Home** > **Analyzer Maintenance** > **Maintenance**. The system displays the Analyzer Maintenance: Maintenance tab. For the ISE, select **Home** > **Analyzer Maintenance** > **ISE Maintenance**.

4 Select the **Analyzer Maintenance** box. For the ISE, select **ISE Maintenance** box. The system activates the maintenance operation buttons.

5 Select **Clean Wash Well**. The system displays the Clean Wash Well dialog.

6 The system selects all units by default. If a unit is not required, deselect the **Unit**.

7 Select **OK**.

8 Press the **DIAG** button. The sample and reagent probes initialize. All probes for the inner cuvettes move from their home positions over the wash wells to the cuvettes. If the system has an ISE unit, the ISE sample probe moves from the home position over the wash well to the ISE solution position.

CAUTION

Do not spill sodium hypochlorite solution outside the wash well. Follow your laboratory procedure to wipe up spills immediately.

IMPORTANT

While cleaning the interior of the wash well, avoid touching the sample probe and reagent probe.

9 Using a pipette, dispense the sodium hypochlorite solution (0.5%) into each sample probe and reagent probe wash wells for the inner cuvettes or the ISE.

10 Use a cotton-tipped applicator to clean each well. Use a different cotton-tipped applicator for each wash well to avoid any contamination. If the system has an ISE unit, skip steps 11 through 13. Go to step 14.

11 Press the **DIAG** button twice. All probes for outer cuvettes move from their home positions over the wash wells to the cuvettes.

12 Using a pipette, dispense the sodium hypochlorite solution (0.5%) into each sample probe and reagent probe wash wells for the outer cuvettes.

13 Use a cotton-tipped applicator to clean each well. Use a different cotton-tipped applicator for each wash well to avoid any contamination.

14 For the analyzer unit, select **Prime Washing Line**. The system displays the Prime Washing Line dialog. For the ISE unit, select **Replace Sample Probe**. The system displays the Replace Sample Probe dialog.

15 For **Times**, enter **3**, and then select **OK.**

16 Press the **DIAG** button. After initialization, the system primes water through the probes and wash wells. Visually inspect the probe wash wells for correct drainage. If drainage is poor, repeat steps 4 to 15.

17 Close all the doors and covers on all the analyzer units and the ISE unit.

18 Clear the **Analyzer Maintenance** box or the **ISE Maintenance** box to deactivate the maintenance operation buttons.

19 Update the Maintenance Log. For more information, refer to Update the Maintenance Log.

Clean the Mix Bar Wash Wells

In normal operation, the mix bar wash wells clean the outside surface of each mix bar by washing in 1% wash solution and then rinsing with deionized water.

Dirty wash wells can cause incorrectly cleaned mix bars, which can cause carryover problems.

To maintain the reliability of the analyzer and prevent contamination, clean the wash wells monthly.

For more information on materials required, refer to Parts List for Analyzer Maintenance.

Materials Required:

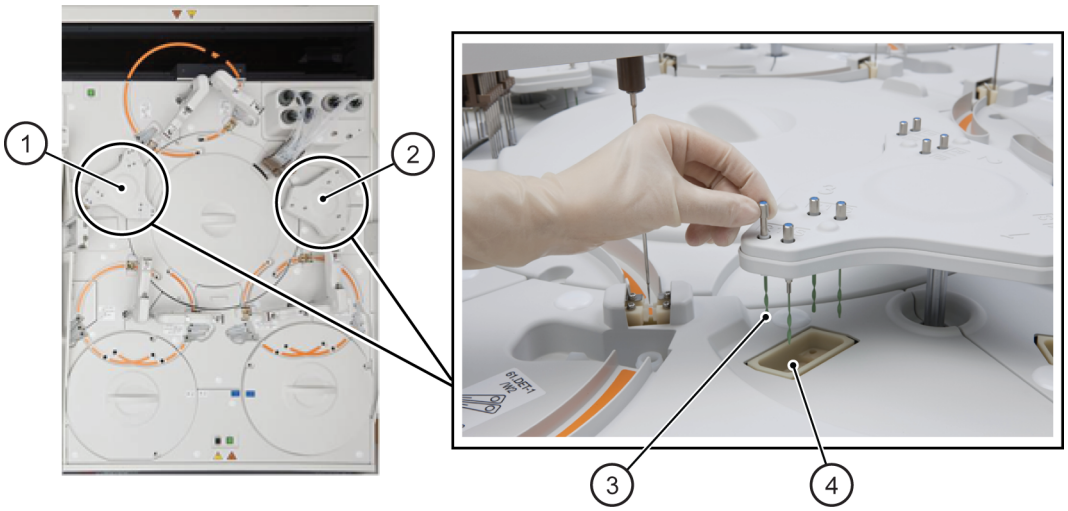
- Sodium hypochlorite solution (0.5%)
- Cotton-tipped applicator
- Disposable pipette

1 Confirm that the system is in *Warm up* or *Standby* mode.

2 Lift the back upper cover of each analyzer unit.

3 Manually turn the mix bar component so that the mix bars are not over the wash wells.

Figure 6.28 Mix Bar Wash Wells



1. R1/S mix bar component
2. R2 mix bar component
3. Mix bar
4. Mix bar wash well

CAUTION

Do not spill sodium hypochlorite solution outside the wash well. Follow your laboratory procedure to wipe up spills immediately.

4 Using a pipette, dispense the sodium hypochlorite solution (0.5%) into each of the four mix bar wash wells.

5 Use a cotton-tipped applicator to clean each well. Use a different cotton-tipped applicator for each wash well to avoid any contamination.

6 Select **Home** > **Analyzer Maintenance** > **Maintenance**. The system displays the Analyzer Maintenance: Maintenance tab.

7 Select the **Analyzer Maintenance** box. The system activates the maintenance operation buttons.

8 Select **Replace Mix Bar**. The system displays the Replacing Mix Bar dialog.

Figure 6.29 Replacing Mixing Bar Dialog

9 The system selects all units by default. If a unit is not required, deselect the **Unit**.

10 Select **The First Mixer**.

11 For **Times**, enter **1**, and then select **OK**.

12 Press the **DIAG** button. The R1/S mix bar component initializes and performs a sequence.

13 Visually inspect the mix bar wash wells for correct water drainage. If drainage is poor, repeat steps 3 to 12.

14 Select **The Second Mixer**.

15 For **Times**, enter **1**, and then select **OK**.

16 Press the **DIAG** button. The R2 mix bar component initializes and a sequence.

17 Visually inspect the mix bar wash wells for correct water drainage. If drainage is poor, repeat steps 3 to 9 and 14 to 16.

18 Close all analyzer doors and covers.

19 Clear the **Analyzer Maintenance** box to deactivate the maintenance operation buttons.

20 Update the Maintenance Log. For more information, refer to Update the Maintenance Log.

Clean the Wash Nozzle Component and Inspect the Tube Mounting Joints

The wash nozzle unit consists of 18 nozzles, responsible for aspirating liquid out of the cuvettes, dispensing diluted wash solution and DI water into the cuvettes and drying the cuvettes.

If any of the nozzles become clogged, their functionality may suffer, resulting in inefficient cleaning of the cuvettes.

Inspect the mounting joints for cracks or leaks.

If any damage exists, the aspiration and dispense by nozzles could be affected.

IMPORTANT

Always remove and replace the wash nozzle component on the same analyzer unit. If you replace the wash nozzle component on a different analyzer unit, a mechanical error can occur and eventually cause a cuvette overflow.

For more information on materials required, refer to Parts List for Analyzer Maintenance.

Materials Required for each Analyzer Unit:

- Clean, dry lint free cloth
- Sonicator filled with DI water

Remove the Wash Nozzle Component and Inspect the Tube Mounting Joints

1 Confirm that the system is in *Warm up* or *Standby* mode.

2 Lift the back upper cover of each analyzer unit.

3 Select **Home** > **Analyzer Maintenance** > **Maintenance**. The system displays the Analyzer Maintenance: Maintenance tab.

4 The system selects all units by default. If a unit is not required, deselect the **Unit**.

5 Select the **Analyzer Maintenance** box. The system activates the maintenance operation buttons.

6 Select **Replace Wash Nozzle**. The system displays the Replace Wash Nozzle dialog.

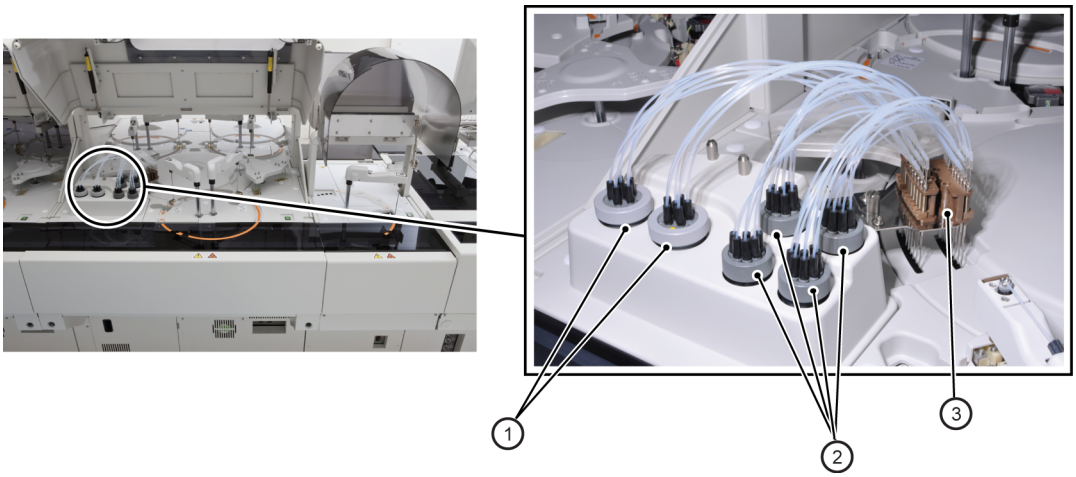
7 Select **OK**.

8 Press the **DIAG** button. The liquid drains from the tubes.

CAUTION

Before cleaning or replacing the tube mounting joints, drain the water remaining in the wash nozzles. If you loosen any manifold without draining the remaining water, the water spills out of the nozzle. If the water spills onto the cuvettes, refer to Clean the Cuvettes and the Cuvette Wedges.

Figure 6.30 Wash Nozzle Component and Tube Mounting Joints



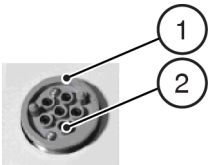
1. Water and wash solution supply tube mounting joint manifolds (A total of six O-rings are used inside)
2. Aspiration tube mounting joint manifold
3. Wash nozzle unit

9 Loosen the six manifolds and remove them from their mounting positions.

IMPORTANT

Six O-rings are inside the water supply tube mounting joint of the wash nozzle component. After removing the manifold, confirm that there are six O-rings seated inside the six grooves in the manifold base.

Figure 6.31 Manifold Base of the Water Supply Tube Mounting Joint



1. Manifold Base
2. O-Ring

If an O-ring is missing, inspect the manifold to confirm that the O-ring is not attached to the surface of the manifold. If it cannot be found, install a new O-ring in the groove in the manifold base. For more information, refer to **Replace the O-rings in the Water Supply Tube Mounting Joints**.

IMPORTANT

Inspect the packing inside each manifold of the four tube mounting joints. If the packing is damaged, replace the packing. For more information, refer to Replace the Packing in the Wash Nozzle Tube Mounting Joints.

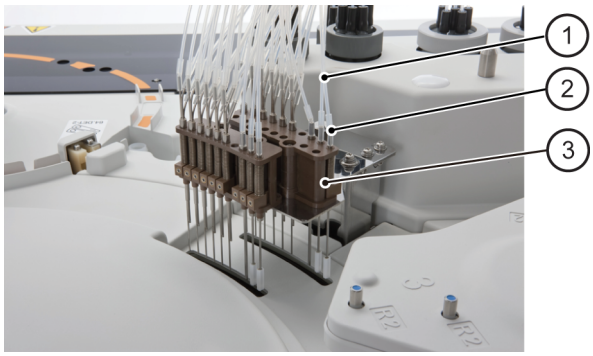
10 Loosen the knob holding the wash nozzle component in position. Loosen the knob until it stops turning.

11 Lift the wash nozzle component up over the positioning screws. Do not bump or bend the nozzles.

IMPORTANT

Do not loosen or remove the positioning screws on either side of the knob when you loosen the knob on the wash nozzle component. The positioning screws keep the wash nozzle component in alignment.

Figure 6.32 Wash Nozzle Component



1. Tubing
2. Wash nozzle joint
3. Wash nozzle unit

12 Remove the wash nozzle component along with the tubing and inspect the joints for cracks. If a crack is found, contact Beckman Coulter to replace the Joint.

Clean and Inspect the Wash Nozzle Component

IMPORTANT

Do not damage the nozzles when using a sonicator to clean the wash nozzle component.

1 Sonicate the wash nozzle component in deionized water for 15 minutes. Only submerge the nozzle portion. Do not get the springs above the nozzles wet. If water does get into the springs, dry them well using a clean, dry, lint-free absorbent tissue, or canned air.

NOTE

Beckman Coulter recommends using a sonicator for cleaning the nozzles. If a sonicator is not available, clean the interior of each nozzle using the supplied stylet and deionized water.

2 Remove the wash nozzle component from the sonicator, and dry thoroughly with a clean, dry, lint-free absorbent tissue.

3 Inspect the O-rings inside the water supply tube mounting joints. Confirm that all six O-rings are correctly inserted in individual grooves inside each joint. Confirm that the O-rings are not ripped or over-stretched. Look for dust or detergent crystals around each O-ring. If faults are found with the O-rings, replace the O-rings.

For more information, refer to Replace the O-rings in the Water Supply Tube Mounting Joints.

4 Return the wash nozzle component to its original position. Place the wash nozzle component over the positioning screws, then tighten the knob to hold the wash nozzle component in position.

IMPORTANT

Do not hit the nozzle tips on the cuvette wheel cover when installing the wash nozzle component.

5 Return each of the manifolds to their original position. Match the colored dot on the manifold with the one next to its position. Tighten the manifolds without cross threading them. Confirm that the manifolds are finger-tight to prevent a cuvette wheel overflow, but do not over-tighten.

IMPORTANT

To avoid system damage and to perform tests correctly:

- When you install the manifolds, confirm that the manifolds are in the correct, color-coded positions. Firmly tighten the manifolds.
- Confirm that all tubing from the nozzles to the tube mounting joints are connected.
- Do not damage any of the joints or tubing. Damaged components can cause leaks and can contaminate or flood the cuvette wheel.

6 Select **Prime Wash Nozzle**. The system displays the Start dialog.

7 For **Times**, enter **5**, and then select **OK**.

8 Press the **DIAG** button. The air in the tubing is purged as the wash nozzle component moves up and down.

IMPORTANT

Confirm that the wash nozzle component moves freely without interference and that no leaks occur. If leaks occur, remove the water supply manifold, and confirm that there are six O-rings correctly placed in the grooves. Inspect each O-ring, and replace damaged O-rings.

9 Close all analyzer doors and covers.

10 Clear the **Analyzer Maintenance** box to deactivate the maintenance operation buttons.

11 Update the Maintenance Log. For more information, refer to Update the Maintenance Log.

Clean the Deionized Water Tank, Deionized Water Filter, and Sample Probe Filter

The deionized water filter and sample probe filter prevent particles from entering the internal deionized water system. Clean the deionized water tank to avoid bacterial contamination of the system.

For more information on materials required, refer to Parts List for Analyzer Maintenance.

Materials Required for each Analyzer Unit:

- Clean, dry, lint-free absorbent tissue
- Basin
- Sonicator filled with deionized water
- Extra deionized water tank, filled with 5 L of deionized water
- Sodium hypochlorite solution (1.0%)

IMPORTANT

Before you start this procedure, turn off the system. If you perform this procedure with the system on (in *Standby* mode), the system supplies deionized water through the supply tube, the float sensor in the deionized water tank activates, and water drains continuously from the tube.

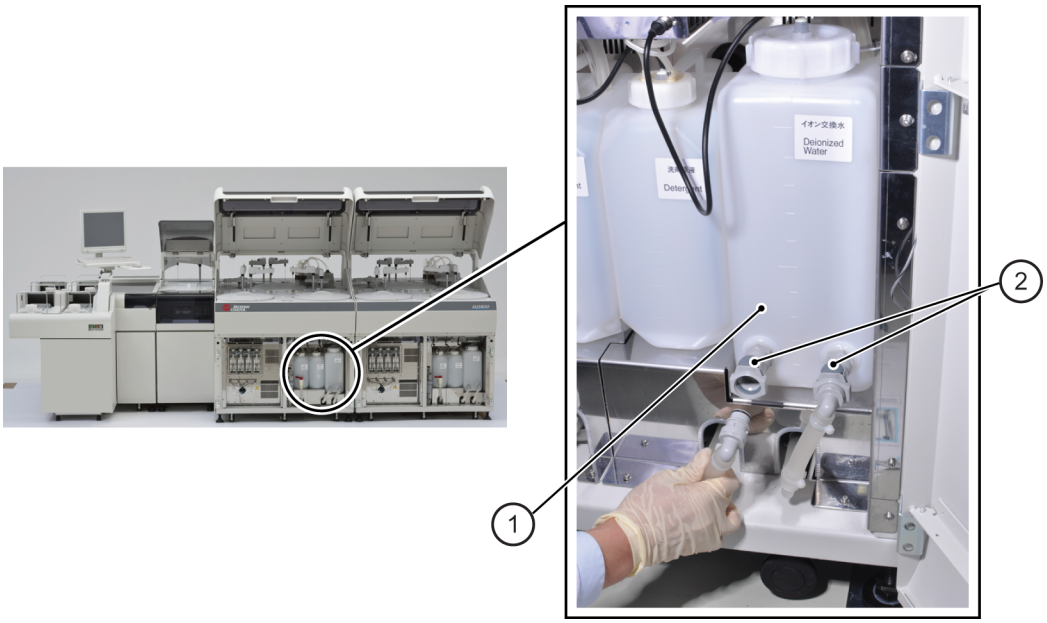
Clean the Deionized Water Tank

1 To shut down the system, select End. For more information, refer to System Shutdown (End Process).

2 Open the right front door of the analyzer unit.

3 Position a basin on the floor under the deionized water tank to catch spilled water.

Figure 6.33 Deionized Water Tank



1. Deionized water tank
2. Quick disconnects

4 Unplug the black float sensor connector 795.

5 Press the gray buttons of the quick disconnect joints on the front of the tank and remove the tubes.

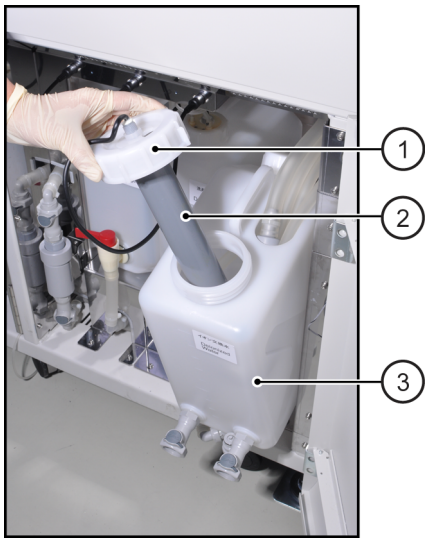
IMPORTANT

When the float sensor and tubing are removed from the tank, deionized water can drip. If the deionized water drips, immediately wipe off the water with a clean, dry lint-free absorbent tissue.

6 Pull the deionized water tank out of the analyzer. Confirm that the tubes clear the top of the tank and wrap them in a clean absorbent tissue.

7 Unscrew the cap of the tank and remove the float sensor.

Figure 6.34 Float Sensor



1. Cap
2. Float sensor
3. Deionized water tank

8 Discard the deionized water in the tank.

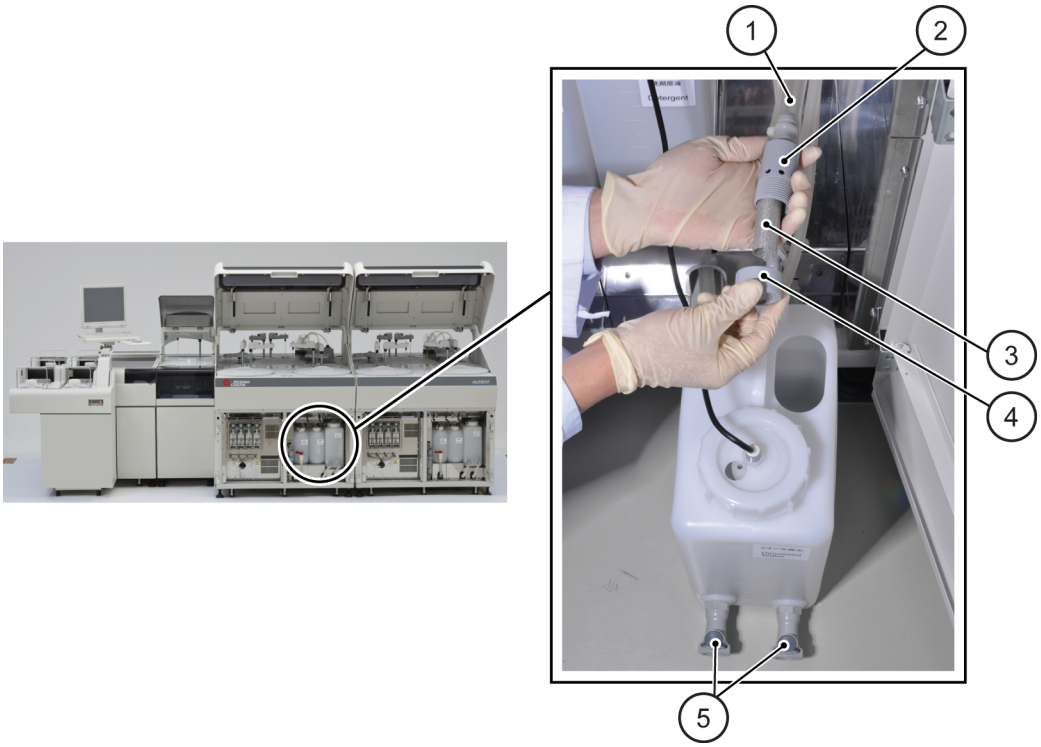
9 Clean the tank with sodium hypochlorite solution (1.0%).

10 Rinse the tank thoroughly using deionized water and set aside and allow the tank to dry.

11 Clean the float sensor and the exterior part of the tubes with deionized water.

12 Remove the deionized water filter from the case attached to the water supply tube over the basin by unscrewing it. Water drips from it.

Figure 6.35 Deionized Water Filter



1. Water supply tube
2. Filter case
3. Deionized water filter
4. Cap of filter case
5. Joint

13 Locate the sample probe filter case directly to the left of the diluted wash solution tank and remove it from the bracket.

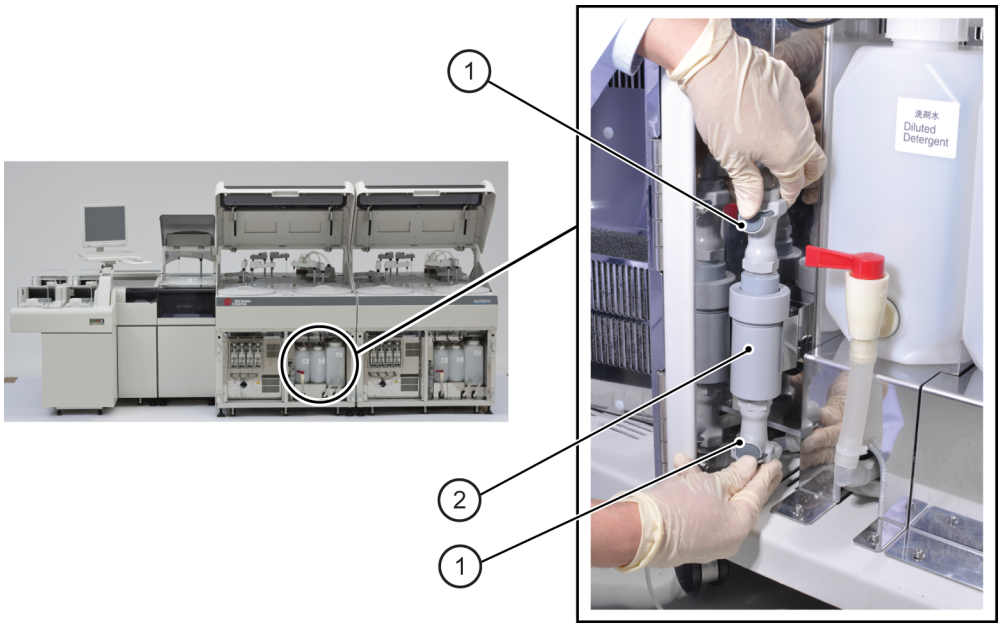
14 Press the gray button of the quick disconnect joints and pull to remove the tubes from the top and bottom of the filter case.

15 Unscrew the filter case over the basin and remove the sample probe filter.

IMPORTANT

When working with the sample probe filter, do not lose the O-ring.

Figure 6.36 Sample Probe Filter



1. Quick disconnect
2. Filter case

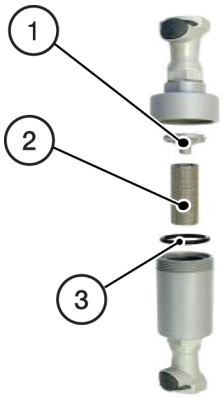
Clean the Deionized Water Filter and Sample Probe Filter

1	Place the deionized water filter and the sample probe filter in the sonicator filled with deionized water.
2	Sonicate the filters for 10 minutes.
3	Reinsert the clean deionized water filter into its case and tighten the cap.
4	Reinsert the clean sample probe filter into the filter case.

IMPORTANT

When working with the sample probe filter, do not lose the O-ring.

Figure 6.37 Sample Probe Filter



1. Filter positioning insert
2. Sample probe filter
3. O-ring

5 Tighten the filter case firmly.

CAUTION

Do not connect the filter case to the joints upside down. If you connect the filter case upside down, debris can cause data errors.

6 Reconnect the quick disconnects by forcing the tubes into their connections until you hear a distinct click.

7 Push the filter case into the metal bracket.

Replace the Deionized Water Tank

1 Fill the clean tank with 5 L of deionized water.

IMPORTANT

Fill the deionized water tank with 5 L of deionized water before turning the system on. If the deionized water tank is empty and the pump turns on, a malfunction can result when the system is turned on.

2 Place the float sensor into the deionized water tank. Tighten the cap.

3 Place the tank into the system and reinsert all water supply tubes into the top of the tank. Push the tank into place.

4 Reconnect each quick disconnect to the tank by forcing the tube into its connection until you hear a distinct click.

5 Reconnect the float sensor connector 795.

6 Wipe any spilled water from the analyzer surface and remove the basin.

7 Press the **ON** button. The system powers on and initializes, enters into *Warm up* for 20 minutes, and then enters *Standby*.

8 When the New Index dialog displays, select **New Index**.

Perform a Prime Washing Line

1 Select **Home** > **Analyzer Maintenance** > **Maintenance**. The system displays the Analyzer Maintenance: Maintenance tab.

2 The system selects all units by default. If a unit is not required, deselect the **Unit**.

3 Select the **Analyzer Maintenance** box. The system activates the maintenance operation buttons.

4 Select **Prime Washing Line**. The system displays the Prime Washing Line dialog.

5 For **Times**, enter **3**, and then select **OK**.

6 Press the **DIAG** button. Watch the sample probe tubing, reagent probe tubing, and water supply tubing for the wash nozzle component as the system performs the prime. Repeat the prime until all bubbles are removed from the tubing by pressing the **DIAG** button.

7 Close all analyzer doors and covers.

8 Clear the **Analyzer Maintenance** box to deactivate the maintenance operation buttons.

9 Update the Maintenance Log. For more information, refer to Update the Maintenance Log.

Quarterly Maintenance

Perform the following procedures quarterly (every three months).

- Clean the Air Filters
- Inspect and, if Needed, Replace the Deionized Water Filter, Sample Probe Filter, and Replace the O-ring

Clean the Air Filters

The air filters prevent dust and other contaminates from entering the analyzer.

CAUTION

Do not run the analyzer without filters in position. If filters are missing, heaters and the power supplies get dusty, which can cause a short circuit and fire.

Materials Required:

- Air filter
- Vacuum

For more information on materials required, refer to Parts List for Analyzer Maintenance.

1 To shut down the system, select **End**. For more information, refer to System Shutdown (End Process).

2 Press **EM STOP** to completely turn off the power, including the fans. An emergency stop is necessary to avoid the risk of the fans bringing dust into the analyzer while the filter is removed.

3 Open the left front door of the analyzer unit.

4 Remove the air filter.

Figure 6.38 Air Filter Location

1. Air filter

5 Vacuum the dust from the filter or clean the filter with water and allow the filter to completely dry.

Replace the air filter if it is torn.

The air filter can be cleaned with a vacuum without being removed from the analyzer. If the filter is moved from its original position after cleaning, reposition the filter to its original flat condition and position.

IMPORTANT

If you are cleaning the filter with water, confirm that the filter is completely dry before replacing it on the system to avoid moisture from getting into the system.

6 Replace the filter in its original position.

7 Close all analyzer doors and covers.

8 Press the **RESET** button (white button on the front-right of the rack feeder unit) to turn on the main power, and then wait 5 seconds.

9 Press the **ON** button (green button on the front-right of the rack feeder unit). The lamp turns on and the software loads. The system displays a dialog to confirm retrieving the database.

10 The system is in *Warm up* mode for 1.5 hours. When the New Index dialog displays, select **New Index**.

After the required 20 minutes for the lamp to warm up, wait until the temperature of the cuvette wheel reaches 37 °C, then select **Home** > **Analyzer Maintenance**. Select **Stand By (F4)** to return to the *Standby* mode.

11 Select **Home** > **Analyzer Maintenance** > **Maintenance**. The system displays the Analyzer Maintenance: Maintenance tab.

12 Update the Maintenance Log. For more information, refer to Update the Maintenance Log.

Inspect and, if Needed, Replace the Deionized Water Filter, Sample Probe Filter, and Replace the O-ring

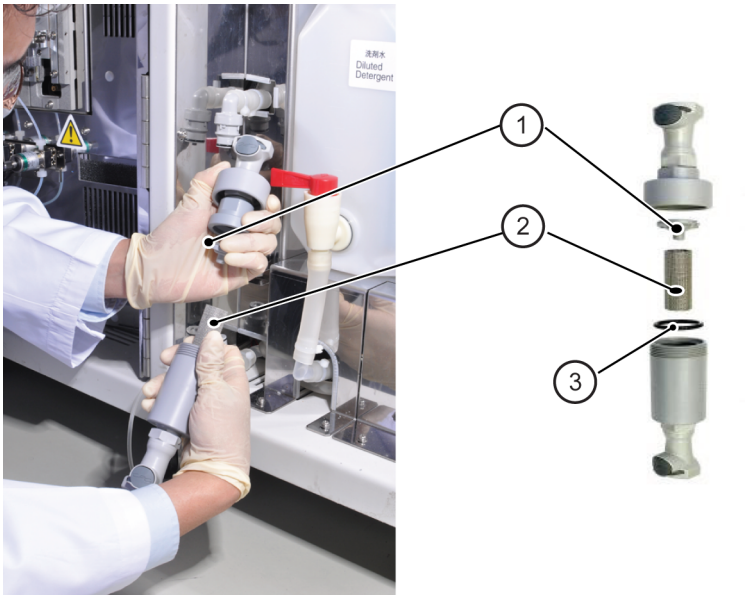
For more information on materials required, refer to Parts List for Analyzer Maintenance.

Materials Required for each Analyzer Unit:

- Sample Probe Filter
- Deionized Water Filter
- O-rings

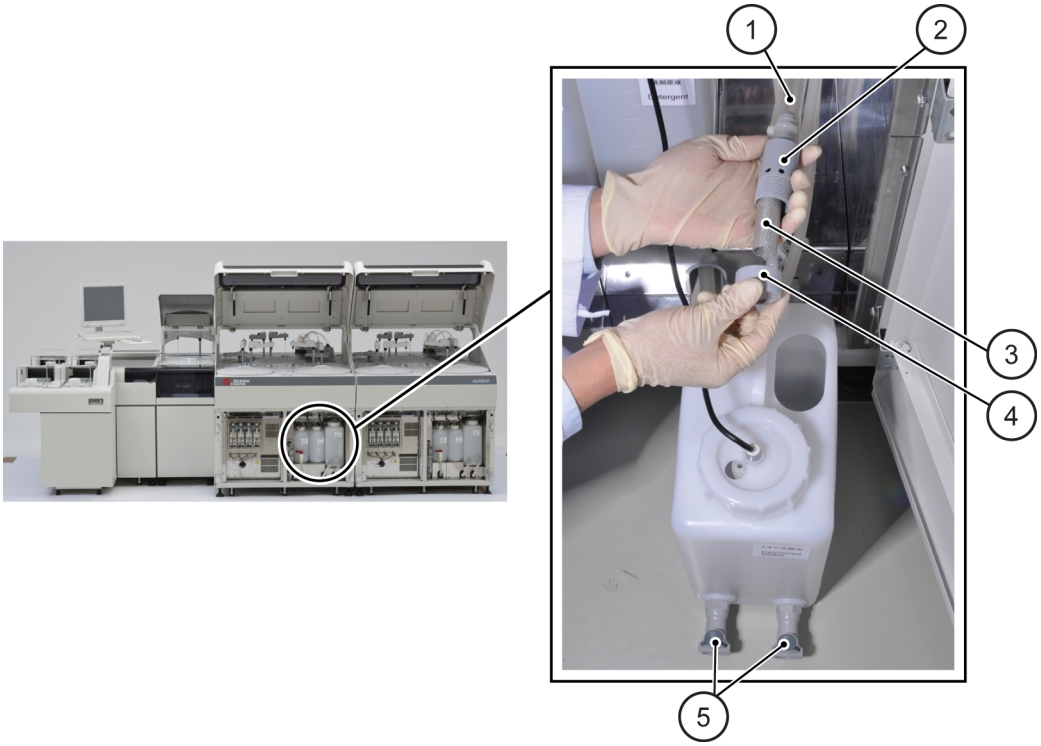
For information on how to remove the filters, refer to Clean the Deionized Water Tank, Deionized Water Filter, and Sample Probe Filter.

Figure 6.39 Parts in the Sample Probe Filter Case



1. Filter positioning insert
2. Sample probe filter
3. O-ring

Figure 6.40 Deionized Water Filter



1. Water supply tube
2. Filter case
3. Deionized water filter
4. Filter case cap
5. Joint

1. When the filters are removed for cleaning, inspect them. If the filters cannot be cleaned successfully, replace them.
2. Replace the O-ring. For more information, refer to Clean the Deionized Water Tank, Deionized Water Filter, and Sample Probe Filter.
3. Update the Maintenance Log. For more information, refer to Update the Maintenance Log.

Six-Month Maintenance

Perform the following procedures every six months.

- Clean the Cuvettes and the Cuvette Wedges

Clean the Cuvettes and the Cuvette Wedges

To maintain correct operation of the photometry system, the cuvettes and the wedges must be clean. There are 12 wedges, 34 cuvettes per wedge, for a total of 408 cuvettes per analyzer unit.

You check the cuvettes weekly (during the photocal procedure). Perform this procedure every 6 months to keep the cuvettes in optimal condition, and if a cuvette overflow occurs.

For more information on materials required, refer to Parts List for Analyzer Maintenance.

Materials Required:

- Cotton-tipped applicator
- 2% Wash solution
- Sonicator
- Clean, dry, lint-free absorbent tissue
- Plastic containers to hold cuvettes in the sonicator
- Large plastic containers to hold cuvette wedges

CAUTION

There are cuvettes with different interior and outer dimension. The AU5800 uses cuvette PN MU855200 with an interior dimension of 5 mm x 4 mm. These cuvettes are different from the other AU analyzers. Do not use a cuvette from another AU analyzer on the AU5800. Use of a cuvette other than the AU5800 cuvette on the AU5800 causes erroneous results.

Remove the Cuvette Wedges

Perform this procedure on a work surface protected with clean, dry, lint-free absorbent tissue.

1. Confirm that the system is in *Warm up* or *Standby* mode.

2 Select **Home** > **Analyzer Maintenance** > **Maintenance**. The system displays the Analyzer Maintenance: Maintenance tab.

3 Select the **Analyzer Maintenance** box. The system activates the maintenance operation buttons.

4 Select **Replace Cuvette**. The system displays the Replace Cuvette dialog.

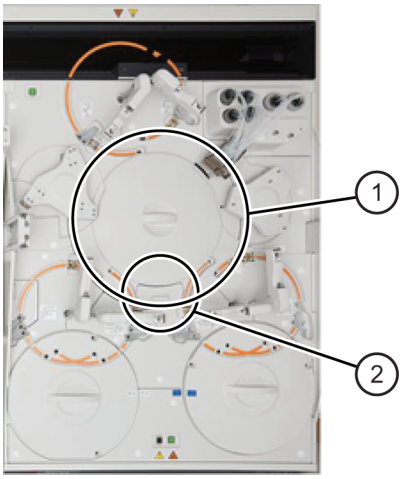
5 The system selects all units by default. If a unit is not required, deselect the **Unit**.

6 Lift the main front cover of each analyzer unit.

7 Press the **DIAG** button. The analyzer initializes the probes.

8 Carefully remove the cuvette wedge cover. Avoid bumping the probes with the cuvette wedge cover.

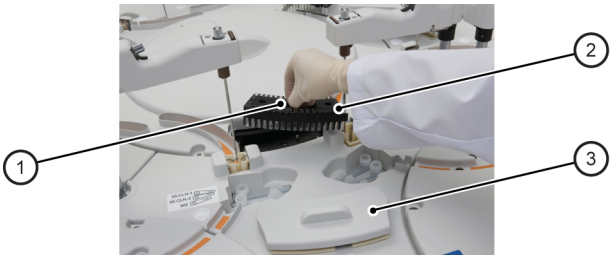
Figure 6.41 Cuvette Wheel Component



1. Cuvette wheel cover
2. Cuvette wedge cover

9 To remove the cuvette wedge, loosen the screw and then lift the cuvette wedge out of the cuvette wheel.

Figure 6.42 Remove a Cuvette Wedge



1. Screw
2. Cuvette wedge
3. Cuvette wedge cover

CAUTION

Do not loosen or remove the positioning pins. The positioning pins keep the cuvette wheel in correct alignment. Incorrect results or system errors can occur.

CAUTION

When handling cuvettes, do not scratch the cuvettes. If a cuvette is scratched, the photometric data is inaccurate, and you must replace the cuvette.

CAUTION

To maintain correct photometric analysis, do not get fingerprints on the photometric surface of the cuvettes. Always wear gloves when handling the cuvettes.

CAUTION

There are cuvettes with different interior and outer dimension. The AU5800 uses cuvette PN MU855200 with an interior dimension of 5 mm x 4 mm. These cuvettes are different from the other AU analyzers. Do not use a cuvette from another AU analyzer on the AU5800. Use of a cuvette other than the AU5800 cuvette on the AU5800 causes erroneous results.

10 Press the **DIAG** button to move the next cuvette wedge to the changing position.

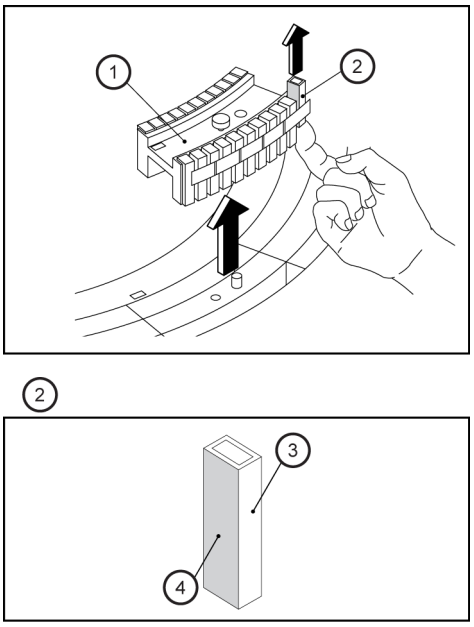
11 Repeat steps 9 to 10 to remove all 12 wedges.

Remove the Cuvettes from the Wedge

Perform this procedure over a protected work surface.

Use a finger or the reverse end of a cotton-tipped applicator to push each cuvette from the bottom to remove it from the wedge. Remove all the 408 cuvettes from the 12 wedges.

Figure 6.43 Remove a Cuvette



1. Cuvette wedge
2. Cuvette
3. Photometric face
4. Frosted glass face

Clean All Cuvettes and Wedges

CAUTION

When handling cuvettes, do not scratch the cuvettes. If a cuvette is scratched, the photometric data is inaccurate, and you must replace the cuvette.

1 Submerge all cuvettes in a plastic container filled with 2% wash solution.

2 Sonicate for 15 minutes.

3 Thoroughly rinse the cuvettes in deionized water, or sonicate them in deionized water for 10 minutes to remove any residual wash solution.

4 Allow the cuvettes to dry completely.

IMPORTANT

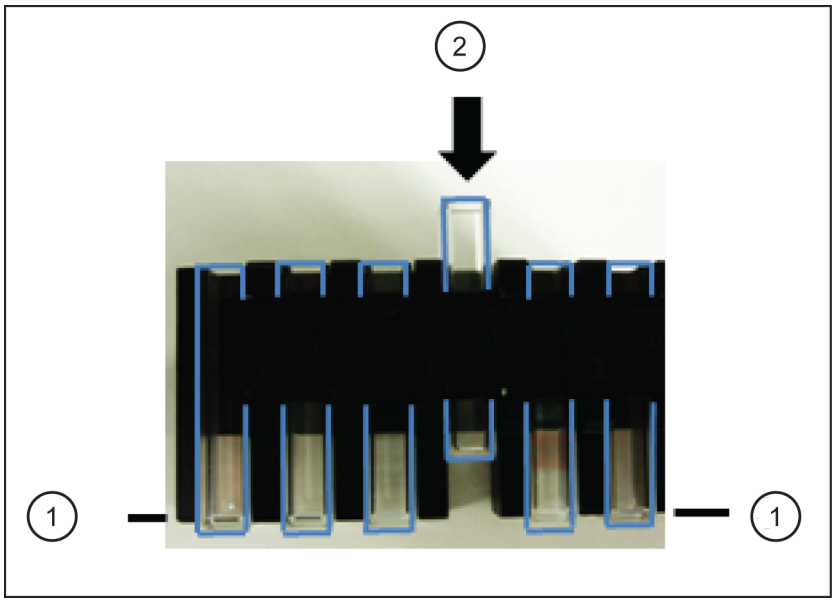
Use one of the following cuvette drying methods:

- Allow cuvettes to air dry.
- Use an oven with the heat set under 50 °C (122 °F).
- Use a clean, dry, lint-free absorbent tissue.

5 Rinse the cuvette wedges with deionized water and dry thoroughly with a clean, dry, lint-free absorbent tissue.

6 Insert the cuvettes into the wedges. Confirm that each cuvette is gently pushed down completely into the wedge.

Figure 6.44 Insert the cuvettes into the wedges



1. Bottom
2. Push in

CAUTION

Confirm that 408 cuvettes are correctly installed in the cuvette wedges. If one of the cuvettes is missing, the mixture, reagent, or wash solution spills into the cuvette wheel, causing a cuvette wheel overflow and preventing successful analysis.

CAUTION

Do not scratch the cuvettes when replacing cuvettes on the cuvette wedges. Never touch the photometric surface of a cuvette. If the photometric surface is scratched or stained, analysis data is inaccurate. Wear gloves when handling the cuvettes.

7 Replace the cuvette wedges in the original positions on the analyzer unit.

8 Align the numbers on the wedge with the numbers on the cuvette wheel. Gently push the cuvette wedges down completely into the wheel.

9 Tighten the screw to fix the cuvette wedge.

10 Press the **DIAG** button to move the cuvette wheel to the next replacing position.

11 Repeat steps 8 to 10 to remove all 12 wedges.

12 After replacing the cuvette wedges in the cuvette wheel, confirm that all 12 cuvette wedges are in place. Confirm that the top of each cuvette is even with the top of the wedge and that each wedge is level within the cuvette wheel.

13 Replace the cuvette wedge cover.

14 Close all analyzer doors and covers.

15 Clear the **Analyzer Maintenance** box to deactivate the maintenance operation buttons.

16 Update the Maintenance Log. For more information, refer to Update the Maintenance Log.

17 Perform a photocal. For more information, refer to Perform a Photocal.

CAUTION

After cleaning cuvettes, perform a photocal to confirm that the cuvettes are cleaned correctly.

IMPORTANT

To obtain optimal analysis data, do not start the photocal until the lamp is stable after turning on the system. The lamp requires 20 minutes to stabilize after you press the **ON** button.

18 Confirm that all cuvettes have passed the photocal and run QC before processing samples.

Yearly Maintenance

Perform the following procedures yearly.

- Replace the O-rings in the Water Supply Tube Mounting Joints

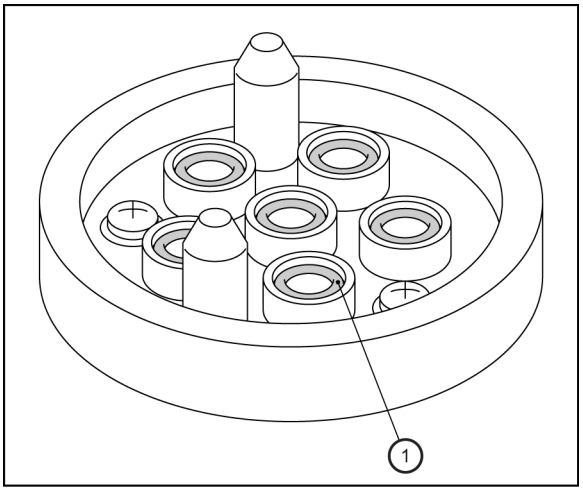
Replace the O-rings in the Water Supply Tube Mounting Joints

Replace each O-ring in the water supply tube mounting joint with a new one yearly.

When installing the water supply tube mounting joints of the wash nozzle component, inspect the following items.

- All six O-rings are seated in a groove, refer to Replace the O-rings in the Water Supply Tube Mounting Joints.
- Particles such as dust or wash solution crystals are not observed on or around the O-rings.

Figure 6.45 Manifold Base of the Water Supply Tube Mounting Joint



1. O-ring

For more information on materials required, refer to Parts List for Analyzer Maintenance.

Materials Required:

- O-rings
- Clean, dry, lint-free absorbent tissue
- Pair of tweezers

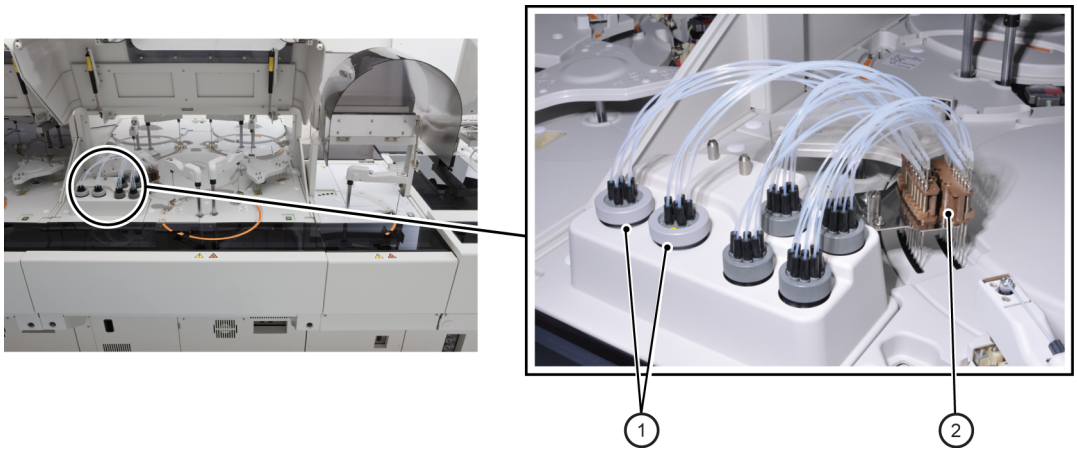
1	Confirm that the system is in *Warm up* or *Standby* mode.
2	Lift the back upper cover of each analyzer unit.
3	Select **Home** > **Analyzer Maintenance** > **Maintenance**. The system displays the Analyzer Maintenance: Maintenance tab.
4	Select the **Analyzer Maintenance** box. The system activates the maintenance operation buttons.
5	Select **Replace Wash Nozzle**. The system displays the Replace Wash Nozzle dialog.
6	The system selects all units by default. If a unit is not required, deselect the **Unit**.
7	Select **OK**.
8	Press the **DIAG** button. The liquid drains from the tubes.

CAUTION

Before cleaning or replacing the tube mounting joints, drain the water remaining in the wash nozzles. If you loosen any manifold without draining the remaining water, the water spills out of the nozzle. If the water spills onto the cuvettes, refer to Clean the Cuvettes and the Cuvette Wedges.

9 Loosen the manifolds for the water supply tube mounting joints and remove them from the mounting positions.

Figure 6.46 Water Supply Tube Mounting Joint



1. Water supply tube mounting joint manifolds (A total of six O-rings are used in each joint)
2. Wash nozzle component

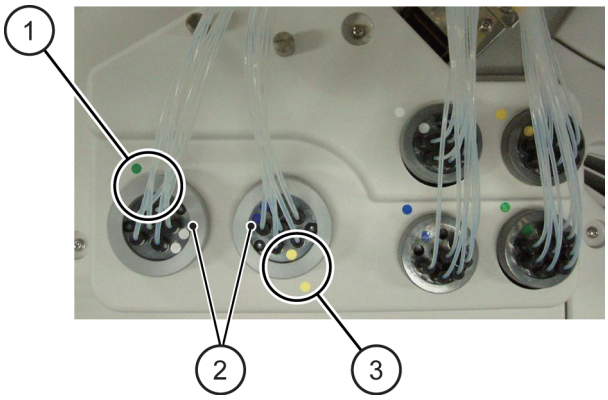
Figure 6.47 Loosen the manifolds

10 Using a pair of tweezers, remove each O-ring from the groove. Wipe away any crystallization or foreign matter found around O-ring grooves.

11 Set new O-rings into the grooves.

12 Replace the manifolds into their positions on the analyzer unit. Match the colored dot on the manifold with the one next to its position. Tighten the manifolds without cross threading and do not over tighten. For more information, refer to Clean the Wash Nozzle Component and Inspect the Tube Mounting Joints.

Figure 6.48 Match the colored dot



1. Green
2. Water supply tube mounting joint manifolds
3. Yellow

13 Select **Prime Wash Nozzle**. The system displays the Prime Wash Nozzle dialog.

14 For **Times**, enter **5**, and then select **OK**.

15 Press the **DIAG** button.

16 Confirm that the tube mounting joints do not leak. If you detect a leak, unscrew the manifold for the water supply tube mounting joint, and confirm that the O-rings are installed correctly.

IMPORTANT

If you use the O-rings for a long time without cleaning or if you replace the joint manifold without the O-rings correctly set, wash solution crystals can form, causing errors with the cuvettes. Inspect the O-rings along with the monthly maintenance of the wash nozzle component.

17 Close all analyzer doors and covers.

18 Clear the **Analyzer Maintenance** box to deactivate the maintenance operation buttons.

19 Update the Maintenance Log. For more information, refer to Update the Maintenance Log.

As Needed Maintenance

- Replenish the Wash Solution
- Clean the R1 or R2 Reagent Probes
- Replace a Sample Probe
- Replace a Reagent Probe
- Replace the Mix Bars

- Replace the Packing in the Wash Nozzle Tube Mounting Joints
- Replace the Sample, Reagent, ISE Sample, or ISE Buffer Syringe
- Replace the Wash Syringe Type 1
- Replace the Wash Syringe Type 2
- Clean the Interior of the Reagent Refrigerators
- Clean or Replace the Anti-static Brushes
- Replace the Sample or Reagent Probe Tubing
- Perform a W1
- Replace Rack ID Labels
- Clean or Replace Individual Cuvettes
- Clean the Cuvettes, Cuvette Wedges, and Cuvette Wheel after an Overflow
- Replace the Photometer Lamp
- Clean the Rack
- Clean the Rack Tray
- Clean the Rack Transfer Lanes
- Save Parameters
- Reset the System from Stop to Standby Mode

Replenish the Wash Solution

The 20 L master wash solution tank located under the rack feeder unit is replenished as needed.

The master wash solution tank on each analyzer unit is automatically supplied with the solution from the tank on the rack feeder unit.

The system continues analysis for up to 4 hours after the master wash solution tank under the rack feeder unit becomes empty by using the wash solution in each tank on the analyzer units.

To replenish the master wash solution:

WARNING

- **Wear gloves to prevent hands from coming in contact with the concentrated wash solution. If hands or clothes come in contact with concentrated wash solution, wash them immediately with water. If the concentrated wash solution comes into contact with the eyes or mouth, flush with water and consult a doctor immediately.**
- **If the concentrated wash solution is splashed or accidentally spills, clean the spill according to laboratory Standard Operating Procedures. If any spill is left untreated, the spill may generate toxic gas and corrode parts of the analyzer.**

For more information on materials required, refer to Parts List for Analyzer Maintenance.

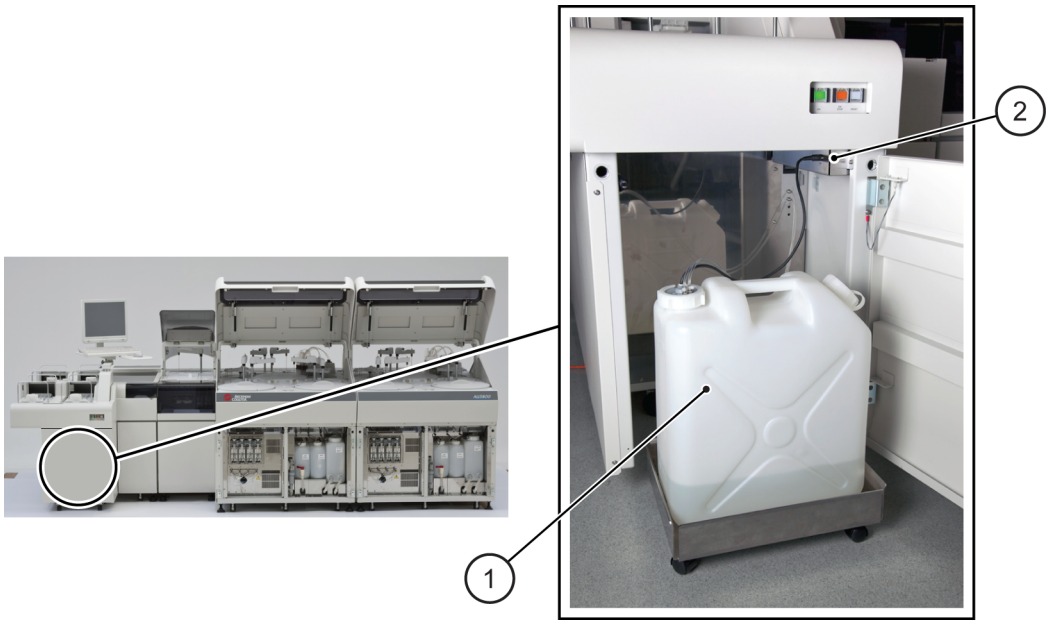
Materials Required for each Analyzer Unit:

- Wash Solution

---

1 Open the front door of the rack feeder unit.

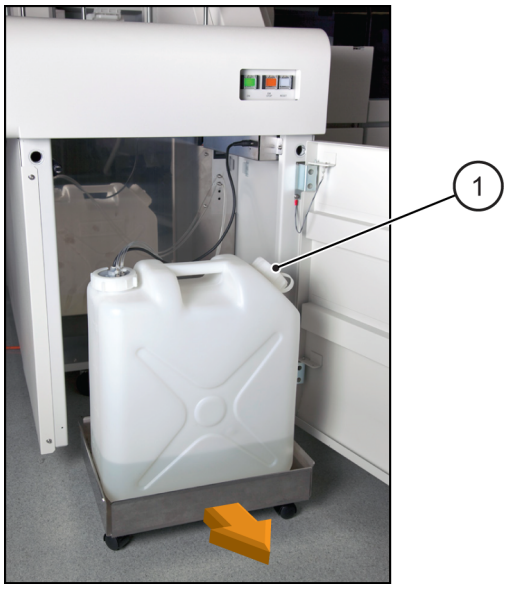
Figure 6.49 Master Wash Solution Tank Location



1. Master Wash Solution Tank
2. Sensor connector (290)

2 Pull the master wash solution tank forward.

Figure 6.50 Pull the master wash solution tank



1. Master Wash Solution Tank Cap

3 Unscrew the master wash solution tank cap.

4 Fill the master wash solution tank with wash solution by carefully pouring wash solution into the tank.

5 Replace the master wash solution tank cap and tighten the cap.

TIP

You can add new wash solution to the remaining wash solution in the wash solution tank.

6 Push the tank backward into the Rack Feeder Unit.

7 Close the front door of the rack feeder unit.

Clean the R1 or R2 Reagent Probes

CAUTION

If reagent probes are contaminated or stained, carryover between reagents can occur. To prevent contamination and to provide correct analysis and results, clean the reagent probes as needed.

The cleaning procedure for each probe is identical.

For more information on materials required, refer to Parts List for Analyzer Maintenance.

Materials Required:

- Alcohol prep pads (70% Isopropyl alcohol)
- Stylet φ0.3 (diameter)

1 Confirm that the system is in *Warm up* or *Standby* mode.

2 Select **Home** > **Analyzer Maintenance** > **Maintenance**. The system displays the Analyzer Maintenance: Maintenance tab.

3 Select the **Analyzer Maintenance** box. The system activates the maintenance operation buttons.

4 Select **Replace Reagent Probe**. The system displays the Replace Reagent Probe dialog.

5 The system selects all units by default. If a unit is not required, deselect the **Unit**.

6 In **Cuvette**, select **Inner** for R1-1 and R2-1 or **Outer** for R1-2 and R2-2.

7 Select **R1** or **R2**. For **Times** enter **3**, and then select **OK**.

8 Lift the front upper cover of each analyzer unit.

9 Press the **DIAG** button. When you press the **DIAG** button, the selected probe initializes, then drains the deionized water in the probe.

10 Press the **DIAG** button. The selected probe moves forward.

11 Unscrew the connector above the probe.

IMPORTANT

When handling the probe, do not bend or damage the probe tip.

12 Lift the probe from the arm.

13 Wipe the tip of the probe with an alcohol prep pad.

14 Carefully insert the stylet into the probe to remove the obstruction.

15 Return the probe to its arm and tighten the connector over the top.

16 Press the **DIAG** button. Watch the dispense to confirm that you reinstalled the probe correctly.

17 If the water is spraying or not dispensing straight from the probe tip, replace the probe. For more information, refer to Replace a Reagent Probe.

18 Close all analyzer doors and covers.

19 Clear the **Analyzer Maintenance** box to deactivate the maintenance operation buttons.

20 Update the Maintenance Log. For more information, refer to Update the Maintenance Log.

Replace a Sample Probe

The sample probes deliver precise quantities of sample to the cuvettes.

Clogged, bent, or damaged probes can affect correct analysis.

If the probes are still contaminated after cleaning, replace the probes.

For more information on materials, refer to Parts List for Analyzer Maintenance.

Materials Required:

- Sample probe

IMPORTANT

Confirm that the sample probe is above the wash well and then replace it with a new one. Deionized water drips from the probe tip as the connector is unscrewed.

IMPORTANT

When handling the probe, do not bend or damage the probe tip.

1 Confirm that the system is in *Warm up* or *Standby* mode.

2 Lift the back upper cover of each analyzer unit.

3 Unscrew the connector above the probe.

Figure 6.51 Remove a Sample Probe

1. Sample probe connector (S2)
2. Sample probe connector (S1)
3. Sample probe transfer (S2)
4. Sample probe transfer (S1)

4 Allow water to drip from the probe, then lift the probe from the arm.

5 Place the new probe into its position and tighten the connector over the top. Firmly tighten the connector so that no leaks occur.

NOTE

If the probe connector does not fit, confirm that you are replacing the correct probe type. The sample probe has a smaller diameter than the reagent probe.

6 Select **Home** > **Analyzer Maintenance** > **Maintenance**. The system displays the Analyzer Maintenance: Maintenance tab.

Or

Select **Home** > **Analyzer Maintenance** > **ISE Maintenance**. The system displays the ISE Maintenance: Maintenance tab.

7 Select the **Analyzer Maintenance** box. The system activates the maintenance operation buttons.

Or

Select the **ISE Maintenance** box. The system activates the maintenance operation buttons.

8 Select the option for the probe you are replacing.

Table 6.23 Probe Options

Probe	Maintenance Operation Button
Sample probe	Replace Sample Probe

Table 6.23 Probe Options (Continued)

Probe	Maintenance Operation Button
ISE Sample Probe	(ISE) Replace Sample Probe

The system displays the Replace Sample Probe dialog.

9 The system selects all units by default. If a unit is not required, deselect the **Unit**. For Cuvette, select **Inner** for S1 or **Outer** for S2 when replacing a sample probe on an analyzer unit. For **Times**, enter **3**, and then select **OK**.

10 Press the **DIAG** button. Deionized water is dispensed from the probe tip. Confirm that the deionized water is dispensed in a thin straight stream, and does not spray or dispense at an angle.

11 Close all analyzer doors and covers.

12 Clear the **Analyzer Maintenance** box or **ISE Maintenance** box to deactivate the maintenance operation buttons.

13 Update the Maintenance Log. For more information, refer to Update the Maintenance Log.

14 Perform QC, inspect the data, and recalibrate if necessary.

Replace a Reagent Probe

The reagent probes deliver precise quantities of reagent to the cuvettes.

Clogged, bent, or damaged probes can affect correct analysis.

If the probes are still contaminated after cleaning, replace the probes.

For more information on materials required, refer to Parts List for Analyzer Maintenance.

Materials Required:

- Reagent probe

IMPORTANT

Confirm that the reagent probe is above the wash well and then replace it with a new one. Deionized water drips from the probe tip as the connector is unscrewed.

IMPORTANT

When handling the probe, do not bend or damage the probe tip.

1 Confirm that the system is in *Warm up* or *Standby* mode.

2 Select **Home** > **Analyzer Maintenance** > **Maintenance**. The system displays the Analyzer Maintenance: Maintenance tab.

3 Select the **Analyzer Maintenance** box. The system activates the maintenance operation buttons.

4 Select **Replace Reagent Probe**.

Table 6.24 Probe Options

Probe	Maintenance Operation Button
Reagent Probe (R1-1) Reagent Probe (R1-2) Reagent Probe (R2-1) Reagent Probe (R2-2)	Replace Reagent Probe

The system displays the Replace Reagent Probe dialog.

5 The system selects all units by default. If a unit is not required, deselect the **Unit**. Select the probe (Inner/Outer and R1/R2) to be replaced. For **Times**, enter **3**, and then select **OK**.

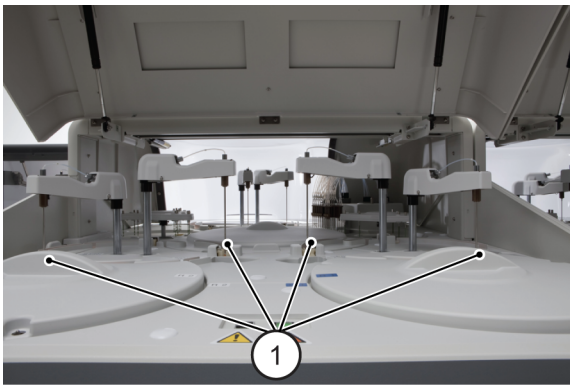
6 Lift the front upper cover of each analyzer unit.

7 Press the **DIAG** button. When the **DIAG** button is pressed, the selected probes initialize, and then drain the DI water in the probe.

8 Press the **DIAG** button. The selected probe moves forward.

9 Unscrew the silver connector above the probe.

Figure 6.52 Remove a Reagent Probe



1. Reagent probe connectors

10 Lift the probe from the arm.

11 Place the new probe into its position and tighten the connector over the top. Firmly tighten the connector so that no leaks occur.

NOTE

If the probe connector does not fit, confirm that you are replacing the correct probe type. The sample probe has a smaller diameter than the reagent probe.

12 Press the **DIAG** button. After the probe initializes, deionized water is dispensed from the probe tip. Confirm that the deionized water is dispensed in a thin straight stream, and does not spray or dispense at an angle.

13 Close all analyzer doors and covers.

14 Clear the **Analyzer Maintenance** box to deactivate the maintenance operation buttons.

15 Update the Maintenance Log. For more information, refer to Update the Maintenance Log.

16 Perform QC, inspect the data, and recalibrate if necessary.

Replace the Mix Bars

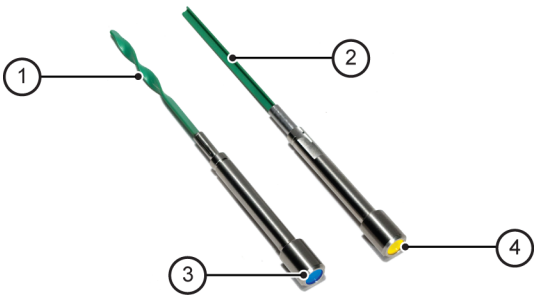
Replace the mix bars if they are stained, damaged, or if the fluororesin coating is chipped.

For more information on materials required, refer to Parts List for Analyzer Maintenance.

Materials Required:

- R1/S: Spiral shape mix bar
- R2: L shape mix bar

Figure 6.53 Mix Bars



1. Spiral-shaped mix bar
2. L-shaped mix bar
3. Blue
4. Yellow

CAUTION

Do not operate the mix bar component when replacing a mix bar. Replacement of the mix bar during operation can cause an injury.

1 Confirm that the system is in *Warm up* or *Standby* mode.

2 Lift the back upper cover of each analyzer unit.

3 Pull out the mix bar to be replaced.

Figure 6.54 Remove a Mix Bar

4 Insert a new mix bar into the mix bar component.

CAUTION

Do not scratch the mix bar when inserting the mix bar into the mix bar component. Scratched or damaged mix bars can cause sample and reagent carryover and affect results.

Rotate each mix bar slightly to insert completely.

CAUTION

The shapes of the mix bars differ between mix types. If the spiral and L-shaped mix bars are not placed in the correct mix bar component, analysis results can be affected. The placement of each mix bar shape:

- **R1 and S positions: Spiral-shaped mix bar**
- **R2 positions: L-shaped mix bar**

5 Select **Home** > **Analyzer Maintenance** > **Maintenance**. The system displays the Analyzer Maintenance: Maintenance tab.

6 Select the **Analyzer Maintenance** box. The system activates the maintenance operation buttons.

7 Select **Replace Mix Bar**. The system displays the Replace Mix Bar dialog.

8 The system selects all units by default. If a unit is not required, deselect the **Unit**.

9 Select **The First Mixer** or **The Second Mixer**.

10 For **Times**, enter **1**, and then select **OK.**

11 Press the **DIAG** button. The selected mix bar component initializes and performs a sequence.

12 Close all analyzer doors and covers.

13 Clear the **Analyzer Maintenance** box to deactivate the maintenance operation buttons.

14 Update the Maintenance Log. For more information, refer to Update the Maintenance Log.

Replace the Packing in the Wash Nozzle Tube Mounting Joints

When inspecting the wash nozzle tube mounting joints, replace the packing if it is overstretched, cracked, or torn.

For more information on materials required, refer to Parts List for Analyzer Maintenance.

Materials Required:

- Packing
- Pair of tweezers

1 Confirm that the system is in *Warm up* or *Standby* mode.

2 Open the rear cover of the analyzer.

3 Select **Home** > **Analyzer Maintenance** > **Maintenance**. The system displays the Analyzer Maintenance: Maintenance tab.

4 Select the **Analyzer Maintenance** box. The system activates the maintenance operation buttons.

5 Select **Replace Wash Nozzle**. The system displays the Replace Wash Nozzle dialog.

6 The system selects all units by default. If a unit is not required, deselect the **Unit**.

7 Select **OK**.

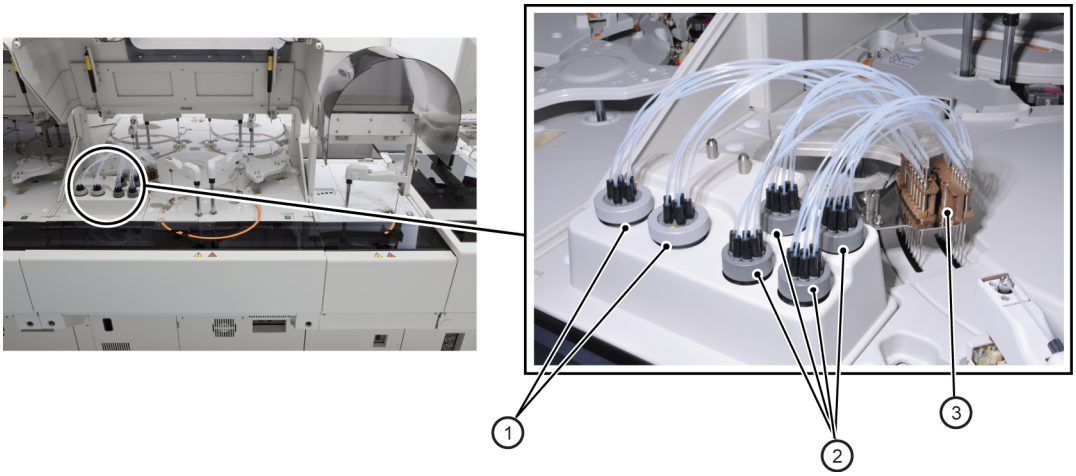
8 Press the **DIAG** button. The liquid drains from the tubes.

NOTE

Before cleaning or replacing the wash nozzle joints, drain the water remaining in the wash nozzles. If you loosen any manifold without draining the remaining water, the water spills out of the nozzle. If the water spills onto the cuvettes, refer to Clean the Cuvettes and the Cuvette Wedges.

9 Remove all the wash nozzle tube mounting joints.

Figure 6.55 Wash Nozzle and Water Supply Tube Mounting Joint Manifold Location



1. Water supply tube mounting joint manifold
2. Wash nozzle tube mounting joint manifold
3. Wash nozzle component

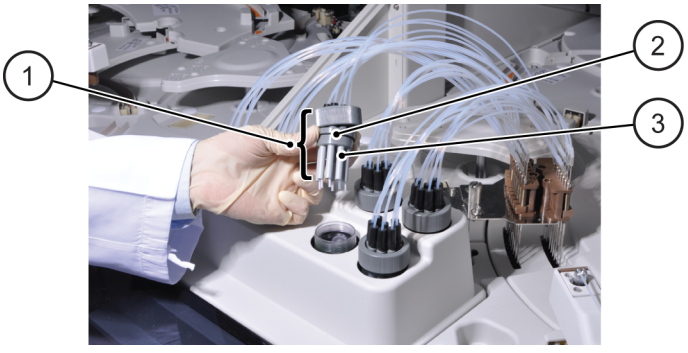
10 Remove the packing with tweezers from each tube mounting joint.

11 Install new packing on each tube mounting joint.

IMPORTANT

Place the packing in the groove of each tube mounting joint.

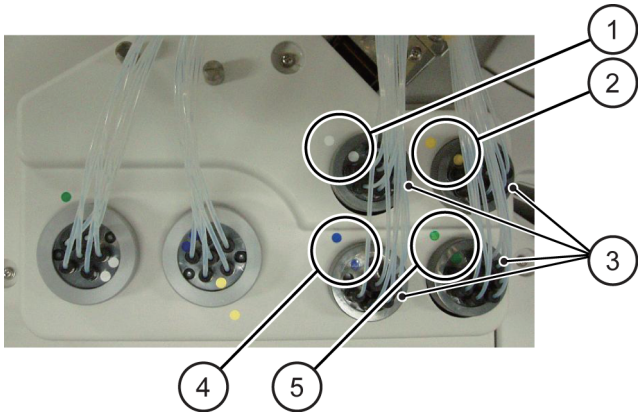
Figure 6.56 Wash Nozzle Tube Mounting Joint



1. Wash Nozzle Tube Mounting Joints
2. Packing
3. Groove of the tube mounting joint

12 Install all the wash nozzle tube mounting joints into their original positions. Match the colored dot on the manifold with the one next to its position.

Figure 6.57 Match the Colored Dots



1. White
2. Yellow
3. Wash nozzle tube mounting joint manifold
4. Blue
5. Green

IMPORTANT

Install the tube mounting joints in the correct positions. The tube mounting joints are color-coded to match where the placement of each joint belongs on the analyzer.

IMPORTANT

Tighten the cap of each tube mounting joint firmly when replacing the tube mounting joints, otherwise leaks can result.

13 Select **Prime Washing Line**. The system displays the Prime Washing Line dialog.

14 The system selects all units by default. If a unit is not required, deselect the **Unit**.

15 Press the **DIAG** button. Confirm that the wash nozzle component is operating correctly.

16 Close all analyzer doors and covers.

17 Clear the **Analyzer Maintenance** box to deactivate the maintenance operation buttons.

18 Update the Maintenance Log. For more information, refer to Update the Maintenance Log.

Replace the Sample, Reagent, ISE Sample, or ISE Buffer Syringe

For replacing a wash syringe, refer to Replace the Wash Syringe Type 1 or Replace the Wash Syringe Type 2.

The procedures for replacing the sample syringes, reagent syringes, ISE sample syringe, and ISE buffer syringes are identical.

If a leak, crack, or any other damage is found with a syringe, replace the syringe.

If syringe performance is questionable because of abnormal data, remove and inspect the syringe.

Replace a syringe if:

- There is not smooth resistance when pulling on the piston. A worn or damaged syringe has a pulling movement that is too hard or too loose.
- The fluorocarbon polymer tip is worn, damaged or there is evidence of the fluorocarbon polymers flaking.
- The syringe or case leaks even after correct installation.
- The head of the syringe is cracked.

Replace a syringe case if:

- The case head is chipped, worn, or damaged in any way.

For more information on materials required, refer to Parts List for Analyzer Maintenance.

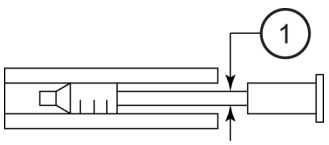
Materials Required:

- Sample syringe (S syringe)
- Reagent syringe (R syringe)
- S syringe case
- R syringe case
- ISE buffer syringe case
- Clean, dry, lint-free absorbent tissue

⚠ CAUTION

Identify the S syringe and R syringe using the diameter of the piston shaft. If you install the incorrect syringe, you obtain incorrect results.

Figure 6.58 Piston Shaft Diameter

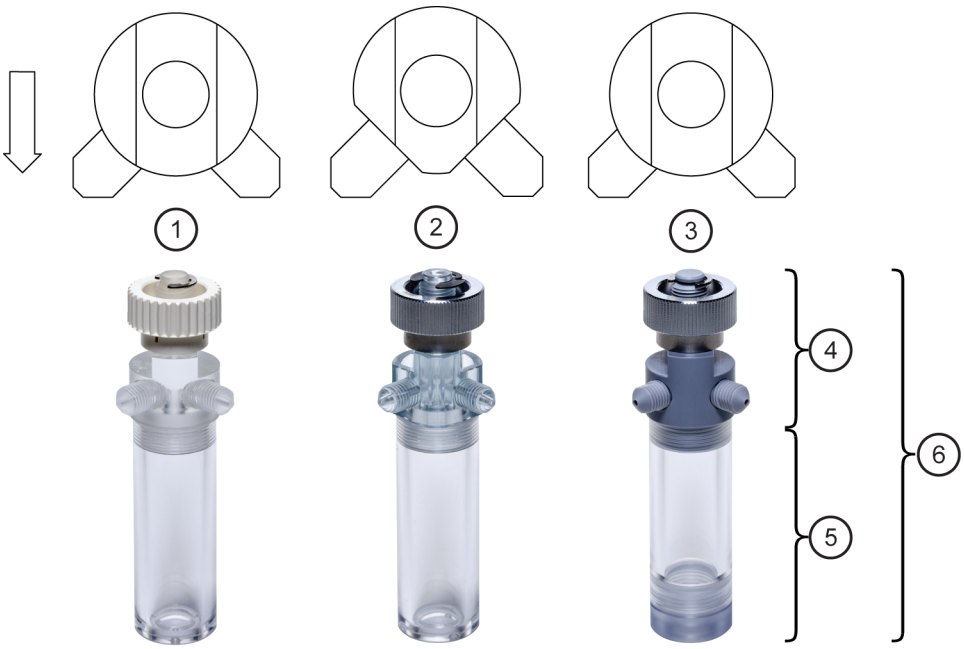


1. 2 mm for S syringe and 5 mm for R syringe

CAUTION

Do not remove the piston from a new syringe. If you remove the piston, the performance of the syringe can be unreliable.

Figure 6.59 Sample, Reagent, and ISE Buffer Syringe Case Heads



1. Sample Syringe Case Head (Transparent)
2. Reagent Syringe Case Head (Transparent)
3. ISE Buffer Syringe Case Head (Gray)
4. Case Head
5. Case Body
6. Syringe Case

IMPORTANT

The case heads for the S syringe, R syringe, and ISE Buffer syringe differ in shape and color.

Table 6.25 Combinations of Syringes and Syringe Cases

		Syringe		Syringe Case		
		S	**R**	**S**	**R**	**ISE**
Analyzer	Sample syringe	X		X		
	Reagent syringe		X		X	
ISE (Option)	Sample syringe	X		X		
	Buffer syringe		X			X

Remove the Syringe

Procedures for removing the sample syringe, reagent syringe, ISE sample syringe, and ISE buffer syringe are identical.

1 Confirm that the system is in *Warm up* or *Standby* mode.

2 Open the left front door to access the reagent syringes and left rear door to access the sample syringes on the analyzer units. Open the top ISE reagent cover to access the ISE buffer syringes, or the front door of the ISE unit to access the ISE sample syringe.

3 Loosen the bottom piston fixing screw and the top fixing nut to remove the syringe and the syringe case from the mounting grooves.

4 Pull the syringe and the syringe case forward to remove it from the mounting grooves.

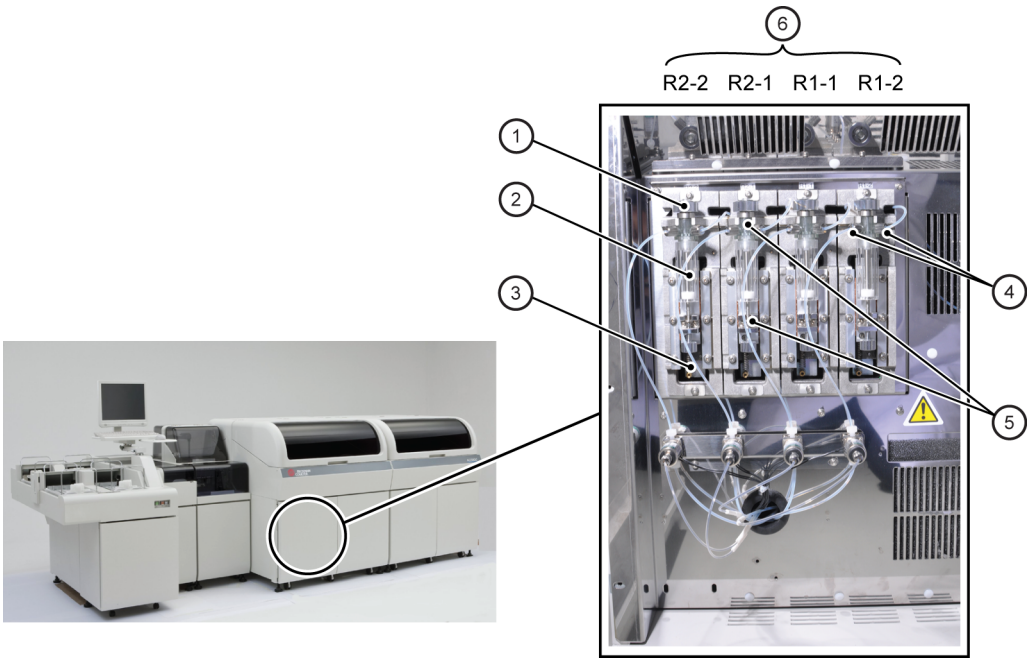
CAUTION

If your skin, eyes, or mouth contact any liquid, immediately rinse the affected area with water. Follow your laboratory procedure.

IMPORTANT

When removing the syringe and the syringe case, hold the bottom with a clean, dry, lint-free absorbent tissue. Do not bend the tubing when removing the syringe and the syringe case.

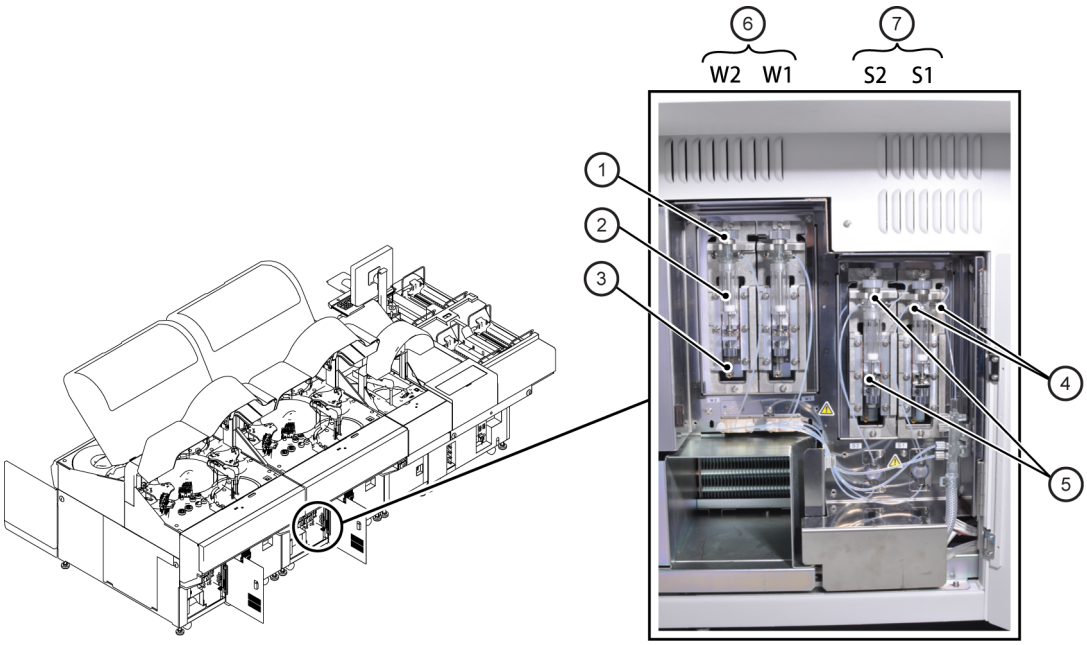
Figure 6.60 Location of Reagent Syringes



1. Fixing nut
2. Syringe and syringe case
3. Piston fixing screw
4. Fixing screws

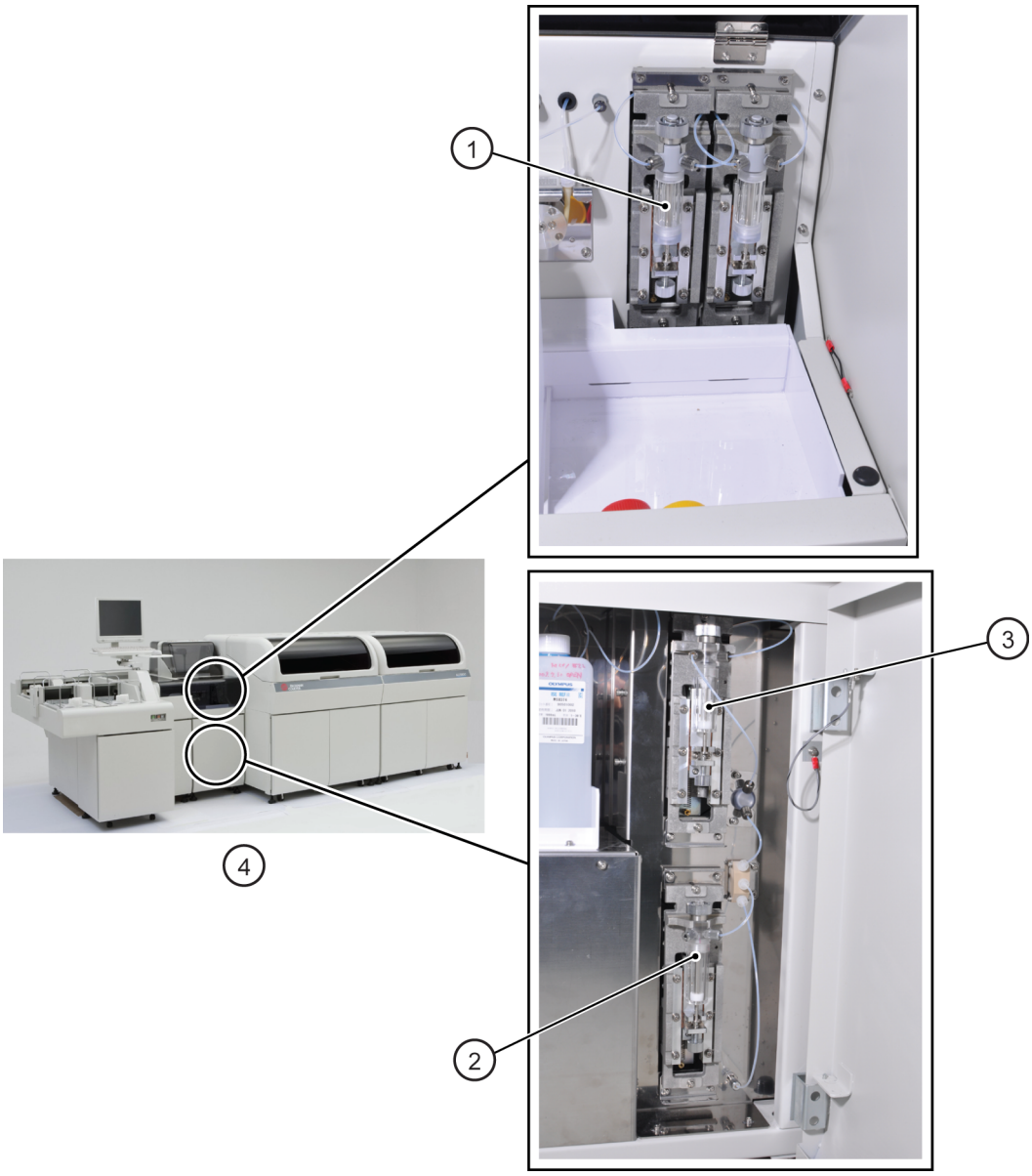
5. Mounting groove
6. Reagent syringe

Figure 6.61 Location of Sample Syringes



1. Fixing nut
2. Syringe and syringe case
3. Piston fixing screw
4. Fixing screws
5. Mounting groove
6. Wash syringe
7. Sample syringe

Figure 6.62 Location of ISE Sample Syringe and ISE Buffer Syringes



1. Buffer syringes
2. Wash syringe
3. Sample syringe
4. Front of ISE unit

5 Tilt the syringe and the syringe case upside down before removing the syringe from the syringe case. Tilt the syringe and the syringe case prevents air from entering the tubing lines and keeps the water from leaking into the syringe case.

6 Remove the syringe case body by turning it counterclockwise while holding the case head. Pull the syringe from the case head.
Do not lose the O-ring, which can drop from the case head. If the O-ring remains in the case head, carefully remove it with tweezers.

Install a New Syringe or a New Syringe Case

1 Obtain a new syringe, and if necessary, a new syringe case.

2 Insert the new syringe into the case head.

3 Dry excess water from the syringe and case head to prevent condensation from forming in the case body. Screw the syringe case body into the case head by twisting clockwise. Do not over-tighten. Tighten the syringe case body by 45 to 60 degrees from the position that it becomes tight.

4 Install the syringe and the syringe case by placing the case head into the mounting groove. Align the syringe piston into the drive shaft.

⚠ CAUTION

Do not allow a strong alkali, such as the wash solution, to contact the syringe case. If a strong alkali contacts the syringe case, cracks can occur.

If a strong alkali contacts the syringe case, remove the syringe case and rinse it with water.

5 Tighten the top fixing nut and then tighten the bottom piston fixing screw.

Prime the New Syringe

1 Select **Home** > **Analyzer Maintenance** > **Maintenance**. The system displays the Analyzer Maintenance: Maintenance tab.

or

Select **Home > Analyzer Maintenance > ISE Maintenance > Maintenance**. The system displays the ISE Maintenance: Maintenance tab.

2 Select the **Analyzer Maintenance** box. The system activates the maintenance operation buttons.

or

Select the **ISE Maintenance** box. The system activates the maintenance operation buttons.

3 After replacing the syringe, select the maintenance operation button. The system displays the Replace Reagent Syringe or Replace Sample Syringe dialog.

Table 6.26 Sample, Reagent, and ISE Buffer Syringe Prime Function

Syringe	Maintenance Operation Button
S1 or S2 sample syringe (S syringe)	Replace Sample Syringe
R1-1, R1-2, R2-1, or R2-2 reagent syringe (R syringe)	Replace Reagent Syringe

Table 6.26 Sample, Reagent, and ISE Buffer Syringe Prime Function (Continued)

Syringe	Maintenance Operation Button
ISE sample syringe (S syringe)	(ISE) Replace Sample Syringe
ISE buffer syringe (R syringe)	(ISE) Buffer Prime

4 In the dialog, select the quantity of cycle times, and then select **OK**.

Table 6.27 Sample, Reagent, and ISE Prime Cycle Times

Maintenance Operation Button	Setting
Replace Sample Syringe	— Each **Unit** is checked. Remove the check if the syringe is not being replaced on that unit(s). — For **Cuvette**, select **Inner** for S1, **Outer** for S2 or **Both**. — **Times** setting is preset at 260.
Replace Reagent Syringe	— Each **Unit** is checked. Remove the check if the syringe is not being replaced on that unit(s). — For **Cuvette**, select **Inner** for R1-1 and R2-1, **Outer** for R1-2 and R2-2 or **Both**. — For **Reagent Syringe**, select **R1**, **R2**, or **Both**. — For **Times**, select 5 or more.
(ISE) Replace Sample Syringe	— **Times** setting is preset at 260.
(ISE) Buffer Prime	— Preset.

5 Press the **DIAG** button.

6 For the reagent syringe or ISE buffer syringe and tubing: If there are bubbles in the syringe after priming, repeat the prime until all bubbles are cleared. If you cannot clear the bubbles after the prime, perform the corrective actions. For more information, refer to Corrective Actions if Prime Fails for Reagent Syringe or ISE Buffer Syringe.

or

For the sample syringe and tubing: If the prime fails (air is still detected), the system displays a `Sample Syringe Prime Incomplete` alarm. Repeat the prime. If the system generates the alarm again, replace the syringe.

NOTE

The sample syringe prime can take from 12 to 44 minutes to complete. The sample syringe primes until the system detects no air using pressure changes.

7 Close all analyzer doors and covers.

8 Clear the **Analyzer Maintenance** box to deactivate the maintenance operation buttons.

or

Clear the **ISE Maintenance** box to deactivate the maintenance operation buttons.

9 Update the Maintenance Log. For more information, refer to Update the Maintenance Log.

10 Perform QC, inspect the data, and recalibrate if necessary.

Corrective Actions if Prime Fails for Reagent Syringe or ISE Buffer Syringe

1 Loosen the bottom piston fixing screw and the top fixing nut to remove the syringe and the syringe case from the mounting grooves.

2 Pull the syringe and the syringe case forward to remove it from the mounting grooves.

CAUTION

If your skin, eyes, or mouth contact any liquid, immediately rinse the affected area with water. Follow your laboratory procedure.

IMPORTANT

When removing the syringe and the syringe case, hold the bottom with a clean, dry, lint-free absorbent tissue. Do not bend the tubing when removing the syringe and the syringe case.

IMPORTANT

Do not apply excessive force to the fixing screws when you remove the syringe and the syringe case. Excessive force to the fixing screws damages the syringe case.

3 Slowly move the syringe piston up and down by hand. Confirm that there are no bubbles on the syringe tip.

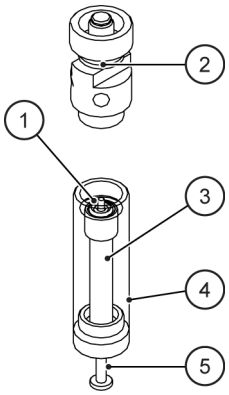
If you see bubbles, move the piston up and down until the bubbles are purged.

CAUTION

Do not move the piston by hand with the syringe case disconnected.

If you move the syringe piston with the syringe case disconnected, the accuracy is not retained because of the deformation of the piston. This deformation can decrease the time a syringe is in use before requiring replacement.

Figure 6.63 Confirm No Bubbles are on the Syringe Tip



1. Confirm that no bubbles are attached to the fluorocarbon polymer tip.
2. Case head
3. Syringe
4. Case body
5. Piston

NOTE

This figure illustrates the disconnected syringe case body and case head to show the location to inspect for bubbles. Do not disconnect the syringe case body from the case head to confirm that there are no bubbles.

4 Install the syringe and the syringe case by placing the case head into the mounting groove. Align the syringe piston into the drive shaft.

5 Tighten the top fixing nut and then tighten the bottom piston fixing screw.

Replace the Wash Syringe Type 1

If a leak, crack, or any other damage is found when the syringe is inspected, you must replace the syringe.

If syringe performance is questionable because of abnormal data, remove and inspect the syringe.

Replace the Wash Syringe Type 1 if:

- There is not smooth resistance when pulling on the piston. A worn or damaged syringe has a pulling movement that is too hard or too loose.
- The fluorocarbon polymer tip is worn, damaged or there is evidence of the fluorocarbon polymers flaking.
- The syringe or the syringe case leaks even after correct installation.

Replace the syringe case if the syringe case is chipped, worn, or damaged in any way.

If leaks occur around the seal assembly even though the seal assembly is not loose, replace the seal assembly.

Materials Required:

- Clean, dry, lint-free absorbent tissue
- Wash Syringe Type 1 (R syringe)
- R syringe case
- Seal assembly

For more information on materials required, refer to Parts List for Analyzer Maintenance.

CAUTION

Do not remove the piston from a new syringe. If you remove the piston, the performance of the syringe can be unreliable.

Figure 6.64 Wash Syringe Type 1

1. Syringe case
2. Case head
3. Case body
4. Fixing screws

Remove the Wash Syringe Type 1

1 Confirm that the system is in *Warm up* or *Standby* mode.

2 To prime the analyzer Wash Syringes Type 1, select **Home** > **Analyzer Maintenance** > **Maintenance**. The system displays the Analyzer Maintenance: Maintenance tab to replace the wash syringe in the analyzer unit.

or

To prime the ISE Wash Syringe Type 1, select **Home** > **Analyzer Maintenance** > **ISE Maintenance**. The system displays the ISE Maintenance: Maintenance tab to replace the wash syringe in the ISE unit

3 Select the **Analyzer Maintenance** box to replace the wash syringe in the analyzer unit.

or

Select the **ISE Maintenance** box to replace the wash syringe in the ISE unit.

The system activates the maintenance operation buttons.

4 Select **Replace Wash Syringe**. The system displays the Replace Wash Syringe dialog.

For analyzer units, each **Unit** is checked.

Select **OK**.

CAUTION

Select OK before replacing the wash syringe. If you remove the syringe from the case head before selecting OK, water leaks from the case head.

NOTE

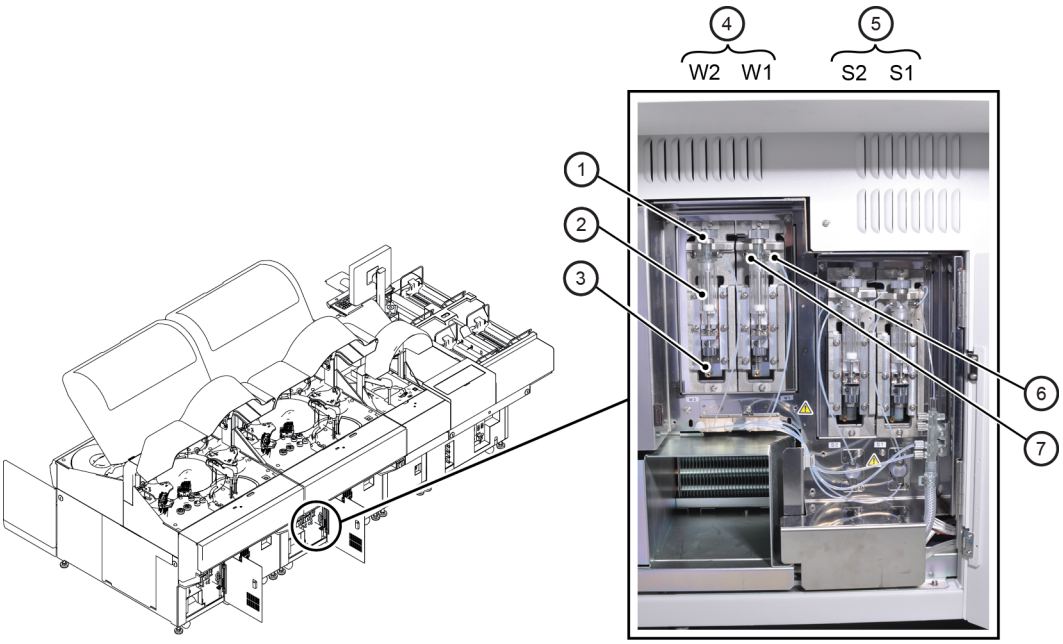
The purpose for selecting **Replace Wash Syringe** and then **OK** is to stop the deionized water pump. It is not necessary to select **Cuvette** and **Times**.

5 Open the left rear door of the analyzer unit to access the wash syringes on the analyzer units or open the front door of the ISE unit to access the wash syringe on the ISE unit.

6 Loosen the bottom piston fixing screw and the top fixing nut to remove the syringe and the syringe case from the mounting grooves.

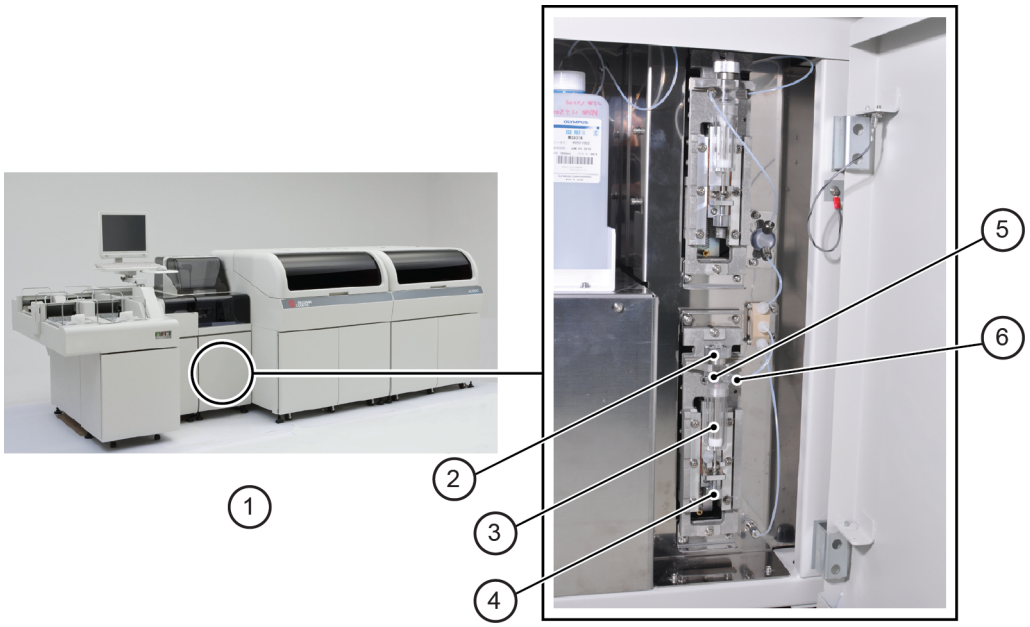
7 Pull the syringe and syringe case forward to remove them from the mounting grooves.

Figure 6.65 Location of Wash Syringe (Analyzer unit)



1. Fixing nut
2. Syringe and syringe case
3. Piston fixing screw
4. Wash syringe
5. Sample syringe
6. Tube connecting nut
7. Seal assembly

Figure 6.66 Location of Wash Syringe (ISE unit)



1. Front of ISE unit
2. Fixing nut
3. Syringe and syringe case
4. Piston fixing screw
5. Seal assembly
6. Tube connecting nut

IMPORTANT

When removing the syringe and the syringe case from the mounting grooves, hold the bottom with a clean, dry, lint-free absorbent tissue. Do not bend the tubing when removing the syringe and the syringe case.

8 Tilt the syringe and the syringe case upside down before removing the syringe from the syringe case. Tilting the syringe and the syringe case prevents air from entering the tubing lines and keeps the water from leaking into the syringe case.

Install a New Syringe, a New Syringe Case, or a New Seal Assembly (For Wash Syringe Type 1)

1 Remove the case body by turning it counterclockwise while holding the case head. Pull the syringe from the case head.
Do not lose the O-ring, which can drop from the case head. If the O-ring remains in the case head, carefully remove it with tweezers.

2 Obtain a new syringe, and if necessary, a new syringe case and a seal assembly.

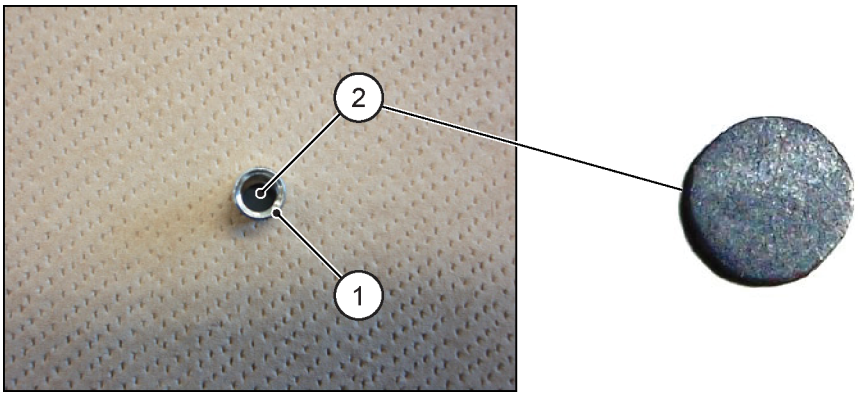
3 To replace the syringe case, loosen the tube connecting nut, remove it from the case head, and then connect it to the new case head.

4 To replace the seal assembly, unscrew and remove the seal assembly, and then install the new seal assembly.

IMPORTANT

Confirm that the packing located in the screw of the new seal assembly is not loose. If you handle the packing carelessly, the packing can fall out because the packing is inserted into the screw and not glued.

Figure 6.67 Seal Assembly



1. Silver screw
2. Packing

5 Insert the new syringe into the case head.

6 Dry excess water from the syringe and case head to prevent condensation from forming in the case body. Screw the case body into the case head by twisting clockwise. Do not over tighten. Tighten the case body by 45 to 60 degrees from the position that it became tight.

7 Install the syringe and the syringe case by placing the case head into the mounting groove. Align the syringe piston into the drive shaft.

8 Tighten the top fixing nut and then tighten the bottom piston fixing screw.

Prime the Wash Syringe to Remove the Air for Wash Syringe Type 1

1 Select **Replace Sample Syringe**.
The system displays the Replace Sample Syringe dialog.

For analyzer units, each **Unit** is checked. Remove the check if the syringe is not being replaced on that unit(s).

For analyzer units, for **Cuvette**, select **Inner** for W1, **Outer** for W2 or **Both**.

Confirm that **Times** is set to **260**, and then select **OK**.

2 Press the **DIAG** button on the analyzer unit or ISE unit with the new wash syringe to initiate the prime.

3 Watch the syringe prime and confirm that it is not leaking. If the syringe is leaking, press the **DIAG** button to stop the prime, and then repeat the Install a New Syringe, a New Syringe Case, or a New Seal Assembly (For Wash Syringe Type 1) procedure.

4 Confirm that the air is primed out of the syringe. If the prime fails (air is still detected), the system displays a `Sample Syringe Prime Incomplete` alarm. Repeat the prime. If the system generates the alarm again, replace the syringe.

5 After finishing the prime, loosen the bottom piston fixing screw and the top fixing nut, then pull the syringe and the syringe case forward to remove them from the mounting grooves.

IMPORTANT

When removing the syringe and the syringe case from the mounting groove, hold the bottom with a clean, dry, lint-free absorbent tissue. Do not bend the tubing when removing the syringe and the syringe case.

IMPORTANT

Do not apply excessive force to the fixing screws when you remove the syringe and the syringe case. Excessive force to the fixing screws damages the syringe case.

6 Slowly move the syringe piston up and down by hand. Confirm that there are no bubbles on the syringe tip.

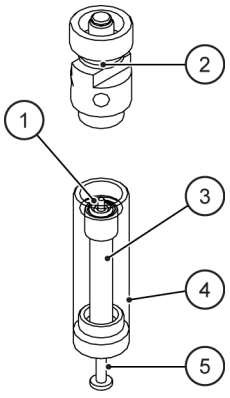
If bubbles are there, move the piston up and down until the bubbles are purged.

CAUTION

Do not move the piston by hand with the syringe case disconnected.

If you move the piston with the syringe case disconnected, the accuracy is not retained because of the deformation of the piston. This deformation can decrease the time a syringe is in use before requiring replacement.

Figure 6.68 Confirm No Bubbles are on the Syringe Tip



1. Confirm that no bubbles are attached to the fluorocarbon polymer tip
2. Case head
3. Syringe
4. Case body
5. Piston

NOTE

This figure illustrates the disconnected case body and case head to show the location to inspect for bubbles. Do not disconnect the case body from the case head to confirm that there are no bubbles.

7 Tighten the top fixing nut and then tighten the bottom piston fixing screw.

8 Close all doors and covers on the analyzer units and the ISE unit.

9 Clear the **Analyzer Maintenance** box or the **ISE Maintenance** box to deactivate the maintenance operation buttons.

10 Update the Maintenance Log. For more information, refer to Update the Maintenance Log.

11 Perform QC, inspect the data, and recalibrate if necessary.

Replace the Wash Syringe Type 2

If a leak, crack, or any other damage is found when the syringe is inspected, you must replace the syringe.

If syringe performance is questionable because of abnormal data, remove and inspect the syringe.

Replace Wash Syringe Type 2 if there are leaks around the syringe.

If leaks occur around the seal assembly even though the seal assembly is not loose, replace the seal assembly.

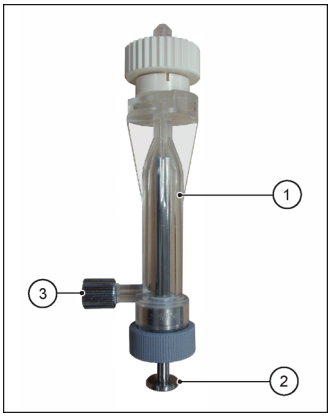
Replace the Wash Syringe Type 2 piston if there is a leak at the bottom of the syringe even after replacing the syringe.

Materials Required:

- Clean, dry, lint-free absorbent tissue
- Wash Syringe Type 2
- Seal Assembly
- Piston
- Alcohol prep pads (70% Isopropyl alcohol)

For more information on materials required, refer to Parts List for Analyzer Maintenance.

Figure 6.69 Wash Syringe Type 2



1. Wash Syringe Type 2
2. Piston
3. Seal Assembly

Remove the Wash Syringe for Type 2

1 Confirm that the system is in *Warm up* or *Standby* mode.

2 Select **Home** > **Analyzer Maintenance** > **Maintenance**. The system displays the Analyzer Maintenance: Maintenance tab.

3 Select the **Analyzer Maintenance** box. The system activates the maintenance operation buttons.

4 Select **Replace Wash Syringe**. The system displays the Replace Wash Syringe dialog.

Each **Unit** is checked.

Select **OK**.

NOTE

The purpose for selecting **Replace Wash Syringe** and then **OK** is to stop the deionized water pump. It is not necessary to select **Cuvette** and **Times**.

CAUTION

Select OK before replacing the wash syringe. If you remove the tube connecting nut from the syringe before selecting OK, water sprays from the tube.

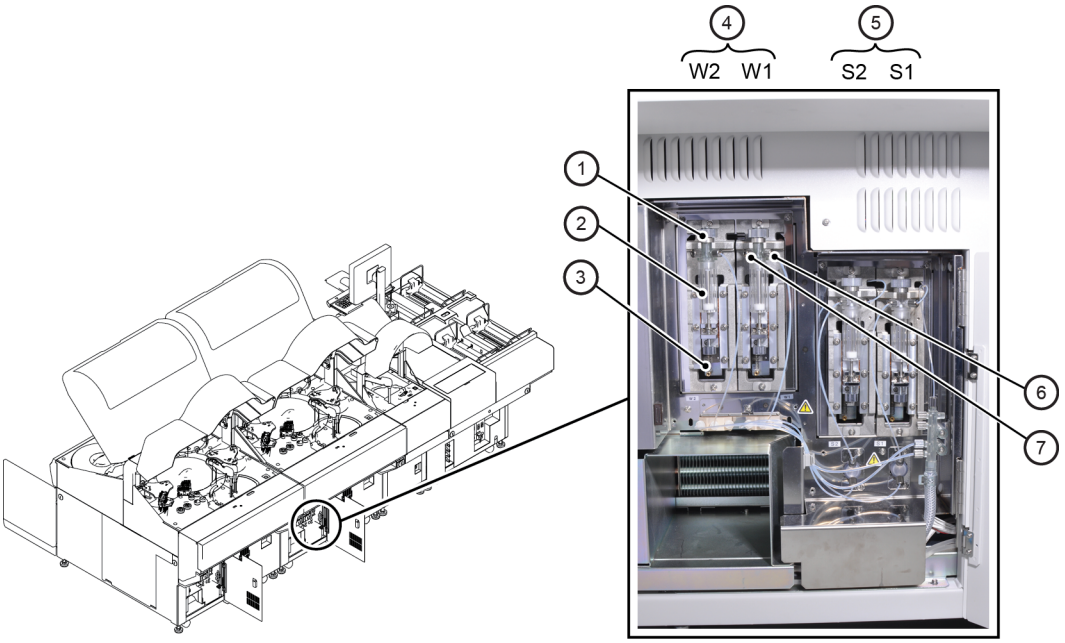
5 Open the left rear door of the analyzer unit.

6 Unscrew the tube connecting nut on the top of the syringe.

7 Loosen the bottom piston fixing screw and the top fixing nut to remove the syringe from the mounting grooves.

8 Pull the syringe forward to remove it from the mounting grooves.

Figure 6.70 Location of Wash Syringe



1. Fixing nut
2. Syringe
3. Piston fixing screw
4. Wash syringe
5. Sample syringe

IMPORTANT

When removing the syringe from the mounting grooves, hold the bottom with a clean, dry, lint-free absorbent tissue. Do not bend the tubing when removing the syringe.

Install a New Wash Syringe and Seal Assembly (For Wash Syringe Type 2)

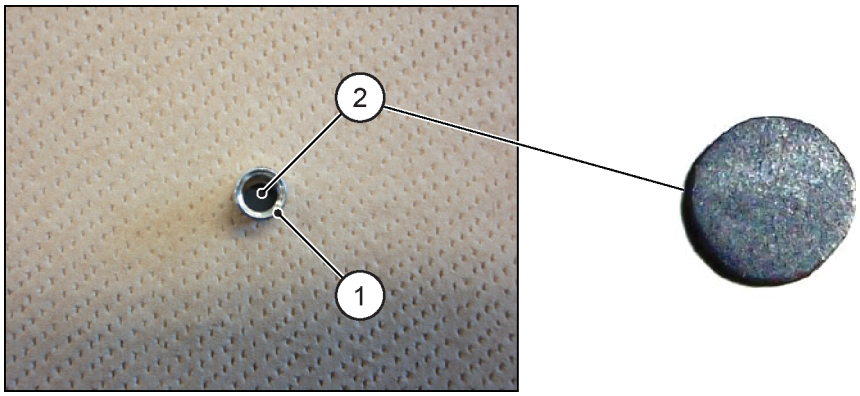
1 Obtain a new syringe, a new piston, and a seal assembly.

2 If necessary, unscrew and remove the seal assembly, and then install the new seal assembly.

IMPORTANT

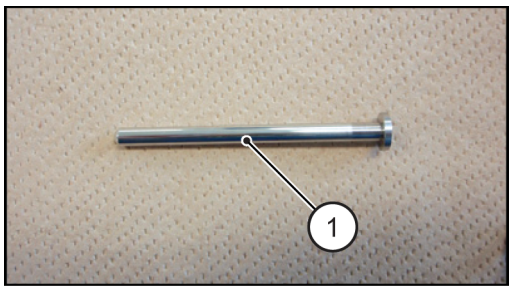
Confirm that the packing located in the screw of the new seal assembly is not loose. If you handle the packing carelessly, the packing can fall out because the packing is inserted into the screw and not glued.

Figure 6.71 Seal Assembly



1. Silver screw
2. Packing

Figure 6.72



1. Piston

3 Wipe the piston with an alcohol prep pad (70% Isopropyl alcohol).

4 Gently insert the piston into the new wash syringe.

IMPORTANT

Do not damage the piston. If the piston is damaged, leaks from the bottom of the syringe may occur.

5 Connect the tubing to the top of the syringe and tighten the tube connecting nut.

6 Install the syringe into the mounting groove. Align the syringe piston into the drive shaft.

7 Tighten the top fixing nut and then tighten the bottom piston fixing screw.

Prime the Wash Syringe to Remove the Air for Wash Syringe Type 2

1 Select **Replace Sample Syringe**.
The system displays the Replace Sample Syringe dialog.

Each **Unit** is checked. Remove the check if the syringe is not being replaced on that unit(s).

For **Cuvette**, select **Inner** for W1 or **Outer** for W2 or **Both**.

Confirm that **Times** is set to **260**, and then select **OK**.

2 Press the **DIAG** button on the analyzer unit in which the syringe is replaced. The wash syringe is primed.

TIP

The system primes deionized water through the tubing to remove air.

The sample syringe prime could take from 12 to 44 minutes to complete. The sample syringe primes until no air is detected by pressure changes. To stop the operation, press the **DIAG** button. At this time, an abort error alarm is generated. The alarm can be cleared, and no corrective actions are required.

3 Watch the syringe prime and confirm that it is not leaking. If the syringe is leaking, press the **DIAG** button to stop the prime, and then repeat the Install a New Wash Syringe and Seal Assembly (For Wash Syringe Type 2) procedure.

4 Confirm that the air is primed out of the syringe.

5 After finishing the prime, if bubbles are still present, tap the top of the wash syringe with your finger.

CAUTION

Do not touch the moving piston. Injury can result if your finger is caught in the syringe component.

It is not necessary to remove bubbles around the seal assembly or small bubbles less than 1 mm in diameter. Small bubbles have no effect on the accuracy of the syringe dispensing.

6 Close all analyzer doors and covers.

7 Clear the **Analyzer Maintenance** box to deactivate the maintenance operation buttons.

8 Update the Maintenance Log. For more information, refer to Update the Maintenance Log.

9 Perform QC, inspect the data, and recalibrate if necessary.

Clean the Interior of the Reagent Refrigerators

Condensation forms inside the reagent refrigerators caused by exposure to the outside air.

Keep the reagent refrigerator covers in position to diminish the amount of condensation formed.

Clean the interior of refrigerators when a reagent is spilled, or as needed after inspection.

If you suspect bacterial contamination, or if you observe mold, contact Beckman Coulter for the decontamination procedure.

NOTE

Avoid wiping the bar code reader glass window inside the reagent refrigerators. If the glass window is smudged from wiping, reagent ID read errors can occur.

Clean the Interior of the Reagent Refrigerators

For more information on materials required, refer to Parts List for Analyzer Maintenance.

Materials Required:

- Clean, dry, lint-free absorbent tissue
- Alcohol prep pads (70% Isopropyl alcohol)

1 Confirm that the system is in *Warm up* or *Standby* mode.

2 Lift the front upper cover of each analyzer unit.

3 Remove the reagent refrigerator covers.

4 Remove the reagents along with the reagent tray from each refrigerator by lifting the white securing pins until they unclip from the base. Lift the tray up from the center, and gently place the tray in a safe place.

5 Wipe off the condensation and stains on the wall, bottom, and central area inside the reagent refrigerators with a dry, clean absorbent tissue.

6 Wipe the same components again with an alcohol prep pad (70% Isopropyl alcohol) to clean the refrigerator. Then, rinse with deionized water and dry with a clean, dry, lint-free absorbent tissue.

7 Return reagents and reagent tray to its original position for each refrigerator. Set the tray onto the metal pin. Press down on the white securing pins to secure the reagent tray.

8 Replace the reagent refrigerator covers.

9 Close all analyzer doors and covers.

10 Select **Home** > **Analyzer Maintenance** > **Maintenance**. The system displays the Analyzer Maintenance: Maintenance tab.

11 Update the Maintenance Log. For more information, refer to Update the Maintenance Log.

Clean or Replace the Anti-static Brushes

Anti-static brushes reduce the chance of static electricity affecting a sample by removing static electricity before sampling takes place.

⚠ CAUTION

To avoid infection, always wear gloves to clean or replace the anti-static brushes. If the solution contacts skin or clothes, rinse the affected area thoroughly with water. If the solution contacts the eyes or mouth, immediately flush with water. Seek medical attention. Follow your laboratory procedure.

For more information on materials required, refer to Parts List for Analyzer Maintenance.

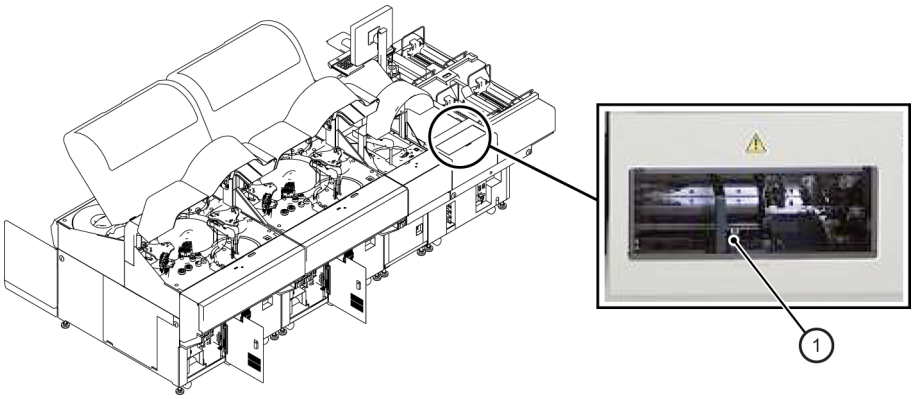
Materials Required:

- Anti-static brushes
- Alcohol prep pads (70% Isopropyl alcohol)

1 Confirm that the system is in *Warm up* or *Standby* mode.

2 Remove the dark acrylic cover from the rack back of the rack buffer component.

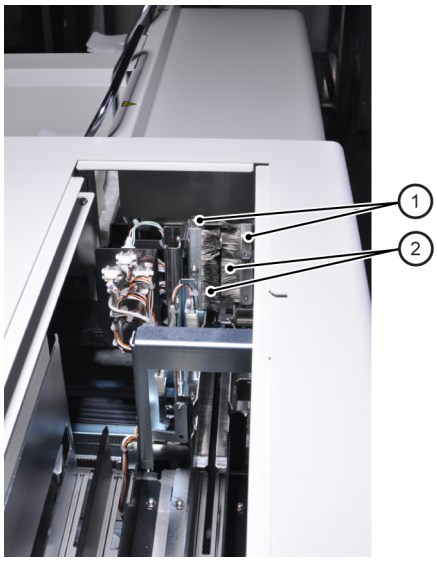
Figure 6.73 Location of Anti-static Brushes



1. Anti-static brushes

3 Loosen the fixing screw at the top of the anti-static brush, and remove the anti-static brush.

Figure 6.74 Anti-static Brushes



1. Fixing screws
2. Anti-static brushes

4 Follow the same procedure with the brush component on the other side of the rack transport.

5 Clean any stains on the brushes with an alcohol prep pad (70% Isopropyl alcohol) from the base to the end of the bristle tips.

6 If the static discharge brushes are still stained after cleaning or indicate wear, replace them.

7 Dispose of the old brushes in a receptacle for biohazard waste.

8 Reinstall the anti-static brushes and tighten the fixing screws on top.

9 Replace the dark acrylic cover over the back of the rack buffer component.

10 Select **Home** > **Analyzer Maintenance** > **Maintenance**. The system displays the Analyzer Maintenance: Maintenance tab.

11 Update the Maintenance Log. For more information, refer to Update the Maintenance Log.

Replace the Sample or Reagent Probe Tubing

Replace the sample or reagent probe tubing if the tubing leaks or breaks.

Replace the sample probe or reagent probe tubing using the same procedure.

For more information on materials required, refer to Parts List for Analyzer Maintenance.

Materials Required:

- Sample probe tubing
- Reagent probe tubing
- (ISE) Sample probe tubing

IMPORTANT

Before disconnecting the tubing, confirm that the probe is positioned over the wash well. Dripping from the probe can occur.

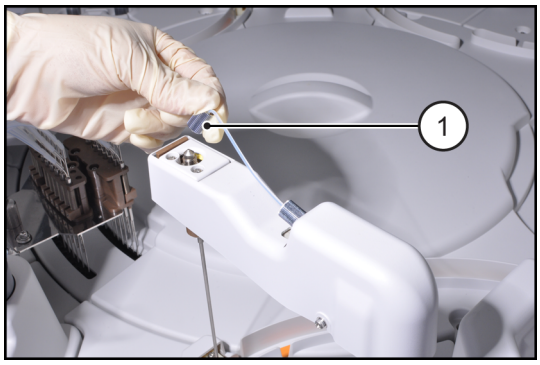
1 Confirm that the system is in *Warm up* or *Standby* mode.

2 Lift the upper cover of the unit.

— Sample probe : Rear upper cover of each analyzer unit
— Reagent probe : Front upper cover of each analyzer unit
— ISE Sample probe : Rear upper cover of ISE unit

3 Loosen the connectors on both sides of the probe tubing to remove it.

Figure 6.75 Probe Tubing



1. Connector

4 Tighten the new tubing connectors to secure both ends of the probe tubing. Tighten the connectors firmly so that no liquid leaks.

5 Select **Home** > **Analyzer Maintenance** > **Maintenance**. The system displays the Analyzer Maintenance: Maintenance tab.

Or

Select **Home** > **Analyzer Maintenance** > **ISE Maintenance** > **Maintenance**. The system displays the ISE Maintenance: Maintenance tab.

6 Select the **Analyzer Maintenance** box. The system activates the maintenance operation buttons.

Or

Select the **Analyzer Maintenance** box or **ISE Maintenance** box. The system activates the maintenance operation buttons.

7 Select **Prime Washing line** for the analyzer sample and reagent probe, or select **Replace Sample Probe** for the ISE sample probe. The system displays the Prime Washing Line or Replace Sample Probe dialog.

8 The system selects all units by default. If a unit is not required, deselect the **Unit**.

9 For **Times**, enter **5**, and then select **OK.**

10 Press the **DIAG** button. Confirm that the tubing is not leaking and that the probe is dispensing correctly.

11 Close all analyzer doors and covers.

12 Clear the **Analyzer Maintenance** box or **ISE Maintenance** box to deactivate the maintenance operation buttons.

13 Update the Maintenance Log. For more information, refer to Update the Maintenance Log.

Perform a W1

If the analyzer is put into *Stop* mode during analysis, reagents and sample remain in the cuvettes for longer than normal operation. A W1 cleans the entire cuvette wheel automatically using the wash nozzle component.

1 Confirm that the system is in *Warm up* or *Standby* mode.

2 Select **Home** > **Analyzer Maintenance** > **Maintenance**. The system displays the Analyzer Maintenance: Maintenance tab.

3 Select **W1 (F5)**. The system displays the W1 Start dialog.

4 The system selects all units by default. If a unit is not required, deselect the **Unit**.

5 Select **OK**. The system starts the W1. The W1 takes approximately 19 minutes. After the W1 is complete, the system automatically updates the maintenance log.

Replace Rack ID Labels

If a rack ID label is scratched, stained, or deteriorated, an ID read error results. Replace the rack ID label with a new one.

IMPORTANT

Rack ID labels can deteriorate with time. If a rack ID read error occurs on an older label and the label shows no anomalies, the label is assumed to have deteriorated from discoloration or reduction in reflectivity. If the rack ID label is deteriorated, replace all the labels that have been used for the same time as the concerned label.

- The bar code label is faint, or scratched caused by abrasion or scraping.
- A label is stained or blurred caused by adhesion of foreign matters (liquid or solid).
- A label is peeled or torn.

For more information on materials required, refer to Parts List for Analyzer Maintenance.

Materials Required:

- New Rack ID labels

IMPORTANT

If it is difficult to remove a label, dampen the label with water and use a tool to scrape it off, such as a razor blade or scissors.

Never use an organic solvent such as ethyl alcohol (ethanol). Organic solvents alter the quality of the plastic surface on a rack.

If you use water, wipe the water off completely so that no moisture remains on the rack.

Do not scratch the rack surface.

1 Remove the rack ID label.

Figure 6.76 Rack ID Label on a Rack

2 Attach a new rack ID label on the rack. Place the label on the beveled edge of the rack with the numbers on the left (when looking at the rack).

For more information, refer to the AU5800 Reference Manual.

CAUTION

When replacing rack ID labels, do not use labels with the same rack ID on more than one rack. Using duplicate rack IDs can cause concordance errors between samples.

Clean or Replace Individual Cuvettes

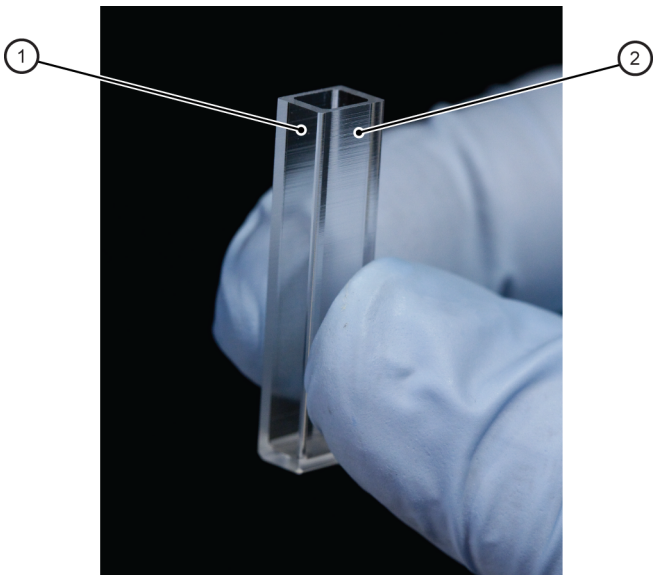
CAUTION

Confirm that 408 cuvettes are correctly installed in the cuvette wheel. If one of the cuvettes is missing, the mixture, reagent, or wash solution spills into the cuvette wheel, causing a cuvette wheel overflow and preventing successful analysis.

CAUTION

Do not scratch the cuvettes when replacing cuvettes on the cuvette wheel. Never touch the photometric surface of a cuvette. If the photometric surface is stained or scratched, analysis data is inaccurate. Wear gloves when handling the cuvettes.

Figure 6.77 Cuvette



1. Photometric face
2. Frosted glass face

NOTE

There are cuvettes with different interior and outer dimensions. The AU5800 uses cuvette PN MU855200 with an interior dimension of 5 mm x 4 mm. These cuvettes are different from the other AU analyzers. Do not use a cuvette from another AU analyzer

on the AU5800. Use of a cuvette other than the AU5800 cuvette on the AU5800 causes erroneous results.

Clean or replace individual cuvettes that fail the weekly photocal procedure. If only a few cuvettes need cleaning or replacing after a cuvette wheel overflow, you can use this procedure.

For more information on materials required, refer to Parts List for Analyzer Maintenance.

Materials Required:

- Cuvettes
- Cotton-tipped applicator
- Clean, dry, lint-free absorbent tissue
- 2% Wash solution
- Plastic container
- Sonicator

1 Confirm that the system is in *Warm up*, *Standby*, or *Stop* mode.

2 Select **Home** > **Analyzer Maintenance** > **Maintenance**. The system displays the Analyzer Maintenance: Maintenance tab.

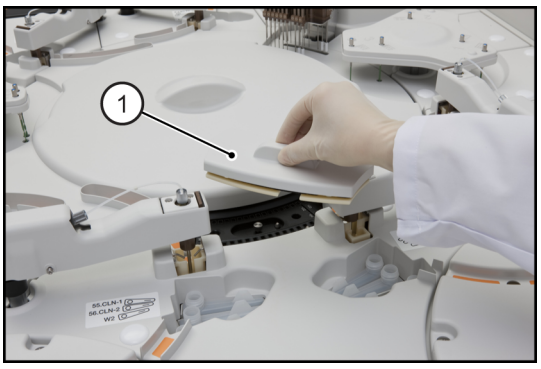
3 Select the **Analyzer Maintenance** box. The system activates the maintenance operation buttons.

4 Select **Replace Cuvette**. The system displays the Replace Cuvette dialog.

5 Lift the upper cover of the analyzer unit.

6 Lift the cuvette wedge cover, carefully remove it from the analyzer, and set it aside.

Figure 6.78 Cuvette Wheel



1. Cuvette wedge cover

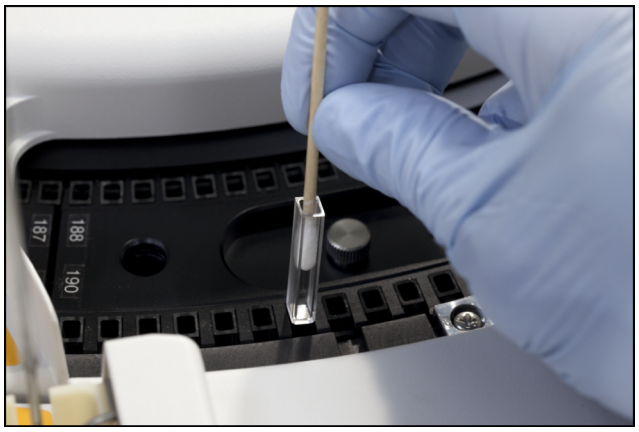
7 Press the **DIAG** button. The analyzer initializes the cuvette wheel and rotates the wheel to the home position.

8 Press the **DIAG** button as many times as you need to rotate the cuvette wheel to reach the cuvette to replace or clean. Each time you press the DIAG button, the cuvette wheel

rotates to the next wedge. Each wedge has a numerical label so you can identify the cuvette number to clean or replace. Each wedge has 17 inner and outer cuvettes.

9 Insert the cotton tipped applicator stick to the bottom of the cuvette. Gently pull the cuvette out of the wedge.

Figure 6.79 Removing the Cuvette



10 Determine if the cuvette needs replacing or cleaning.

- To replace individual cuvettes: Insert the new cuvette into the wedge. Gently push the cuvette completely into the wedge.
- To clean individual cuvettes: Sonicate cuvettes in a 2% Wash Solution for 15 minutes. If a sonicator is not available, soak them in a 5% Wash Solution overnight. Rinse the cuvette in deionized water. Allow the cuvettes to completely dry.

11 Replace the new or cleaned cuvette into its position. Gently push the cuvette completely into the wedge.

12 Replace the cuvette wedge cover.

13 Select **Prime Washing Line**. The system displays the Prime Washing Line dialog.

14 The system selects all units by default. If a unit is not required, deselect the **Unit**.

15 Select **OK.**

16 Press the **DIAG** button. Watch as the wash nozzle component moves, and confirm that the downward motion is not inhibited.

17 Clear the **Analyzer Maintenance** box to deactivate the maintenance operation buttons.

18 Perform a photocal on the individual cuvette. For more information, refer to Perform a Photocal.

Clean the Cuvettes, Cuvette Wedges, and Cuvette Wheel after an Overflow

Erroneous data is generated if the cuvettes become wet on the outside (cuvette overflow). The reaction of the sample and reagents takes place in a carefully controlled dry incubation bath. Water on the outside of the cuvette affects the light as it passes through the cuvette. Test results are impacted due to this change in absorbance. A "Photometry Error During Cuvette Wash" alarm is generated when an overflow has occurred. Refer to Recovering from a Photometry Error During a Cuvette Wash Alarm. Determine the cause for the overflow and follow the correct procedures to recover from an overflow.

For more information, refer to Recovering from a Cuvette Wheel Overflow.

WARNING

The overflow occurs either in the inner cuvettes or the outer cuvettes, or both in the inner and outer cuvettes depending on the failure mode. The code (1 or 2) only indicates the location where the cuvette overflow is first detected. The cuvette overflow can spread over both the inner and outer cuvettes. Clean the inner and outer cuvettes, the wedges, and the wheel.

Materials Required for each Analyzer Unit:

- Cotton tip applicator
- 2% Wash Solution
- Sonicator
- Clean, dry lint-free cloth
- Large plastic containers to hold cuvette wedges
- Plastic containers to hold cuvettes in the sonicator

Remove the Cuvette Wedges and Wheel

Perform this procedure on a work surface protected with clean, dry lint-free cloth.

1 Confirm that the system is in *Warm up* or *Standby* mode.

2 Lift the main front cover of each analyzer unit.

3 Select **Home** > **Analyzer Maintenance** > **Maintenance**. The system displays the Analyzer Maintenance: Maintenance tab.

4 Select the **Analyzer Maintenance** box. The system activates the maintenance operation buttons.

5 Select **Cleaning Probe**. The system displays the Cleaning Probe dialog.

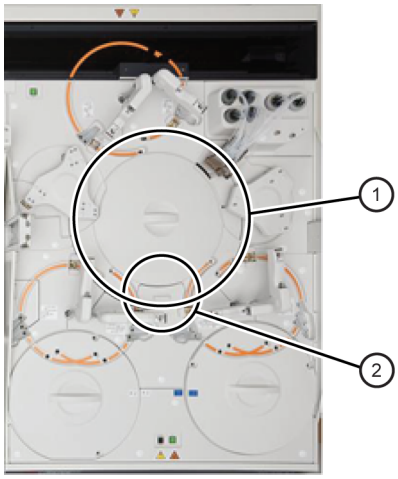
6 The system selects all units by default. If a unit is not required, deselect the **Unit**.

7 Select **OK**.

8 Press the **DIAG** button. The analyzer initializes the probes.

9 Press the **DIAG** button again to move the probes over the cleaning solution bottles and away from the cuvette wheel.

Figure 6.80 Cuvette Wheel



1. Cuvette wheel cover
2. Cuvette wedge cover

10 Remove all mix bars that are over the cuvette wheel cover.

11 Loosen the silver screw on the wash nozzle component, and place the wash nozzle component on the stand by the wash nozzle component manifolds.

12 Carefully remove the cuvette wedge cover, then the cuvette wheel cover. Avoid bumping the probes or mix bars with the cuvette wheel cover.

13 To remove a cuvette wedge, loosen the screw then lift the cuvette wedge out of the cuvette wheel. Remove all 12 cuvette wedges.

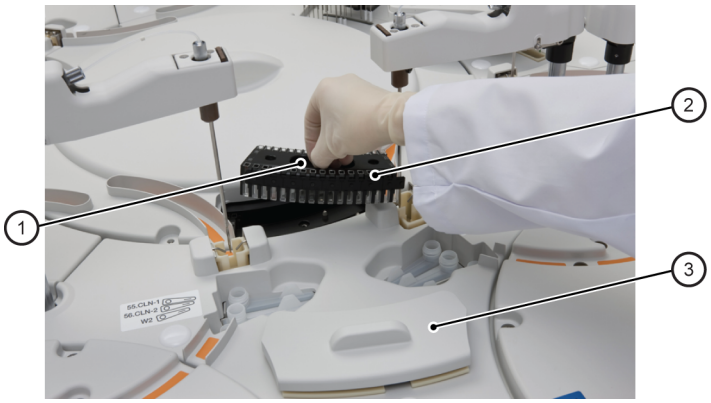
TIP

The cuvette wheel can be removed with the cuvette wedges; however, the wheel is large and the cuvette wedges are fairly heavy. Removing the wedges first may make it easier to remove the wheel.

CAUTION

- **When handling cuvettes, do not scratch the cuvettes. If a cuvette is scratched, the photometric data is inaccurate, and the cuvette must be replaced.**
- **To maintain correct photometric analysis, do not get fingerprints on the photometric surface of the cuvettes. Always wear gloves when handling the cuvettes.**
- **Avoid mixing cuvettes when replacing or cleaning them in laboratories with multiple Beckman Coulter analyzers other than the AU5800.**

Figure 6.81 Remove a Cuvette Wedge



1. Screw
2. Cuvette wedge
3. Cuvette wedge cover

14 Remove the two large flat screws on the metal plate in the center of the cuvette wheel. These screws are used as handles to remove the cuvette wheel from the incubation bath.

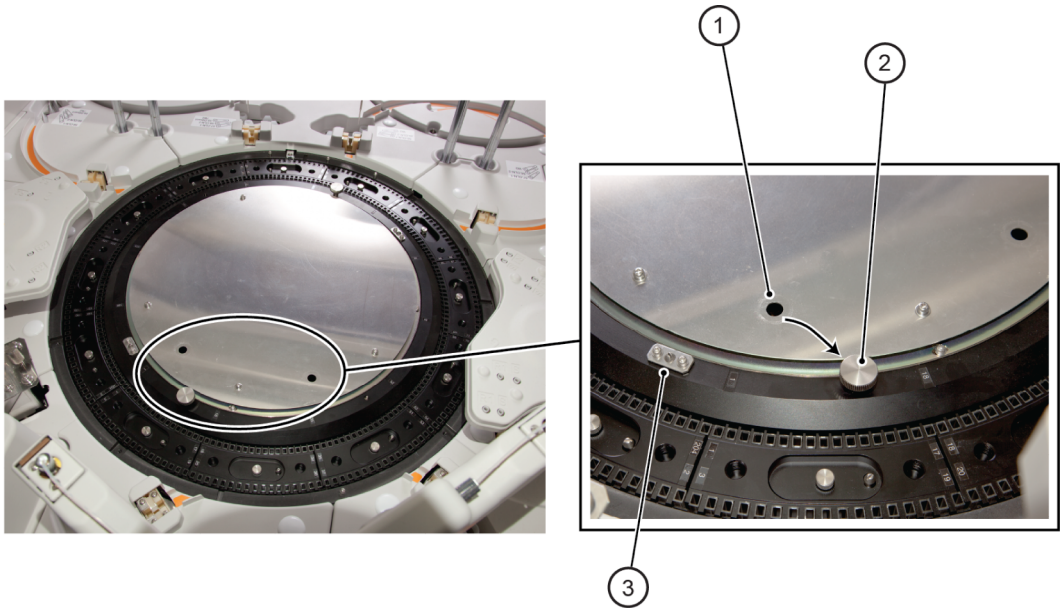
NOTE

You can remove the cuvette wheel with cuvette wedges. Beckman Coulter recommends you to remove the wedge first , then remove the wheel, since the wheel is large and the cuvette wedges are fairly heavy.

15 Remove the two large flat screws on the metal plate in the center of the cuvette wheel. These screws are used as handles to remove the cuvette wheel from the incubation bath.

16 Attach the flat screws to the frame of the cuvette wheel. Place one of the screws into the opening on the wheel close to cuvette number 18 and the other screw close to cuvette number 120. Firmly tighten the screws into the cuvette wheel.

Figure 6.82 Remove the Cuvette Wheel



1. Location of flat screws
2. Location of flat screws on frame of cuvette wheel
3. Positioning pin

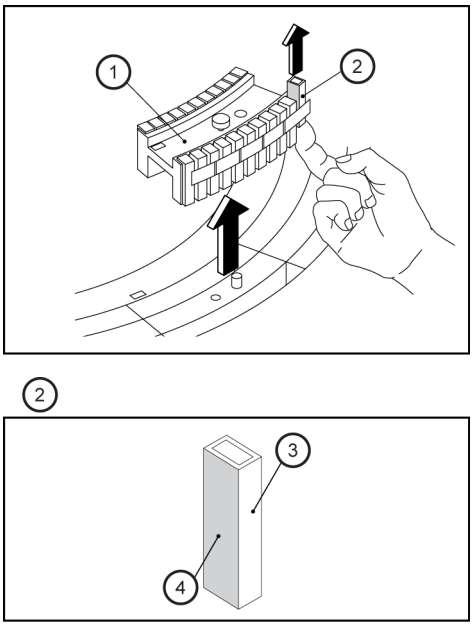
17 Using the two flat screws as handles, carefully pull the cuvette wheel up off the two metal positioning pins. It may be necessary to angle the wheel slightly to clear the mix units. Place the cuvette wheel on a work surface protected with clean, dry lint-free cloth.

Remove the Cuvettes from the Wedges

Perform this procedure over a protected work surface.

1 Use a finger or the reverse end of a cotton-tipped applicator stick to push each cuvette from the bottom to remove it from the wedge. You must remove all 34 cuvettes.

Figure 6.83 Remove a Cuvette



1. Cuvette wedge
2. Cuvette
3. Photometric face
4. Frosted glass face

2 Repeat step 1 to remove all 408 cuvettes from 12 wedges.

Clean the Cuvettes, Cuvette Wedges, and Cuvette Wheel

CAUTION

When handling cuvettes, do not scratch them. If a cuvette is scratched, the photometric data is inaccurate, and you must replace the cuvette.

1 Submerge all cuvettes in a plastic container filled with 2% wash solution.

2 Sonicate for 15 minutes.

3 Thoroughly rinse the cuvettes in DI water, or sonicate them in DI water for 10 minutes to remove any residual wash solution.

4 Allow the cuvettes to dry completely.

IMPORTANT

Use one of the following cuvette drying methods:

— Allow cuvettes to air dry.
— Use an oven with the heat set under 50 °C (122 °F).
— Use a clean, dry, lint-free absorbent tissue.

5 Rinse the cuvette wedges and wheel with a sufficient quantity of DI water and thoroughly dry them. Do not use wash solution or any detergents as this may damage the finish on the metal.

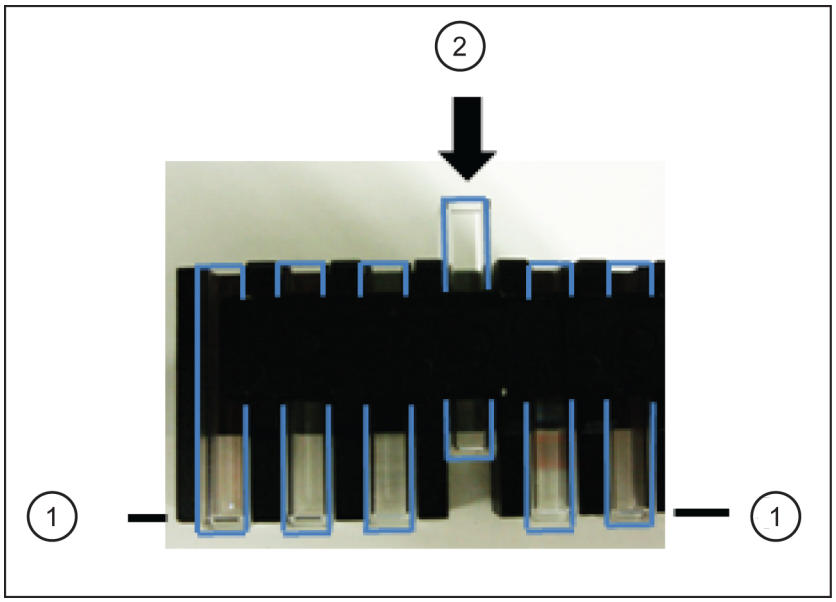
6 Dry the incubation bath with clean, dry, lint-free absorbent tissues.

7 Replace the cuvette wheel back into the incubation bath. It may be necessary to angle the wheel slightly to clear the mix units. Align the wheel over the positioning pins. The wheel only fits in the correct position aligned by the positioning pins.

8 Loosen the two large flat screws, and place them in the openings on the metal plate in the center of the cuvette wheel.

9 Insert the cuvettes back into the wedges. Confirm that each cuvette is gently pushed down completely into the wedge.

Figure 6.84 Replace the Cuvettes



1. Bottom
2. Push in

10 Replace the cuvette wedges in their original positions on the system. Align the numbers on the wedge with the numbers on the cuvette wheel. Confirm that the cuvette wedge is gently pushed down completely into the wheel.

11 After replacing the cuvette wedges in the cuvette wheel, confirm that all 12 cuvette wedges are in place. Confirm that the top of each cuvette is even with the top of the wedge and that each wedge is level within the cuvette wheel.

12 Loosen the two large flat screws, and place them in the openings on the metal plate in the center of the cuvette wheel.

13 Replace the cuvette wheel cover, cuvette wedge cover, mix bars, and wash nozzle component.

14 Close all analyzer doors and covers.

15 Clear the **Analyzer Maintenance** box to deactivate the maintenance operation buttons.

16 Update the Maintenance Log. For more information, refer to Update the Maintenance Log.

17 Perform a photocal. For more information, refer to Perform a Photocal.

Replace the Photometer Lamp

Over time, the intensity of the photometer lamp diminishes, and results are affected.

Beckman Coulter recommends replacing the photometer lamp every 1,000 hours. Replacement of the lamp at 1,000 hours ensures continuous and reliable lamp performance without unexpected analyzer down-time.

Replace the lamp when a cuvette displays in orange for a Lamp Check Error in the Photocal Monitor tab, or when troubleshooting indicates the need for a new lamp, even if 1,000 hours have not passed since the lamp was replaced.

After replacing the lamp, the system requires a photocal to evaluate the quality and intensity of the new lamp.

WARNING

To prevent electric hazards, shut down the system (End Process) before replacing the photometer lamp. For more information, refer to System Shutdown (End Process). Wait a minimum of 5 minutes after the system completes the shutdown process. Do not touch the lamp with your bare hands until the photometer lamp has cooled down completely. The lamp is hot and can cause burns.

IMPORTANT

Never touch the glass of the photometer lamp with your bare hands. If oil from skin or fingerprints are left on the glass, wipe them off with a clean, dry, lint-free absorbent tissue.

For more information on materials required, refer to Parts List for Analyzer Maintenance.

Materials Required:

- Photometer lamp

1 To shut down the system, select End. For more information, refer to System Shutdown (End Process).

2 Allow the lamp to cool for a minimum of 5 minutes.

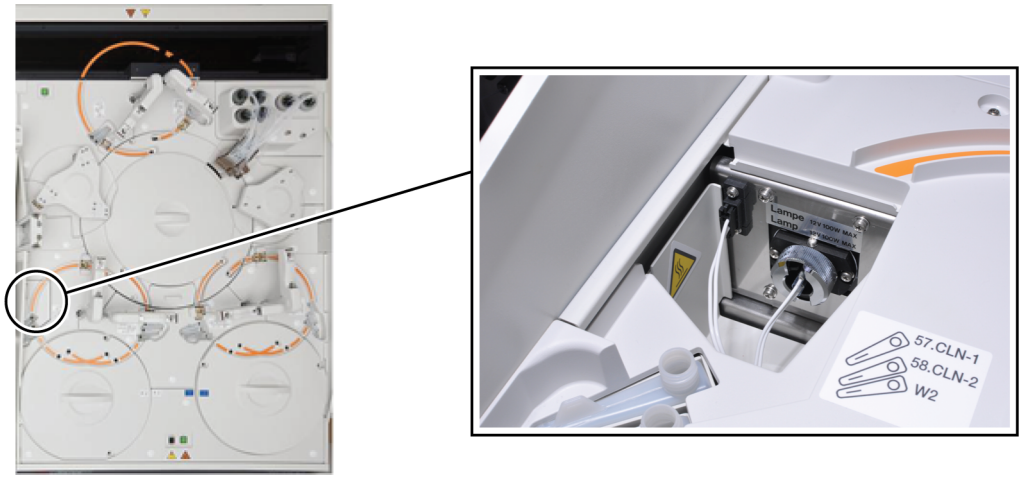
3 Lift the front upper cover of each analyzer unit.

4 Remove the lamp cover.

IMPORTANT

Do not bump the cover against the reagent probe when removing the lamp cover.

Figure 6.85 Remove the Lamp Cover



5 Disconnect the plug.

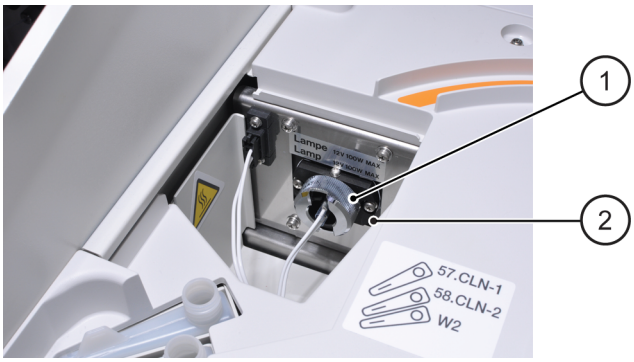
Figure 6.86 Lamp Plug

6 Remove the lamp by turning the lamp holder counterclockwise, then pulling the lamp from the lamp receptacle. Handle the lamp by the lead wires.

IMPORTANT

Never touch the glass of the photometer lamp with your bare hands. If oil from skin or fingerprints are left on the glass, wipe them off with a clean, dry, lint-free absorbent tissue.

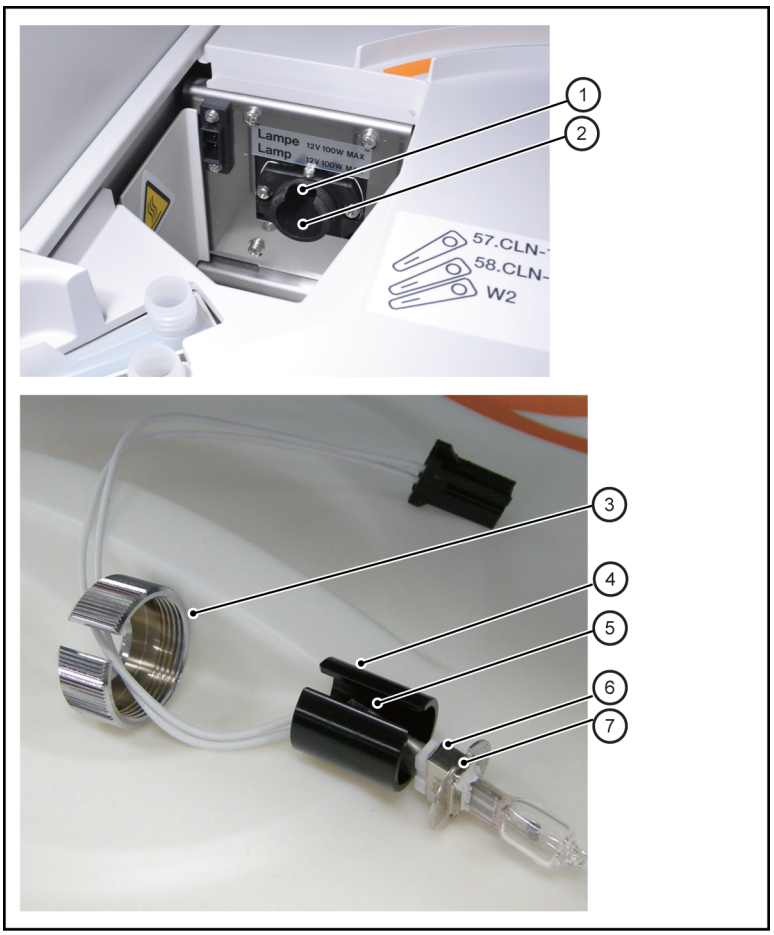
Figure 6.87 Lamp Holder



1. Lamp holder
2. Lamp receptacle

7 Remove the lamp holder and collar from the lamp and keep them for future use.

Figure 6.88 Lamp Component



1. Protrusion
2. Lamp receptacle
3. Lamp holder
4. Collar
5. Collar notch
6. Guide key
7. Notch

8 Obtain a new lamp. Handle the lamp using only the wires. If you touch the bulb, you can damage it.

9 Slide the collar along the lead wires with the opening of the notch toward the rear of the lamp. Align the notched collar with the notch of the guide key of the lamp.

10 Insert the lamp into the receptacle with the notches lined up on the top. Slide the notches into the keyed protrusion of the receptacle.

11 Slide the lamp holder along the wires behind the lamp and tighten to hold it in position.

CAUTION

Confirm that the lamp holder is securely in position. If the holder is loose, accurate analysis data is not obtained.

12 Connect the plug.

13 Replace the lamp cover.

14 Close all analyzer doors and covers.

15 Press the **ON** button. The system powers up and initializes.

IMPORTANT

After replacing the lamp, perform a photocal to confirm that the lamp does not have any defects. To obtain accurate analysis data, wait 20 minutes to stabilize the lamp after turning on the system, then perform the photocal.

16 Select **Home > Analyzer Maintenance > Consumption**.

17 Select **Replacing Photometer Lamp**.

18 Select **Change**. The system displays the Change dialog.

19 The system displays all units selected. Deselect **Unit** that was not replaced the lamp.

20 Select **OK** to indicate the lamp is replaced and reset the lamp used time.

NOTE

The system automatically saves the first photocal value after you update Replacing Photocal Lamp in the Consumption tab. The system uses this photocal value as the reference value in **Photocal Monitor > Detail(F5) > Graph**.

21 Allow the lamp 20 minutes to warm up and come to the correct intensity before continuing to the next step.

22 Perform a photocal. For more information, refer to Perform a Photocal.

23 Confirm that all cuvettes have passed the photocal.

Errors can occur after the photocal. If numerous cuvettes fail the photocal, the lamp is incorrectly replaced or the lamp is defective. If only a few cuvettes fail the photocal, the cuvettes are dirty or stained. Clean the cuvettes. If the system still reports an error after cleaning, replace the cuvettes. For more information, refer to Clean or Replace Individual Cuvettes.

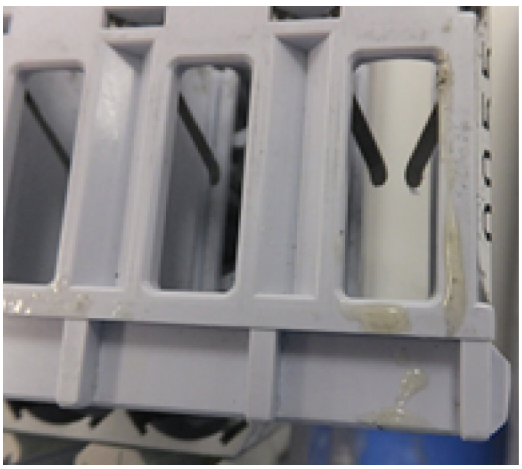
24 Run QC before processing samples.

Analyze QC data, and recalibrate if necessary.

Clean the Rack

Inspect the rack before using it for analysis. If the rack is dirty or sticky, it might cause a rack jam. Clean the rack.

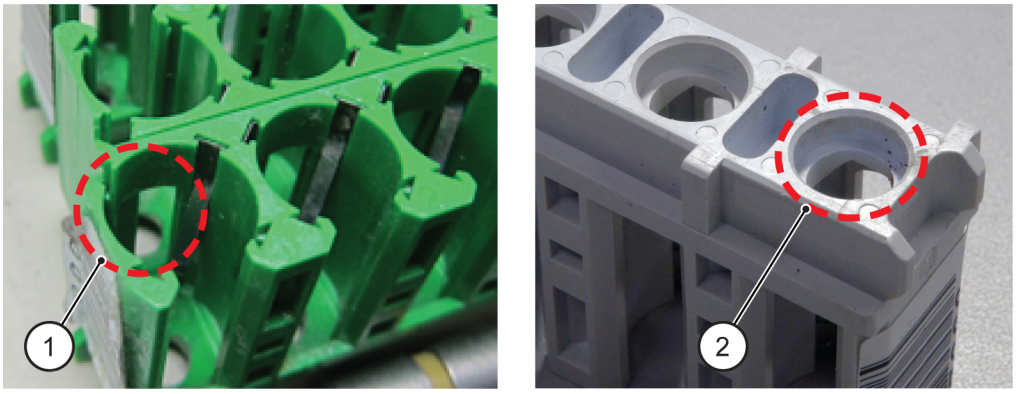
Figure 6.89 Dirty Rack



If the rack ID label is peeling, it can also cause a rack jam. Replace the rack ID label. Refer to Replace Rack ID Labels.

When the rack is damaged, or the magnet on the bottom of the rack is missing , replace the rack.

Figure 6.90 Damaged Rack and Rack with a Missing Magnet



1. Rack without supporting metal bar
2. Rack with a missing magnet

Materials Required:

- Clean, dry, lint-free absorbent tissue
- Hot water

Wipe the racks with lint-free absorbent tissue moistened with hot water.

IMPORTANT

Handle the racks with care to keep racks clean.

— Do not fill the cup or tube completely to the top with sample. The sample surface in the cup or tube should be lower than 15 mm from the top of the cup or tube.
— Keep clean or replace the anti-static brush if it gets dirty. Refer to Clean the Anti-static Brushes.
— Carefully place the cups or tubes filled with sample into the racks to avoid sample spilling from the cup or tube onto the rack. Beckman Coulter recommends using a rack tray when the sample racks are loaded on the rack feeder unit.
— When disposing of sample cups or tubes, do not turn the rack upside down with the cups or tubes in the rack as sample can drip onto the rack.

Clean the Rack Tray

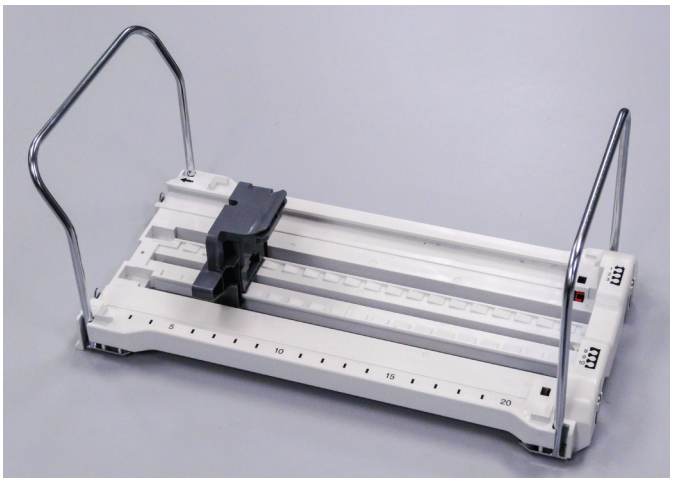
If the rack tray is dirty or sticky, the racks on the tray might fall over.

Materials Required:

- Clean, dry, lint-free absorbent tissue
- Hot water

Wipe the rack tray with lint-free absorbent tissue moistened with hot water.

Figure 6.91 Rack Tray



Clean the Rack Transfer Lanes

If the rack transfer lanes are dirty or sticky, rack jams might occur. Beckman Coulter recommends inspecting the rack transfer lanes periodically, and cleaning them as needed.

Materials Required:

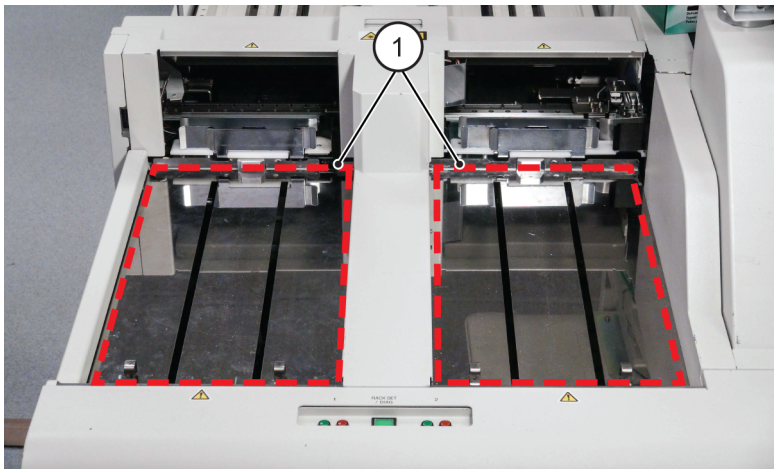
- Alcohol prep pads (70% Isopropyl alcohol)
- Clean, dry, lint-free absorbent tissue
- Hot water

Clean the Rack Loading Area

1 To shut down the system, select **End**. For more information, refer to System Shutdown (End Process).

2 Remove the rack trays on the rack input component.

Figure 6.92 Rack Tray Loading Areas without the Rack Input Trays



1. Wipe these areas

3 Wipe the area with an alcohol prep pad (70% Isopropyl alcohol) or lint-free absorbent tissue moistened with hot water.

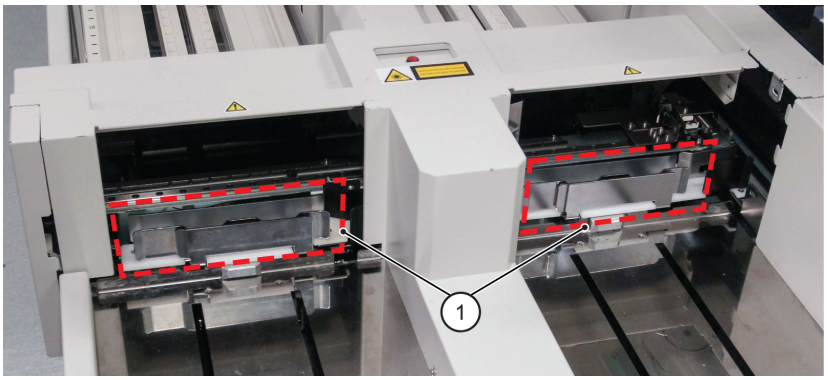
Clean the Rack Input Transfer Component

1 Inspect the metal parts on the rack input transfer component behind the rack input trays. If the parts are dirty or sticky, clean the parts.

2 Wipe the following areas on the rack input transfer component with an alcohol prep pad (70% Isopropyl alcohol) or lint-free absorbent tissue moistened with hot water:

— Front and back surface of the front metal wall.
— Front surface of the back metal wall.
— Bottom surface between the front and back metal walls.

Figure 6.93 Rack Input Transfer Component

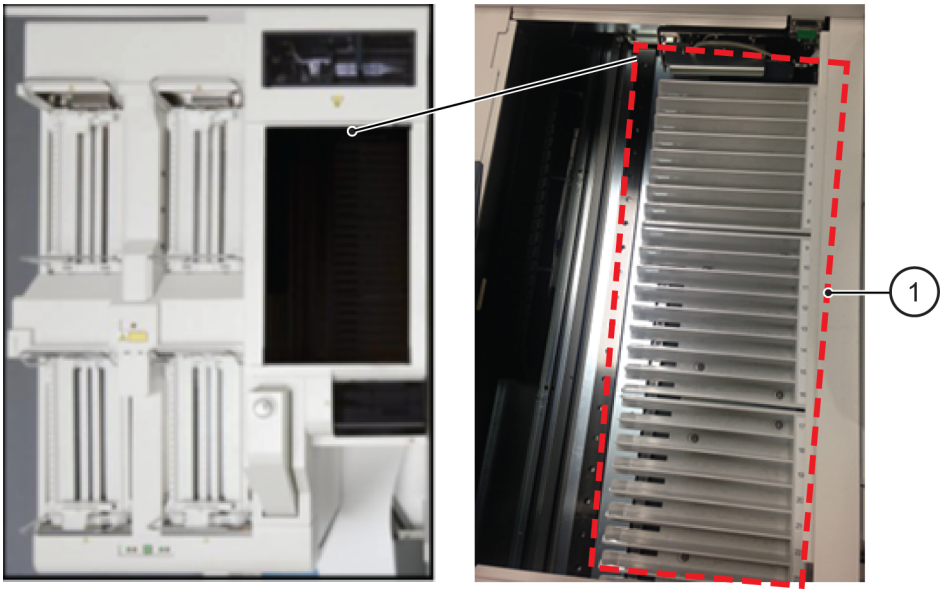


1. Wipe these areas

Clean the Rack Buffer Component

1 Remove the dark acrylic cover from the rack buffer component.

Figure 6.94 Top View of Rack Feeder Unit



1. Rack buffer area

2 Wipe the rack buffer area with an alcohol prep pad (70% Isopropyl alcohol) or lint-free absorbent tissue moistened with hot water.

3 Replace the cover on the rack buffer component.

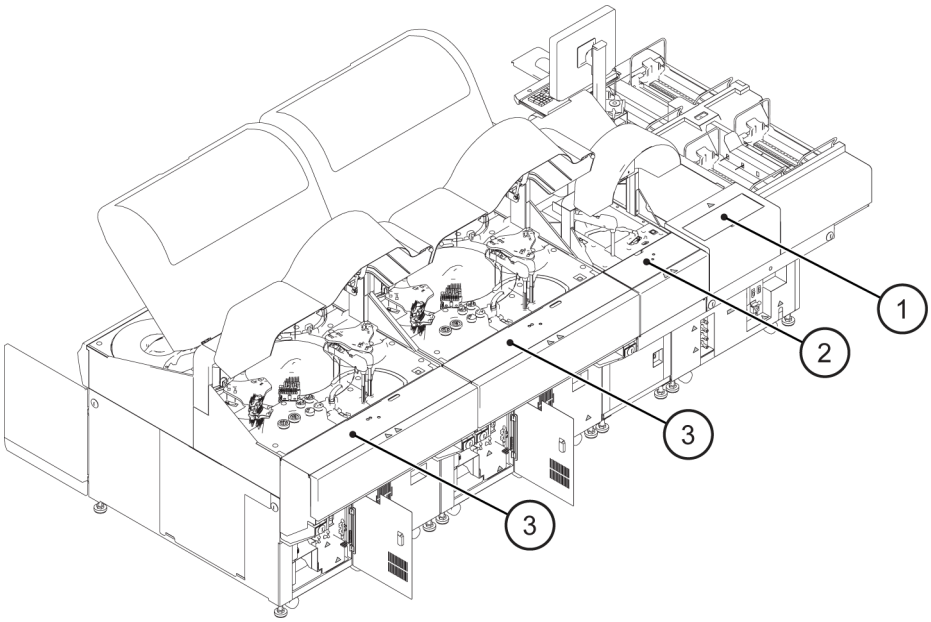
Clean the Anti-static Brushes

Clean the anti-static brushes. Refer to Clean or Replace the Anti-static Brushes.

Clean the Analyzer and ISE Rack Transfer Lanes

1 Remove the dark acrylic covers for the rack transfer lanes on the back side of the rack feeder unit, the ISE unit, and the analyzer units.

Figure 6.95 Location of Covers for Rack Transfer Lanes



1. Rack transfer lane cover on the rack feeder unit
2. Rack transfer lane cover on the ISE unit
3. Rack transfer lane cover on the analyzer unit

---

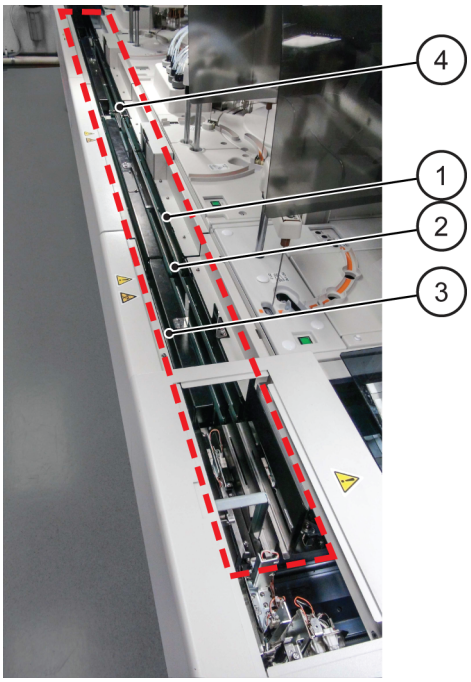
2 Inspect the rack transfer lanes. If the following parts are dirty or sticky, clean the parts:

— Side walls and bottom surface of each rack transfer lane.

— Primary sample transport lane
— Bypass lane
— Rack return lane

— Inside wall surfaces of the rack lane changer.

Figure 6.96 Rack Transfer Lanes



1. Bypass lane
2. Primary sample transport lane
3. Return lane
4. Lane changer

3 Wipe the dirty parts with an alcohol prep pad (70% Isopropyl alcohol) or lint-free absorbent tissue moistened with hot water.

IMPORTANT

It is not necessary to rotate the green belt on the bottom of the rack transfer lanes to clean them.

4 Replace the covers on the analyzer units and the ISE unit.

Save Parameters

Beckman Coulter recommends saving parameters when programming changes are made or following your laboratory procedures.

If multiple AU5800s are in the laboratory, Beckman Coulter recommends saving the parameter files for each AU5800 to external media.

For more information, refer to the AU5800 Reference Manual.

Reset the System from *Stop* to *Standby* Mode

When the system is in *Stop* mode to perform maintenance, reset it with the following procedure.

1. Clear the **Analyzer Maintenance** box to deactivate the maintenance operation buttons.

   or

   Clear the **ISE Maintenance** box to deactivate the maintenance operation buttons.
2. Select **Home**.
3. Select **Stop/Standby**. After initialization, the system enters *Warm up* or *Standby* mode.

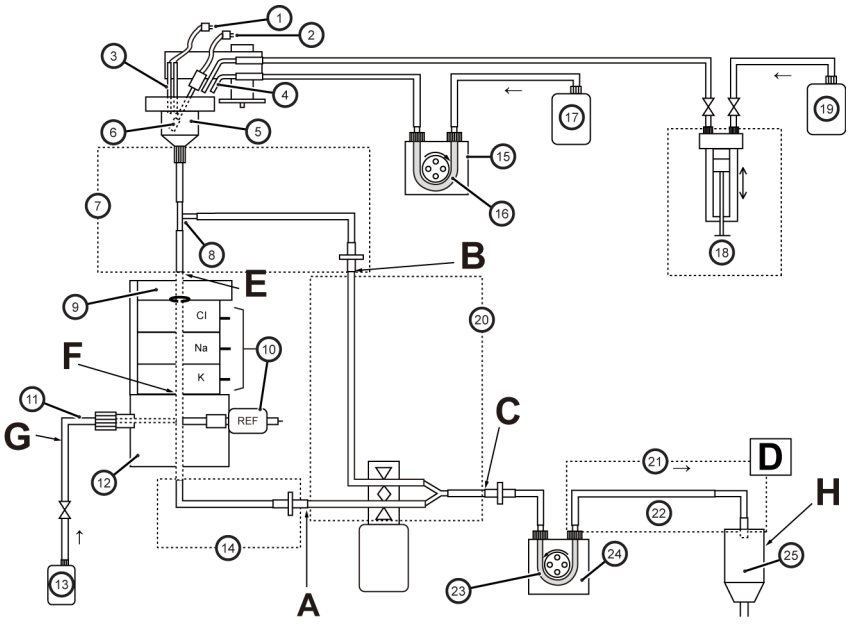
ISE Maintenance for All Markets Except Japan

IMPORTANT

For the Japan market, refer to Maintenance in the ISE Addendum.

ISE Tubing Block Diagram

Figure 6.97 ISE Tubing Block Diagram



1. Level sensor connector
2. Mixing motor connector
3. Liquid level sensor
4. Nozzle
5. Sample pot
6. Mix bar
7. Tubing between the Sample Pot, Electrode Block, and T-Connector (Cell 1 : Tube Set, Cell 2: Tube Set 7)
8. T-connector
9. Electrode block (inlet)
10. Electrode

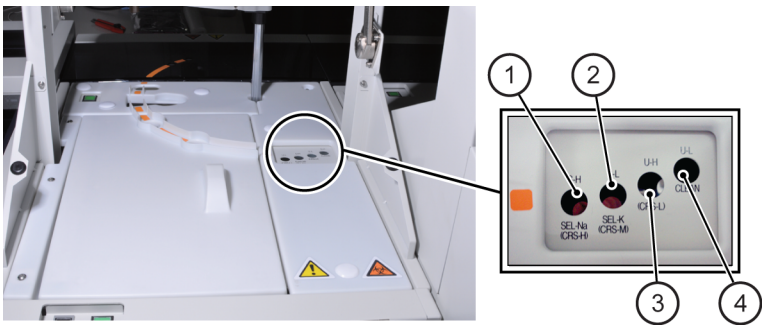
11. REF solution tube
12. REF electrode block
13. ISE Reference Solution
14. REF Electrode Blockside Drain Tube (Cell 1: Tube Set 2 labeled 6, Cell 2: Tube Set 8 labeled 8)
15. MID standard roller pump
16. Roller pump tubing
17. ISE MID Standard Solution
18. Buffer syringe
19. ISE Buffer Solution
20. Pinch valve tubing
21. Waste solution
22. Drain tube
23. Roller pump tubing
24. Mixture aspiration roller pump
25. Drain well

NOTE

A to H: Tubing detachment locations. Refer to the specific maintenance procedure for a detailed diagram and description.

ISE Solution Position Area

Figure 6.98 ISE Solution Position Area



1. S-H and SEL-Na
2. S-L and SEL-K
3. U-H
4. U-L and CLEAN

Position	Sample
S-H	ISE High Serum Standard
S-L	ISE Low Serum Standard
U-H	ISE High Urine Standard
U-L	ISE Low Urine Standard
SEL-Na	ISE Na+ Selectivity Check
SEL-K	ISE K+ Selectivity Check
CLEAN	ISE Cleaning Solution
CRS-H/M/L	Standard serum in Japan only

Parts List for ISE Maintenance

Table 6.29 Daily ISE Maintenance

Maintenance Procedure	Part	Part Number
Inspect, Clean, and Prime the ISE Sample Probe (ISE Option)	Alcohol prep pads (70% Isopropyl alcohol)	Commercial item
Clean the ISE (ISE Option)	ISE Cleaning Solution • ISE Cleaning Solution (US) • Cleaning Solution (Outside US)	• AUH1019 (US) • 66039 (Outside US) • For the Japan market, refer to the ISE Addendum
	Hitachi Cup	MU853200
Calibrate the ISE (ISE Option)	ISE High Serum Standard	• AUH1015 (US) • 66316 (Outside US)
	ISE Low Serum Standard	• AUH1014 (US) • 66317 (Outside US)
	ISE Low/High Urine Standard	• AUH1016 (US) • 66315 (Outside US)
	Hitachi Cup (4 cups)	MU853200

Table 6.30 Weekly ISE Maintenance

Maintenance Procedure	Part	Part Number
Selectivity Check for the Na and K Electrodes	ISE Na+/K+ Selectivity Check	• AUH1018 (US) • 66313 (Outside US)
	Hitachi Cup (2 cups)	MU853200
Enhanced Cleaning of Electrode Line	ISE Cleaning Solution • ISE Cleaning Solution (US) • Cleaning Solution (Outside US)	• AUH1019 (US) • 66039 (Outside US) • For the Japan market, refer to the ISE Addendum
	Hitachi Cup	MU853200

Table 6.31 Every Other Week or 3,000 Samples ISE Maintenance

Maintenance Procedure	Part	Part Number
Manually Clean the ISE Mix Bar, Liquid Level Sensors, Sample Pot, and Sample Pot Tubing	Alcohol prep pads (70% Isopropyl alcohol)	Commercial item
	Clean, dry, lint-free absorbent tissue	Commercial item
	1% Wash solution	• ODR2000 (4x5L) or OSR0001 (6x2L) (Outside Japan) • MS028400 (Japan)
	Deionized water	-
	Sonicator	Commercial item

Table 6.32 Every Other Month or Every 20,000 Samples ISE Maintenance

Maintenance Procedure	Part	Part Number
Inspect and Add ISE Internal Reference Solution	ISE Internal Reference Solution	• AUH1017 (US) • 66314 (Outside US)

Table 6.33 Quarterly or Every 20,000 Samples ISE Maintenance

Maintenance Procedure	Part	Part Number
Replace the Mixture Aspiration and MID Standard Roller Pump Tubing	Roller pump tubing	MU962300
Replace the Tubing between the Sample Pot Electrode Block and T-Connector	Tube Set	MU538600 (for Cell 1)
	Tube Set 7	MU857800 (for Cell 2)
Replace the REF Electrode Block-side Drain Tube and Pinch Valve Tubing	Tube Set 2	MU824700 (for Cell 1)
	Tube Set 8	MU857900 (for Cell 2)
	Pinch Valve Tubing	ZM297000 (for Cell 1 and Cell 2)
Manually Clean the Drain Well and, if Needed, Replace the Drain Tube	Drain Tube 3	MU858000 (for Cell 1 and Cell 2)
	Sodium hypochlorite solution (0.5%) • 5% Sodium Hypochlorite Solution diluted 1:10 (US) • Cleaning Solution diluted 1:10 (Outside US and Japan) • Sodium hypochlorite solution (5%) diluted 1:10 (Japan)	• A32319 (US) • 66039 (Outside US and Japan) • Commercial item (Japan)

Table 6.33 Quarterly or Every 20,000 Samples ISE Maintenance (Continued)

Maintenance Procedure	Part	Part Number
Enhanced ISE Cleaning (Manual)	ISE Cleaning Solution diluted 1:10 • ISE Cleaning Solution diluted 1:10 (US) • Cleaning Solution diluted 1:10 (Outside US)	• AUH1019 (US) • 66039 (Outside US) • For the Japan market, refer to the ISE Addendum.
	ISE MID Standard Solution	• AUH1012 (US) • 66319 (Outside US)
	Disposable pipette (that can collect more than 1 mL of liquid)	Commercial item

Table 6.34 Every 6 Months or Every 40,000 Samples ISE Maintenance

Maintenance Procedure	Part	Part Number
Replace the Na K or Cl Electrode	Na Electrode	MU919400
	K Electrode	MU919500
	Cl Electrode	MU919600
	O-ring	MU990000

Table 6.35 Every Two Years or Every 150,000 Samples ISE Maintenance

Maintenance Procedure	Part	Part Number
Replace the REF Electrode and Packing	REF Electrode (with the packing)	MU919700
	REF Electrode Packing	MU920200

Table 6.36 As Needed ISE Maintenance

Maintenance Procedure	Part	Part Number
Replace the Sample Pot	Sample Pot	MU962700
Clean the ISE Electrode Block (Inlet Side)	Stylet ϕ0.3 (diameter)	ZM022700
Manually Clean the ISE K Electrode	Clean, dry, lint-free absorbent tissue	Commercial item
Manually Clean and Replace the ISE REF Electrode Block	REF Electrode Block	MU824500
	2% Wash solution	• ODR2000 (4x5L) or OSR0001 (6x2L) (Outside Japan) • MS028400 (Japan)
Replace the ISE Mix Bar	Mix bar	MU962800

Table 6.36 As Needed ISE Maintenance (Continued)

Maintenance Procedure	Part	Part Number
Replace the ISE Reagents	ISE Buffer Solution	• AUH1011 (US) • 66320 (Outside US)
	ISE MID Standard Solution	• AUH1012 (US) • 66319 (Outside US)
	ISE Reference Solution	• AUH1013 (US) • 66318 (Outside US)

ISE Daily Maintenance

Perform the following procedures daily.

- Inspect, Clean, and Prime the ISE Sample Probe (ISE Option)
- Clean the ISE (ISE Option)
- Calibrate the ISE (ISE Option)

The analyzer maintenance section includes supplementary maintenance procedures for the ISE. Inspections for the sample syringe, the wash syringe, the ISE buffer syringes, and the sample probe wash solutions are in the analyzer daily maintenance section. For more information, refer to Inspect the Syringes for Leaks and Replace the Sample Probe Wash Solutions.

Inspect, Clean, and Prime the ISE Sample Probe (ISE Option)

The ISE sample probe is responsible for delivering precise quantities of sample to the ISE sample pot.

You cannot achieve a correct analysis, if the probe is clogged, bent, or otherwise damaged.

Before you begin analysis, inspect the ISE sample probe for damage or deterioration and confirm correct operation.

For more information on materials required, refer to Parts List for ISE Maintenance.

Inspect the Sample Probe for Damage or Deterioration

Materials Required:

- Alcohol prep pads (70% Isopropyl alcohol)

1 Visually inspect that the probe is not bent or damaged. If the probe is bent or damaged, replace the probe. Refer to Replace a Sample Probe.

2 Confirm that the probe is free of debris. If any contaminants or crystallization adhere to the probe, wipe the outside surface with an alcohol prep pad (70% Isopropyl Alcohol).

CAUTION

Confirm that the ISE sample probe is not bent during cleaning.

3 If there is a problem with the alignment of the probe, contact Beckman Coulter.

Figure 6.99 ISE Sample Probe

1. ISE sample probe wash well

Confirm Correct Operation of the ISE Sample Probe

1 Confirm that the analyzer is in *Warm up* or *Standby* mode.

2 Select **Home** > **Analyzer Maintenance** > **ISE Maintenance** > **Maintenance**. The system displays the ISE Maintenance: Maintenance tab.

3 Select the **ISE Maintenance** box. The system activates the maintenance operation buttons.

4 Select **Replace Sample Probe**. The system displays the Replace Sample Probe dialog.

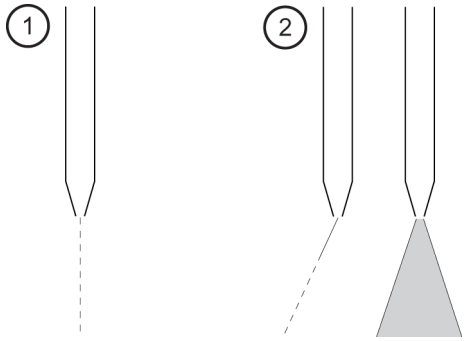
5 For **Times**, enter 3, and then select **OK.**

6 Lift the back upper cover of the ISE unit.

7 Press the **DIAG** button. Deionized water is dispensed from the probe tip. Confirm that the probe dispenses a thin, straight stream of water, and that water flows in the wash well.

— If the water is spraying or dispensing at an angle, clean the probe. For more information, refer to Inspect, Clean, and Prime the ISE Sample Probe (ISE Option).
— If cleaning does not correct the problem, replace the probe. For more information, refer to Replace a Sample Probe.

Figure 6.100 Flow of DI water from the ISE Sample Probe Tip



1. Correct flow
2. Incorrect flow

Clean the ISE (ISE Option)

Clean the sample pot and the electrode lines daily to prevent contamination and inaccurate results. This procedure requires approximately 6 minutes to complete.

WARNING

Wear Personal Protective Equipment (PPE) such as gloves, eye shields, and lab coats, to handle ISE Cleaning Solution. If the ISE Cleaning Solution contacts skin or clothes, rinse the affected area thoroughly with water. If the ISE Cleaning Solution contacts the eyes or mouth, immediately flush with water. Seek medical attention. Refer to the Safety Data Sheets (SDS) for more information. Follow your laboratory procedure to wipe up spills immediately.

NOTE

If the analyzer does not run continuously, clean the ISE as part of the daily shutdown.

NOTE

The system defaults to clean Cell 1 and Cell 2. Always perform the cleaning procedure on Cell 1 and Cell 2 unless performing corrective actions on Cell 1 or Cell 2.

For more information on materials required, refer to Parts List for ISE Maintenance.

Materials Required:

- ISE Cleaning Solution
- Hitachi Cup

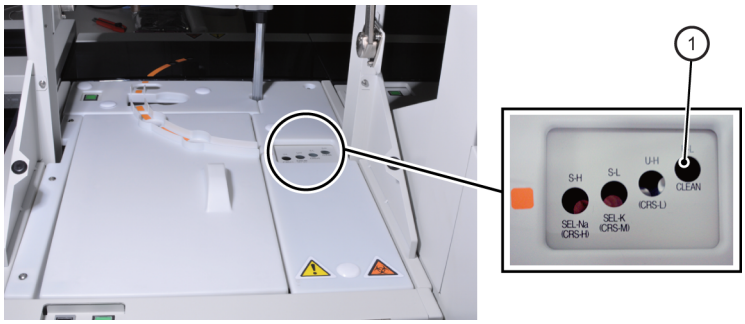
1 Confirm that the system is in *Warm up* or *Standby* mode.

2 Lift the front upper cover of the ISE unit.

3 Fill the Hitachi cup with a minimum of 1 mL of ISE Cleaning Solution.

4 Place the Hitachi cup in the CLEAN position on the ISE solution position area.

Figure 6.101 ISE Solution Position Area



1. CLEAN position

CAUTION

Wipe up ISE Cleaning Solution spills immediately. Follow your laboratory procedure.

5 Select **Home > Analyzer Maintenance > ISE Maintenance > Maintenance**. The system displays the ISE Maintenance: Maintenance tab.

6 Select **Cleaning**. The system displays the Cleaning dialog.

7 Select **OK**. The system starts the cleaning operation.

NOTE

If you need to stop the cleaning operation before completion, select **STOP** on the STANDBY/STOP switch on the ISE unit. The ISE stops the cleaning and goes to *STOP* mode. To return to *Standby* mode, select STANDBY on the STOP/STANDBY switch on the ISE unit.

8 When the cleaning operation is complete, remove the Hitachi cup from the CLEAN position and discard.

9 Close all doors and covers of the ISE unit.

Calibrate the ISE (ISE Option)

Calibrate the ISE every 24 hours, following specific maintenance procedures, and when replacing the ISE reagents.

NOTE

Calibrating only serum or urine requires approximately 4 minutes to complete.
Calibrating serum and urine together requires approximately 7 minutes to complete.

For more information on materials required, refer to Parts List for ISE Maintenance.

Materials Required:

- ISE High Serum Standard
- ISE Low Serum Standard
- ISE Low/High Urine Standard
- Hitachi Cup (4 cups)

1 Confirm that the system is in *Warm up* or *Standby* mode.

2 Perform a total prime. A total prime is required to clear the lines of ISE Cleaning Solution if you calibrate the ISE immediately after the Clean the ISE (ISE Option) procedure.

a. Select **Home > Analyzer Maintenance > ISE Maintenance > Maintenance**. The system displays the ISE Maintenance: Maintenance tab.

b. Select the **ISE Maintenance** box. The system activates the maintenance operation buttons.

c. Select **Total Prime**. The system displays the Total Prime dialog.

d. Select **OK**.

e. Press the **DIAG** button. The ISE sample probe moves away.

f. Press the **DIAG** button to start the prime. The DIAG LED turns on after the priming is complete.

g. Clear the **ISE Maintenance** box to deactivate the maintenance operation buttons.

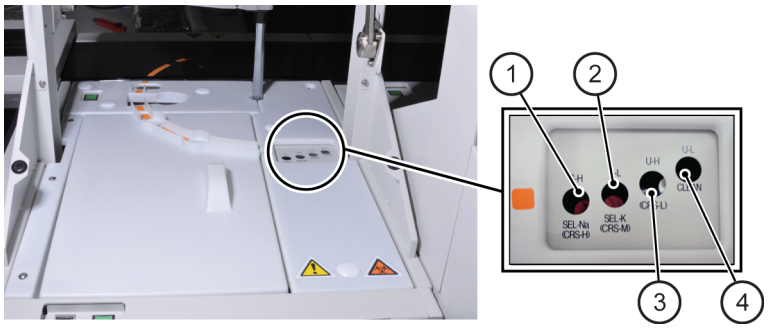
3 Lift the front upper cover of the ISE unit.

4 Fill a Hitachi cup with approximately 500 µL of Standard Solution as required for processing (determined by your laboratory processing serum, urine, or both sample types).

— ISE High Serum Standard
— ISE Low Serum Standard
— ISE High Urine Standard
— ISE Low Urine Standard

5 Place the Hitachi cups into the corresponding positions on the ISE solution position area.

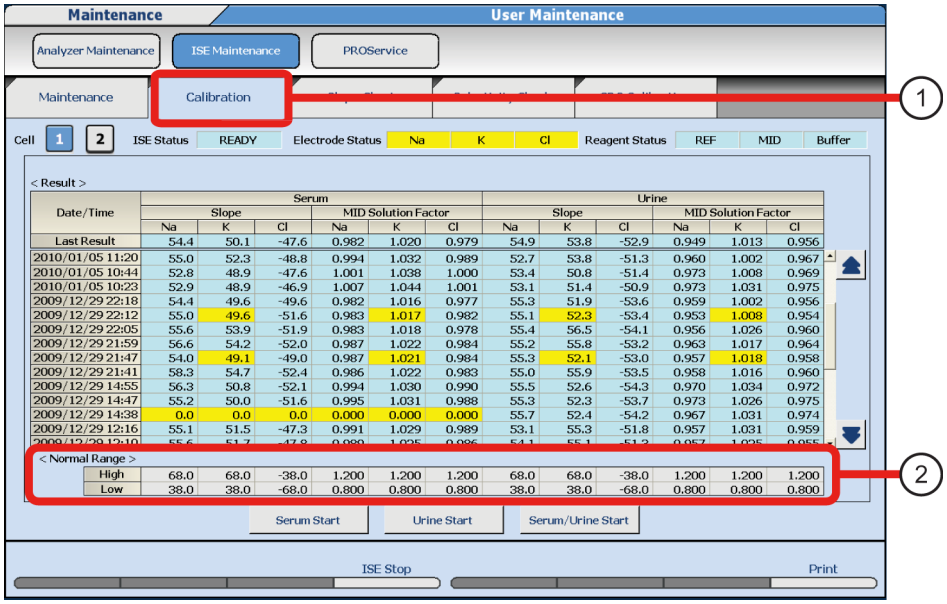
Figure 6.102 ISE Solution Position Area



1. S-H: ISE High Serum Standard
2. S-L: ISE Low Serum Standard
3. U-H: ISE High Urine Standard
4. U-L: ISE Low Urine Standard

6 Select **Home > Analyzer Maintenance > ISE Maintenance > Calibration**. The system displays the ISE Maintenance: Calibration tab.

Figure 6.103 ISE Maintenance: Calibration Tab



1. Calibration tab
2. Normal Range

7 Select **Serum Start**, **Urine Start**, or **Serum/Urine Start** depending on the sample types to calibrate. The system displays the dialog.

8 Select **OK**. The system starts calibration.

9 When calibration is complete, confirm that the result for each electrode is within the ranges for the calibrated sample types.

The system highlights acceptable results in blue and results that exceed the **<Normal Range>** for the calibration slope in yellow.

To determine calibration quality, compare the current results with previous results for consistency.

10 If the ISE unit has two ISE cells, select **Cell 2** to confirm the results for cell 2.

11 Remove the Hitachi cups from the ISE solution position area and discard.

12 Close the front upper cover of the ISE unit.

ISE Weekly Maintenance

Perform the following procedures weekly.

- Selectivity Check for the Na and K Electrodes
- Enhanced Cleaning of Electrode Line

The analyzer maintenance section includes supplementary maintenance procedures for the ISE.

The analyzer weekly maintenance section includes instructions for cleaning the ISE sample probe. For more information, refer to Clean the Sample Probes and Mix Bars.

Selectivity Check for the Na and K Electrodes

The Na electrode and K electrode are ion-selective electrodes. If the selectivity of the electrodes deteriorates, ions other than Na or K can affect the electrodes, and results can be affected.

To confirm the ion selectivity of the electrodes, perform a selectivity check of the Na and K electrodes every week.

IMPORTANT

Do not leave the bottle of ISE Selectivity Check Solution open. The ISE Selectivity Check Solution can become concentrated or crystallized.

For more information on materials required, refer to Parts List for ISE Maintenance.

Materials Required:

- ISE Na+/K+ Selectivity Check
- Hitachi Cup (2 cups)

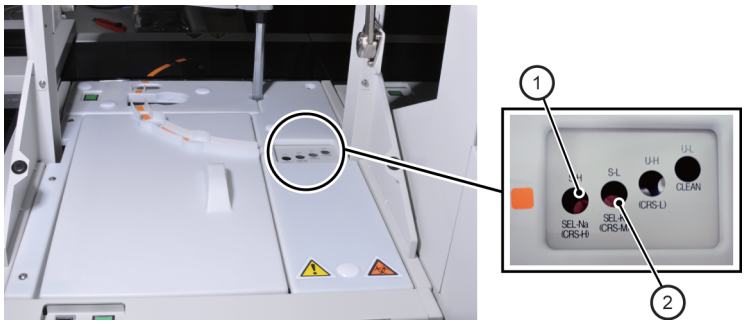
1 Confirm that the system is in *Warm up* or *Standby* mode.

2 Lift the front upper cover of the ISE unit.

3 Fill the Hitachi cups with approximately 500 µL of ISE Selectivity Check Solution (Na) and 500 µL of ISE Selectivity Check Solution (K) separately.

4 Place the ISE Selectivity Check Solution (Na) in the SEL-Na position. Place the ISE Selectivity Check Solution (K) in the SEL-K position.

Figure 6.104 Location for the ISE Selectivity Check Solutions

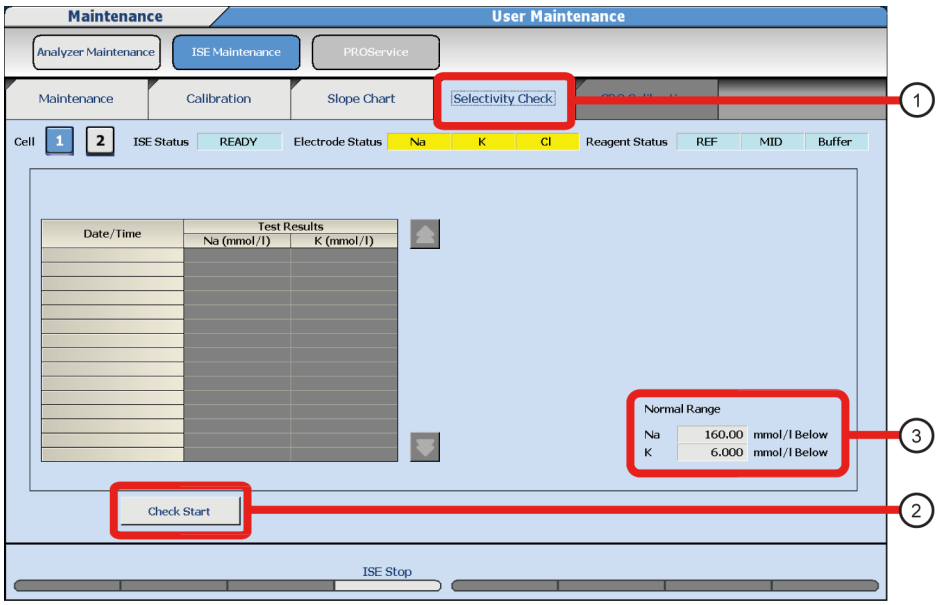


1. SEL-Na: ISE Na+ Selectivity Check
2. SEL-K: ISE K+ Selectivity Check

5 Close the front upper cover of the ISE unit.

6 Select **Home > Analyzer Maintenance > ISE Maintenance > Selectivity Check**. The system displays the ISE Maintenance: Selectivity Check tab.

Figure 6.105 ISE Maintenance: Selectivity Check Tab



1. Selectivity Check tab
2. Check Start button
3. Normal Range

7 Select **Check Start**. The system displays the Selectivity Check dialog.

8 Select **OK**.

9 Confirm the selectivity check data.

For abnormal data, the background for the result is displayed in yellow. The system judges a result more than 160 mmol/L for Na electrode and a result more than 6 mmol/L for K electrode as abnormal data.

If the selectivity check results are abnormal, confirm the ISE Selectivity Check Solution (Na) and ISE Selectivity Check Solution (K) by repeating the procedure with new bottles of ISE Selectivity Check Solution (Na) and ISE Selectivity Check Solution (K). Perform the Selectivity Check with a valid ISE Calibration. However, if the ISE Calibration passes, and the Selectivity Check fails, replace the relevant electrode.

For more information, refer to Replace the Na K or Cl Electrode.

10 If the system has two ISE cells, select **Cell 2** to confirm the results for cell 2. Repeat step 9 for Cell 2.

11 Perform a MID/REF Prime three times to clear the electrode flowcell of any ions remaining from the selectivity check procedure.

a. Select the **Maintenance** tab.

b. Select the **ISE Maintenance** box. The system activates the maintenance operation buttons.

c. Select **MID/REF Prime**. The system displays the MID/REF Prime dialog.

d. Select **OK**.

e. Press the **DIAG** button. The ISE sample probe moves away.

f. Press the **DIAG** button to start the priming. The DIAG LED turns on after the priming is complete.

g. Initiate the MID/REF prime two more times by pressing the **DIAG** button.

h. Clear the **ISE Maintenance** box to deactivate the maintenance operation buttons.

12 After completing the operation, open the front upper cover of the ISE unit, and then remove the Hitachi cups from the ISE solution position area.

13 Close all doors and covers of the ISE unit.

Enhanced Cleaning of Electrode Line

If you do not perform the ISE enhanced cleaning cycle, the flowcell can become contaminated or results can be inaccurate.

This cleaning procedure requires 30 minutes to complete. If the ISE enhanced cleaning is performed with the W2, both procedures complete in approximately 30 minutes. For more information, refer to Perform a W2.

For more information on materials required, refer to Parts List for ISE Maintenance.

Materials Required:

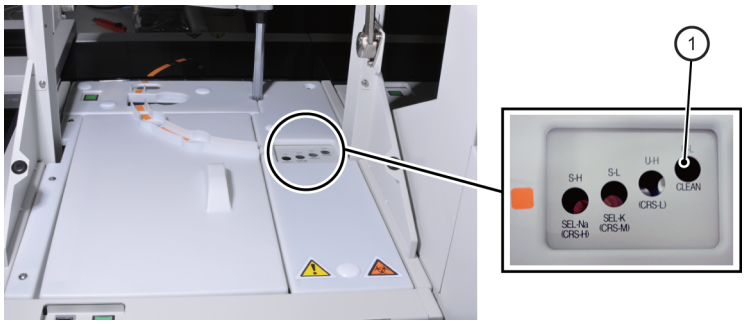
- ISE Cleaning Solution
- Hitachi Cup

WARNING

Wear Personal Protective Equipment (PPE) such as gloves, eye shields, and lab coats, to handle ISE Cleaning Solution. If the ISE Cleaning Solution contacts skin or clothes, rinse the affected area thoroughly with water. If the ISE Cleaning Solution contacts the eyes or mouth, immediately flush with water. Seek medical attention. Refer to the Safety Data Sheets (SDS) for more information. Follow your laboratory procedure to wipe up spills immediately.

1. Confirm that the system is in *Warm up* or *Standby* mode.
2. Lift the front upper cover of the ISE unit.
3. Fill the Hitachi cup with approximately 1.5 mL of ISE Cleaning Solution.
4. Place the Hitachi cup in the CLEAN position in the ISE solution position area.

Figure 6.106 Location of the ISE Cleaning solution



1. CLEAN

5. Select **Home > Analyzer Maintenance > ISE Maintenance > Maintenance**. The system displays the ISE Maintenance: Maintenance tab.
6. Select **Cleaning (Enhanced)**, and then select **OK**. The system starts the enhanced cleaning operation. This process requires 30 minutes to complete.
7. After performing the enhanced cleaning operation, remove the ISE Cleaning Solution.
8. Close all doors and covers of the ISE unit.

ISE Maintenance Every Other Week or Every 3,000 Samples

Perform the following procedures every other week or every 3,000 samples, whichever comes first.

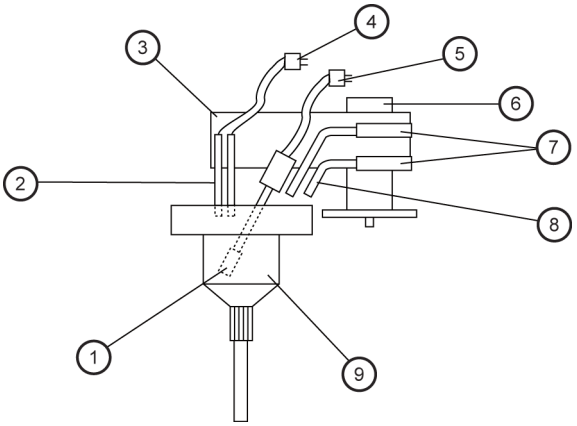
- Manually Clean the ISE Mix Bar, Liquid Level Sensors, Sample Pot, and Sample Pot Tubing

Manually Clean the ISE Mix Bar, Liquid Level Sensors, Sample Pot, and Sample Pot Tubing

To obtain accurate results and optimum system performance without unexpected analyzer downtime, perform the following ISE maintenance procedure every two weeks or every 3,000 samples, whichever comes first. Clean according to your laboratory procedures and after careful monitoring calibration and QC data.

For more information, refer to Figure 6.97 ISE Tubing Block Diagram.

Figure 6.107 ISE Mix Bar, Liquid Level Sensors, and Sample Pot



1. Mix bar
2. Liquid level sensor
3. Mixing component
4. Level sensor connector
5. Mixing motor connector
6. Mixing component knob
7. ISE Buffer Solution and ISE MID Standard Solution connecting tubes
8. Nozzle
9. Sample pot

Prepare the ISE for Maintenance

IMPORTANT

Always prepare the ISE for maintenance procedures. The preparation procedure prevents the automatic ISE MID Standard Solution periodic (hourly) priming cycle from dispensing ISE MID Standard Solution.

1 Confirm that the system is in *Warm up* or *Standby* mode.

2 Select **Home > Analyzer Maintenance > ISE Maintenance > Maintenance**. The system displays the ISE Maintenance: Maintenance tab.

3 Select the **ISE Maintenance** box. The system activates the maintenance operation buttons.

4 Select **Drain Flowcell**. The system displays the Drain Flowcell dialog.

5 Select **OK**.

6 Press the **DIAG** button. The ISE sample probe moves to the CLEAN position in the ISE solution position area.

IMPORTANT

If the ISE cover is open, the system generates an `ISE Cover Open [ISE]` alarm. Select **Alarm Clear** to clear the audible alarm. The ISE sample probe remains at the sample probe wash well. It is possible to continue with the next steps in the maintenance procedure.

To move the ISE sample probe to the CLEAN position on the ISE solution position area, close the ISE cover, select the maintenance operation button again, then press the **DIAG** button.

7 Lift the front upper cover of the ISE unit.

8 Open the ISE cover.

9 Press the **DIAG** button again. The liquid drains from the flowcell.

Clean the Nozzles, Mix Bar, and Liquid Level Sensors

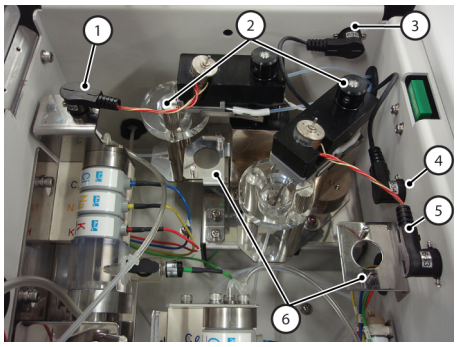
For more information on materials required, refer to Parts List for ISE Maintenance.

Materials Required:

- Alcohol prep pads (70% Isopropyl alcohol)
- Clean, dry, lint-free absorbent tissue

1 Disconnect the liquid level sensor connectors (638 (cell1), 654 (cell 2)) and mixing motor connectors (648 (cell 1), 663 (cell 2)).

Figure 6.108 Location of Liquid Level Sensors and Mixing Motor Connectors



1. Mixing motor connector (648) for Cell 1
2. Knob
3. Liquid level sensor connector (638) for Cell 1
4. Liquid level sensor connector (654) for Cell 2
5. Mixing motor connector (663) for Cell 2
6. Mixing component holder

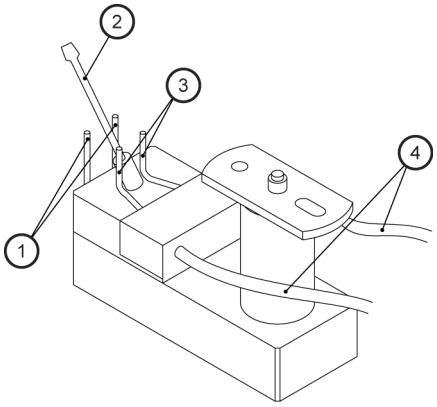
2 Loosen the knob securing the mixing component. Gently lift the mixing component to unseat it.

IMPORTANT

Do not bend or break the liquid level sensors when cleaning.

3 Use an alcohol prep pad (70% Isopropyl alcohol) to wipe the two nozzles, the liquid level sensors, and the mix bar.

Figure 6.109 Mixing Component



1. Liquid level sensors
2. Mix bar
3. Nozzle
4. Connecting tubing

4 Place the mixing component on the mixing component holder.

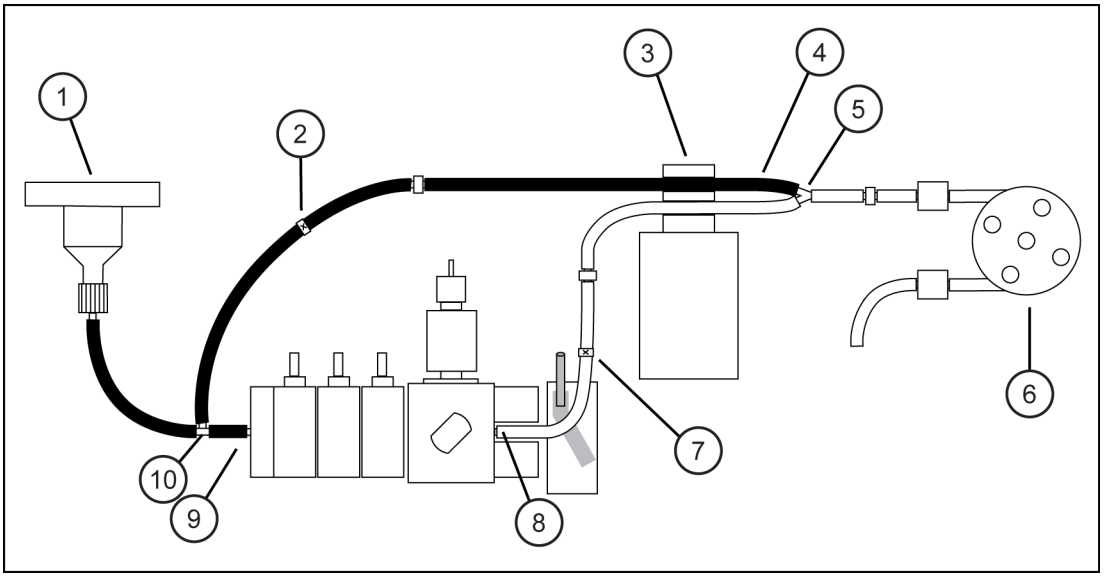
IMPORTANT

Do not change the orientation position of the two nozzles attached to the mixing component. Do not apply excess pressure to the tubing.

Clean the Sample Pot and Tubing

For more information, refer to Figure 6.97 ISE Tubing Block Diagram.

Figure 6.110 Sample Pot and Tubing



1. Sample pot
2. Bypass tubing labeled 5 (Cell 1) or 7 (Cell 2)
3. Pinch valve
4. Pinch valve tubing
5. Y-connector
6. Mixture aspiration roller pump
7. Tubing labeled 6 (Cell 1) or 8 (Cell 2)
8. REF Electrode block outlet
9. Electrode block inlet
10. T-connector

For more information on materials required, refer to Parts List for ISE Maintenance.

Materials Required:

- Freshly prepared 1% Wash solution
- Deionized water
- Clean, dry, lint-free absorbent tissue
- Sonicator

1 Loosen the retaining knob securing the sample pot, and lift the pot from the peg.

2 Hold the sample pot with one hand while removing the sample pot tubing from the electrode block inlet.

a. Follow the bypass tubing labeled 5 (Cell 1) or 7 (Cell 2) connected to the pinch valve tubing and remove it from the pinch valve.

b. Disconnect the pinch valve tubing at the Y-connector that is next to the mixture aspiration roller pump.

3 Fill the sample pot tubing and bypass tubing with 1% wash solution. Use a disposable pipette tip attached to a squeeze bottle or a syringe to fill the sample pot tubing and bypass tubing.

a. Place the pipette tip or syringe inside the bottom of the sample pot tubing.

b. Force the wash solution through the sample pot tubing.

c. Place the pipette tip or syringe in the end of the bypass tubing. Force the wash solution through it.

4 Submerge the sample pot and all attached tubing into a beaker filled with 1% wash solution.

5 Place the beaker in the sonicator filled with deionized water and sonicate for 10 minutes.

6 Rinse the sample pot and tubing with deionized water.

a. Place the pipette tip or syringe at the bottom of the sample pot tubing.

b. Force deionized water through the sample pot tubing.

c. Place the pipette tip or syringe in the bypass tubing. Force deionized water through it.

d. Confirm that the lines have been flushed thoroughly. Rinse the sample pot with deionized water.

7 Use a clean, dry, lint-free absorbent tissue to dry the sample pot and tubing before replacement.

Reinstall the Sample Pot, Tubing, and Mixing Component

1 While holding the sample pot, connect the sample pot tubing to the electrode block inlet.

2 Reinstall the sample pot. Align the hole on the top of the sample pot with the peg and slide the screw post into the groove on the opposite side. Tighten the retaining knob.

3 Connect the pinch valve tubing onto the Y-connector located close to the mixture aspiration roller pump.

4 Slide the pinch valve tubing into the top slot of the pinch valve.

5 Replace the mixing component on the two positioning pins. Tighten the knob to secure the mixing component.

6 Reconnect the liquid level sensor connectors (638 (Cell1), 654 (Cell 2)) and mixing motor connectors (648 (Cell 1), 663 (Cell 2)).

IMPORTANT

The connectors are specially keyed to fit each plug. To avoid damage to the pins, do not force a connector into its plug. If the pins are damaged, the mix bar does not rotate, or the liquid level sensors do not function.

IMPORTANT

When reinstalling the mixing component, confirm that the tubing is not pinched between the mixing component and its stand.

7 Press the **DIAG** button to reprime the lines with ISE MID Standard Solution. Confirm that liquid is correctly dispensed from the sample pot to the flowcell by confirming that no bubbles are in the tubings labeled 6 (Cell 1) and 8 (Cell 2) coming from the flowcell.

NOTE

You might need to repeat this step five times. If bubbles are in the tubing after priming, confirm that the electrodes and tubing are installed correctly and that the lock lever secures the electrodes.

8 Perform a buffer prime.

During the prime, confirm that buffer is correctly dispensed into the sample pot and flows to waste without generating alarms:

a. Select **Buffer Prime**. The system displays the Buffer Prime dialog.

b. Select **OK**.

c. Press the **DIAG** button to start the priming. The DIAG LED turns on after the priming is complete.

9 Perform a total prime to prime the ISE with fresh ISE Buffer Solution, ISE MID Standard Solution, and ISE Reference Solution.

a. Select **Total Prime**. The system displays the Total Prime dialog.

b. Select **OK**.

c. Press the **DIAG** button to start the priming. The DIAG LED turns on after the priming is complete.

10 Close all doors and covers of the ISE unit.

11 Clear the **ISE Maintenance** box to deactivate the maintenance operation buttons.

12 Update the Maintenance Log. For more information, refer to Update the Maintenance Log.

13 To confirm that the ISE is working correctly after the maintenance procedure, perform a calibration.

ISE Maintenance Every Month

The analyzer monthly maintenance section includes instructions for cleaning the ISE sample probe wash well. For more information, refer to Clean the Sample Probe and Reagent Probe Wash Wells.

ISE Maintenance Every Other Month or Every 20,000 Samples

Perform the following procedures every other month or every 20,000 samples, whichever comes first.

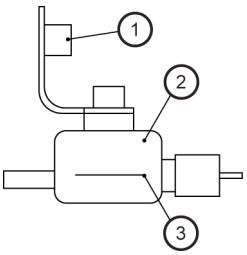
- Inspect and Add ISE Internal Reference Solution

Inspect and Add ISE Internal Reference Solution

Visually inspect the REF electrode. Add ISE Internal Reference Solution when it is less than the reference line.

For more information, refer to Figure 6.97 ISE Tubing Block Diagram.

Figure 6.111 REF Electrode



1. REF electrode cap
2. REF electrode
3. Reference line

For more information on materials required, refer to Parts List for ISE Maintenance.

Materials Required:

- ISE Internal Reference Solution

1 Confirm that the system is in *Warm up* or *Standby* mode.

2 Lift the front upper cover of the ISE unit.

3 Open the ISE cover.

4 Open the cap of the REF electrode. Add ISE Internal Reference Solution up to, but not over the reference line.

IMPORTANT

Do not break or damage the glass REF electrode.

5 Replace the REF electrode cap.

6 Select **Home > Analyzer Maintenance > ISE Maintenance > Maintenance**. The system displays the ISE Maintenance: Maintenance tab.

7 Wait 15 minutes to allow the solution to equilibrate.

8 Select the **ISE Maintenance** box. The system activates the maintenance operation buttons.

9 Select **Total Prime**. The system displays the Total Prime dialog.

10 Select **OK**.

11 Press the **DIAG** button to start the prime. The DIAG LED turns on after the priming is complete.

12 Close all doors and covers of the ISE unit.

13 Clear the **ISE Maintenance** box to deactivate the maintenance operation buttons.

14 Update the Maintenance Log. For more information, refer to Update the Maintenance Log.

15 To confirm that the ISE is working correctly after the maintenance procedure, perform a calibration.

ISE Quarterly Maintenance or Maintenance Every 20,000 Samples

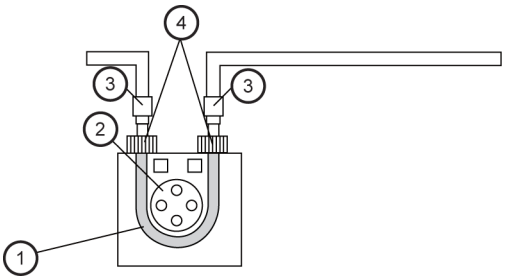
Perform the following procedures quarterly (every three months) or every 20,000 samples, whatever comes first.

- Replace the Mixture Aspiration and MID Standard Roller Pump Tubing
- Replace the Tubing between the Sample Pot Electrode Block and T-Connector
- Replace the REF Electrode Block-side Drain Tube and Pinch Valve Tubing
- Manually Clean the Drain Well and, if Needed, Replace the Drain Tube
- Enhanced ISE Cleaning (Manual)

Replace the Mixture Aspiration and MID Standard Roller Pump Tubing

The friction of each roller pump and vibrations cause the roller pump tubing to deteriorate. If the roller tubing is not replaced for an extended time, it can become flat or worn and leaks can occur. Replace the roller pump tubing every 3 months or every 20,000 samples.

Figure 6.112 Roller Pump and Tubing



1. Roller pump tubing
2. Roller pump
3. Tube number
4. Tube connectors

For more information on materials required, refer to Parts List for ISE Maintenance.

Materials Required:

- Roller pump tubing

Prepare the ISE for Maintenance

IMPORTANT

Always prepare the ISE for maintenance procedures. The preparation procedure prevents the automatic ISE MID Standard Solution periodic (hourly) priming cycle from dispensing ISE MID Standard Solution.

1. Confirm that the system is in *Warm up* or *Standby* mode.
2. Select **Home > Analyzer Maintenance > ISE Maintenance > Maintenance**. The system displays the ISE Maintenance: Maintenance tab.
3. Select the **ISE Maintenance** box. The system activates the maintenance operation buttons.
4. Select **Drain Flowcell**. The system displays the Drain Flowcell dialog.
5. Select **OK**.
6. Press the **DIAG** button. The ISE sample probe moves to the CLEAN position in the ISE solution position area.

   IMPORTANT

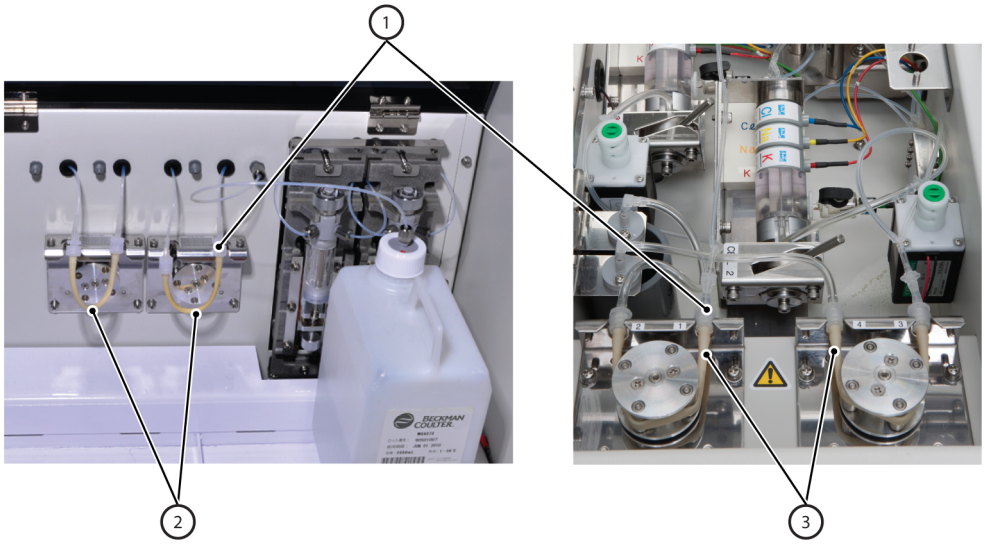
   If the ISE cover is open, the system generates an `ISE Cover Open [ISE]` alarm. Select **Alarm Clear** to clear the audible alarm. The ISE sample probe remains at the sample probe wash well. It is possible to continue with the next steps in the maintenance procedure.

   To move the ISE sample probe to the CLEAN position on the ISE solution position area, close the ISE cover, select the maintenance operation button again, then press the **DIAG** button.
7. Lift the front upper cover of the ISE unit.
8. Open the ISE cover.
9. Press the **DIAG** button again. The liquid drains from the flowcell.

Procedure: Replace the Mixture Aspiration and MID Standard Roller Pump Tubing

1. Slide the ISE reagent bottle tray forward.

Figure 6.113 Mixture Aspiration and MID Standard Roller Pump Tubing



1. Connector
2. MID Standard roller pump tubing
3. Mixture aspiration roller pump tubing

2 Remove each roller pump tubing from the pump brackets.

3 Remove the MID Standard roller pump tubing and the mixture aspiration roller pump tubing by twisting apart the connectors at each end.

4 Connect a new roller pump tubing. Turn the connectors at both ends to secure it.

5 Place the roller pump tubing on the correct roller pump, then match the tubing connector number to their corresponding numbers on the pump bracket. Hook one end of the tubing in the bracket, stretch the tubing around the pump, and hook the other end in the bracket.

IMPORTANT

Confirm that the tubing is not twisted on the roller pump.

6 Select **Prime Bypass**. The system displays the Prime Bypass dialog.

7 Select **OK**.

8 Press the DIAG button to start the prime. The two roller pumps are activated to prime liquid through the ISE. The roller pumps rotate for approximately 1 minute to remove the air from the tubing.

9 Close all doors and covers of the ISE unit.

10 Clear the **ISE Maintenance** box to deactivate the maintenance operation buttons.

11 Update the Maintenance Log. For more information, refer to Update the Maintenance Log.

Replace the Tubing between the Sample Pot Electrode Block and T-Connector

If the system analyzes certain samples (such as dialysis samples) that contain large amounts of fibrin and protein, the fibrin and protein can accumulate close to the T-connector between the sample pot and electrode block. Accumulation of fibrin and protein can cause errors.

To obtain accurate results and optimum system performance without unexpected analyzer downtime, perform the following ISE maintenance procedure quarterly or every 20,000 samples. Clean according to your laboratory procedures and after careful monitoring of calibration and QC data.

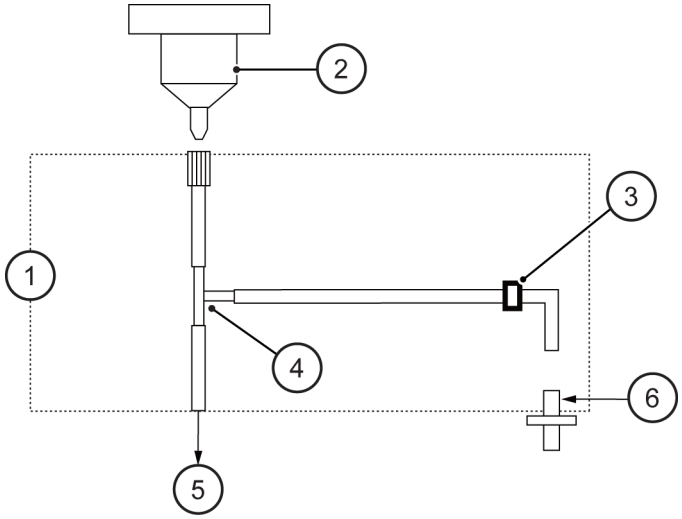
For more information on how to clean the sample pot, tubing, and T-connector, refer to Manually Clean the ISE Mix Bar, Liquid Level Sensors, Sample Pot, and Sample Pot Tubing.

For more information on materials required, refer to Parts List for ISE Maintenance.

Materials Required:

- Tube Set (for Cell 1)
- Tube Set 7 (for Cell 2)

Figure 6.114 Tubing Between the Sample Pot, Electrode Block, and T-Connector



1. Tubing between the sample pot and electrode block (tube set)
2. Sample pot
3. Bypass tubing labeled 5 (Cell 1) or 7 (Cell 2)
4. T-connector
5. Electrode block
6. Tube joint

Prepare the ISE for Maintenance

IMPORTANT

Always prepare the ISE for maintenance procedures. The preparation procedure prevents the automatic ISE MID Standard Solution periodic (hourly) priming cycle from dispensing ISE MID Standard Solution.

1. Confirm that the system is in *Warm up* or *Standby* mode.
2. Select **Home > Analyzer Maintenance > ISE Maintenance > Maintenance**. The system displays the ISE Maintenance: Maintenance tab.
3. Select the **ISE Maintenance** box. The system activates the maintenance operation buttons.
4. Select **Drain Flowcell**. The system displays the Drain Flowcell dialog.
5. Select **OK**.
6. Press the **DIAG** button. The ISE sample probe moves to the CLEAN position in the ISE solution position area.

   IMPORTANT

   If the ISE cover is open, the system generates an `ISE Cover Open [ISE]` alarm. Select **Alarm Clear** to clear the audible alarm. The ISE sample probe remains at the sample probe wash well. It is possible to continue with the next steps in the maintenance procedure.

   To move the ISE sample probe to the CLEAN position on the ISE solution position area, close the ISE cover, select the maintenance operation button again, then press the **DIAG** button.
7. Lift the front upper cover of the ISE unit.
8. Open the ISE cover.
9. Press the **DIAG** button again. The liquid drains from the flowcell.

Procedure: Replace the Tubing between the Sample Pot Electrode Block and T-Connector

1. Disconnect the liquid level sensor connectors (638 (Cell 1), 654 (Cell 2)) and mixing motor connectors (648 (Cell 1), 663 (Cell 2)).
2. Loosen the knob securing the mixing component. Gently lift the mixing component to remove it and place it on the mixing component holder.
3. Loosen the retaining knob securing the sample pot, and lift the pot from the peg.

4 Follow the tubing from the bottom of the sample pot to its connection at the electrode block inlet. Disconnect the tubing from the electrode block inlet.

5 Follow the bypass tubing (labeled 5 (Cell 1) or 7 (Cell 2)) from the T-connector to its junction with the pinch valve tubing. Disconnect the bypass tubing from the pinch valve tubing.

6 Unscrew the tubing connected to the bottom of the sample pot, and discard the tubing.

7 Connect the new set of tubing to the electrode block inlet, and then to the pinch valve tubing.

8 Attach the tubing to the sample pot by screwing on the connector.

IMPORTANT

To connect the T-connector and tubing, push them completely so that each joint does not leak. To attach the tubing to the bottom of the sample pot, finger-tighten the connector.

9 Reinstall the sample pot. Align the hole on the top of the sample pot with the peg and slide the screw post into the groove on the opposite side. Tighten the retaining knob.

10 Replace the mixing component on the two positioning pins. Tighten the knob to secure the mixing component.

11 Reconnect the liquid level sensor connectors (638 (Cell 1), 654 (Cell 2)) and mixing motor connectors (648 (Cell 1), 663 (Cell 2)).

IMPORTANT

The connectors are specially keyed to fit each plug. To avoid damage to the pins, do not force a connector into its plug. If the pins are damaged, the mix bar does not rotate, or the liquid level sensors do not function.

IMPORTANT

When reinstalling the mixing component, confirm that the tubing is not pinched between the mixing component and its stand.

12 Confirm that **Drain Flowcell** is selected.

13 Press the **DIAG** button to reprime the lines with ISE MID Standard Solution. Confirm that liquid is correctly dispensed from the sample pot to the flowcell by confirming that no bubbles are in the tubings labeled 6 (Cell 1) and 8 (Cell 2) coming from the flowcell.

NOTE

You might need to repeat this step five times. If bubbles are still in the tubing after priming, confirm that the electrodes and tubing are installed correctly and that the lock lever secures the electrodes.

14 Close all doors and covers of the ISE unit.

15 Clear the **ISE Maintenance** box to deactivate the maintenance operation buttons.

16 Update the Maintenance Log. For more information, refer to Update the Maintenance Log.

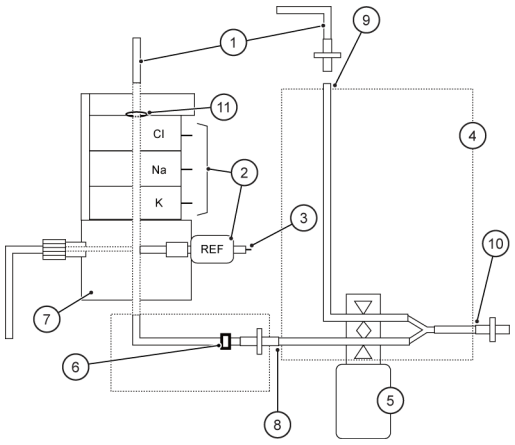
17 To confirm that the ISE is working correctly after the maintenance procedure, perform a calibration.

Replace the REF Electrode Block-side Drain Tube and Pinch Valve Tubing

If the REF electrode block-side drain tube and the pinch valve tubing are used for an extended period of time, the tubing can deteriorate. Beckman Coulter recommends replacing the REF electrode block-side drain tube and pinch valve tubing every 3 months or every 20,000 samples.

For more information, refer to Figure 6.97 ISE Tubing Block Diagram.

Figure 6.115 REF Electrode Block-side Drain Tube and Pinch Valve Tubing



1. Tubing between the sample pot and electrode block (tube set)
2. Electrodes
3. REF electrode wire (green)
4. Pinch valve tubing
5. Pinch valve
6. REF electrode block-side drain tube (Cell 1: Tube Set 2 labeled 6, Cell 2: Tube Set 8 labeled 8)
7. REF electrode block
8. Tubing connection A
9. Tubing connection B
10. Tubing connection C
11. O-ring

For more information on materials required, refer to Parts List for ISE Maintenance.

Materials Required:

- Tube Set 2 (for Cell 1)
- Tube Set 8 (for Cell 2)
- Pinch Valve Tubing (for Cell 1 and Cell 2)

Prepare the ISE for Maintenance

IMPORTANT

Always prepare the ISE for maintenance procedures. The preparation procedure prevents the automatic ISE MID Standard Solution periodic (hourly) priming cycle from dispensing ISE MID Standard Solution.

1 Confirm that the system is in *Warm up* or *Standby* mode.

2 Select **Home > Analyzer Maintenance > ISE Maintenance > Maintenance**. The system displays the ISE Maintenance: Maintenance tab.

3 Select the **ISE Maintenance** box. The system activates the maintenance operation buttons.

4 Select **Drain Flowcell**. The system displays the Drain Flowcell dialog.

5 Select **OK**.

6 Press the **DIAG** button. The ISE sample probe moves to the CLEAN position in the ISE solution position area.

IMPORTANT

If the ISE cover is open, the system generates an `ISE Cover Open [ISE]` alarm. Select **Alarm Clear** to clear the audible alarm. The ISE sample probe remains at the sample probe wash well. It is possible to continue with the next steps in the maintenance procedure.

To move the ISE sample probe to the CLEAN position on the ISE solution position area, close the ISE cover, select the maintenance operation button again, then press the **DIAG** button.

7 Lift the front upper cover of the ISE unit.

8 Open the ISE cover.

9 Press the **DIAG** button again. The liquid drains from the flowcell.

Replace the REF Electrode Block-side Drain Tube

IMPORTANT

Always drain the flowcell before moving the lock lever to release the electrode block. If the ISE Reference Solution is not drained, ISE Reference Solution can flow up into the electrodes and cause problems with the electrode measuring capability. ISE Reference Solution only flows past the REF electrode (not Na, K, or Cl electrode) in normal operation. ISE Reference Solution is more concentrated than the ISE MID Standard Solution or the samples that flow through the flowcell.

1. Move the lock lever to the left to release the electrodes.
2. Disconnect the green REF electrode wire.
3. Gently lift up the REF electrode block.
4. While holding the REF electrode block, disconnect Tube Set 2 (for Cell 1) and Tube Set 8 (for Cell 2). Tube Set 2 (labeled 6) or Tube Set 8 (labeled 8) is the tubing from the REF electrode block and connected to the pinch valve tubing. Refer to Figure 6.115 REF Electrode Block-side Drain Tube and Pinch Valve Tubing.
5. Attach a new Tube Set 2 (labeled 6) or Tube Set 8 (labeled 8) by connecting the tubing to the REF electrode block and the pinch valve tubing.
6. Place the REF electrode block in the original position and reconnect the green REF electrode wire.
7. Align the electrodes in a straight stack with the electrode pegs in the holes.
8. Move the lock lever to the right to lock the electrodes in position.

Replace the Pinch Valve Tubing

1. Remove the pinch valve tubing from the pinch valve grooves by pulling out and then up.
2. Disconnect the pinch valve tubing at tubing connection A, tubing connection B, and tubing connection C. Refer to Figure 6.115 REF Electrode Block-side Drain Tube and Pinch Valve Tubing.
3. Replace the pinch valve tubing by connecting the short end to tubing connection C, the shorter of the two remaining pieces of tubing to tubing connection A, and the longest tubing to tubing connection B. Refer to Figure 6.115 REF Electrode Block-side Drain Tube and Pinch Valve Tubing.

IMPORTANT

Install the shorter tubing in the bottom groove of the pinch valve (between A and C in the tubing block diagram). Install the longer tubing in the top groove of the pinch

valve (between B and C in the tubing block diagram). For more information, refer to Figure 6.97 ISE Tubing Block Diagram.

4 Insert pinch valve tubing (for tubing connections A and B) into the grooves of the pinch valve. Confirm that the tubing is inserted completely into the groove. For Cell 1, put tubing labeled 6 (connected to tubing connection A) in the bottom groove of the pinch valve, and put tubing labeled 5 (connected to tubing connection B) in the top groove of the pinch valve. For Cell 2, put tubing labeled 8 (connected to tubing connection A) in the bottom groove of the pinch valve, and put tubing labeled 7 (connected to tubing connection B) in the top groove of the pinch valve. For more information, refer to Figure 6.115 REF Electrode Block-side Drain Tube and Pinch Valve Tubing.

5 Confirm that **Drain Flowcell** is selected.

6 Press the **DIAG** button to reprime the lines with ISE MID Standard Solution. Confirm that liquid is correctly dispensed from the sample pot to the flowcell by confirming that no bubbles are in the tubings labeled 6 (Cell 1) or 8 (Cell 2) coming from the flowcell.

NOTE

You might need to repeat this step five times. If bubbles are in the tubing after priming, confirm that the electrodes and tubing are installed correctly and that the lock lever secures the electrodes.

7 Close all doors and covers of the ISE unit.

8 Clear the **ISE Maintenance** box to deactivate the maintenance operation buttons.

9 Update the Maintenance Log. For more information, refer to Update the Maintenance Log.

10 To confirm that the ISE is working correctly after the maintenance procedure, perform a calibration.

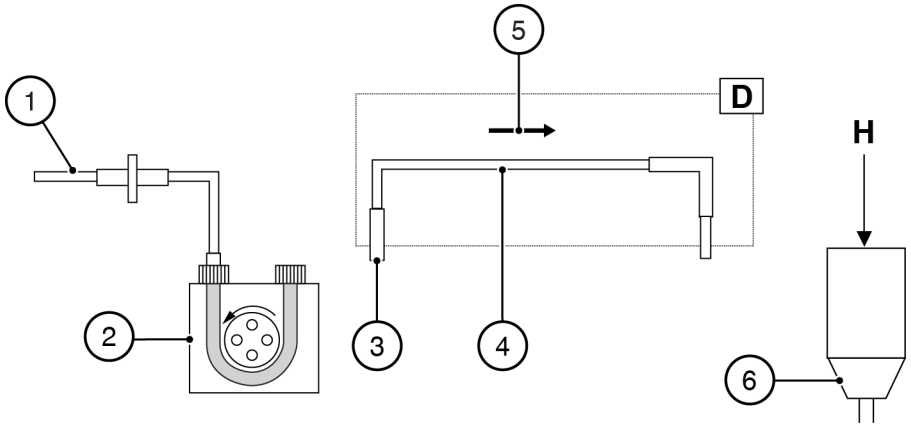
Manually Clean the Drain Well and, if Needed, Replace the Drain Tube

If the system analyzes samples that contain large amounts of fibrin and protein, the fibrin and protein can accumulate by the drain tube outlet and drain well, possibly causing errors.

Manually clean the drain well quarterly, and replace the drain tube as needed.

For more information, refer to Figure 6.97 ISE Tubing Block Diagram.

Figure 6.116 Drain Well and Drain Tube



1. Pinch valve tubing
2. Mixture aspiration roller pump
3. Tube Joint 3
4. Drain Tube
5. Flow direction of waste solution
6. Drain well

For more information on materials required, refer to Parts List for ISE Maintenance.

Materials Required:

- Drain Tube 3
- Sodium hypochlorite solution (0.5%)

Prepare the ISE for Maintenance

IMPORTANT

Always prepare the ISE for maintenance procedures. The preparation procedure prevents the automatic ISE MID Standard Solution periodic (hourly) priming cycle from dispensing ISE MID Standard Solution.

1 Confirm that the system is in *Warm up* or *Standby* mode.

2 Select **Home > Analyzer Maintenance > ISE Maintenance > Maintenance**. The system displays the ISE Maintenance: Maintenance tab.

3 Select the **ISE Maintenance** box. The system activates the maintenance operation buttons.

4 Select **Drain Flowcell**. The system displays the Drain Flowcell dialog.

5 Select **OK**.

6 Press the **DIAG** button. The ISE sample probe moves to the CLEAN position in the ISE solution position area.

IMPORTANT

If the ISE cover is open, the system generates an `ISE Cover Open [ISE]` alarm. Select **Alarm Clear** to clear the audible alarm. The ISE sample probe remains at the sample probe wash well. It is possible to continue with the next steps in the maintenance procedure.

To move the ISE sample probe to the CLEAN position on the ISE solution position area, close the ISE cover, select the maintenance operation button again, then press the **DIAG** button.

7 Lift the front upper cover of the ISE unit.

8 Open the ISE cover.

9 Press the **DIAG** button again. The liquid drains from the flowcell.

Procedure: Manual Clean the Drain Well and if Needed Replace the Drain Tube

1 Remove the drain tube from the hook over the drain well. For more information, refer to D in Figure 6.116 Drain Well and Drain Tube.

WARNING

Wear Personal Protective Equipment (PPE) such as gloves, eye shields, and lab coats, to handle hydrochloric acid or sodium hypochlorite solution (0.5%). If the hydrochloric acid or sodium hypochlorite solution (0.5%) contacts skin or clothes, rinse the affected area thoroughly with water. If the hydrochloric acid or sodium hypochlorite solution (0.5%) contacts the eyes or mouth, immediately flush with water. Seek medical attention. Refer to the Safety Data Sheets (SDS) for more information. Follow your laboratory procedure to wipe up spills immediately.

2 Prepare approximately 50 mL of sodium hypochlorite solution (0.5%). For more information, refer to **Dilution Ratios for Maintenance Solutions**.

3 Pour the sodium hypochlorite solution (0.5%) into the drain well directly from the top. For more information, refer to H in Figure 6.116 Drain Well and Drain Tube.

4 Allow the sodium hypochlorite solution (0.5%) to sit for approximately 10 minutes, and then pour enough deionized water into the drain well to rinse out the sodium hypochlorite solution.

5 Inspect the drain tube by confirming that the tubing is clear (transparent) and checking for internal surface damage. If the drain tube is opaque or damaged, replace it with a new drain tube.

IMPORTANT

Confirm that the drain tube is securely connected to the mixture aspiration roller pump tubing so leaks do not occur.

6 Replace the drain tube over the drain well.

7 Press the **DIAG** button to reprime the lines with ISE MID Standard Solution. Confirm that liquid is correctly dispensed from the sample pot to the flowcell by confirming that no bubbles are in the tubings labeled 6 (Cell 1) and 8 (Cell 2) coming from the flowcell.

NOTE

You might need to repeat this step five times. If bubbles are in the tubing after priming, confirm that the electrodes and tubing are installed correctly and that the lock lever secures the electrodes.

8 Close all doors and covers of the ISE unit.

9 Clear the **ISE Maintenance** box to deactivate the maintenance operation buttons.

10 Update the Maintenance Log. For more information, refer to Update the Maintenance Log.

Enhanced ISE Cleaning (Manual)

Use this method when the ISE calibration slopes are in the mid-to-low forties, or if you find a residue when you inspect the sample pot or T-tubing.

For more information on materials required, refer to Parts List for ISE Maintenance.

Materials Required:

- ISE Cleaning Solution diluted 1:10
- ISE MID Standard Solution
- Pipette (that is commercially available and can collect more than 1 mL of liquid)

WARNING

Wear Personal Protective Equipment (PPE) such as gloves, eye shields, and lab coats, to handle ISE Cleaning Solution. If the ISE Cleaning Solution contacts skin or clothes, rinse the affected area thoroughly with water. If the ISE Cleaning Solution contacts the eyes or mouth, immediately flush with water. Seek medical attention. Refer to the Safety Data Sheets (SDS) for more information. Follow your laboratory procedure to wipe up spills immediately.

Prepare the ISE for Maintenance

IMPORTANT

Always prepare the ISE for maintenance procedures. The preparation procedure prevents the automatic ISE MID Standard Solution periodic (hourly) priming cycle from dispensing ISE MID Standard Solution.

1. Confirm that the system is in *Warm up* or *Standby* mode.
2. Select **Home > Analyzer Maintenance > ISE Maintenance > Maintenance**. The system displays the ISE Maintenance: Maintenance tab.
3. Select the **ISE Maintenance** box. The system activates the maintenance operation buttons.
4. Select **Drain Flowcell**. The system displays the Drain Flowcell dialog.
5. Select **OK**.
6. Press the **DIAG** button. The ISE sample probe moves to the CLEAN position in the ISE solution position area.

   IMPORTANT

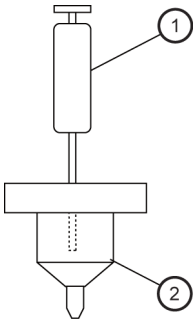
   If the ISE cover is open, the system generates an `ISE Cover Open [ISE]` alarm. Select **Alarm Clear** to clear the audible alarm. The ISE sample probe remains at the sample probe wash well. It is possible to continue with the next steps in the maintenance procedure.

   To move the ISE sample probe to the CLEAN position on the ISE solution position area, close the ISE cover, select the maintenance operation button again, then press the **DIAG** button.
7. Lift the front upper cover of the ISE unit.
8. Open the ISE cover.
9. Press the **DIAG** button again. The liquid drains from the flowcell.

Procedure: Enhanced ISE Cleaning (Manual)

1. Disconnect the liquid level sensor connectors (638, 654) and mixing motor connectors (648, 663).
2. Loosen the mixing component knob, lift the mixing component from the two positioning pins, and place the mixing component on the mixing component holder.
3. Remove the tubing (labeled 5 and 6 for Cell1 and 7 and 8 for Cell 2) from the pinch valve.
4. For the first 2 minutes, pipette the ISE Cleaning Solution into the sample pot while manually turning the roller pump components located below Cell 1 and Cell 2 clockwise until most of the ISE Cleaning Solution empties from the sample pot into the tubing. Continue filling the sample pot with the ISE Cleaning Solution while turning the roller pump component. Do not completely empty the sample pot before adding more ISE Cleaning Solution. Confirm that the tubing is filled with the ISE Cleaning Solution.

Figure 6.117 Filling the Sample Pot



1. Pipette
2. Sample Pot

5 Let the ISE Cleaning Solution remain in the tubing for 5 minutes.

6 Manually turn the roller pump to clear the ISE Cleaning Solution from the tubing.

7 Pipette 10 mL of ISE MID Standard Solution into the sample pot and manually turn the roller pump to clear the ISE MID Standard Solution. Repeat 3 times.

8 Replace the mixing component.

9 Replace the pinch valve tubing.

NOTE

Refer to the label on the back of the ISE cover for placement of the pinch valve tubing. Install the tubing (labeled 5 and 6 for Cell 1, 7 and 8 for Cell 2) in the correct grooves of the pinch valve.

10 Reconnect the liquid level sensor connectors (638, 654) and mixing motor connectors (648, 663).

11 Select **MID/REF Prime**. The system displays the MID/REF Prime dialog.

12 Select **OK.**

13 Press the **DIAG** button to start the prime.

14 Repeat the MID/REF prime three times.

15 Select **Total Prime**. The system displays the Total Prime dialog.

16 Select **OK.**

17 Press the **DIAG** button to start the prime.

18 Close all doors and covers of the ISE unit.

19 Clear the **ISE Maintenance** box to deactivate the maintenance operation buttons.

20 Calibrate and process QC on the ISE.

21 If the tubing is not clean after performing this procedure, replace the tubing according to the following procedures:

— Replace the Tubing between the Sample Pot, Electrode Block, and T-Connector
— Replace the REF Electrode Block-side Drain Tube and Pinch Valve Tubing
— Manually Clean the Drain Well and, if Needed, Replace the Drain Tube

ISE Six-Month Maintenance or Every 40,000 Samples

Perform the following procedures every six months or every 40,000 samples, whatever comes first.

- Replace the Na K or Cl Electrode

Replace the Na K or Cl Electrode

Replace the electrode when calibration or Selectivity Check results are out of range, and troubleshooting has been performed. Replacement of the electrode at every 40,000 samples or every six months ensures continuous and reliable electrode performance without unexpected analyzer down-time. If the electrodes have deteriorated, the system cannot obtain accurate analysis results.

For more information, refer to Figure 6.97 ISE Tubing Block Diagram.

For more information on materials required, refer to Parts List for ISE Maintenance.

Materials Required:

- Na Electrode
- K Electrode
- Cl Electrode
- O-ring

Prepare the ISE for Maintenance

IMPORTANT

Always prepare the ISE for maintenance procedures. The preparation procedure prevents the automatic ISE MID Standard Solution periodic (hourly) priming cycle from dispensing ISE MID Standard Solution.

1 Confirm that the system is in *Warm up* or *Standby* mode.

2 Select **Home > Analyzer Maintenance > ISE Maintenance > Maintenance**. The system displays the ISE Maintenance: Maintenance tab.

3 Select the **ISE Maintenance** box. The system activates the maintenance operation buttons.

4 Select **Drain Flowcell**. The system displays the Drain Flowcell dialog.

5 Select **OK**.

6 Press the **DIAG** button. The ISE sample probe moves to the CLEAN position in the ISE solution position area.

IMPORTANT

If the ISE cover is open, the system generates an `ISE Cover Open [ISE]` alarm. Select **Alarm Clear** to clear the audible alarm. The ISE sample probe remains at the sample probe wash well. It is possible to continue with the next steps in the maintenance procedure.

To move the ISE sample probe to the CLEAN position on the ISE solution position area, close the ISE cover, select the maintenance operation button again, then press the **DIAG** button.

7 Lift the front upper cover of the ISE unit.

8 Open the ISE cover.

9 Press the **DIAG** button again. The liquid drains from the flowcell.

Procedure: Replace the Na, K, or Cl Electrode

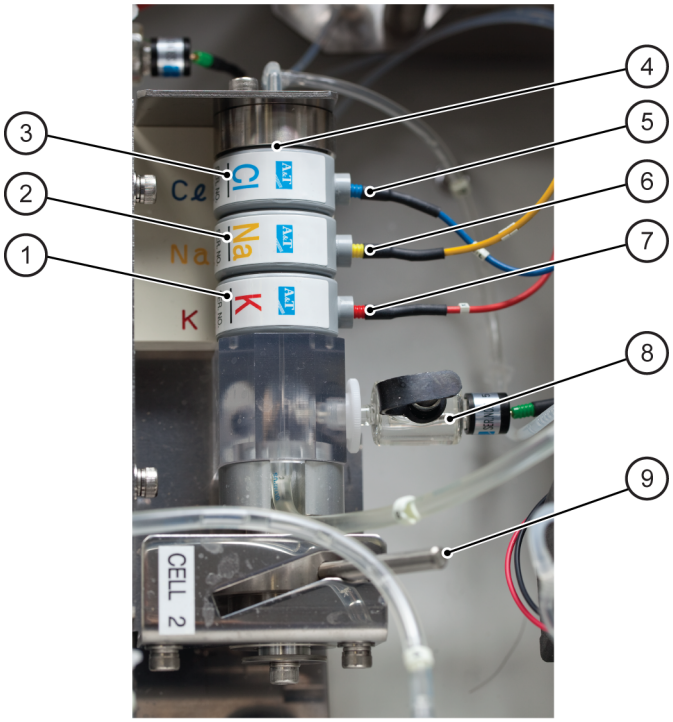
IMPORTANT

Always drain the flowcell before moving the lock lever to release the electrode block. If the ISE Reference Solution is not drained, ISE Reference Solution can flow up into the electrodes and cause problems with the electrode measuring capability. ISE Reference Solution only flows past the REF electrode (not Na, K, or Cl electrode) in normal operation. ISE Reference Solution is more concentrated than the ISE MID Standard Solution or the samples that flow through the flowcell.

1 Move the lock lever to the left to release the electrodes.

2 Remove the three electrodes.

Figure 6.118 Na, K, and Cl Electrodes



1. K electrode
2. Na electrode
3. Cl electrode
4. O-ring
5. Cl electrode wire (blue)
6. Na electrode wire (yellow)
7. K electrode wire (red)
8. REF electrode
9. Lock Lever

3 Disconnect the lead wires from each of the electrodes.

4 Replace the failed electrode with a new one.

IMPORTANT

The system uses four O-rings in the electrode block. The O-ring attaches to the outlet side of each electrode and the metal part that contacts the Cl electrode (location E in Figure 6.97 ISE Tubing Block Diagram). Do not lose the O-rings when removing the electrodes.

5 Connect the blue wire to the Cl electrode, the yellow wire to the Na electrode, and the red wire to the K electrode.

6 Confirm that the green wire connects to the REF electrode.

7 Before installing the electrodes, wipe the electrode block with a clean, dry, lint-free absorbent tissue.

8 Install the three electrodes on the electrode block. Install the electrodes according to the labels of Cl, Na, and K from the sample pot side to the REF electrode block side.

IMPORTANT

Confirm that all four O-rings are in position before using the lock lever to secure the electrodes. The O-rings are necessary to create an airtight seal for the flowcell.

9 Move the lock lever to the right to lock the electrodes in position.

10 Press the **DIAG** button to reprime the lines with ISE MID Standard Solution. Confirm that liquid is correctly dispensed from the sample pot to the flowcell by confirming that no bubbles are in the tubings labeled 6 (Cell 1) and 8 (Cell 2) coming from the flowcell.

NOTE

You might need to repeat this step five times. If bubbles are in the tubing after priming, confirm that the electrodes and tubing are installed correctly and that the lock lever secures the electrodes.

11 Close all doors and covers of the ISE unit.

12 Clear the **ISE Maintenance** box to deactivate the maintenance operation buttons.

13 Update the Maintenance Log. For more information, refer to Update the Maintenance Log.

14 The system displays the Electrode Serial No. dialog. Enter the serial number of the new electrodes.

15 Wait at least 5 minutes after closing the covers, and then perform a calibration.

IMPORTANT

To obtain the best possible analysis data, perform two calibration measurements to confirm the electrode stability:

	Na	K	Cl
Difference between 1st and 2nd factors	0.020	0.045	0.025

For more information, refer to Figure 2.25 ISE Maintenance: Calibration Tab.

— If the difference in the MID Solution Factor value between the first and second calibrations is within the values in the preceding table, the electrodes are stable.

or

If the difference between the MID Solution Factor values is not within each value in the preceding table, or if the slope result is 0 at the first calibration:

Air can remain inside the flowcell. Perform a MID/REF prime.

1. Select **Home** > **Analyzer Maintenance** > **ISE Maintenance** > **Maintenance**. The system displays the ISE Maintenance: Maintenance tab.
2. Select the **ISE Maintenance** box. The system activates the maintenance operation buttons.
3. Select **MID/REF Prime**. The system displays the MID/REF Prime dialog.
4. Select **OK**.
5. Press the **DIAG** button once. The ISE sample probe moves away.
6. Lift the front upper cover of the ISE unit.
7. Open the ISE cover.
8. Press the **DIAG** button to start the priming.
9. Press the **DIAG** button again. The liquid drains from the flowcell. The DIAG LED turns on after the priming is complete.
10. Initiate the MID/REF prime two more times by pressing the DIAG button.
11. Close all doors and covers of the ISE unit.
12. Clear the **ISE Maintenance** box to deactivate the maintenance operation buttons.
13. Repeat the ISE calibration two more times and compare the results to the chart.

— If the slope results are 0 for both calibrations:

The electrodes might not be set correctly. Repeat the Replace the Na, K, or Cl Electrode procedure to make sure that you have set the electrodes correctly.

ISE Maintenance Every Two Years or Every 150,000 Samples

Perform the following procedures every two years or every 150,000 samples, whatever comes first.

- Replace the ISE REF Electrode and Packing

Replace the ISE REF Electrode and Packing

Replace the REF electrode when calibration or Selectivity Check results are out of range for Na, K, and Cl, or the Na, K, and Cl results fluctuate significantly higher or lower than the previous measurement, and you have performed troubleshooting. Replace the electrode at 150,000 samples or 2 years, whatever comes first, to ensure continuous and reliable electrode performance without unexpected analyzer down-time.

If all calibration measurement values of Na, K, and Cl fluctuate, higher or lower than previous measurements, or if the system displays an alarm message after replacing the REF electrode, contact Beckman Coulter.

For more information, refer to ISE Tubing Block Diagram.

For more information on materials required, refer to Parts List for ISE Maintenance.

Materials Required:

- REF Electrode (with the packing)
- REF Electrode Packing

IMPORTANT

Do not use force to install or uninstall the REF electrode. When installing or uninstalling the electrode, do not break the electrode.

Prepare the ISE for Maintenance

IMPORTANT

Always prepare the ISE for maintenance procedures. The preparation procedure prevents the automatic ISE MID Standard Solution periodic (hourly) priming cycle from dispensing ISE MID Standard Solution.

1 Confirm that the system is in *Warm up* or *Standby* mode.

2 Select **Home > Analyzer Maintenance > ISE Maintenance > Maintenance**. The system displays the ISE Maintenance: Maintenance tab.

3 Select the **ISE Maintenance** box. The system activates the maintenance operation buttons.

4 Select **Drain Flowcell**. The system displays the Drain Flowcell dialog.

5 Select **OK**.

6 Press the **DIAG** button. The ISE sample probe moves to the CLEAN position in the ISE solution position area.

IMPORTANT

If the ISE cover is open, the system generates an `ISE Cover Open [ISE]` alarm. Select **Alarm Clear** to clear the audible alarm. The ISE sample probe remains at the sample probe wash well. It is possible to continue with the next steps in the maintenance procedure.

To move the ISE sample probe to the CLEAN position on the ISE solution position area, close the ISE cover, select the maintenance operation button again, then press the **DIAG** button.

7 Lift the front upper cover of the ISE unit.

8 Open the ISE cover.

9 Press the **DIAG** button again. The liquid drains from the flowcell.

Remove the REF Electrode and Packing

IMPORTANT

Always drain the flowcell before moving the lock lever to release the electrode block. If the ISE Reference Solution is not drained, ISE Reference Solution can flow up into the electrodes and cause problems with the electrode measuring capability. ISE Reference Solution only flows past the REF electrode (not Na, K, or Cl electrode) in normal operation. ISE Reference Solution is more concentrated than the ISE MID Standard Solution or the samples that flow through the flowcell.

1 Move the lock lever to the left to release the electrodes.

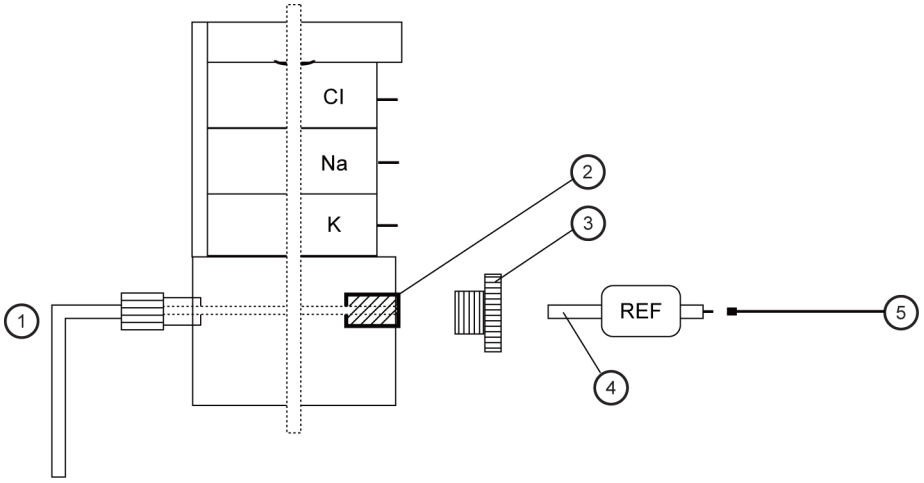
2 Remove the Na, K, and Cl electrodes from the electrode block to keep these electrodes away from the REF electrode. Any contact with the ISE Reference Solution can deteriorate the Na, K, and Cl electrodes.

3 Disconnect the green wire from the REF electrode.

4 Gently lift the REF electrode block.

5 Carefully unscrew the REF electrode cap screw, then gently remove the REF electrode along with the cap screw.

Figure 6.119 ISE REF Electrode and Packing



1. REF solution tube
2. REF electrode packing
3. Cap screw
4. REF electrode
5. REF electrode wire (green)

6 Remove the REF electrode packing.

Replace the REF Electrode and Packing

1. Confirm that no air bubbles are in the REF electrode tip. If air bubbles are found in the tip, remove the bubbles by pointing the electrode tip downward while tapping it with a finger.
2. Insert new packing into the REF electrode block.
3. Place the cap screw on the REF electrode, then place the REF electrode in the REF electrode block so that the electrode tip is centered in the packing.

   NOTE

   Dampen the REF electrode tip with deionized water if you have difficulty inserting the REF electrode into the REF electrode block.
4. Insert the cap screw into the REF electrode block and screw it in carefully. Finish tightening the cap screw by a quarter or half turn to orient the REF electrode correctly.
5. Reinstall the REF electrode block.
6. Connect the green REF electrode wire to the REF electrode.
7. Wipe the top of the block with a clean, dry, lint-free absorbent tissue. Rinse the ISE Reference Solution from your hands.
8. Replace the Na, K, and Cl electrodes.
9. Move the lock lever to the right to lock the electrodes in position.
10. Select **MID/REF Prime**. The system displays the MID/REF Prime dialog.
11. Select **OK**.
12. Press the **DIAG** button to reprime the lines with ISE MID Standard Solution. Confirm that liquid is correctly dispensed from the sample pot to the flowcell by confirming that no bubbles are in the tubings labeled 6 (Cell 1) and 8 (Cell 2) coming from the flowcell.

    NOTE

    You might need to repeat this step five times. If bubbles are in the tubing after priming, confirm that the electrodes and tubing are installed correctly and that the lock lever secures the electrodes.
13. Close all doors and covers of the ISE unit.
14. Clear the **ISE Maintenance** box to deactivate the maintenance operation buttons.
15. Update the Maintenance Log. For more information, refer to Update the Maintenance Log.

16 The system displays the Electrode Serial No. dialog. Enter the serial number of the new REF electrode.

17 Wait at least 5 minutes after closing the covers, and then perform a calibration.

IMPORTANT

To obtain the best possible analysis data, perform two calibration measurements to confirm the electrode stability:

	Na	K	Cl
Difference between 1st and 2nd factors	0.020	0.045	0.025

For more information, refer to Figure 2.25 ISE Maintenance: Calibration Tab.

— If the difference in the MID Solution Factor value between the first and second calibrations is within the values in the preceding table, the electrodes are stable.

or

If the difference between the MID Solution Factor values is not within each value in the preceding table, or if the slope result is 0 at the first calibration:

Air can remain inside the flowcell. Perform a MID/REF prime.

1. Select **Home** > **Analyzer Maintenance** > **ISE Maintenance** > **Maintenance**. The system displays the ISE Maintenance: Maintenance tab.
2. Select the **ISE Maintenance** box. The system activates the maintenance operation buttons.
3. Select **MID/REF Prime**. The system displays the MID/REF Prime dialog.
4. Select **OK**.
5. Press the **DIAG** button once. The ISE sample probe moves away.
6. Lift the front upper cover of the ISE unit.
7. Open the ISE cover.
8. Press the **DIAG** button to start the priming.
9. Press the **DIAG** button again. The liquid drains from the flowcell. The DIAG LED turns on after the priming is complete.
10. Initiate the MID/REF prime two more times by pressing the DIAG button.
11. Close all doors and covers of the ISE unit.
12. Clear the **ISE Maintenance** box to deactivate the maintenance operation buttons.
13. Repeat the ISE calibration two more times and compare the results to the chart.

— If the slope results are 0 for both calibrations:

The electrodes might not be set correctly. Repeat the Replace the Na, K, or Cl Electrode procedure to make sure that you have set the electrodes correctly.

ISE As Needed Maintenance

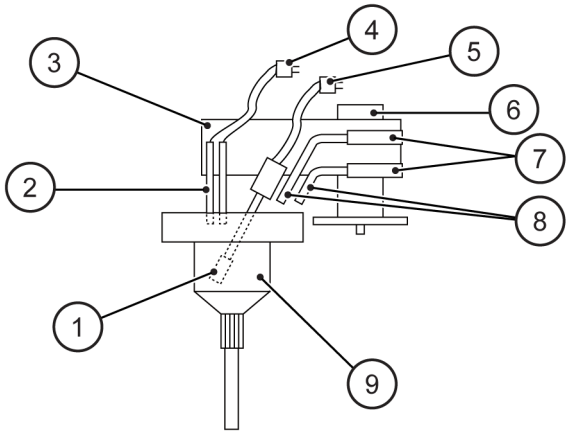
- Replace the Sample Pot
- Clean the ISE Electrode Block (Inlet Side)
- Manually Clean the ISE K Electrode
- Manually Clean and Replace the ISE REF Electrode Block
- Replace the ISE Mix Bar
- Replace the ISE Reagents

Replace the Sample Pot

Replace the sample pot if contaminants accumulate and cannot be removed during the every other week cleaning procedure. Also replace the pot if you find any cracks or flaws in the pot.

For more information, refer to ISE Tubing Block Diagram.

Figure 6.120 Sample Pot and Mixing Component



1. Mix bar
2. Liquid level sensor
3. Mixing component
4. Level sensor connector
5. Mixing motor connector
6. Mixing component knob
7. Buffer solution and MID solution connecting tubes
8. Nozzles
9. Sample pot

For more information on materials required, refer to Parts List for ISE Maintenance.

Materials Required:

- Sample Pot

Prepare the ISE for Maintenance

IMPORTANT

Always prepare the ISE for maintenance procedures. The preparation procedure prevents the automatic ISE MID Standard Solution periodic (hourly) priming cycle from dispensing ISE MID Standard Solution.

1. Confirm that the system is in *Warm up* or *Standby* mode.
2. Select **Home > Analyzer Maintenance > ISE Maintenance > Maintenance**. The system displays the ISE Maintenance: Maintenance tab.
3. Select the **ISE Maintenance** box. The system activates the maintenance operation buttons.
4. Select **Drain Flowcell**. The system displays the Drain Flowcell dialog.
5. Select **OK**.
6. Press the **DIAG** button. The ISE sample probe moves to the CLEAN position in the ISE solution position area.

   IMPORTANT

   If the ISE cover is open, the system generates an `ISE Cover Open [ISE]` alarm. Select **Alarm Clear** to clear the audible alarm. The ISE sample probe remains at the sample probe wash well. It is possible to continue with the next steps in the maintenance procedure.

   To move the ISE sample probe to the CLEAN position on the ISE solution position area, close the ISE cover, select the maintenance operation button again, then press the **DIAG** button.
7. Lift the front upper cover of the ISE unit.
8. Open the ISE cover.
9. Press the **DIAG** button again. The liquid drains from the flowcell.

Procedure: Replace the Sample Pot

1. Disconnect the liquid level sensor connectors (638 (Cell 1), 654 (Cell 2)) and mixing motor connectors (648 (Cell 1), 663 (Cell 2)).
2. Loosen the knob securing the mixing component. Gently lift the mixing component to remove it and place it on the mixing component holder.
3. Loosen the retaining knob securing the sample pot, and lift the pot from the peg.

4. Disconnect the sample pot from the tubing by twisting the connector from the bottom of the sample pot.
5. Reattach the tubing to the new sample pot.
6. Reinstall the sample pot. Align the hole on the top of the sample pot with the peg and slide the screw post into the groove on the opposite side. Tighten the retaining knob.
7. Replace the mixing component on the two positioning pins. Tighten the knob to secure the mixing component.
8. Reconnect the liquid level sensor connectors (638 (Cell 1), 654 (Cell 2)) and mixing motor connectors (648 (Cell 1), 663 (Cell 2)).

IMPORTANT

The connectors are specially keyed to fit each plug. To avoid damage to the pins, do not force a connector into its plug. If the pins are damaged, the mix bar does not rotate, or the liquid level sensors do not function.

IMPORTANT

When reinstalling the mixing component, confirm that the mixing component and its stand are not pinching the tubing.

9. Press the **DIAG** button to reprime the lines with ISE MID Standard Solution. Confirm that liquid is correctly dispensed from the sample pot to the flowcell by confirming that no bubbles are in the tubings labeled 6 (Cell 1) and 8 (Cell 2) coming from the flowcell.

NOTE

You might need to repeat this step five times. If bubbles are in the tubing after priming, confirm that the electrodes and tubing are installed correctly and that the lock lever secures the electrodes.

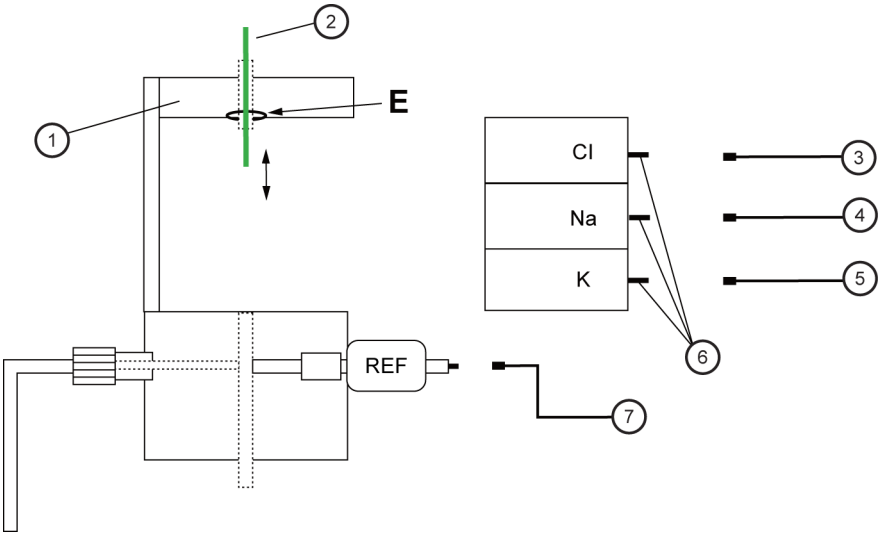
10. Close all doors and covers of the ISE unit.
11. Clear the **ISE Maintenance** box to deactivate the maintenance operation buttons.
12. Update the Maintenance Log. For more information, refer to Update the Maintenance Log.
13. To confirm that the ISE is working correctly after the maintenance procedure, perform a calibration.

Clean the ISE Electrode Block (Inlet Side)

Inspect the inlet side of the electrode block for contaminants that have accumulated. Perform maintenance to clean the inlet side of the electrode block as needed.

For more information, refer to Figure 6.97 ISE Tubing Block Diagram.

Figure 6.121 Electrode Block



1. Electrode block (inlet side)
2. Stylet
3. Cl electrode wire (blue)
4. Na electrode wire (yellow)
5. K electrode wire (red)
6. Electrodes
7. REF electrode wire (green)

For more information on materials required, refer to Parts List for ISE Maintenance.

Materials Required:

- Stylet φ0.3 (diameter)

Prepare the ISE for Maintenance

IMPORTANT

Always prepare the ISE for maintenance procedures. The preparation procedure prevents the automatic ISE MID Standard Solution periodic (hourly) priming cycle from dispensing ISE MID Standard Solution.

1 Confirm that the system is in *Warm up* or *Standby* mode.

2 Select **Home > Analyzer Maintenance > ISE Maintenance > Maintenance**. The system displays the ISE Maintenance: Maintenance tab.

3 Select the **ISE Maintenance** box. The system activates the maintenance operation buttons.

4 Select **Drain Flowcell**. The system displays the Drain Flowcell dialog.

5 Select **OK**.

6 Press the **DIAG** button. The ISE sample probe moves to the CLEAN position in the ISE solution position area.

IMPORTANT

If the ISE cover is open, the system generates an `ISE Cover Open [ISE]` alarm. Select **Alarm Clear** to clear the audible alarm. The ISE sample probe remains at the sample probe wash well. It is possible to continue with the next steps in the maintenance procedure.

To move the ISE sample probe to the CLEAN position on the ISE solution position area, close the ISE cover, select the maintenance operation button again, then press the **DIAG** button.

7 Lift the front upper cover of the ISE unit.

8 Open the ISE cover.

9 Press the **DIAG** button again. The liquid drains from the flowcell.

Procedure: Clean the ISE Electrode Block (Inlet Side)

IMPORTANT

Always drain the flowcell before moving the lock lever to release the electrode block. If the ISE Reference Solution is not drained, ISE Reference Solution can flow up into the electrodes and cause problems with the electrode measuring capability. ISE Reference Solution only flows past the REF electrode (not Na, K, or Cl electrode) in normal operation. ISE Reference Solution is more concentrated than the ISE MID Standard Solution or the samples that flow through the flowcell.

1 Move the lock lever to the left to release the electrodes.

2 Remove the Na, K, and Cl electrodes from the electrode block.

IMPORTANT

The system uses four O-rings in the electrode block. The O-ring attaches to the outlet side of each electrode and the metal part that contacts the Cl electrode (location E in Figure 6.97 ISE Tubing Block Diagram). Do not lose the O-rings when removing the electrodes.

3 Disconnect the Na, K, and Cl lead wires.

4 Remove the tubing connecting to the sample pot from the electrode block inlet.

5 Pass the stylet through the flowcell hole on the inlet side of the electrode block. Contamination can lodge in the flowcell of the electrode block. Bind the stylet up to the maximum thickness that can pass through the flowcell.

6 Remove contamination in the block by turning the stylet. When there are contaminants on the stylet, wipe them with a clean, dry, lint-free absorbent tissue several times.

7 Connect the blue wire to the Cl electrode, the yellow wire to the Na electrode, and the red wire to the K electrode.

8 Install the three electrodes on the electrode block. Attach the electrodes in this order from the sample pot side:

1. Cl
2. Na
3. K

9 Move the lock lever to the right to lock the electrodes in position.

10 Attach the tubing connecting the sample pot to the electrode block.

11 Press the **DIAG** button to reprime the lines with ISE MID Standard Solution. Confirm that liquid is correctly dispensed from the sample pot to the flowcell by confirming that no bubbles are in the tubings labeled 6 (Cell 1) and 8 (Cell 2) coming from the flowcell.

NOTE

You might need to repeat this step five times. If bubbles are in the tubing after priming, confirm that the electrodes and tubing are installed correctly and that the lock lever secures the electrodes.

12 Close all doors and covers of the ISE unit.

13 Clear the **ISE Maintenance** box to deactivate the maintenance operation buttons.

14 Update the Maintenance Log. For more information, refer to Update the Maintenance Log.

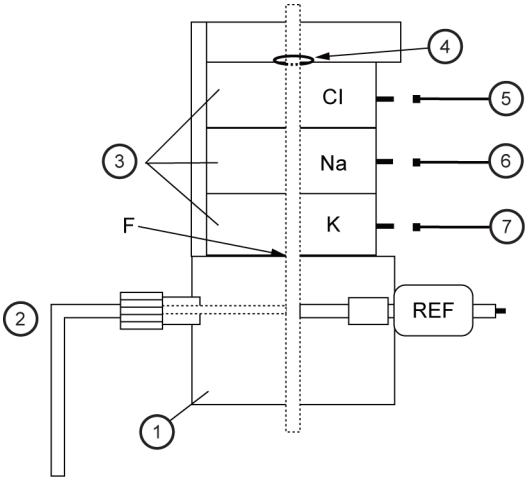
15 To confirm that the ISE is working correctly after the maintenance procedure, perform a calibration.

Manually Clean the ISE K Electrode

If calibration errors, such as slope readings of 0, occur frequently for the K electrode only, the ISE Reference Solution can contaminate the K electrode. In this situation, perform the manual cleaning of the K electrode.

For more information, refer to Figure 6.97 ISE Tubing Block Diagram.

Figure 6.122 Electrode Block



1. REF electrode block
2. REF solution tube
3. Electrodes
4. O-ring
5. Cl electrode wire (blue)
6. Na electrode wire (yellow)
7. K electrode wire (red)

For more information on materials required, refer to Parts List for ISE Maintenance.

Materials Required:

- Clean, dry, lint-free absorbent tissue

Prepare the ISE for Maintenance

IMPORTANT

Always prepare the ISE for maintenance procedures. The preparation procedure prevents the automatic ISE MID Standard Solution periodic (hourly) priming cycle from dispensing ISE MID Standard Solution.

1 Confirm that the system is in *Warm up* or *Standby* mode.

2 Select **Home > Analyzer Maintenance > ISE Maintenance > Maintenance**. The system displays the ISE Maintenance: Maintenance tab.

3 Select the **ISE Maintenance** box. The system activates the maintenance operation buttons.

4 Select **Drain Flowcell**. The system displays the Drain Flowcell dialog.

5 Select **OK**.

6 Press the **DIAG** button. The ISE sample probe moves to the CLEAN position in the ISE solution position area.

IMPORTANT

If the ISE cover is open, the system generates an `ISE Cover Open [ISE]` alarm. Select **Alarm Clear** to clear the audible alarm. The ISE sample probe remains at the sample probe wash well. It is possible to continue with the next steps in the maintenance procedure.

To move the ISE sample probe to the CLEAN position on the ISE solution position area, close the ISE cover, select the maintenance operation button again, then press the **DIAG** button.

7 Lift the front upper cover of the ISE unit.

8 Open the ISE cover.

9 Press the **DIAG** button again. The liquid drains from the flowcell.

Procedure: Manually Clean the ISE K Electrode

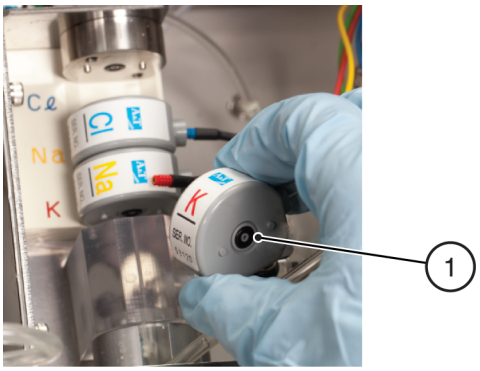
IMPORTANT

Always drain the flowcell before moving the lock lever to release the electrode block. If the ISE Reference Solution is not drained, ISE Reference Solution can flow up into the electrodes and cause problems with the electrode measuring capability. ISE Reference Solution only flows past the REF electrode (not Na, K, or Cl electrode) in normal operation. ISE Reference Solution is more concentrated than the ISE MID Standard Solution or the samples that flow through the flowcell.

1 Move the lock lever to the left to release the electrodes.

2 Remove the K electrode from the electrode block.

Figure 6.123 K Electrode



1. O-ring

3 Disconnect the lead wire of the K electrode.

4 Remove the O-ring of the K electrode.

5 Use a squeeze bottle to dispense deionized water to clean the O-ring and O-ring groove of the electrode. Deionized water that gets into the electrode flowcell does not cause a problem.

6 Wipe the side face (location F in Figure 6.97 ISE Tubing Block Diagram) of the REF electrode block that contacts the K electrode using a clean, dry, lint-free absorbent tissue dampened with deionized water.

7 Using a clean, dry, lint-free absorbent tissue, dry the K electrode, O-ring, and REF electrode block surfaces.

8 Connect the red lead wire to the K electrode.

9 Install the three electrodes on the electrode block. Attach the electrodes in this order from the sample pot side:

1. Cl
2. Na
3. K

IMPORTANT

The system uses four O-rings in the electrode block. The O-ring attaches to the outlet side of each electrode and the metal part that contacts the Cl electrode (location E in Figure 6.97 ISE Tubing Block Diagram). Do not lose the O-rings when removing the electrodes.

10 Move the lock lever to the right to lock the electrodes in position.

11 Confirm that **Drain Flowcell** is selected.

12 Press the **DIAG** button to reprime the lines with ISE MID Standard Solution. Confirm that liquid is correctly dispensed from the sample pot to the flowcell by confirming that no bubbles are in the tubings labeled 6 (Cell 1) and 8 (Cell 2) coming from the flowcell.

NOTE

You might need to repeat this step five times. If bubbles are in the tubing after priming, confirm that the electrodes and tubing are installed correctly and that the lock lever secures the electrodes.

13 Close all doors and covers of the ISE unit.

14 Clear the **ISE Maintenance** box to deactivate the maintenance operation buttons.

15 Update the Maintenance Log. For more information, refer to Update the Maintenance Log.

16 Wait at least 5 minutes after closing the covers, and then perform a calibration.

IMPORTANT

To obtain the best possible analysis data, perform two calibration measurements to confirm the electrode stability:

	Na	K	Cl
Difference between 1st and 2nd factors	0.020	0.045	0.025

For more information, refer to Figure 2.25 ISE Maintenance: Calibration Tab.

— If the difference in the MID Solution Factor value between the first and second calibrations is within the values in the preceding table, the electrodes are stable.

or

If the difference between the MID Solution Factor values is not within each value in the preceding table, or if the slope result is 0 at the first calibration:

Air can remain inside the flowcell. Perform a MID/REF prime.

1. Select **Home** > **Analyzer Maintenance** > **ISE Maintenance** > **Maintenance**. The system displays the ISE Maintenance: Maintenance tab.
2. Select the **ISE Maintenance** box. The system activates the maintenance operation buttons.
3. Select **MID/REF Prime**. The system displays the MID/REF Prime dialog.
4. Select **OK**.
5. Press the **DIAG** button once. The ISE sample probe moves away.
6. Lift the front upper cover of the ISE unit.
7. Open the ISE cover.
8. Press the **DIAG** button to start the priming.
9. Press the **DIAG** button again. The liquid drains from the flowcell. The DIAG LED turns on after the priming is complete.
10. Initiate the MID/REF prime two more times by pressing the DIAG button.
11. Close all doors and covers of the ISE unit.
12. Clear the **ISE Maintenance** box to deactivate the maintenance operation buttons.
13. Repeat the ISE calibration two more times and compare the results to the chart.

— If the slope results are 0 for both calibrations:

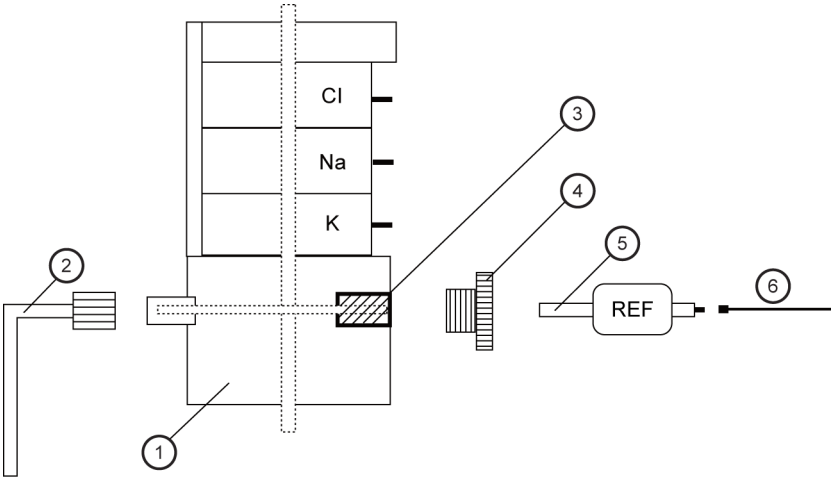
The electrodes might not be set correctly. Repeat the Replace the Na, K, or Cl Electrode procedure to make sure that you have set the electrodes correctly.

Manually Clean and Replace the ISE REF Electrode Block

The accumulation of contaminants or crystals, a reduction in the flow rate, or noise interference can cause data problems. If the data indicates that it is needed, manually clean or replace the ISE REF electrode block.

For more information, refer to Figure 6.97 ISE Tubing Block Diagram.

Figure 6.124 ISE REF Electrode Block



1. REF electrode block
2. REF solution tube (location G in Figure 6.97 ISE Tubing Block Diagram)
3. REF electrode packing
4. Cap screw
5. REF Electrode
6. REF electrode wire (green)

For more information on materials required, refer to Parts List for ISE Maintenance.

Materials Required:

- REF Electrode Block
- 2% Wash solution

Prepare the ISE for Maintenance

IMPORTANT

Always prepare the ISE for maintenance procedures. The preparation procedure prevents the automatic ISE MID Standard Solution periodic (hourly) priming cycle from dispensing ISE MID Standard Solution.

1 Confirm that the system is in *Warm up* or *Standby* mode.

2 Select **Home > Analyzer Maintenance > ISE Maintenance > Maintenance**. The system displays the ISE Maintenance: Maintenance tab.

3 Select the **ISE Maintenance** box. The system activates the maintenance operation buttons.

4 Select **Drain Flowcell**. The system displays the Drain Flowcell dialog.

5 Select **OK**.

6 Press the **DIAG** button. The ISE sample probe moves to the CLEAN position in the ISE solution position area.

IMPORTANT

If the ISE cover is open, the system generates an `ISE Cover Open [ISE]` alarm. Select **Alarm Clear** to clear the audible alarm. The ISE sample probe remains at the sample probe wash well. It is possible to continue with the next steps in the maintenance procedure.

To move the ISE sample probe to the CLEAN position on the ISE solution position area, close the ISE cover, select the maintenance operation button again, then press the **DIAG** button.

7 Lift the front upper cover of the ISE unit.

8 Open the ISE cover.

9 Press the **DIAG** button again. The liquid drains from the flowcell.

Procedure: Manually Clean and Replace the ISE REF Electrode Block

IMPORTANT

Always drain the flowcell before moving the lock lever to release the electrode block. If the ISE Reference Solution is not drained, ISE Reference Solution can flow up into the electrodes and cause problems with the electrode measuring capability. ISE Reference Solution only flows past the REF electrode (not Na, K, or Cl electrode) in normal operation. ISE Reference Solution is more concentrated than the ISE MID Standard Solution or the samples that flow through the flowcell.

1 Move the lock lever to the left to release the electrodes.

2 Disconnect the Na, K, and Cl lead wires, and remove all three electrodes from the electrode block. If ISE Reference Solution contacts the electrodes, the electrodes can become contaminated.

3 Gently lift up the block on which the REF electrode is installed.

4 Disconnect the REF electrode wire (green) from the REF electrode.

5 Loosen the cap screw on the REF electrode and gently remove the electrode along with the cap screw. Remove the REF electrode packing in the block.

6 While holding the REF electrode block by hand, pull the drain tube (labeled 6 for Cell 1, and 8 for Cell 2) out of the REF electrode block.

7 Remove the REF solution tube (refer to Figure 6.124 ISE REF Electrode Block) connected to the lower side of the REF electrode block. Remove the REF electrode block.

IMPORTANT

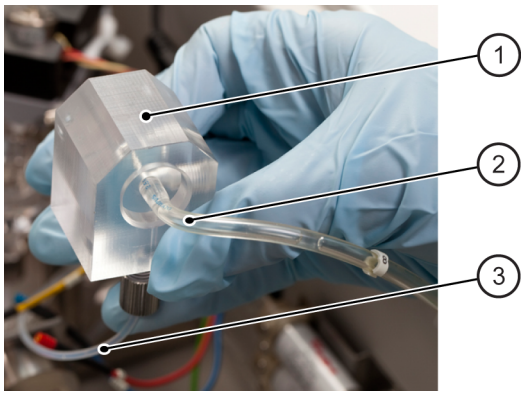
To prevent the REF electrode block from becoming deformed from ultrasonic cleaning, follow these precautions. If the REF electrode block is deformed or cracked, replace it.

- Do not perform ultrasonic cleaning for more than 10 minutes.
- Use a cleaning liquid at room temperature.
- Use a sonicator rated at 600 W or less. If the output of the sonicator is uncertain, contact the manufacturer of the sonicator.

8 To clean the REF electrode block, sonicate for 10 minutes in 2% wash solution. If a sonicator is not available, soak it in the 2% wash solution for more than 30 minutes. Confirm that 2% wash solution can flow through the flow path in the REF electrode block.

9 Thoroughly rinse the REF electrode block in deionized water, and dry with a clean, dry, lint-free absorbent tissue. If you are replacing the REF electrode block, obtain a new REF electrode block.

Figure 6.125 REF Electrode Block



1. REF electrode block
2. REF electrode block-side drain tube (Tube Set 2 labeled 6, Tube Set 8 labeled 8)
3. REF solution tube

10 Attach the drain tube (labeled 6 for Cell 1 and 8 for Cell 2) and the REF solution tube (refer to Figure 6.124 ISE REF Electrode Block) to a clean or new REF electrode block.

11 Confirm that no air bubbles are in the REF electrode tip. If you find air bubbles in the REF electrode tip, remove the bubbles by pointing the electrode tip downward while tapping it with a finger.

12 Insert the REF electrode packing into the REF electrode block. Confirm that the packing is not cracked or broken. If so, replace the packing.

13 Place the cap screw on the REF electrode, then place the REF electrode in the REF electrode block so that the electrode tip is centered in the packing.

NOTE

If you have difficulty inserting the REF electrode into the REF electrode block, dampen the REF electrode tip with deionized water.

14 Insert the cap screw into the REF electrode block and screw it in carefully. Finish tightening the cap screw by a quarter or half turn to orient the REF electrode correctly.

15 Reinstall the REF electrode block.

16 Connect the green REF electrode wire to the REF electrode.

17 Wipe the top of the block with a clean, dry, lint-free absorbent tissue. Rinse the ISE Reference Solution from your hands.

18 Replace the Na, K, and Cl electrodes.

19 Move the lock lever to the right to lock the electrodes in position.

20 Connect the blue wire to the Cl electrode, the yellow wire to the Na electrode, and the red wire to the K electrode.

21 Confirm that **Drain Flowcell** is selected.

22 Press the **DIAG** button to reprime the lines with ISE MID Standard Solution. Confirm that liquid is correctly dispensed from the sample pot to the flowcell by confirming that no bubbles are in the tubings labeled 6 (Cell 1) and 8 (Cell 2) coming from the flowcell.

NOTE

You might need to repeat this step five times. If bubbles are in the tubing after priming, confirm that the electrodes and tubing are installed correctly and that the lock lever secures the electrodes.

23 Close all doors and covers of the ISE unit.

24 Clear the **ISE Maintenance** box to deactivate the maintenance operation buttons.

25 Update the Maintenance Log. For more information, refer to Update the Maintenance Log.

26 To confirm that the ISE is working correctly after the maintenance procedure, perform a calibration.

Replace the ISE Mix Bar

If the ISE mix bar is bent or damaged, you cannot achieve correct analysis. Replace the ISE mix bar.

WARNING

Wear Personal Protective Equipment (PPE) such as gloves, eye shields, and lab coats, to handle ISE Cleaning Solution. If the ISE Cleaning Solution contacts skin or clothes, rinse the affected area thoroughly with water. If the ISE Cleaning Solution contacts the eyes or mouth, immediately flush with water. Seek medical attention. Refer to the Safety Data Sheets (SDS) for more information. Follow your laboratory procedure to wipe up spills immediately.

For more information on materials required, refer to Parts List for ISE Maintenance.

Materials Required:

- Mix bar

Prepare the ISE for Maintenance

IMPORTANT

Always prepare the ISE for maintenance procedures. The preparation procedure prevents the automatic ISE MID Standard Solution periodic (hourly) priming cycle from dispensing ISE MID Standard Solution.

1 Confirm that the system is in *Warm up* or *Standby* mode.

2 Select **Home > Analyzer Maintenance > ISE Maintenance > Maintenance**. The system displays the ISE Maintenance: Maintenance tab.

3 Select the **ISE Maintenance** box. The system activates the maintenance operation buttons.

4 Select **Drain Flowcell**. The system displays the Drain Flowcell dialog.

5 Select **OK**.

6 Press the **DIAG** button. The ISE sample probe moves to the CLEAN position in the ISE solution position area.

IMPORTANT

If the ISE cover is open, the system generates an `ISE Cover Open [ISE]` alarm. Select **Alarm Clear** to clear the audible alarm. The ISE sample probe remains at the sample probe wash well. It is possible to continue with the next steps in the maintenance procedure.

To move the ISE sample probe to the CLEAN position on the ISE solution position area, close the ISE cover, select the maintenance operation button again, then press the **DIAG** button.

7 Lift the front upper cover of the ISE unit.

8 Open the ISE cover.

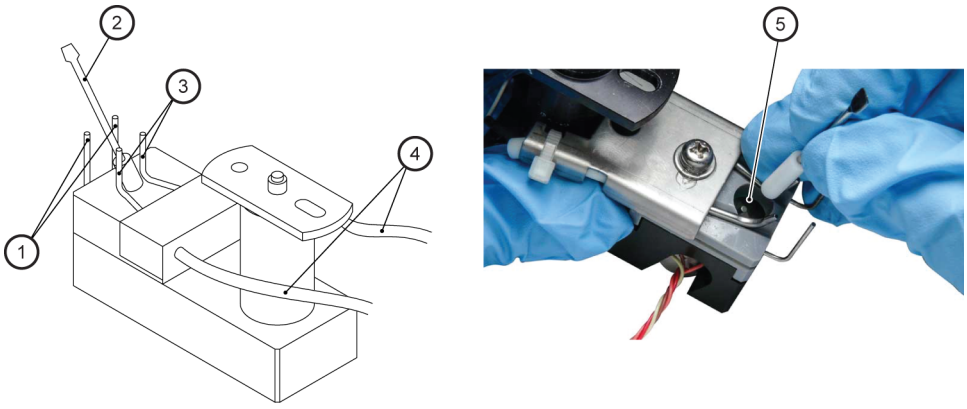
9 Press the **DIAG** button again. The liquid drains from the flowcell.

Replace the Mix Bar

1 Disconnect the liquid level sensor connectors (638 (Cell 1), 654 (Cell 2)) and mixing motor connectors (648 (Cell 1), 663 (Cell 2)).

2 Loosen the knob securing the mixing component. Gently lift the mixing components to unseat it.

Figure 6.126 Mixing Component



1. Liquid level sensors
2. Mix bar
3. Nozzle
4. Connecting tubing
5. Shaft

3 Pull the mix bar to remove it.

IMPORTANT

When removing the mix bar, hold the connecting tubing in place on the mixing component.

4 Obtain a new mix bar.

5 Insert the new mix bar into the shaft on the mixing component. Gently push the mix bar until it reaches the end of the shaft.

Reinstall the Mixing Component

1 Replace the mixing component on the two positioning pins. Tighten the knob to secure the mixing component.

IMPORTANT

The connectors are specially keyed to fit each plug. To avoid damage to the pins, do not force a connector into its plug. If the pins are damaged, the mix bar does not rotate, or the liquid level sensors do not function.

IMPORTANT

When reinstalling the mixing component, confirm that the tubing is not pinched between the mixing component and its stand.

2 Reconnect the liquid level sensor connectors (638 (Cell 1), 654 (Cell 2)) and mixing motor connectors (648 (Cell 1), 663 (Cell 2)).

3 Perform a total prime to prime the ISE with fresh ISE Buffer Solution, ISE MID Standard Solution, and ISE Reference Solution.

During the prime, confirm that buffer solution and MID Standard solution are correctly dispensed into the sample pot and flows to waste without generating alarms. Also, confirm that the mix bar rotates without contacting the sample pot. The mix bar makes a mechanical noise when it contacts the sample pot:

1. Select **Total Prime**. The system displays the Total Prime dialog.
2. Select **OK**.
3. Press the **DIAG** button to start the priming. The DIAG LED turns on after the priming is complete.
4. Close all doors and covers of the ISE unit.
5. Clear the ISE Maintenance box to deactivate the maintenance operation buttons.
6. To confirm that the ISE is working correctly after the maintenance procedure, perform a calibration.

Replace the ISE Reagents

Replace the ISE reagents when the on-board stability expires, the reagent expires, or the quantity of reagent is insufficient. The system displays an alarm message when an ISE reagent reaches the ISE Reagent Short notification level (5.2 cm above the bottom of the bottle). Replace the reagent before the bottle empties.

NOTE

These are the number of samples the system can run after the alarm occurs for each reagent:

- ISE Buffer Solution - 240 samples
- ISE MID Standard Solution - 180 samples
- ISE Reference Solution - 600 samples

For on-board stability claims for the ISE, refer to the Chemistry Information Sheet.

NOTE

ISE Reference Solution is highly concentrated. Prevent contact between the ISE Reference Solution (bottle, cap, and aspiration tube) with the ISE Buffer Solution and ISE MID Standard Solution (bottle, cap, and aspiration tube).

NOTE

Do not add new reagent to existing bottles. Adding new reagent to existing bottles can affect results.

For more information on materials required, refer to Parts List for Analyzer Maintenance.

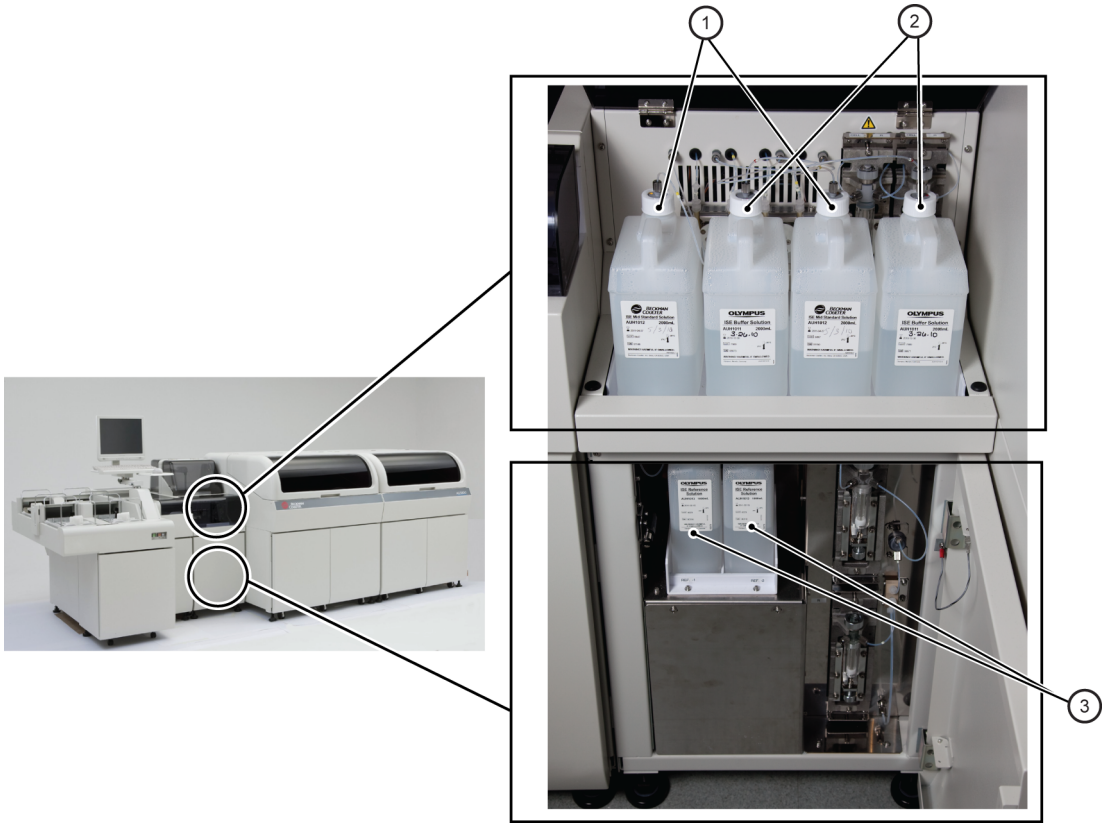
Materials Required:

- ISE Buffer Solution
- ISE MID Standard Solution
- ISE Reference Solution

1 Confirm that the system is in *Warm up* or *Standby* mode.

2 Lift the ISE reagent cover to replace the ISE Buffer solution or ISE MID Standard solution, or open the front door of the ISE unit to replace the ISE Reference solution.

Figure 6.127 ISE Reagent Bottles



1. ISE MID Standard Solution
2. ISE Buffer Solution
3. ISE Reference Solution

3 Place the new bottle of reagent next to the ISE unit and remove the cap.

4 Pull out the reagent bottle to replace it.

5 Loosen the cap of the reagent bottle and remove the aspiration tube.

NOTE

Do not touch the aspiration tube.

Dispose of the old solution according to your laboratory procedure.

6 Place the aspiration tube in the new bottle and tighten the cap.

7 Place the new bottle on the ISE unit and push the bottle into position.

8 Select **Home** > **Analyzer Maintenance** > **ISE Maintenance** > **Maintenance**. The system displays the ISE Maintenance: Maintenance tab.

9 Select the **ISE Maintenance** box. The system activates the maintenance operation buttons.

10 Select one of the following options. If all reagents are being replaced simultaneously, replace the reagents in the following order:

1. To replace ISE Buffer Solution, select **Buffer Prime**
2. To replace ISE MID Standard Solution, select **MID/REF Prime**
3. To replace ISE Reference Solution, select **MID/REF Prime**

The system displays the dialog.

11 Select **OK.**

12 Press the **DIAG** button once. The system moves the ISE sample probe away.

13 Press the **DIAG** button again. The system primes the reagent for approximately 90 seconds.

14 Close all doors and covers of the ISE unit.

15 Clear the **ISE Maintenance** box to deactivate the maintenance operation buttons.

16 Update the Maintenance Log. For more information, refer to Update the Maintenance Log.

17 To confirm that the ISE is working correctly after the maintenance procedure, perform a calibration.

CHAPTER 7
Flags

Flags

The system generates flags when the system encounters a condition that can affect the result. This condition can range from minor warnings to severe errors that require attention immediately. Review each flag and identify the root cause, and perform the corrective action.

Do not report any result with an unresolved or unexpected flag. When in doubt, always consider repeating the sample analysis, and diluting or condensing the sample if necessary.

This chapter contains a list of all flags in priority order, suggestions of their cause, and action to take.

The priority determines what flags you see if a result generates multiple flags. A maximum of four flags can display.

Error Flags - Alphabetical Order

The following table summarizes the flags in alphabetical order:

Table 7.1 Summary of Flags (Alphabetical Order)

Flag	Definition
!	Unable to calculate concentration
#	Insufficient sample detected
$	Not enough data to determine linearity of reaction
%	Clot detected
&	Prozone test data is abnormal
(	Shortage of cleaning solution for contamination parameters
)	Reagent lot number used for sample analysis is different from the lot number used for RB/ Calibration
*	Linearity error in rate method
/	Test pending or not analyzed
?	Unable to calculate a result
@	OD is higher than 3.0
1Q	QC data exceeds the range entered in Single Check Level field
2Q	QC data exceeds 1_{3s} control range

Table 7.1 Summary of Flags (Alphabetical Order) (Continued)

Flag	Definition
3Q	QC data exceeds 2_{2s} control range
4Q	QC data exceeds R_{4s} control range
5Q	QC data exceeds 41s control range
6Q	A preset number of consecutive QC results fall on one side of the mean
7Q	Consecutive QC results show steadily increasing or decreasing values
a	Reagent expired
B	OD of reaction is lower than the minimum OD range
ba	No calibration data or expired
bh	Results are calculated with previous successful, saved calibration or reagent blank data because the most recent calibration or reagent blank failed
bn	Mastercurve used
bz	Calibration curve for Prozone data used
c	Result corrected by the operator
d	QC result is excluded (deleted) by the operator
D	OD of reaction is higher than the maximum OD range
e	Data edited by the operator
E	Overreaction in a rate assay detected
F	Result is higher than the dynamic range
fh	Result is higher than the repeat run reflex range
fl	Result is lower than the repeat run reflex range
Fx	Result (OD) is higher than the dynamic range
G	Result is lower than the dynamic range
Gx	Result (OD) is lower than the dynamic range
h	Result can be affected by hemolysis
H	Result is higher than reference range
i	Result can be affected by icterus
J	Result is higher than the repeat decision range
K	Result is lower than the repeat decision range
l	Result can be affected by lipemia
L	Result is lower than reference range
M	A sample ID is read that is the same as a sample ID currently in process on the track line or AU5800 when the AU5800 is connected to the Beckman laboratory automation system
n	LIH test not performed

Table 7.1 Summary of Flags (Alphabetical Order) (Continued)

Flag	Definition
N	Negative
P	Positive
ph	Result is higher than the upper panic value
pl	Result is lower than the low panic value
R	Insufficient reagent detected
r	Result has been transferred to laboratory information system through online communication
S	Sample repeated and original results replaced by repeat result
T	Abnormality found in the optional calculated test check programmed in the Checked Tests Menu
U	Reagent Blank OD exceeds the lower limit set at the last photometric read point
u	Reagent blank or routine (patient) OD at first photometric point low
Va	Deviation of multiple measurements check is out of range
Wa	Test has been analyzed with an erroneous cuvette
xQ	Multi-rule QC has detected failure on the other QC sample
Y	Reagent Blank OD exceeds the high limit set at the last photometric read point
y	Reagent blank or routine (patient) OD at first photometric point high
Z	Prozone error

Summary of Flags (Priority Order)

The following table summarizes the flags in priority order:

Table 7.2 Summary of Flags (Priority Order)

Flag	Definition
d	QC result is excluded (deleted) by the operator
e	Data edited by the operator
(	Shortage of cleaning solution for contamination parameters
Wa	Test has been analyzed with an erroneous cuvette
R	Insufficient reagent detected
#	Insufficient sample detected
%	Clot detected
?	Unable to calculate a result
M	A sample ID is read that is the same as a sample ID currently in process on the track line or AU5800 when the AU5800 is connected to the Beckman laboratory automation system

Table 7.2 Summary of Flags (Priority Order) (Continued)

Flag	Definition
n	LIH test not performed
l	Result can be affected by lipemia
i	Result can be affected by icterus
h	Result can be affected by hemolysis
Y	Reagent Blank OD exceeds the high limit set at the last photometric read point
U	Reagent Blank OD exceeds the lower limit set at the last photometric read point
y	Reagent blank or routine (patient) OD at first photometric point high
u	Reagent blank or routine (patient) OD at first photometric point low
@	OD is higher than 3.0
$	Not enough data to determine linearity of reaction
D	OD of reaction is higher than the maximum OD range
B	OD of reaction is lower than the minimum OD range
*	Linearity error in rate method
&	Prozone test data is abnormal
Z	Prozone error
E	Overreaction in a rate assay detected
Fx	Result (OD) is higher than the dynamic range
Gx	Result (OD) is lower than the dynamic range
!	Unable to calculate concentration
)	Reagent lot number used for sample analysis is different from the lot number used for RB/ Calibration
a	Reagent expired
ba	No calibration data or expired
bh	Results are calculated with previous successful, saved calibration or reagent blank data because the most recent calibration or reagent blank failed
bn	Mastercurve used
bz	Calibration curve for Prozone data used
F	Result is higher than the dynamic range
G	Result is lower than the dynamic range
ph	Result is higher than the upper panic value
pl	Result is lower than the low panic value
T	Abnormality found in the optional calculated test check programmed in the Checked Tests Menu
P	Positive

Table 7.2 Summary of Flags (Priority Order) (Continued)

Flag	Definition
N	Negative
H	Result is higher than reference range
L	Result is lower than reference range
J	Result is higher than the repeat decision range
K	Result is lower than the repeat decision range
fh	Result is higher than the repeat run reflex range
fl	Result is lower than the repeat run reflex range
Va	Deviation of multiple measurements check is out of range
xQ	Multi-rule QC has detected failure on the other QC sample
1Q	QC data exceeds the range entered in Single Check Level field
2Q	QC data exceeds 1_{3s} control range
3Q	QC data exceeds 2_{2s} control range
4Q	QC data exceeds R_{4s} control range
5Q	QC data exceeds 4_{1s} control range
6Q	A preset number of consecutive QC results fall on one side of the mean
7Q	Consecutive QC results show steadily increasing or decreasing values
S	Sample repeated and original results replaced by repeat result
/	Test pending or not analyzed
r	Result has been transferred to laboratory information system through online communication
c	Result corrected by the operator

Flag Details

d: QC result is excluded (deleted) by the operator

Possible Cause	Corrective Action
QC data has been manually excluded (deleted) from calculation by the operator. This flag is applied in **Menu List** > **QC** > **QC Data Review**. For more information, refer to the AU5800 Reference Manual.	No corrective action is required. **IMPORTANT** Before excluding any QC data, investigate and record the cause of the result with the flag. Follow your laboratory procedure.

e: Data edited by the operator

Possible Cause	Corrective Action
Data has been edited. For more information, refer to the AU5800 Reference Manual.	No corrective action is required. **IMPORTANT** Before reporting results, review any edited or changed data carefully.

(: Shortage of cleaning solution for contamination parameters

Possible Cause	Corrective Action
One or more cleaning solutions programmed in the Contamination Parameters screen in Positions 57 to 60 for R1 and 55 to 58 for R2 are empty. Contamination parameters are suspended for the related cleaning solution. Carry-over might have occurred on tests that have this flag.	1. Fill the cleaning solution bottles. 2. Perform a reagent check on the cleaning solution bottles. For more information, refer to Monitor the Reagent Status. 3. Repeat analysis for the flagged tests.

Wa: Test has been analyzed with an erroneous cuvette

Possible Cause	Corrective Action
The test has been analyzed using a cuvette which failed photocal criteria.	1. Identify the cuvette with the error by selecting **Home** > **Analyzer Maintenance** > **Photocal Monitor**. 2. Clean or replace the cuvette based on the error. 3. Repeat the photocal. 4. Repeat the analysis.

R: Insufficient reagent detected

Possible Cause	Corrective Action
Level detection indicates reagent volume not sufficient for analysis.	1. Review all results generated immediately before this flag for consistency and validity (in particular the low or high results), and repeat analysis if necessary. 2. Place new reagent onto the system and repeat analysis. 3. Confirm that the reagent is placed securely and correctly on the reagent tray. Partitions and adapters hold the reagent in the correct position for level sensing. 4. If the flag occurs even though there is sufficient reagent, the reagent bottle can contain bubbles. Remove the bubbles and perform another reagent check. 5. Dry the reagent bottle opening if it is wet. Inspect the reagent probe, and clean or replace as required. For more information, refer to Inspect, Clean, and Prime the Sample Probes, Reagent Probes, and Mix Bars Clean the Sample Probe and Reagent Probe Wash Wells, Replace a Sample Probe, and Replace a Reagent Probe. 6. Confirm that the reagent probe is correctly installed and connected.

#: Insufficient sample detected

Possible Cause	Corrective Action
The sample probe cannot detect sufficient sample volume. • Insufficient sample volume. • Malfunction of the sample level detection system. • Inappropriate sample cup or tube.	1. Review all other results that were generated on the same sample before generating the flag to confirm validity and consistency (no extremely low or high values). 2. Confirm that there is enough sample in the cup or tube. Confirm that the sample cup or tube is validated for use on the system. Repeat analysis using a validated cup or tube with sufficient sample volume. You do not have to continue with the sample probe related errors if the problem is with the sample or sample cup or tube. 3. Wipe the probe with an alcohol prep pad (70% Isopropyl alcohol) and inspect the probe to confirm that it is installed and connected correctly. For more information, refer to Inspect, Clean, and Prime the Sample Probes, Reagent Probes, and Mix Bars. 4. Replace the sample probe. For more information, refer to Replace a Sample Probe or Replace a Reagent Probe. 5. Confirm that the correct sample cup or tube is in use. For more information, refer to Cups or Tubes Specifications.

%: Clot detected

Possible Cause	Corrective Action
The sample probe is blocked or partially blocked during sample aspiration.	1. Review all other results that were generated on the same sample before generating the flag to confirm validity and consistency (no extremely low or high values). 2. Confirm that the sample is free of clots, and remove any that are in the sample. If necessary, centrifuge the sample and repeat analysis. 3. If the error still occurs, clean or replace the sample probe. For more information, refer to Clean the Sample Probes and Mix Bars and Replace a Sample Probe.

?: Unable to calculate a result

Possible Cause	Corrective Action
A result cannot be calculated for this sample because: • In a rate reaction, fewer than three photometric readings satisfy the test criteria specified in **Specific Test Parameters**. • Outside of cuvette walls or the cuvette wheel is wet. • A mechanical error has occurred.	1. If the sample has a high concentration, the sample can be severely lipemic, icteric, hemolytic or can contain excessively large concentration of the analyte being tested. Dilute the sample and repeat analysis. 2. Confirm the reagent condition. 3. The system generates a flag or alarm identifying the malfunction. Select **Alarm List** for a description of the alarm and corrective actions. When the problem is solved, repeat analysis. If the issue persists, contact Beckman Coulter. 4. Analyze the reaction data including those processed immediately before and after the flagged result. In the presence of any abnormality, inspect the cuvettes and cuvette wheel for a possible overflow. If the cuvette wheel is wet, perform appropriate corrective actions. For more information, refer to Recovering from a Cuvette Wheel Overflow and Clean the Cuvettes and the Cuvette Wedges. 5. If the AU5800 connects to a laboratory automation system, confirm that the system does not have any errors. If the issue persists, contact Beckman Coulter.

M: A sample ID is read that is the same as a sample ID currently in process on the track line or AU5800 when the AU5800 is connected to the Beckman Coulter laboratory automation system

Possible Cause	Corrective Action
A duplicate sample ID has been read within the samples in process.	1. Confirm that the results of the samples with the duplicate sample ID are correct. 2. Follow laboratory procedure.

n: LIH test not performed

Possible Cause	Corrective Action
The LIH test has not been performed for tests with **LIH Influence Check** set to **Yes** in **Specific Test Parameters > General**.	1. Examine the sample and repeat if necessary. 2. Confirm the LIH reagent.

l: Result can be affected by lipemia

Possible Cause	Corrective Action
The result can be affected by lipemia or samples are turbid.	Follow laboratory procedure for lipemic samples.

i: Result can be affected by icterus

Possible Cause	Corrective Action
The result can be affected by bilirubin.	Follow laboratory procedure for icteric samples.

h: Result can be affected by hemolysis

Possible Cause	Corrective Action
The result can be affected by hemolysis.	Follow laboratory procedure for hemolytic samples.

Y: Reagent Blank OD exceeds the high limit set at the last photometric read point

Possible Cause	Corrective Action
Reagent blank OD is higher than the Reagent OD Limit range defined for the last photometric point. The Reagent OD Limit range is programmed in **Menu List** > **Parameters** > **Specific Test Parameters** > **General**. This could be caused by: • Reagent expired. • Reagent contamination. • Incorrectly prepared reagents. • Incorrect range programmed.	1. Inspect the reagent expiration and on-board expiration date. 2. Confirm that the reagent was prepared correctly. 3. Confirm the Reagent OD Limit range programmed in **Specific Test Parameters** is correct. 4. Replace the reagent and repeat analysis.

U: Reagent Blank OD exceeds the lower limit set at the last photometric read point

Possible Cause	Corrective Action
Reagent blank OD is lower than the Reagent OD Limit range defined for the last photometric point. The Reagent OD Limit range is programmed in **Menu List** > **Parameters** > **Specific Test Parameters** > **General**. This could be caused by: • Reagent expired. • Reagent contamination. • Incorrectly prepared reagents. • Incorrect range programmed.	1. Inspect the reagent expiration and on-board expiration date. 2. Confirm that the reagent was prepared correctly. 3. Confirm the Reagent OD Limit range programmed in **Specific Test Parameters** is correct. 4. Replace the reagent and repeat analysis.

y: Reagent blank or routine (patient) OD at first photometric point high

Possible Cause	Corrective Action
The first photometric point OD of the reagent blank or the OD at P0 of normal analysis is higher than the Reagent OD Limit range defined for the first photometric point. Reagent OD Limit is programmed in **Menu List** > **Parameters** > **Specific Test Parameters** > **General**. This could be caused by: • Reagent expired. • Reagent contamination. • Incorrectly prepared reagents. • Incorrect range programmed.	1. Inspect the reagent expiration and on-board expiration date. 2. Confirm that the reagent was prepared correctly. 3. Confirm the Reagent OD Limit range programmed in **Specific Test Parameters** is correct. 4. Replace the reagent and repeat analysis.

u: Reagent blank or routine (patient) OD at first photometric point low

Possible Cause	Corrective Action
The first photometric point OD of the reagent blank or the OD at P0 of normal analysis is lower than the Reagent OD Limit range defined for the first photometric point. The Reagent OD Limit range is programmed in **Menu List** > **Parameters** > **Specific Test Parameters** > **General**. This could be caused by: • Reagent expired. • Reagent contamination. • Incorrectly prepared reagents. • Incorrect range programmed.	1. Inspect the reagent expiration and on-board expiration date. 2. Confirm that the reagent was prepared correctly. 3. Confirm the Reagent OD Limit range programmed in **Specific Test Parameters** is correct. 4. Replace the reagent and repeat analysis.

@: OD is higher than 3.0

Possible Cause	Corrective Action
An abnormally high value. A reaction OD has exceeded 3.0. In a dual wavelength measurement, an error occurs if either of the two wavelengths exceed 3.0 OD. This error occurs if one of the following three conditions is met: • Primary wavelength is over the limit (3.0) • Secondary wavelength is over the limit (3.0) • Reaction wavelength is over the limit (3.0) This error only occurs on END or FIXED reaction methods, not on RATE reaction methods. • Sample quality. The sample is severely lipemic, icteric, hemolytic or can contain excessively large concentration of the analyte being tested. • Faulty photometer lamp. • Cuvette overflow.	1. Dilute the sample and repeat analysis. 2. Confirm that the cuvette wheel is not wet. If the cuvette wheel is wet, perform appropriate corrective actions. For more information, refer to Recovering from a Cuvette Wheel Overflow and Clean the Cuvettes and the Cuvette Wedges. 3. Perform a photocal to assess the condition of the lamp. Replace the lamp if the results are out of range. For more information, refer to Perform a Photocal or Replace the Photometer Lamp.

$: Not enough data to determine linearity of reaction

Possible Cause	Corrective Action
Fewer than three read points of a RATE reaction are within the acceptable optical density range specified. To calculate a RATE reaction correctly, a minimum of three readings must be taken before reaching maximum or minimum optical density. If these optical density limits are exceeded, the reaction might go into substrate depletion caused by a high concentration or a problem with the condition of the reagent. Linearity calculations are not made when this flag occurs.	1. If the sample has a high concentration, the sample can be severely lipemic, icteric, hemolytic or can contain excessively large concentration of the analyte being tested. Dilute the sample and repeat analysis. 2. Confirm that the probes and syringes are functioning correctly. For more information, refer to Inspect the Syringes for Leaks and Inspect, Clean, and Prime the Sample Probes, Reagent Probes and Mix Bars. 3. Analyze the reaction data including the reaction data processed immediately before and after the flagged result. In the presence of any abnormality, inspect the cuvettes and cuvette wheel for a possible overflow. If the cuvette wheel is wet, perform appropriate corrective actions. For more information, refer to Recovering from a Cuvette Wheel Overflow and Clean the Cuvettes and the Cuvette Wedges.

D: OD of reaction is higher than the maximum OD range

Possible Cause	Corrective Action
The OD of a RATE or FIXED reaction does not meet the maximum OD criteria programmed in OD Limit in **Specific Test Parameters**: • A specified read point FST+2 (first photometry point plus two) in a positive RATE reaction method: High concentration. • A specified read point LST-2 (last photometry point minus two) in a negative RATE reaction method: Low concentration. • A photometry read point in a positive FIXED reaction method: High concentration. • A photometry read point in a negative FIXED reaction method: Low concentration.	• If this flag is only generated on one or a few samples, inspect the sample quality: — If the sample has a high concentration, the sample can be severely lipemic, icteric, hemolytic or can contain excessively large concentration of the analyte being tested. Dilute the sample and repeat analysis. — If the sample has a low concentration, no reaction occurs in the cuvette. Confirm that there is enough sample volume in the tube. • If this flag is only generated on one reagent, inspect the reagent quality and for reagent contamination: — Inspect the reagent expiration, onboard expiration, and reagent blank expiration. — Confirm that the reagent was prepared correctly. — Confirm that fixed reagents are in the correct position. • If this flag is generated randomly on several samples and several different tests: — Confirm that the cuvette wheel is not wet. If the cuvette wheel is wet, perform appropriate corrective actions. For more information, refer to Recovering from a Cuvette Wheel Overflow and Clean the Cuvettes and the Cuvette Wedges. — Perform a photocal to assess the condition of the lamp. Replace the lamp if the results are out of range. For more information, refer to Perform a Photocal or Replace the Photometer Lamp.

B: OD of reaction is lower than the minimum OD range

Possible Cause	Corrective Action
The OD of a RATE or FIXED reaction does not meet the minimum OD criteria programmed in OD Limit in **Specific Test Parameters**: • A specified read point FST+2 (first photometry point plus two) in a negative RATE reaction method: High concentration. • A photometry read point in a negative FIXED reaction method: High concentration. • A photometry read point in a positive FIXED reaction method: Low concentration.	• If this flag is only generated on one or a few samples, inspect the sample quality: — If the sample has a high concentration, the sample can be severely lipemic, icteric, hemolytic or can contain excessively large concentration of the analyte being tested. Dilute the sample and repeat analysis. — If the sample has a low concentration, no reaction occurs in the cuvette. Confirm that there is enough sample volume in the tube. • If this flag is only generated on one reagent, inspect the reagent quality and for reagent contamination: — Inspect the reagent expiration, onboard expiration, and reagent blank expiration. — Confirm that the reagent was prepared correctly. — Confirm that fixed reagents are in the correct position. • If this flag is generated randomly on several samples and several different tests: — Perform a photocal to assess the condition of the lamp. Replace the lamp if the results are out of range. For more information, refer to Perform a Photocal. When the photocal completes, check results and clean or replace the cuvettes based on the errors detected.

*: Linearity error in rate method

Possible Cause	Corrective Action
The system generates the * flag when the rate of a reaction varies by more than the defined % variance, as defined in **Menu List** > **Parameters** > **Specific Test Parameters** > **General** and is therefore deemed non-linear, or the reverse reaction check on a RATE reaction method failed. • Unusually high result. • Contaminated reagent. • Dirty or defective mix bars. • Defective cuvettes. • Deteriorated lamp. • Reagent or sample probe alignment problem. • Outer cuvette walls or the cuvette wheel is wet. • The concentration is near zero for toxicology analysis using the RATE reaction method.	1. Dilute the sample and repeat analysis or perform a diluted repeat analysis. 2. Replace reagent if contamination is suspected, reagent is expired or on-board expired. 3. Clean all mix bars and inspect them for damage. For more information, refer to Inspect ,Clean, and Prime the Sample Probes Reagent Probes and Mix Bars. Replace any that have scratches or chips in the fluororesin coating. For more information, refer to Replace the Mix Bars. 4. Confirm that the sample probe and reagent probe alignment. If the probe is bent, replace the probe. For more information, refer to Replace a Sample Probe or Replace a Reagent Probe. 5. Confirm that the cuvette wheel is not wet. If the cuvette wheel is wet, perform appropriate corrective actions. For more information, refer to Recovering from a Cuvette Wheel Overflow and Clean the Cuvettes and the Cuvette Wedges. 6. Perform a photocal to assess the lamp and cuvette integrity. Replace the lamp or cuvettes as required and perform another photocal. For more information, refer to Replace the Photometer Lamp, Clean or Replace Individual Cuvettes, or Perform a Photocal. 7. No action required. If the method is RATE, the reverse reaction check is performed. If the concentration is near zero, the reaction curve is flat and triggers the * flag. Confirm that there is no other cause for the * flag before reporting the result.

&: Prozone test data is abnormal

Possible Cause	Corrective Action
The data for prozone judgement is abnormal.	Dilute the sample and repeat analysis. If the issue persists, contact Beckman Coulter.

Z: Prozone error

Possible Cause	Corrective Action
The data check equation for any one of logic check 1, 2 or 3 is satisfied. This is often caused by an abnormally high concentration of analyte in a sample.	Dilute the sample and repeat analysis.

E: Overreaction in a rate assay detected

Possible Cause	Corrective Action
In the rate assay, the result is judged as an error by checking an overreaction in which the reaction was finished in an excessively short time. • An abnormally high concentration of analyte in a sample.	Dilute the sample and repeat analysis.

Fx: Result (OD) is higher than the dynamic range

Possible Cause	Corrective Action
No concentration could be calculated. The OD of the sample exceeded the OD of the upper limit of the dynamic range.	Dilute the sample and repeat analysis.

Gx: Result (OD) is lower than the dynamic range

Possible Cause	Corrective Action
No concentration could be calculated. The OD of the sample is lower than the OD of the low limit of the dynamic range.	1. Review the result in the clinical context of the patient and repeat if necessary. 2. Confirm the correct operation of the reagent probes. 3. Confirm that the reagent bottles are in the correct position. 4. Inspect the reagents for bubbles.

!: Unable to calculate concentration

Possible Cause	Corrective Action
The system has failed to calculate a result.	1. If the flag is a single sample issue, repeat and dilute if necessary. 2. If multiple samples are affected, review all operating parameters such as: — Reagent quality — Calibration — Sample integrity — General system issues 3. Analyze the reaction data including the reaction data processed immediately before and after the flagged result. In the presence of any abnormality, inspect the cuvettes and cuvette wheel for a possible overflow. If the cuvette wheel is wet, perform appropriate corrective actions. For more information, refer to Recovering from a Cuvette Wheel Overflow, Clean the Cuvettes and the Cuvette Wedges and Recovering from a Photometry Error During a Cuvette Wash Alarm. 4. If the flag is generated on Na, K, or Cl, repeat enough samples which preceded the appearance of the **!** flag in order to confirm that the system did not report incorrect results. It is possible that air in the flowcell affected samples before the system generated the **!** flag. — To confirm that there are no obstructions in the flowcell path, perform a MID/REF Prime and confirm that no bubbles are in the tubing at the bottom of the flowcell. — Confirm that all tubing is connected correctly.

): Reagent lot number used for sample analysis is different from the lot number used for RB/ Calibration

Possible Cause	Corrective Action
The reagent lot number does not match the calibrated reagent lot number.	1. Calibrate the reagent used for the test that generated the flag. 2. Process QC. 3. Repeat analysis or recalculate the results manually by selecting **Menu List** > **Routine** > **Sample Manager** > **Main**. Select **Recalculate Data (F5)**.

a: Reagent expired

Possible Cause	Corrective Action
The reagent has either expired or has been on board beyond the period defined in **Specific Test Parameters**.	Replace the reagents and perform a reagent check and a calibration if necessary.

ba: No calibration data or expired

Possible Cause	Corrective Action
No reagent blank or calibration data, or the data is expired.	1. Perform a calibration. For more information, refer to Calibrate Tests. 2. Review calibration in **Menu List** > **Calibration** > **Calibration Monitor**. 3. Carefully review any results generated with this flag and repeat if necessary.

bh: Results are calculated with previous successful, saved calibration or reagent blank data because the most recent calibration or reagent blank failed.

Possible Cause	Corrective Action
The most recent reagent blank or calibration failed or is expired. Results can be erroneous and should not be reported.	1. Perform a calibration. For more information, refer to Calibrate Tests. 2. Review calibration in **Menu List** > **Calibration** > **Calibration Monitor**. 3. Repeat samples using a valid calibration.

bn: Mastercurve used

Possible Cause	Corrective Action
Calibration has either not been performed, or was not successful. The system has used the master curve to generate the result. Review calibration in **Menu List** > **Calibration** > **Calibration Monitor**. Results can be erroneous and should not be reported.	1. Perform a calibration. For more information, refer to Calibrate Tests. 2. Repeat samples using a valid calibration.

bz: Calibration curve for Prozone data used

Possible Cause	Corrective Action
The system has used a calibration curve affected by prozone to generate the result, and the result is invalid. Only use the result as a reference to estimate the dilution rate for repeat analysis.	Carefully review any results generated with this flag and repeat the analysis with dilution.

F: Result is higher than the dynamic range

Possible Cause	Corrective Action
The concentration of the sample is above the dynamic range high limit, programmed in **Menu List** > **Parameters** > **Specific Test Parameters** > **General**.	1. Confirm that the correct dynamic range is programmed in **Specific Test Parameters**. 2. Dilute the sample and repeat analysis. Dilute samples so that they yield a value in the middle of the analytical measuring range.

G: Result is lower than the dynamic range

Possible Cause	Corrective Action
The concentration of the sample is below the dynamic range low limit, programmed in **Menu List** > **Parameters** > **Specific Test Parameters** > **General**, or the reagent was not dispensed correctly. • Incorrect dynamic range is programmed. • The clinical context of the patient. • Insufficient reagent dispensing. • Insufficient sample dispensing	1. Confirm that the correct dynamic range is programmed in **Specific Test Parameters**. 2. Review the result in the clinical context of the patient and repeat if necessary. 3. Confirm the correct operation of the reagent probes. 4. Confirm that the reagent bottles are in the correct position. 5. Inspect the sample for bubbles.

ph: Result is higher than the upper panic value

Possible Cause	Corrective Action
The result is higher than the upper panic value programmed in **Menu List** > **Parameters** > **Specific Test Parameters** > **Range**.	This flag denotes that the result is outside operator-defined panic ranges. Follow laboratory procedure for abnormal results.

pl: Result is lower than the low panic value

Possible Cause	Corrective Action
The result is lower than the low panic value programmed in **Menu List** > **Parameters** > **Specific Test Parameters** > **Range**.	This flag denotes that the result is outside operator-defined panic ranges. Follow laboratory procedure for abnormal results.

T: Abnormality found in the optional calculated test check programmed in the Checked Tests Menu

Possible Cause	Corrective Action
A result exceeds the range specified in **Menu List** > **Parameters** > **Misc**. > **Checked Tests**.	1. Repeat analysis. 2. Follow laboratory procedure for abnormal results.

P: Positive

Possible Cause	Corrective Action
Qualitative result: Sample result exceeds the upper value programmed in **Menu List** > **Parameters** > **Specific Test Parameters** > **Range**. Select **Flag** in the **Value/Flag** to enable programming in the **Level High** field. Results over the **Level High** generate the P flag.	Follow laboratory procedure.

N: Negative

Possible Cause	Corrective Action
Qualitative result: Sample result is lower than the low value programmed in **Menu List** > **Parameters** > **Specific Test Parameters** > **Range**. Select **Flag** in the **Value/Flag** to enable programming in the **Level Low** field. Results under the **Level Low** generate the N flag.	Follow laboratory procedure.

H: Result is higher than reference range

Possible Cause	Corrective Action
Sample result is higher than the high value programmed in Specific Ranges in **Menu List** > **Parameters** > **Specific Test Parameters** > **Range**. For more information, refer to the AU5800 Reference Manual.	Follow laboratory procedure for abnormal results.

L: Result is lower than reference range

Possible Cause	Corrective Action
Sample result is lower than the low value programmed in Specific Ranges in **Menu List** > **Parameters** > **Specific Test Parameters** > **Range**. For more information, refer to the AU5800 Reference Manual.	Follow laboratory procedure for abnormal results.

J: Result is higher than the repeat decision range

Possible Cause	Corrective Action
The result is higher than the repeat decision range programmed in **Menu List** > **Parameters** > **Repeat Parameters** > **Repeat Specific**.	Follow laboratory procedure.

K: Result is lower than the repeat decision range

Possible Cause	Corrective Action
The result is lower than the repeat decision range programmed in **Menu List** > **Parameters** > **Repeat Parameters** > **Repeat Specific**.	Follow laboratory procedure.

fh: Result is higher than the repeat run reflex range

Possible Cause	Corrective Action
The result is higher than the operator specified reflex range, programmed in **Menu List** > **Parameters** > **Repeat Parameters** > **Repeat Specific**.	Follow laboratory procedure.

fl: Result is lower than the repeat run reflex range

Possible Cause	Corrective Action
The result is lower than the operator specified reflex range, programmed in **Menu List** > **Parameters** > **Repeat Parameters** > **Repeat Specific**.	Follow laboratory procedure.

Va: Deviation of multiple measurements check is out of range

Possible Cause	Corrective Action
The precision of replicates for the reagent blank or calibration exceeds the allowable range programmed in **Menu List** > **Parameters** > **Calibration Parameters** > **Calibration Specific,** then select **Allowable Range Check**.	1. Perform the corresponding maintenance: — Inspect the syringes. For more information, refer to Inspect the Syringes for Leaks. — Inspect the sample probes. For more information, refer to Inspect, Clean, and Prime the Sample Probes, Reagent Probes, and Mix Bars. 2. Confirm the correct sample material was used for the reagent blank or calibration. 3. Inspect for evidence of system contamination.

xQ: Multi-rule QC has detected failure on the other QC sample

Possible Cause	Corrective Action
If one of two QC samples processed in pairs falls out of range using QC Multi-rules, the other QC sample result is flagged. The range is programmed in **Menu List** > **Parameter** > **QC Parameters** > **QC Specific**. For more information, refer to the AU5800 Reference Manual.	If QC results fall outside the acceptable range, investigate the cause before deciding whether to report patient results. If any trends or sudden shifts in values are detected, review all operating parameters. Follow laboratory procedure for out-of-range QC results such as: • Repeat with fresh QC samples. • Perform calibration as required. • Perform maintenance as required.

1Q: QC data exceeds the range entered in Single Check Level field

Possible Cause	Corrective Action
One point of QC data exceeds the SD defined in the Single Check Level in **Menu List** > **Parameters** > **QC Parameters** > **QC Specific**>**Check**. For more information, refer to the AU5800 Reference Manual.	If QC results fall outside the acceptable range, investigate the cause before deciding whether to report patient results. If any trends or sudden shifts in values are detected, review all operating parameters. Follow laboratory procedure for out-of-range QC results such as: • Repeat with fresh QC samples. • Perform calibration as required. • Perform maintenance as required.

2Q: QC data exceeds 1_{3s} control range

Possible Cause	Corrective Action
One point of QC data exceeds the ±3SD limit defined in the Multi Check Level in **Menu List** > **Parameters** > **QC Parameters** > **QC Specific** > **Check**. For more information, refer to the AU5800 Reference Manual.	If QC results fall outside the acceptable range, investigate the cause before deciding whether to report patient results. If any trends or sudden shifts in values are detected, review all operating parameters. Follow laboratory procedure for out-of-range QC results such as: • Repeat with fresh QC samples. • Perform calibration as required. • Perform maintenance as required.

3Q: QC data exceeds 2_{2s} control range

Possible Cause	Corrective Action
Two contiguous QC data points exceed the ±2SD limit in the same direction. The data points are programmed in Multi Check Level in **Menu List** > **Parameters** > **QC Parameters** > **QC Specific**> **Check**. For more information, refer to the AU5800 Reference Manual.	If QC results fall outside the acceptable range, investigate the cause before deciding whether to report patient results. If any trends or sudden shifts in values are detected, review all operating parameters. Follow laboratory procedure for out-of-range QC results such as: • Repeat with fresh QC samples. • Perform calibration as required. • Perform maintenance as required.

4Q: QC data exceeds R_{4s} control range

Possible Cause	Corrective Action
One of the two consecutive high and low concentration QC data points exceeds the +2SD limit and the other exceeds the -2SD limit, or the difference between the two QC samples exceeds 4 SD. The QC rule is selected in Multi Check Level in **Menu List** > **Parameters** > **QC Parameters** > **QC Specific**> **Check**. For more information, refer to the AU5800 Reference Manual.	If QC results fall outside the acceptable range, investigate the cause before deciding whether to report patient results. If any trends or sudden shifts in values are detected, review all operating parameters. Follow laboratory procedure for out-of-range QC results such as: • Repeat with fresh QC samples. • Perform calibration as required. • Perform maintenance as required.

5Q: QC data exceeds 4_{1s} control range

Possible Cause	Corrective Action
Four consecutive QC data point results have exceeded the 1SD limit. The QC rule is selected in Multi Check Level in **Menu List** > **Parameters** > **QC Parameters** > **QC Specific**> **Check**. For more information, refer to the AU5800 Reference Manual.	If QC results fall outside the acceptable range, investigate the cause before deciding whether to report patient results. If any trends or sudden shifts in values are detected, review all operating parameters. Follow laboratory procedure for out-of-range QC results such as: • Repeat with fresh QC samples. • Perform calibration as required. • Perform maintenance as required.

6Q: A preset number of consecutive QC results fall on one side of the mean

Possible Cause	Corrective Action
Results for a preset number (7 to 10) of consecutive data points fall either above or below the mean. The setting is programmed in Multi Check Level in **Menu List** > **Parameters** > **QC Parameters** > **QC Specific**> **Check**. For more information, refer to the AU5800 Reference Manual.	If QC results fall outside the acceptable range, investigate the cause before deciding whether to report patient results. If any trends or sudden shifts in values are detected, review all operating parameters. Follow laboratory procedure for out-of-range QC results such as: • Repeat with fresh QC samples. • Perform calibration as required. • Perform maintenance as required.

7Q: Consecutive QC results show steadily increasing or decreasing values

Possible Cause	Corrective Action
Results for a preset number (4 to 10) of consecutive data points are increasing or decreasing. The setting is programmed in Multi Check Level in **Menu List** > **Parameters** > **QC Parameters** > **QC Specific**> **Check**. For more information, refer to the AU5800 Reference Manual.	If QC results fall outside the acceptable range, investigate the cause before deciding whether to report patient results. If any trends or sudden shifts in values are detected, review all operating parameters. Follow laboratory procedure for out-of-range QC results such as: • Repeat with fresh QC samples. • Perform calibration as required. • Perform maintenance as required.

S: Sample repeated and original results replaced by repeat result

Possible Cause	Corrective Action
A test has been repeated and this repeat result has replaced the previous result to become the final result.	No action required.

/: Test pending or not analyzed

Possible Cause	Corrective Action
The test was not performed, even though it was ordered (requisitioned) (generally because of a reagent shortage), or the testing is still in process.	Review all results generated immediately before this flag for consistency and validity (especially low or high results) and repeat if necessary. 1. If the reagent is empty, place new reagent onto the system and repeat analysis. 2. Confirm that fixed reagents are in the correct position. 3. Inspect the reagent probe and clean or replace as required. For more information, refer to Inspect, Clean, and Prime the Sample Probes, Reagent Probes, and Mix Bars, Replace a Sample Probe, or Replace a Reagent Probe. 4. Confirm that the reagent probe is correctly installed and connected.

r: Result has been transferred to laboratory information system through online communication

Possible Cause	Corrective Action
	No action required.

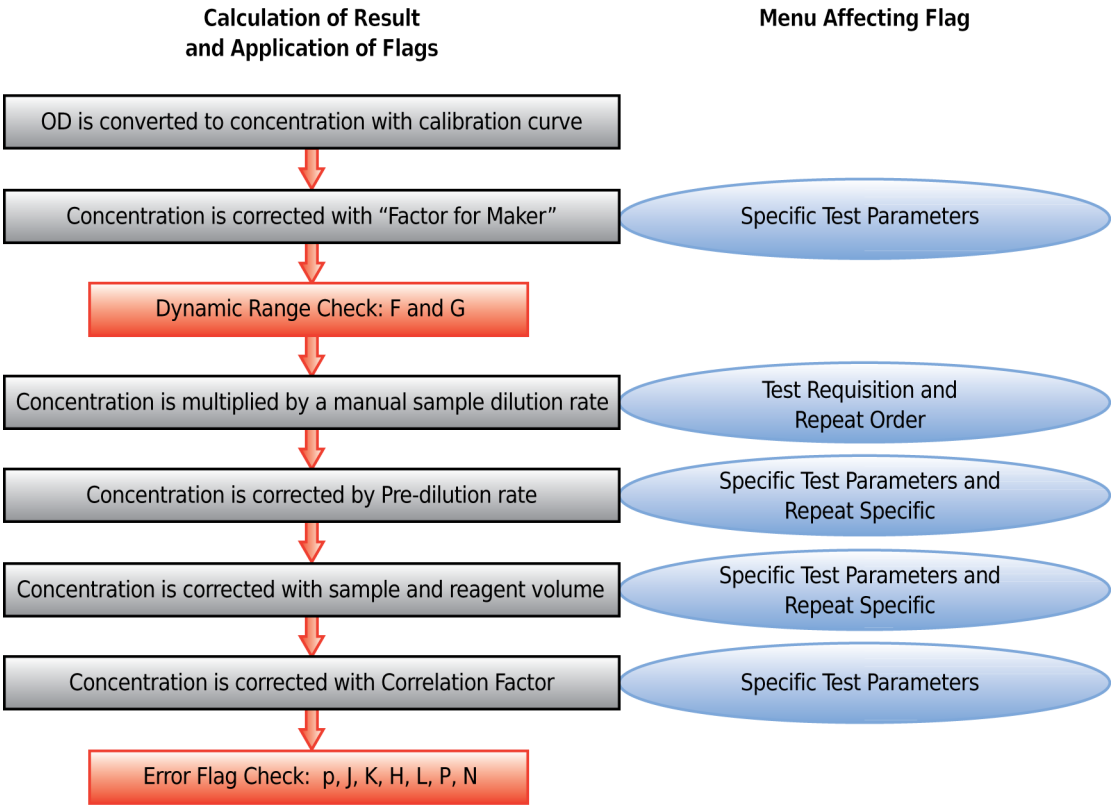
c: Result corrected by the operator

Possible Cause	Corrective Action
Data has been corrected. For more information, refer to the AU5800 Reference Manual.	Follow laboratory procedure. Review any edited or changed data carefully before reporting.

Application of Flags (F, G, p, J, K, H, L, P, and N) During Calculation of Final Result Flowchart

This flowchart shows the calculations that occur to obtain the final concentration result, and when the system applies the flags.

Figure 7.1 Application of F, G, p, J, K, H, L, P, and N flags



Beckman Coulter programs Factor for Maker, and the system displays the setting in **Specific Test Parameters**. **A** is a multiplication factor and **B** is an addition and subtraction factor.

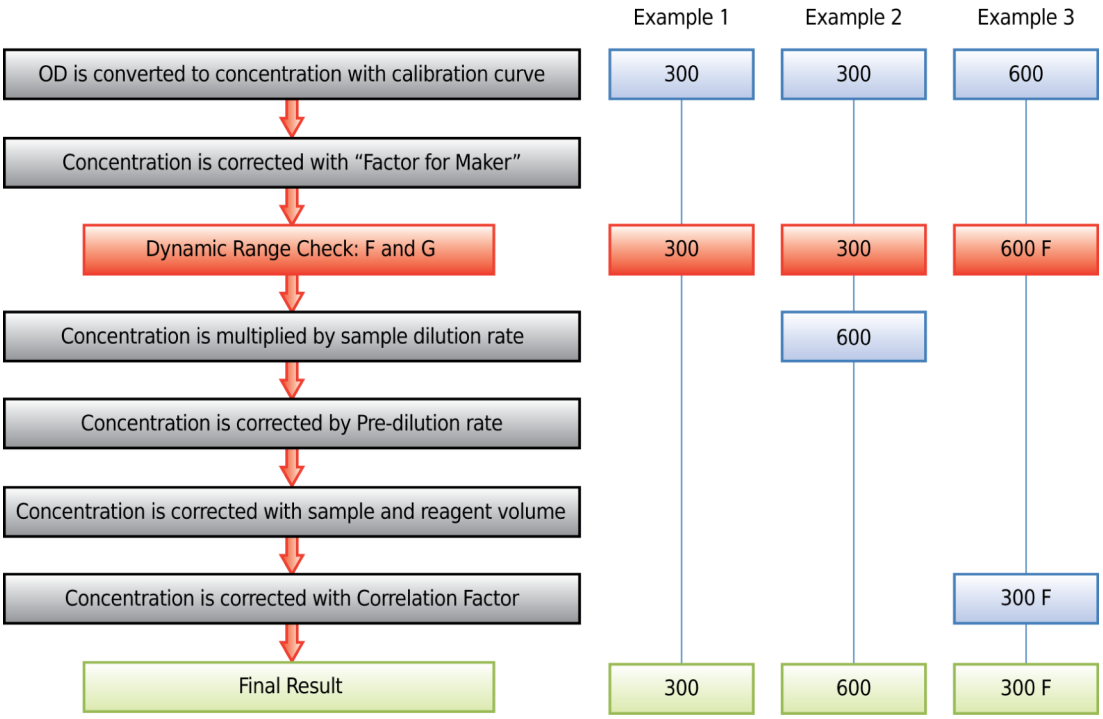
In the Test Requisition and Repeat Order (Requisition) menus, **Sample Dilution (F7)** allows input of a dilution rate when making a manual dilution of the sample for the original or repeat run.

A calculation is made for **Pre-Dilution Rate** defined in **Specific Test Parameters**, as well as **Pre-Dilution Rate** defined in **Repeat Specific** for **Repeat with diluent** and **Repeat with condense**.

A calculation is made based on the sample and reagent volume defined in **Specific Test Parameters** and **Repeat Specific**.

The Correlation Factor is programmed in **Specific Test Parameters**. **A** is a multiplication factor and **B** is an addition or subtraction factor.

Figure 7.2 Examples with F flag: Dynamic Range is 1 to 500



Example 1

A final result of 300 without an F or a G flag.

Example 2

A final result of 600 without an F flag because the dynamic range check occurs (in range), then the concentration is multiplied by 2 for a manual dilution.

Example 3

A final result of 300 with an F flag because the dynamic range check occurs (over range), then a Correlation Factor **A** of 0.5 is applied.

Flags

Application of Flags (F, G, p, J, K, H, L, P, and N) During Calculation of Final Result Flowchart

CHAPTER 8

Error Messages

Error Messages

The system displays the following error messages after selecting the **Start** button. This chapter describes the cause of the error message and corrective actions to perform if the system has an error.

Table 8.1 Error Messages

Error Messages	Possible Cause	Corrective Action
24 hours have elapsed since RB was analyzed. Please open Calibration Requisition menu and requisition the test.		1. Order (requisition) the required test for reagent blank in the Calibration screen. 2. Perform a reagent blank.
After checking printer, resume printer in Analyzer Status menu.	The printer status is abnormal.	1. Confirm that the printer is turned on, and correct any errors with the printer. 2. Select **Home** > **Analyzer Status**. 3. Select **Printer Control (F4)**, then **Resume** or **Cancel**.
Calibration stability is expired. Open Calibration Requisition menu and requisition the test. (Unit:1,2,3,4)	Calibration data has expired.	1. Order (requisition) the required test for reagent blank in the Calibration screen. 2. Perform a calibration.
Calibration stability will expire soon. (Unit: 1,2,3,4)	Calibration data is close to expiration.	1. Order (requisition) the required test for reagent blank in the Calibration screen. 2. Perform a calibration.
Conc Waste tank is full. (Unit:1,2,3,4)	The tank is full of concentrated liquid waste.	Contact Beckman Coulter.
Consumption item expired. Please change.	There is a consumable item over its service life.	Replace the expired consumable item.
Currently communicating with HOST.	The analyzer is communicating with the laboratory information system.	Review the analyzer for the status of communication with the laboratory information system in the Analyzer Status screen.

Table 8.1 Error Messages (Continued)

Error Messages	Possible Cause	Corrective Action
Cuvette Error found. Please check error in the User Maintenance menu. (Unit:1,2,3,4).	One or more cuvettes have failed the photocal.	1. Inspect the cuvette status in **Home** > **Analyzer Maintenance** > **Photocal Monitor**. Inspect each **Unit** and the **Inner** and **Outer** cuvettes to identify the cuvettes with an error. 2. Take corrective action based on the failure. For more information, refer to Clean the Cuvettes and the Cuvette Wedges, Clean or Replace Individual Cuvettes or Replace the Photometer Lamp. 3. Repeat the photocal on any cuvettes that failed the photocal. For more information, refer to Perform a Photocal.
Daily Calibration is not performed. (Cell1:NN...NN, Cell2:NN...NN)		Perform ISE calibration in **Home** > **Analyzer Maintenance** > **ISE Maintenance** > **Calibration**.
Deionized Water Overflow. Please check the tank. (Unit:1,2,3,4)	Overflow of deionized water.	1. Confirm that the deionized water float sensor connector is plugged in correctly. If it is not connected correctly, plug in the connector. 2. If no abnormality is found in the deionized water float sensor, contact Beckman Coulter.
Diluent short. Please perform reagent check. (Unit:1,2,3,4)	The deionized water or diluent in the predilution bottle is insufficient.	1. Replace the deionized water or diluent in the pre-dilution bottle. 2. Perform a reagent check.

Table 8.1 Error Messages (Continued)

Error Messages	Possible Cause	Corrective Action
Diluted Wash Sol. Overflow. Please check the tank. (Unit:1,2,3,4)	Overflow of diluted wash solution.	1. Confirm that the diluted wash solution float sensor connector is plugged in correctly. If it is not connected correctly, plug in the connector. 2. Check the float sensor is plugged in. -If it is not plugged in select End Process or EM Stop (not sure which is more appropriate). — Plug in the float sensor. — Select **START** or **Reset/START** (based on End Process or EM Stop used) — Once the system is in *Warm Up*, confirm that the error is corrected. — If the error persists, contact Beckman Coulter.

Table 8.1 Error Messages (Continued)

Error Messages	Possible Cause	Corrective Action
Diluted Wash Solution short. (Unit:1,2,3,4)	The diluted wash solution is insufficient.	1. Confirm that the diluted wash solution float sensor connector is plugged in correctly. If it is not connected correctly, plug in the connector. 2. Inspect the liquid level in the diluted wash solution tank, wash solution tank (analyzer unit), deionized water tank, and master wash solution tank (rack feeder unit). — If all liquid levels are sufficient, contact Beckman Coulter. — If the liquid level in the diluted wash solution tank is insufficient: — Check the liquid level in the wash solution tank (analyzer unit). If the level in the wash solution tank (analyzer unit) is insufficient, check the liquid level in the master wash solution tank (rack feeder unit). If the wash solution in the master wash solution tank is insufficient, replenish the wash solution. Refer to Replenish the Wash Solution. If the level in the wash solution tank (analyzer unit) is sufficient, contact Beckman Coulter. — Check the liquid level in the deionized water tank. If the liquid level in the deionized water is insufficient, check the deionized water supply. If there is not a problem with the deionized water supply, contact Beckman Coulter.
Incorrect parameter is found. Please open [MM...MM/NN...NN] menu and check the parameters.	A programming error exists in Parameters.	Inspect the Parameters screen or tab listed in the error message. The system displays the screen or tab name instead of [MM...MM/NN...NN] in the error message.
ISE BUF Solution short. (Cell:1,2)		Replace the ISE Buffer Solution bottle. For more information, refer to Replace the ISE Reagents.

Table 8.1 Error Messages (Continued)

Error Messages	Possible Cause	Corrective Action
ISE Detergent Short.		Add the ISE sample probe detergent (2% wash solution) and perform a reagent check for the ISE sample probe detergent (2% wash solution) in the Reagent Management screen.
ISE Detergent unchecked.		Perform a reagent check for the ISE detergent in the Reagent Management screen.
ISE MID Solution short. (Cell:1,2)		Replace the ISE MID Standard Solution bottle. For more information, refer to Replace the ISE Reagents.
ISE REF Solution short. (Cell:1,2)		Replace the ISE Reference Solution bottle. For more information, refer to Replace the ISE Reagents.
ISE selectivity check not performed. (Cell: 1,2)		Perform a Selectivity Check. Refer to Selectivity Check for the Na and K Electrodes.
ISE selectivity error (Cell1:Na, Cell2:Na, Cell1:K, Cell2:K)		1. Perform a Selectivity Check. For more information, refer to Selectivity Check for the Na and K Electrodes. 2. If the error is not resolved, replace the Na or K electrode. For more information, refer to Replace the Na K or Cl Electrode.
ISE slope is over (under) the range [Cell1:MM, NN...NN, Cell2:MM, NN...NN]		1. Calibrate the ISE. For more information, refer to Calibrate the ISE (ISE Option). 2. If the error is not resolved, replace the corresponding electrode. For more information, refer to Replace the Na K or Cl Electrode. **NOTE** The system displays the ISE test name and sample type instead of [MMMMMM, NN...NN] in the Error Message.

Table 8.1 Error Messages (Continued)

Error Messages	Possible Cause	Corrective Action
ISE slope is zero [Cell1:MM, NN...NN, Cell2:MM, NN...NN]		1. Calibrate the ISE. For more information, refer to Calibrate the ISE (ISE Option). 2. If the error is not resolved, replace the corresponding electrode. For more information, refer to Replace the Na K or Cl Electrode. **NOTE** The system displays the ISE test name and sample type instead of [MMMMMM, NN...NN] in the Error Message.
ISE Status is stop. (Cell:1,2)	ISE is in *Stop* mode.	Press the Stop/Standby switch on the ISE unit to reset the ISE to *Standby* mode.
Liquid is remained in vacuum tank. (Unit: 1,2,3,4)	Liquid waste exists in the vacuum tank.	Contact Beckman Coulter.
Maintenance item expired. Please perform maintenance.	The maintenance procedure expired.	1. Review the Maintenance tab. 2. Perform necessary maintenance.
Maintenance item will expire soon. Please check it.	The maintenance procedure is close to expiration.	1. Review the Maintenance tab. 2. Perform necessary maintenance.
Master Curve is not scanned. Please check the Reagent Management menu. (Unit: 1,2,3,4)	A new lot of reagent in the reagent refrigerator has no master curve because the 2-D bar code to create a master curve has not been scanned.	1. Review the details in **Home** > **Reagent Management** > **Details.** 2. Use the hand scanner to scan the 2-D bar code on the reagent. 3. Perform a reagent check.
No deionized water. Please check water supply valve. (Unit:1,2,3,4)	The deionized water tank is empty.	1. Inspect the water outlet valve on the deionized water system. 2. If no abnormality is found in the deionized water system, contact Beckman Coulter.
No Diluent. Please check in the Reagent Management menu. (Unit:1,2,3,4)	The deionized water or diluent in the predilution bottle is empty.	1. Replace the deionized water or diluent in the pre-dilution bottle. 2. Perform a reagent check.

Table 8.1 Error Messages (Continued)

Error Messages	Possible Cause	Corrective Action
No ISE Wash Sol.	The ISE sample probe wash solution is empty.	Replenish the ISE sample probe wash solution, and perform a reagent check for the ISE detergent in the Reagent Management screen.
No Photocal Data. Please perform Photocal in the User Maintenance menu. (Unit: 1,2,3,4)	No Photocal data exists.	Perform a Photocal. Refer to Perform a Photocal.
No R Probe Wash Sol. in the Reagent Management menu. (Unit:1,2,3,4)	The cleaning solution for contamination parameters in the cleaning solution bottle is empty.	1. Select **Home** > **Reagent Management** > **Details** to determine which bottle of cleaning solution is empty. 2. Replace the cleaning solution for contamination prevention in the CLN-1 or CLN-2 bottle located by the reagent refrigerators. 3. Perform a reagent check.
No Reagent. Please check the Reagent Management menu. (Unit:1,2,3,4)	Analysis cannot be performed because the required reagent is empty or missing.	1. Select **Home** > **Reagent Management** to determine which bottle of reagent is empty. 2. Place the required reagent in the reagent refrigerator. 3. Perform a reagent check.
No S Probe Wash Sol. (Unit:1,2,3,4)	The 2% Wash Solution in the sample probe wash solution bottle is empty.	1. Replace the 2% Wash Solution in the sample probe wash solution bottle. 2. Perform a reagent check.
Onboard Stability is expired. Replace the reagent in the refrigerator and perform a reagent volume check. (Unit:1,2,3,4)	One or more reagents have exceeded the onboard stability expiration date.	1. Select **Home** > **Reagent Management** > **Details** to determine which bottle of reagent has exceeded the onboard stability expiration date. 2. Replace the reagent bottle with a new reagent bottle. 3. Perform a reagent check.
Onboard Stability will expire soon. Please check in the Reagent Management menu. (Unit:1,2,3,4)	One or more reagents are close to the onboard stability expiration date.	1. Select **Home** > **Reagent Management** > **Details** to determine which bottle of reagent is close to the onboard stability expiration date. 2. Replace the reagent bottle with a new reagent bottle. 3. Perform a reagent check.

Table 8.1 Error Messages (Continued)

Error Messages	Possible Cause	Corrective Action
Please perform Reagent Check. (Unit: 1,2,3,4)	Reagent status is Unchecked because the reagent refrigerator cover was opened, or a parameter was changed.	1. Select **Home** > **Reagent Management**. 2. Perform a reagent check.
R Probe Wash Sol. Short. Please perform reagent check. (Unit:1,2,3,4)	The cleaning solution for contamination parameters in the cleaning solution bottle is insufficient.	1. Select **Home** > **Reagent Management** > **Details** to determine which bottle is running short of cleaning solution. 2. Replace the cleaning solution for contamination prevention in the CLN-1 or CLN-2 bottle located by the reagent refrigerators. 3. Perform a reagent check.
Rack Collection area is full or No Tray is present.	The trays on the rack output component are full with racks, or there are not any trays on the rack output component.	1. Remove racks from the trays on the rack output component. 2. Place an empty tray on the rack output component.
RB stability is expired. Please open Calibration Requisition and requisition the test. (Unit:1,2,3,4)	Reagent blank data has expired.	1. Order (requisition) the required test for reagent blank in the Calibration Requisition menu. 2. Perform a reagent blank.
RB stability will expire soon. (Unit:1,2,3,4)	Reagent blank data is close to expiration.	1. Order (requisition) the required test for reagent blank in the Calibration screen. 2. Perform a reagent blank.
Reagent error found. Please check the Reagent Management menu. (Unit:1,2,3,4)	An error has been found with a reagent bottle.	1. Select **Home** > **Reagent Management** > **Detail** and review the Comment column for the error. 2. Confirm the reagent bottle position. 3. Perform a reagent check.

Table 8.1 Error Messages (Continued)

Error Messages	Possible Cause	Corrective Action
Reagent is expired. Please check Reagent Management and replace new reagent in the refrigerator. (Unit:1,2,3,4)	The reagent has expired.	1. Select **Home** > **Reagent Management** > **Details** to determine which bottle of reagent has expired. 2. Replace the bottle of expired reagent with a new reagent bottle. 3. Perform a reagent check.
Reagent will expire soon. Please check the Reagent Management menu. (Unit:1,2,3,4)	The reagent is close to expiration.	1. Select **Home** > **Reagent Management** > **Details** to determine which bottle of reagent is expiring. 2. Replace the bottle of expiring reagent with a new reagent bottle. 3. Perform a reagent check.
Remaining samples for the index become less than 3000. Please create a new index.	Less than 3,000 samples can be processed in the current index.	Create a new index in the Start Condition screen.
S Probe Wash Sol. Short. Please perform reagent check. (Unit:1,2,3,4)	The 2% Wash Solution in the sample probe wash solution bottle is insufficient.	1. Replace the 2% Wash Solution in the sample probe wash solution bottle. 2. Perform a reagent check.
Temperature of the incubator bath is over (under) the normal range. (Unit:1,2,3,4)	The temperature of the cuvette wheel is out of specification.	Confirm that the cover is on the cuvette wheel. If the problem continues, contact Beckman Coulter.
Temperature of the refrigerator is over (under) the normal range. (Unit:1,2,3,4)	The reagent refrigerator temperature is out of specification.	Confirm that the cover is on the reagent refrigerator. If the problem continues, contact Beckman Coulter.
Test has no Calibration Data. Please open Calibration Requisition and requisition the test. (Unit:1,2,3,4)	No calibration data exists or calibration analysis failed.	1. Order (requisition) the required test for calibration in the Calibration screen. 2. Perform a calibration.
Test has no RB Data. Please open Calibration Requisition menu and requisition the test. (Unit:1,2,3,4)	No reagent blank data exists or reagent blank analysis failed.	1. Order (requisition) the required test for calibration in the Calibration screen. 2. Perform a reagent blank.

Table 8.1 Error Messages (Continued)

Error Messages	Possible Cause	Corrective Action
Test(s) are set as “Disabled” in Start Condition. (Unit:1,2,3,4)	One or more tests are programmed to disabled (unavailable) in the Start Condition screen. The disabled (unavailable) test is not analyzed for any patient samples.	
The lane error found. Please check the lane. (Unit No.)	An error occurred on the primary sample transport lane, bypass lane, or return lane.	1. Identify the lane where the error occurred in the Analyzer Status screen. 2. When analysis is complete, remove racks from the primary sample transport lane, bypass lane, or return lane. 3. Select **Stop/Standby**. The system displays the Warmup/Standby dialog with a `Reset Analyzer and Transfer to Standby mode?` message. 4. Select **OK**. The system initializes, then goes to *Standby* mode.
The printer is currently in use.	Batch print or real-time print is being performed in *Standby* mode.	Review the printer status in the Analyzer Status screen.
The volume has reached the Alarm volume. Please perform reagent check. (Unit: 1,2,3,4)	The remaining reagent shots (tests) have reached the Alarm Shots programmed in Parameters > Common Test Parameters.	1. Select **Home** > **Reagent Management** > **Details** to determine which bottle is running short of reagent. 2. Add a new reagent bottle. 3. Perform a reagent check.
There is an illegal rack on the rack transfer unit.	During the inspection process after **Start** is selected, a rack was detected on the rack unloader unit that connects to the laboratory automation system.	Remove the rack(s) on the rack unloader unit.

Table 8.1 Error Messages (Continued)

Error Messages	Possible Cause	Corrective Action
Wash Sol. Overflow. Please check the tank. (Unit:1,2,3,4)	Overflow of wash solution.	1. Confirm that the wash solution float sensor connector is plugged in correctly. If it is not connected correctly, plug in the connector. 2. If no abnormality is found in the system, contact Beckman Coulter.
Wash Solution short. (Unit:1,2,3,4)	The wash solution in the wash solution tank on the analyzer unit is insufficient.	1. Confirm that the wash solution float sensor connector is plugged in correctly. If it is not connected correctly, plug in the connector. 2. Inspect the liquid level in the wash solution tank (analyzer unit) and master wash solution tank (rack feeder unit). — If the liquid level in the wash solution tank (analyzer unit) is sufficient, contact Beckman Coulter. — If the liquid level in the wash solution tank (analyzer unit) is insufficient: — Check the liquid level in the master wash solution tank (rack feeder unit). If the wash solution in the master wash solution tank is insufficient, replenish the wash solution. Refer to Replenish the Wash Solution. If the level in the master wash solution tank is sufficient, contact Beckman Coulter.
Waste tank is full. (Unit:1,2,3,4)	The waste tank is full of liquid waste.	Contact Beckman Coulter.

CHAPTER 9

Troubleshooting

Introduction

Regular preventative maintenance is essential for optimum system performance. Many problems outlined in this chapter are caused by neglecting to perform preventative maintenance and required care.

For each aspect of troubleshooting, you can find useful information by referring to the corresponding section of the maintenance chapter.

For more information, refer to Maintenance.

Reagent Blank Data

1. Review printout and look for any flags.
2. Review the **Alarm List** for `RB Data Error` alarms.
3. A reagent blank is a confirmation of the reagent system.
   The reagent system includes reagents, the reagent probes, and the reagent syringes.
4. Review reagent blank data in **Menu List** > **Calibration** > **Calibration Monitor** > **RB History** and **RB Detail**.

Calibration Data

1. Review the **Alarm List** for any calibration alarms.
2. Review the printout.
3. Look at the precision of the replicates for each test.
   The OD readings should have a similar value.
4. Look for separation between calibrators for a multi-point calibration.
5. Calibration is a confirmation of the sampling system.
   The sampling system includes calibrators, the sample probes, the sample syringes, and the wash syringes.
6. If calibration replicates are 0 or close to 0, the problem can be:

— Wrong calibrator used
— Sample did not dispense into cuvette (probe or syringe problem)
— Reagent

7 Review calibration data in **Menu List** > **Calibration** > **Calibration Monitor** > **Calibration History** and **Calibration Detail**.

QC Data

1 Review the **Alarm List** for QC alarms.

2 Review the printout for QC flags 1Q to 7Q.

3 Review the daily QC charts:

— QC validates calibration.
— If all QC is increasing or decreasing (one direction only), the QC problem can be related to the calibration factor and indicates calibration problems.
— If you perform QC on multiple tests from the same QC sample, but QC is only out of range for a specific test, confirm the QC test parameters, reagent, and calibration.
— If tests from only one level of QC are out of range, confirm that you put the correct QC sample into the cup.

4 Repeat with fresh QC samples.

Troubleshooting Reagents, Calibrators, Quality Control, and Samples.

Reagent Blank Issues and Corrective Actions

- Inspect the reagent system including the reagents, reagent probes, and reagent syringes. For more information, refer to Reagent Blank Corrective Actions.
- Review the printout and look for flags.

— Flag u or y if the RB data of the first read point of the test fails.
— Flag U or Y if the RB data of the last read point of the test fails.
— Limits are programmed in **Menu List** > **Parameters** > **Specific Test Parameters** > **General.**
— Review the **Alarm List** for `RB Data Error` alarms that the system generates if the reagent blank fails.

Reagent Blank Corrective Actions

- Reagent

— Inspect the reagent expiration date.
— Inspect the reagent on-board expiration date.
— Confirm the correct reagent preparation.

  - — Confirm that fixed reagents are in the correct position.
  - — Put on a new bottle of reagent and perform a reagent blank or calibration.
  - — Confirm that a bar code labeled reagent is not in a position fixed for a different test.
- Reagent Probes
  - — Inspect the reagent probes. For more information, refer to Inspect, Clean, and Prime the Sample Probes, Reagent Probes, and Mix Bars.
  - — Clean the reagent probes. For more information, refer to Clean the R1 or R2 Reagent Probes.
  - — Clean the reagent probe wash wells. For more information, refer to Clean the Sample Probe and Reagent Probe Wash Wells.
  - — Replace the reagent probes. For more information, refer to Replace a Reagent Probe.
- Reagent Syringes
  - — Inspect the reagent syringes. For more information, refer to Inspect the Syringes for Leaks.
  - — Replace the reagent syringes. For more information, refer to Replace the Sample, Reagent, ISE Sample, or ISE Buffer Syringe.

Calibration Issues and Corrective Actions

- Inspect the sampling system including the calibrators, the sample probes, the sample syringes, and the wash syringes. For more information, refer to Calibration Corrective Actions.
- Review the **Alarm List** and printout:
  - — If the calibration factor range programmed in **Parameters** > **Calibration** > **Calibration Specific** is exceeded, the system generates `Calibration Factor High/Low` and `Calibration Error` alarms.
  - — Inspect for precision of the OD replicates on the printout.
  - — Confirm that the calibrator OD is not almost zero, indicating a possible calibrator aspiration or dispense issue.

Calibration Corrective Actions

- Calibrator
  - — Confirm that the correct calibrator was poured for the calibration.
  - — Confirm the integrity of the calibrator: preparation (if required), expiration date, open-bottle stability, time at room temperature, and contamination.
  - — Confirm that the calibrator is in the correct position in the yellow rack.
  - — Confirm that the calibrator lot number in use and lot number concentration programmed in **Parameters** > **Calibration** > **Calibration Specific** are the same.
- Sample Probe
  - — Inspect the sample probe. For more information, refer to Inspect, Clean, and Prime the Sample Probes, Reagent Probes, and Mix Bars.
  - — Clean the sample probe. For more information, refer to Clean the Sample Probes and Mix Bars.
  - — Clean the sample probe wash wells. For more information, refer to Clean the Sample Probe and Reagent Probe Wash Wells.

  - Replace the sample probe. For more information, refer to Replace a Sample Probe.
- Sample Syringe and Wash Syringe
  - Inspect the sample syringe and wash syringe. For more information, refer to Inspect the Syringes for Leaks.
  - Replace the sample syringe and wash syringe. For more information, refer to Replace the Sample, Reagent, ISE Sample, or ISE Buffer Syringe.

QC Related Issues and Corrective Actions

- Perform QC on the system to validate the calibration. Inspect for a reagent, calibration, or QC issue. For more information, refer to Corrective Actions.
  - Reagent problem
  - Calibrator problem
  - QC problem
- Review the **Alarm List** and printout:
  - The system generates a `QC [test name] over or under` alarm if the QC range programmed in **Parameters** > **QC Parameters** > **QC Specific** is exceeded.
  - Review the printout for QC flags 1Q to 7Q.

Corrective Actions

- Review all Reagent Blank Issues and Corrective Actions.
- Review all Calibration Issues and Corrective Actions.
- Confirm the QC Sample:
  - Confirm that the correct QC sample was poured for the QC analysis.
  - Confirm the integrity of the QC sample: preparation (if required), expiration date, open-bottle stability, time at room temperature, and contamination.
  - Confirm that the QC sample was placed in the correct position in the green rack.
  - Confirm that the lot number of the QC sample is in use and range programmed in **Parameters** > **QC Parameters** > **QC Specific** are correct.
  - Repeat with fresh QC samples.

Sample Related Issues

The following two items cause most data problems:

- Sample evaporation - Sample evaporation can cause unusually high results. Store samples correctly, and keep sample caps closed tightly if they need to be stored for a short period before analysis.
- Incorrect sample handling - Refer to the relevant Instructions for Use supplied with reagents to find the correct procedures for sample collection, handling, and storage.

Note the following sample requirements:

- This system analyzes serum, urine, and other fluids. If problems are encountered when analyzing a specific test, or when using a specific reagent, refer to the relevant reagent IFU or contact Beckman Coulter.

- Use serum or plasma that is adequately separated from cells, and urine that is free of suspended matter, to prevent the sample probe from becoming blocked, and adversely affecting analysis.
- Confirm that blood samples are sufficiently coagulated before serum separation. Remove any suspended fibrin before placing serum on the system.
- If there is any suspended matter present in urine to be tested, centrifuge the sample before testing.
- If a sample requires pretreatment depending on the analysis test, refer to the relevant reagent IFU.
- A minimum quantity of sample is required for analysis. Confirm that a sufficient quantity of sample is available for analysis. For more information, refer to Sample Preparation.
- To prevent sample evaporation, do not leave samples uncovered for an extended time. Evaporation can cause biased results being observed.
- Bubbles on the surface of samples, QC, and calibrators can cause level sensing problems or erroneous results. Confirm that all bubbles are removed from the surface of the sample before placing onto the system.
- Confirm that the sample cups and racks are set correctly. For more information, refer to Place the Sample Cups or Tubes in the Rack.
- Inspect the serum for the extent of hemolysis, lipemia, bilirubin, and other sample quality issues according to your laboratory procedure.
- If the sample has evaporated or deteriorated, or if the QC sample was incorrectly prepared, obtain a new sample or correctly prepare the QC sample and repeat analysis.

Wash Solution Related Issues

Wash solution is the only approved detergent for use on the system. Inspect the following if the wash solution causes data problems.

- If wash solution is not in the master wash solution tank under the rack feeder unit, refer to Replenish the Wash Solution.
- Confirm that the handle on the diluted wash solution tank in each analyzer unit is in the open position. Refer to Inspect the Handle on the Diluted Wash Solution Tank is in the Open Position.
- Inspect the diluted wash solution tank in each analyzer unit. If the tank is dirty or the diluted wash solution does not seem like it is being used on the system, contact Beckman Coulter.

Deionized Water Related Issues

Inspect the following if the deionized water causes data problems:

- Confirm if the deionized water supply system needs servicing for the deionized water quality.
- If the deionized water tank is contaminated, refer to Clean the Deionized Water Tank, Deionized Water Filter, and Sample Probe Filter.
- If the deionized water filter is dirty, refer to Clean the Deionized Water Tank, Deionized Water Filter, and Sample Probe Filter.

Items in Common on the AU5800 that can Aid in Troubleshooting

If you do not perform scheduled maintenance or maintenance is overdue, abnormal data can result. Perform all scheduled maintenance along with regular preventative maintenance. For more information, refer to Maintenance.

- Determine if analysis on the inner or outer cuvettes affected the tests.
  - If the affected tests are analyzed from both the inner and outer cuvettes on the cuvette wheel, inspect the lamp on the analyzer unit. For more information, refer to Abnormal Data Caused by Photometer Lamp or Photometer Component.
  - If the affected tests are analyzed from either the inner or outer cuvettes on the cuvette wheel, inspect the sample probes, reagent probes, syringes, mix bars, and wash nozzles used for the inner or outer cuvette positions that affected the tests.
- Incoming water quality (purity, temperature, and conductivity) and ambient air temperature and humidity can affect the analysis results. For more information, refer to System Specifications or contact Beckman Coulter.
- This system uses the specific sample probe, reagent probe, and cuvettes supplied by Beckman Coulter. Use only genuine Beckman Coulter parts.
- If a mosquito coil or insecticides are close to the system, it can affect the cholinesterase (CHE). If you experience an abnormality, replace the sample cups, reagents, and reagent bottles. Clean the sample probes, reagent probes, mix bars, and cuvettes. For more information, refer to Clean the Sample Probes and Mix Bars, Clean the R1 or R2 Reagent Probes, and Clean the Cuvettes and the Cuvette Wedges.

Mechanical Problems

Syringe Problems

Inspect for:

- Water leaking at syringes: Tighten the case body and the case head of the sample and reagent syringes.

  Also, confirm that there is no damage to sample and reagent syringes, and the abrasion status of pistons. For more information, refer to Replace the Sample, Reagent, ISE Sample, or ISE Buffer Syringe.
- Bubbles in the tubing connected to the syringe: Select **Home** > **Analyzer Maintenance**. Then select **Prime Washing-line** and press the **DIAG** button to start removing air from the tubing. For more information, refer to Replace the Sample, Reagent, ISE Sample, or ISE Buffer Syringe.
- General Syringe Troubleshooting:
  - Confirm that the top and bottom screws are tightened.
  - Confirm that the bottom screw is finger tight against the piston. Over-tightening damages the syringe.
  - Confirm that there is a smooth resistant pull.
  - Confirm that the correct size syringe (sample or reagent) is in the correct position.
  - Confirm that only one O-ring is being used and that it is not flattened or damaged.
  - Confirm that the syringe is installed on the system correctly.
  - Inspect the tubing connected to the syringe head for scratches, bending, or leaks.

— Confirm that the creases in the fluorocarbon polymer tip of the syringe do not have any buildup or flaking of the fluorocarbon polymer tip.
— Confirm that the probes are not blocked. For more information, refer to Clean the Sample Probes and Mix Bars and Clean the R1 or R2 Reagent Probes. If the probes are blocked, syringe operation is affected.

Probe Problems

Inspect for:

- General Probe Troubleshooting:
  - — Confirm that water dispenses in a straight stream.
  - — Confirm that the metal screw cap for the probe connection is tight.
  - — Confirm that the probe tubing does not have bubbles.
- The reagent or sample probe is leaking from loose probe connectors: Tighten the probe connectors. Confirm that the tubing is firmly connected.
- The reagent or sample probe is blocked: For more information, refer to Clean the Sample Probes and Mix Bars and Clean the R1 or R2 Reagent Probes.
- The reagent or sample probe is bent or damaged: Replace the probe. For more information, refer to Replace a Sample Probe or Replace a Reagent Probe.
- The sample aspiration position of the sample probe is incorrect: The sample probe moves down to aspirate sample. The maximum distance the probe can move downward is defined in the system software, but a service engineer can change the programming. If the sample probe downward distance is programmed incorrectly, the probe might hit the bottom of the sample cup or tube. Contact Beckman Coulter.
- The reagent probe is not aligned over the refrigerator: If the R1 or R2 reagent probe is hitting the reagent bottle or refrigerator cover, examine the reagent probes for abnormalities. If the probe is bent, replace it. For more information, refer to Replace a Reagent Probe. If the probe is not bent, and the reagent aspiration position is still not correct, contact Beckman Coulter.
- The sample probe or reagent probe is not aligned over the cuvette: If the sample probe or reagent probe is contacting the cuvettes, examine the sample probe or reagent probe for abnormalities. If a probe is bent, replace it. For more information, refer to Replace a Sample Probe or Replace a Reagent Probe. If the probe is not bent but still not aligned correctly, contact Beckman Coulter.
- Abnormal wash position of the reagent probe and sample probe: If the probe is hitting the wash well, examine the probe. If a probe is bent, replace it. For more information, refer to Replace a Sample Probe or Replace a Reagent Probe. If the probe is not bent, but the probe wash position is still abnormal, contact Beckman Coulter.
- Basic troubleshooting for the reagent transfer components and sample transfer component: Confirm that no drops remain on the path of the transfer component. If drops are on the path of the sample or reagent transfer component, contact Beckman Coulter.
- The sample contains a significant amount of fibrin and protein.
  - — Remove fibrin or filter the sample.
  - — Inspect whether any other contaminant is mixed in the sample.
  - — Remove any clots from the sample probe. For more information, refer to Clean the Sample Probes and Mix Bars.

Abnormal Data Caused by Cuvette Wheel (Cuvette Wedge) or Wash Nozzles

- Scratches, fingerprints, stains, or foreign matter on the cuvettes: Clean the cuvettes. If abnormal data is not corrected after cleaning, replace the cuvettes with new ones. For more information, refer to Clean the Cuvettes and the Cuvette Wedges or Clean or Replace Individual Cuvettes.
- The outside of the cuvette or the cuvette wheel (cuvette wedge) is wet or flooded: Inspect the wash nozzle joints on the wash nozzle and tighten if they are loose. The wash nozzles can clog. Clean the wash nozzles.
  - For more information on how to clean the wash nozzles, refer to Clean the Wash Nozzle Component and Inspect the Tube Mounting Joints.
  - Clean any cuvettes and the cuvette wheel where it is wet. For more information, refer to Clean the Cuvettes and the Cuvette Wedges.
- The deionized water or wash solution is dripping from the wash nozzles: Inspect the wash nozzle joints on the wash nozzles and tighten if they are loose. The wash nozzles can clog. Clean the wash nozzles. For more information, refer to Clean the Wash Nozzle Component and Inspect the Tube Mounting Joints.
- After washing the cuvettes, a large amount of water remains in the cuvettes: Inspect the wash nozzle joints on the wash nozzles and tighten if they are loose. The wash nozzles can clog. Clean the wash nozzles.
  - For more information on how to clean the wash nozzles, refer to Clean the Wash Nozzle Component and Inspect the Tube Mounting Joints.
  - Remove the excess water from inside the cuvettes, refer to Clean the Cuvettes and the Cuvette Wedges.
- The tube in the wash solution tank floats: Straighten the tube, then insert it toward the tank bottom so that it does not contact the tank opening.
- The system has trouble with the float sensor in the wash solution tank or the diluted wash solution tank: Connect the float sensor connector firmly, and move the float sensor and tube in the tank so that they do not contact each other. If these changes do not correct the problem, contact Beckman Coulter to replace the float sensor.
- Some cuvettes are contaminated with foreign matter: Clean the cuvettes. If abnormal data is not corrected after cleaning the cuvettes or if any cuvettes are broken, replace those cuvettes. For more information, refer to Clean the Cuvettes and the Cuvette Wedges or Clean or Replace Individual Cuvettes.
- The cuvette wheel was removed from the analyzer for an extended time, then placed on the analyzer: Do not use the analyzer immediately. It is necessary to leave the cuvette wheel in the dry bath incubator for a minimum of an hour for the cuvettes to stabilize to temperature specifications of 37 °C ± 0.3 °C.

Abnormal Data Caused by Photometer Lamp or Photometer Component

- The quality of the photometer lamp has deteriorated: Inspect the record of photocal measurement results for abnormal data. If there is abnormal data, replace the photometer lamp.
  - For more information on the photocal measurement result record, refer to Perform a Photocal.
  - For more information on replacing the Photometer Lamp, refer to Replace the Photometer Lamp.
- The photometer lamp is not stable: Perform the photocal measurement twice to confirm the difference between two sets of measurement data. If there is a significant

difference between the measurements, the photometer lamp can be defective. Replace the lamp. For more information, refer to Replace the Photometer Lamp.

Mixing Problems

- The mix bars are contaminated: Clean the mix bars. For more information, refer to Clean the Sample Probes and Mix Bars.
- The fluororesin coating on the mix bars is chipped: Replace the mix bars. For more information, refer to Replace the Mix Bars.
- The mix bar component malfunctions, and there is abnormal noise from the system during the mixing motion: If there is an audible abnormal noise coming from the mix bar component, inspect for bent mix bars. If the mix bar is bent, replace the mix bar. For more information, refer to Replace the Mix Bars. If the mix bars are not bent, contact Beckman Coulter.
- The wash water and wash solution are not correctly drained from the mix bar wash wells: Contact Beckman Coulter.
- The mix bars are not positioned correctly causing contact between the mix bars and the mix bar wash well or the cuvettes: If the mix bar is bent, replace the mix bar. For more information, refer to Replace the Mix Bars. If the mix bar is not bent, contact Beckman Coulter.
- The mix bars are not correctly installed on the mix bar component, causing insufficient mixing of the sample and reagents: Install the mix bars correctly. For more information, refer to Replace the Mix Bars.

Deionized Water Tank Problems

- The deionized water tank is contaminated or dirty: If there are indications of particulate contamination on the interior of the tank, clean the tank thoroughly. For more information, refer to Clean the Deionized Water Tank, Deionized Water Filter, and Sample Probe Filter.
- Residual sodium hypochlorite solution remains in the deionized water tank after cleaning: Clean the tank again and rinse thoroughly with deionized water. For more information, refer to Clean the Deionized Water Tank, Deionized Water Filter, and Sample Probe Filter.

Deionized Water or Filter Problems

Confirm the water quality by assessing the following:

- Deionized water supply: Determine if the water supply meets the required specifications. For more information, refer to Table A.90 Water Supply.
- Dirty, stained or blocked filters: Clean the deionized water filter and the sample probe filter. Replace filters if data continues to be abnormal after cleaning. For more information, refer to Clean the Deionized Water Tank, Deionized Water Filter, and Sample Probe Filter and Inspect and, if Needed, Replace the Deionized Water Filter, Sample Probe Filter, and Replace the O-ring.
- Tap water below 5 °C used: The water supply to the deionizer must be above 5 °C. For more information, contact Beckman Coulter.

Incubation Temperature Problems

- Confirm that there is adequate space surrounding the system for air to circulate effectively. Confirm that this space meets Beckman Coulter recommendations. For more information, refer to System Specifications.
- Do not fill adjoining space around analyzers with boxes or other equipment. Space left at installation is required for correct air circulation.
- Clean the air filters. For more information, refer to Clean the Air Filters.
- Confirm that the room temperature is between 18 °C and 32 °C, and the acceptable range of temperature fluctuation is within 4 °C during analysis. Failure to regulate room temperature causes more required calibration events.
- If the cuvette wheel was removed from the analyzer for an extended time, then placed on the analyzer, do not use the analyzer immediately. It is necessary to leave the cuvette wheel in the dry bath incubator for a minimum of an hour for the cuvettes to stabilize to temperature specifications of 37 °C ± 0.3 °C.

Tubing and Pump Problems

The filters are dirty or clogged: Clean the deionized water filter and the sample probe filter. If abnormal data is not corrected after cleaning filters, replace the filters.

- For more information on how to clean the deionized water filter, refer to Clean the Deionized Water Tank, Deionized Water Filter, and Sample Probe Filter.
- For more information on how to clean the sample probe filter, refer to Clean the Deionized Water Tank, Deionized Water Filter, and Sample Probe Filter.
- For more information on how to replace the deionized water filter, refer to Inspect and, if Needed, Replace the Deionized Water Filter, Sample Probe Filter, and Replace the O-ring.
- For more information on how to replace the sample probe filter, refer to Inspect and, if Needed, Replace the Deionized Water Filter, Sample Probe Filter, and Replace the O-ring.

Reagent Refrigerator Problems

If the reagent refrigerator temperature is out of range:

1. Select **Home** > **Analyzer Status** and inspect the coolant temperature for the reagent refrigerator.
2. Open the reagent refrigerator and confirm that the reagent bottles are cool.
3. If the problem persists, contact Beckman Coulter.

Rack Problems

Inspect for the following general problems:

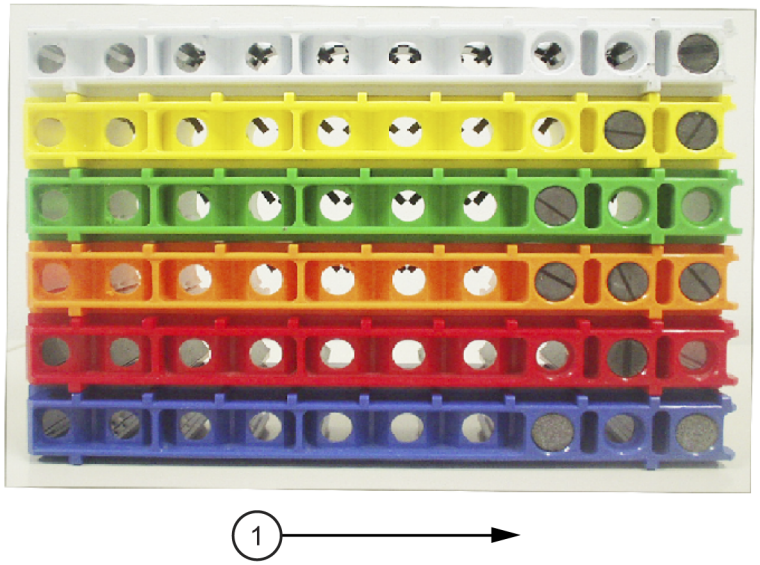
- Confirm that the rack is clean and that the surface is not sticky. Refer to Clean the Rack.
- Inspect bar code label positioning.
  - For more information on attaching the bar code label to the sample rack, refer to the AU5800 Reference Manual.

— For more information on placing the sample cups or tubes in the rack, refer to Place the Sample Cups or Tubes in a Rack.

- Confirm that the rack was loaded correctly.

  For more information on loading racks, refer to Placing a Rack on the Rack Input Tray.
- Confirm that the correct number of magnets are in the bottom of the rack. Compare the configuration of magnets on the underside of the rack with the magnets on another rack of the same color. The configuration for the two racks should be identical. Discard the rack if a magnet is missing.
- If a rack jam occurs, refer to Rack Jams.

Figure 9.1 Rack Magnet Positions



1. Magnets in rack positions 1, 2, or 3 (to the right of the arrow)

Table 9.1 Magnets in Rack Positions 1, 2 or 3

Rack Color	Magnet Position (1 to 3)
White	Position 1
Yellow	Positions 1 and 2
Green	Position 3
Orange	Positions 1, 2, and 3
Red	Position 2
Blue	Positions 1 and 3

System Problems

Alarm for Reagent Refrigerator Temp

- If there is a problem with the reagent refrigerator, confirm that there is adequate space surrounding the system for air to circulate effectively. For more information on installation environment precautions, refer to System Specifications.
- Confirm that the room temperature is from 18 °C to 32 °C. If the room temperature is over 32 °C, the reagent refrigerator temperature is over 12 °C. If the problem persists, contact Beckman Coulter.

Abnormal Sound from Inside the System

- Air bubbles trapped in the tubing: Inspect the deionized water filter. If the filter is damaged, replace it. Inspect the sample probe filter for placement of the filter. For correct positioning of the filter, refer to Figure 9.2 Sample Probe Filter Replacement.

Figure 9.2 Sample Probe Filter Replacement

- Deionized water tank empty alarm: The ion-exchange capability of the deionizer can be insufficient. Replace the deionizer if it does not meet required specifications. Inspect the deionized water filter. If it has become dirty or blocked, clean or replace it.
  - For more information on cleaning the Deionized Water Filter and the Sample Probe Filter, refer to Clean the Deionized Water Tank, Deionized Water Filter, and Sample Probe Filter.
  - For more information on replacing the Deionized Water Filter and the Sample Probe Filter, refer to Inspect and, if Needed, Replace the Deionized Water Filter, Sample Probe Filter, and Replace the O-ring.
- For all other sources of noise, contact Beckman Coulter.

Alarm for Deionized Water

- The deionizer is turned off: Turn on the deionizer. Shut down the system (End Process), and then turn on the system.
- The ion exchange capability of the deionizer is insufficient: Confirm that the deionizer meets specifications. If the deionizer does not meet the specification, replace it. For detailed information, consult the deionizer manufacturer.
- The deionized water filter is clogged: Use your finger to determine if the deionized water filter is slimy. If the filter surface is slimy, the filter can be clogged. Clean the deionized water filter. For more information, refer to Clean the Deionized Water Tank, Deionized Water Filter, and Sample Probe Filter.

Bar Code Label Errors

- Reagent bar code reader dirty: Wipe the bar code reader window with a clean, deionized water dampened, lint-free absorbent tissue to remove any particles on the read window. If necessary, follow up with a clean, dry, lint-free absorbent tissue to dry the reader so there are no smear marks left to cause errors.
- Bar code labels on sample tubes or racks are damaged and discolored: Replace any sample or rack bar code labels that are worn or damaged. For labels on sample cups, refer to *Apply Bar Code Labels to Sample Tubes* in the AU5800 Reference Manual. For labels on racks, refer to Replace Rack ID Labels.
- Bar code labels on reagent bottles are damaged: If the reagent ID is damaged, the operator can edit the reagent ID and still use the bottle of reagent. For more information, refer to Edit a Reagent ID.

WARNING

Never look directly into the bar code readers. The laser light can cause serious eye damage.

Leaks from the Bottom of the System

- Wash line obstructed: Inspect for obstructions in the wash wells for the sample probe and reagent probes. Clean the wells if any obstructions exist. For more information, refer to Clean the Sample Probe and Reagent Probe Wash Wells.
- Waste line not installed correctly: If the waste line is leaking or if the tubing is too long, contact Beckman Coulter.
- Any leaks from the bottom of the analyzer are potentially dangerous: If the source is not clearly visible (for example a leaking syringe), contact Beckman Coulter.

No Wash Solution to Mix Bar Wash Wells

- The deionized water filter can be clogged. Confirm the last time the deionized water tank and filter were cleaned.
- After performing maintenance on the sample probe filter and/or deionized water tank, confirm that the grey quick disconnects are installed correctly. You should hear a distinct click.
- Determine if the interior of the deionized water tank has slick or slimy buildup by sliding your gloved hand on the gray float sensor in the bottle or the side of the tank. This buildup can cause the deionized water and sample probe filters to become clogged. Clean both the deionized water and sample probe filters, and the deionized water tank.

  Refer to Clean the Deionized Water Tank, Deionized Water Filter, and Sample Probe Filter.

Reagent Alarm when Sufficient Reagent Remains in Bottles

The liquid level sensor could be faulty. Select **Alarm List** for the cause and corrective actions.

- Inspect the reagent bottle for bubbles that occur from replacing reagents or for a bottle that is not correctly placed in the reagent refrigerator. Refer to Replace the Reagents and Add Adapters to the Reagent Tray.

- Perform a reagent check to confirm that the alarm is still occurring.
- Contact Beckman Coulter.

Sample Alarm when Sufficient Sample Remains

When there is a sample alarm and sufficient sample remains, there is a possibility that the sample probe did not move down to the liquid level of the sample. Refer to Sample Preparation. Incorrect detection of the height of the cup can cause this error. Confirm that the correct tube or cup is used and placed correctly in the rack. Inspect for bubbles in the sample cup. If an error still occurs, contact Beckman Coulter. For more information, refer to the AU5800 Reference Manual.

No Sample Cup Alarm when Sample Cup is in the Rack

Unspecified cup used: Confirm that the specified sample cups are in each rack. For more information, refer to Cups or Tubes Specifications.

Liquid Leaking from the Reagent Probe or Sample Probe

Confirm that the reagent probe or sample probe is installed correctly:

1. Confirm that the probe connectors are tight.
2. Select **Home** > **Analyzer Maintenance** > **Maintenance**. The system displays the Analyzer Maintenance: Maintenance tab.
3. Select the **Analyzer Maintenance** box. The system activates the maintenance operation buttons.
4. Select **Prime Washing Line**. Make a unit selection (or leave default) and then select **OK**.
5. Press the **DIAG** button to dispense water from the reagent probe and sample probe. If the deionized water does not dispense normally, a reagent probe or sample probe might be incorrectly installed. Inspect the reagent probe or sample probe installation. If it is necessary to replace the probe, refer to Replace a Sample Probe or Replace a Reagent Probe.

Reagent Probe or Sample Probe not Aligned over the Cuvette

Inspect if the reagent probe or sample probe is bent: Examine the probe and replace it if it is bent. For more information, refer to Replace a Sample Probe or Replace a Reagent Probe.

If the probe is not bent but still aligned incorrectly, contact Beckman Coulter.

Flag [#] (Sample Level Detection Error) Generated during the Sample Dispense Operation

Determine if the sample volume is too low: Confirm that there is sufficient sample for the ordered (requisitioned) tests. Consider the dead volume for the different cups. For more information, refer to Cups or Tubes Specifications.

TEMP DIL Alarm for the Wash Water Heater

The water temperature is not within the specified range. Contact Beckman Coulter for assistance.

Rack Jams

Inspect for:

- Contamination on the rack: Confirm that nothing has fallen onto the rack and that the rack ID bar code label, or sample ID bar code labels have not peeled off, causing the rack to jam. Refer to Rack Problems.
- Confirm that the rack tray is clean and not sticky. If it is dirty or sticky, clean the rack tray. Refer to Clean the Rack Tray.
- Confirm that the rack transfer lanes are clean and not sticky. If dirty or sticky, clean the rack transfer lanes. Refer to Clean the Rack Transfer Lanes.
- Object attaching to the magnet on the bottom of a rack: Inspect for small metal objects such as staples or paper clips on the magnets on the bottom of a rack. If foreign matter attaches to the magnet, remove it from the magnet.

Printer Problems

Refer to the printer manual for assistance with all printer troubleshooting.

- Printer is disconnected. Inspect the plug and socket and connecting lead.
- The power to the printer is not turned on. Confirm that the power to the printer is turned on.
- Printer toner is empty and requires replacement.
- Confirm that the online button is on.
- Confirm that paper is loaded correctly.

Data Processor Problems

Menu Cannot be Selected

- Function is inaccessible: Menu items which are not available are inaccessible because of the programmed settings.
- System software crashes, to reset the system:
  - Press **Ctrl** + **Alt** + **Delete** together.
  - Select **Shutdown**, and then **OK.**
  - After the PC shuts down, press **EM STOP** and wait 5 seconds before pressing **RESET**, and then wait another 5 seconds before pressing **ON**.
  - The software and analyzer synchronize and load at the same time.
  - The system displays the System Start dialog with a Program Down Load to Analyzer message.
  - The System Start dialog displays a message to confirm database retrieval. Select **OK.**
  - The system displays a New Index dialog prompting the operator to create a new index. If the operator wants to remain in the current index, select **Index**. If a new index is necessary, select **New Index**.

— The analyzer goes into *Warm up* mode for 90 minutes. If the analyzer has been down longer than 5 minutes, then allow the 20-minute warm up. The operator can then select **Home** > **Analyzer Maintenance**, and select **Stand By (F4)**. The analyzer bypasses *Warm up* to *Standby.*

TIP

The incubator remains red in the Analyzer Status screen until the temperature returns to 37 °C ± 0.3 °C.

- If you are unable to recover from a software crash, contact Beckman Coulter.

Number Key Pad on Keyboard Does Not Work

Num Lock is not selected: Press the **Num Lock** key and then confirm that the LED light over **Num Lock** on the keyboard is on.

Keyboard Not Responding

Possible causes:

- Keyboard cable: Confirm that the cable connector is in the correct socket in the back of the computer (color-coded).
- System crash: For more information, refer to Menu Cannot be Selected.
- System busy: The system might be saving data or performing a series of tasks simultaneously. Wait for a few minutes until the system is ready. If this error occurs frequently, contact Beckman Coulter.
- Data processing, such as data saving, is executing: Wait until data processing is complete.
- Electrical Noise: If you hear a buzzing noise, unplug the keyboard and then firmly plug in the cable connector.

Results Do Not Print Automatically

Inspect for:

- Realtime output is not set: Set the realtime output of reports from **Menu List** > **System** > **Format** > **List Format** > **Basic Condition**, select **Edit (F1)**, and then select **Realtime List (F5)**.

  For more information, refer to the AU5800 Reference Manual.
- Printer is not available during analysis (out of paper, printer is turned off, or the printer is offline): Turn on the printer, confirm that the printer is online, and add paper as needed.

  — Select **Home** > **Analyzer Status**.
  — Select **Printer Control (F5)**.
  — Select **Resume** to start printing the analyzed data.

Online Auto-Output by Laboratory Information System Not Executed

Inspect for:

- Interface cable to the laboratory information system disconnected: Connect the cable.
- Interface cable defective: Contact Beckman Coulter.
- Laboratory information system I/O settings incorrectly modified: Set the correct I/O settings in **System > Online**.

For more information, refer to the AU5800 Reference Manual.

Recovering from an Emergency Stop or Power Loss

If there is a power failure or an emergency stop, the main power is turned off immediately. Power to the incubator and reagent refrigerator is also turned off.

CAUTION

If an emergency stop or power failure occurs during *Measure* mode, any data that is not complete is lost and you must reanalyze the samples.

CAUTION

If you perform a stop or emergency stop or a power loss occurs, sample can remain in the sample probe, and reagents can remain in the cuvettes. Perform a W1 to clean the sample probe and cuvettes after you restart the system. For more information, refer to Perform a W1.

IMPORTANT

If the system is without power for a lengthy time after a power loss or an emergency stop, inspect the reagent integrity before resuming analysis.

Perform an Emergency Stop

An emergency stop turns off power immediately to the analyzer and ISE unit.

1. Press the **EM STOP** button. All power to the analyzer and ISE unit turns off immediately. The computer remains on. To turn off the computer, press **[Ctrl] + [ALT] + [Delete]**. The computer displays a Windows Security dialog. Select **Shut Down**.
2. Remove all racks from the rack lanes.

Return to *Standby* Mode After an Emergency Stop

1. Press the **RESET** button (white button on the front-right of the rack feeder unit) to turn on the main power, and then wait 5 seconds.
2. Press the **ON** button (green button on the front-right of the rack feeder unit). The lamp turns on and the software loads. The system displays a dialog to confirm retrieving the database.

3 Select **OK**.

4 In the New Index dialog, select **Current Index** to continue analysis in the current index.

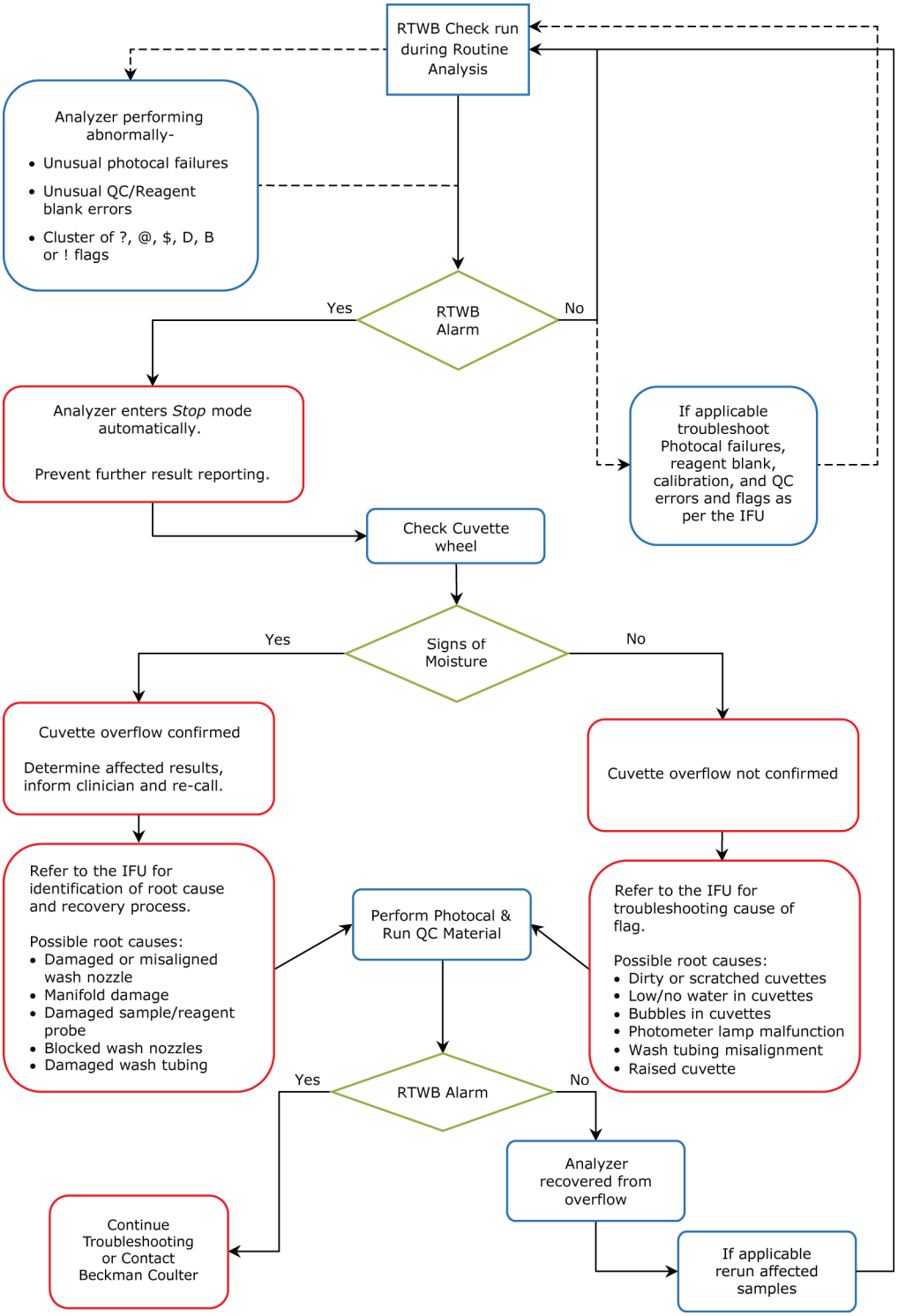
5 The system is in *Warm up* mode for 1.5 hours. After the required 20-minute lamp warm up time, wait until the temperature of the cuvette wheel is 37 °C, and then select **Home > Analyzer Maintenance**. Select **Stand By (F4)** to return to *Standby* mode.

6 Perform a W1. For more information, refer to Perform a W1.

RTWB Troubleshooting Overview Flowchart

The flowchart shows an overview of errors and corrective actions for monitoring the automatic RTWB check function while the system is in operation.

Figure 9.3 RTWB Troubleshooting Overview Flowchart



Recovering from a Photometry Error During a Cuvette Wash Alarm

Inspect the cuvettes to determine if a cuvette overflow occurred when the system generated a `Photometry Error During a Cuvette Wash` alarm. The recovery procedures are different if a cuvette overflow occurred, or if unstable photometry caused the error.

The analyzer goes to *Stop* mode immediately after the system generates a `Photometry Error During a Cuvette Wash` alarm.

Inspect the Cuvettes to Determine if an Overflow Occurred

To confirm that a cuvette overflow has occurred, remove the cuvette wheel cover after initializing system. The cuvettes are frosty or white. If the cuvettes are dark, black, or are wet when removed, a cuvette overflow has occurred. In addition, remove the cuvette number identified in the `Photometry Error During a Cuvette Wash` alarm.

WARNING

The overflow occurs either in the inner cuvettes or the outer cuvettes, or both in the inner and outer cuvettes depending on the failure mode. The code (1 or 2) only indicates the location where the cuvette overflow is first detected. The cuvette overflow can spread over both the inner and outer cuvettes. Inspect both the inner and outer cuvettes.

NOTE

Photometric Error During Cuvette Wash (A,B,C) [unit x]

A, B: Cuvette numbers with a photometric error. There is a 41 cuvette number interval because the RTWB check is performed every 41 cuvettes. If the error is detected on two successive cuvettes, the `Photometry Error During Cuvette Wash` alarm is generated.

C: 1 indicates the inner cuvettes on the cuvette wheel. 2 indicates the outer cuvettes on the cuvette wheel.

X: Unit number with a photometric error.

Visually inspect the cuvette to determine if it is wet. If the cuvette is wet on the outside, refer to Recovering from a Cuvette Wheel Overflow and perform all system recovery procedures. If the cuvette is not wet on the outside, refer to Recovering from an Unstable Photometry Error and perform the required system recovery procedures determined by the cause of the error.

For more information on how to remove the cuvette wheel, refer to Clean the Cuvettes, Cuvette Wedges, and Cuvette Wheel after an Overflow.

Recovering from a Cuvette Wheel Overflow

The following procedure explains what can cause an overflow and how to recognize and recover from a cuvette wheel overflow.

Performing scheduled maintenance reduces the chances of a cuvette wheel overflow. For more information about maintenance for each system component, refer to Maintenance.

Overflow Causes

The following can cause a cuvette wheel overflow:

- A wash nozzle is clogged or partially clogged. When the wash nozzle is clogged, liquid is not aspirated from the cuvette completely and eventually liquid spills over the side. A clogged wash nozzle can occur when the wash nozzles are not cleaned correctly, or when particles such as glass are aspirated into the nozzle.
- A wash nozzle is bent or damaged.
- Damaged or missing O-rings inside the water supply tube mounting joint.
- The reagent probe is bent. A bent probe could be dispensing outside of the cuvette.
- The sample probe is bent. A bent probe could be dispensing outside of the cuvette.
- Cuvettes are chipped or cracked caused by alignment problems with the reagent probes or wash nozzles.
- The wash nozzle tubing is not connected to the nozzle.

Recognizing an Overflow

The system generates a `Photometry Error During a Cuvette Wash` alarm. The overflow could have occurred 60 minutes before the system generated the alarm. Results obtained during the 60 minutes before the alarm are invalid and need reanalysis. The 60-minute timeframe is the time the analyzer was in *Measure* mode. For detailed instructions, refer to Identifying and Reanalyzing Samples after a Cuvette Overflow.

The flags *, ?, @, $, D, B, and ! can indicate a cuvette wheel overflow. The data, alarms, or flags vary depending on the severity of the overflow. An overflow can affect one or all tests. Items to inspect:

- QC flags or alarms
- Reagent blank flags
- Analyzer not performing as normal operation
- Numerous cuvettes fail after a photocal

Lift the cuvette wheel cover. The cuvettes are frosty or white. If they are dark, black, or wet when removed, the cuvette wheel has overflowed.

Items to Confirm when Recovering from an Overflow

WARNING

Perform corrective actions for an overflow immediately. If nothing is done to correct the problem, the wheel continues to overflow. Contact Beckman Coulter for assistance with performing these procedures.

- Align the wash nozzle component over the cuvettes. Visually inspect and confirm the wash nozzles are centered over the cuvettes and inspect the alignment.
- Sonicate and clean the wash nozzles with a stylet to remove any debris.
- Inspect the reagent and sample probes to confirm the probes are correctly aligned. Rotate the sample and reagent probes over the cuvette wheel.
- Inspect for chipped or cracked cuvettes. Replace them if necessary. For more information, refer to Clean the Cuvettes, Cuvette Wedges, and Cuvette Wheel after an Overflow.
- Confirm that the wash nozzle tubing connections are secure.
- Confirm that the O-rings inside the water supply tube mounting joint are in position and not damaged.

After the Overflow is Corrected

After you correct the cuvette wheel overflow, refer to Clean the Cuvettes, Cuvette Wedges, and Cuvette Wheel after an Overflow.

Recovering from an Unstable Photometry Error

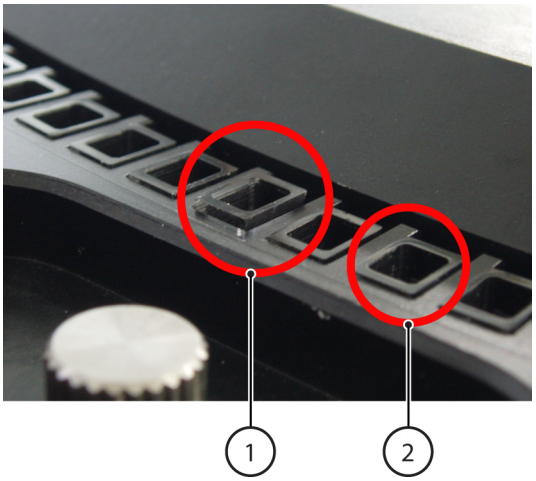
When the system generates a `Photometry Error During a Cuvette Wash` alarm, and a cuvette overflow did not occur, unstable photometry causes the alarm. Incorrectly placed cuvettes in the cuvette wheel, an insufficient amount of wash solution being supplied to clean the cuvettes, bubbles in the bottom of the cuvettes, dirty or scratched cuvettes, or a deteriorating lamp can cause unstable photometry.

Perform the following procedures in this section. After the error is identified and corrected, perform a photocal. For more information, refer to Perform a Photocal. If the error still occurs, contact Beckman Coulter.

Inspect the Cuvette Placement

Inspect the cuvette identified by the `Photometry Error During a Cuvette Wash` alarm to determine if it is placed in the cuvette wheel correctly. Push the cuvette down into the cuvette wheel until the top of the cuvette is even with the cuvette wheel.

Figure 9.4 Incorrect and Correct Cuvette Placement

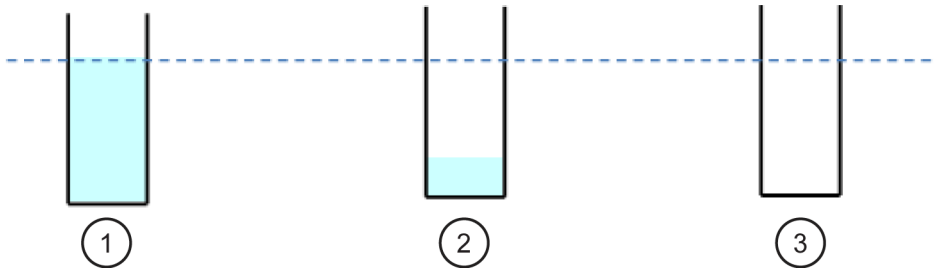


1. Incorrect cuvette placement
2. Correct cuvette placement

Inspect the Cuvette Condition

1 Inspect the cuvettes identified by the `Photometry Error During a Cuvette Wash` alarm to determine if there is sufficient wash solution in the cuvette.
If the remaining wash solution volume is insufficient or empty, there is a possibility of system malfunction. Contact Beckman Coulter.

Figure 9.5 Wash Solution Level in Cuvette



1. Sufficient: OK
2. Insufficient: Not Good
3. Empty: Not Good

2 Inspect the cuvette to determine if there are any bubbles at the bottom of the cuvette.

Figure 9.6 Bubbles in Cuvette

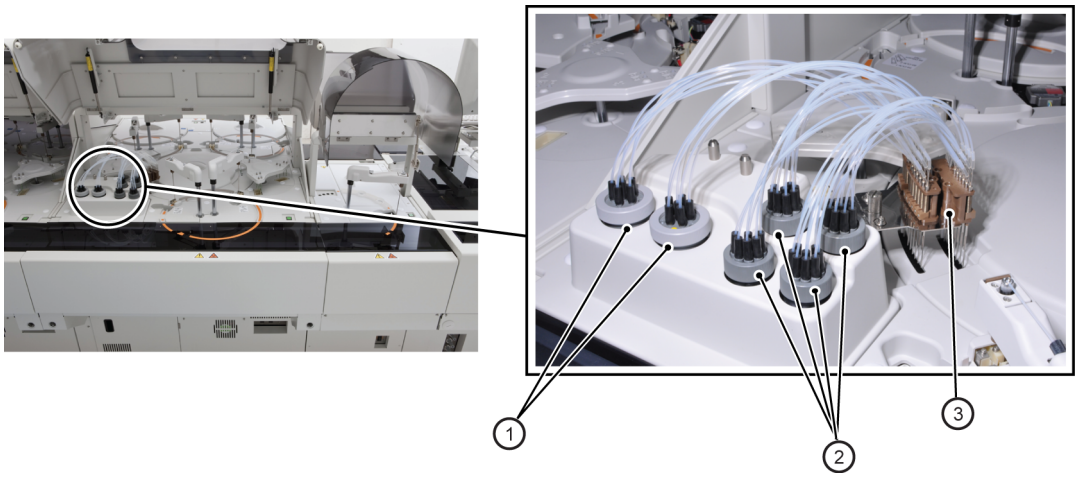
1. Not good
2. Not good

3 If bubbles exist in the cuvette, inspect the water and wash solution supply tubing on the wash nozzle component to determine if there are bubbles. The aspiration tubing has bubbles in normal operation.

4 If bubbles exist in the water and wash solution supply tubing on the wash nozzle component, tighten the tube mounting joints and remove the bubbles by performing a W1 or Prime Wash Nozzle.

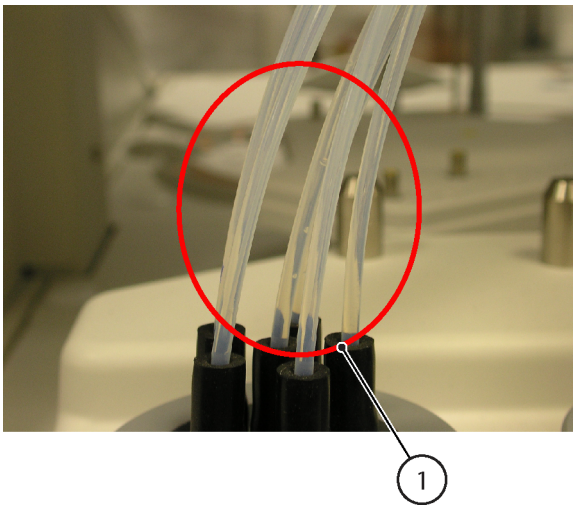
For more information, refer to Perform a W1 and Replace the O-rings in the Water Supply Tube Mounting Joints.

Figure 9.7 Tube Mounting Joint Manifolds



1. Water supply tube mounting joint manifolds (Each contains a total of six O-rings)
2. Wash nozzle tube mounting joint manifolds
3. Wash nozzle component

Figure 9.8 Water Supply Tubing



1. Inspect water supply tubing for bubbles

5 Inspect the cuvette to determine if it is dirty or scratched. Clean or replace the cuvette as required. For more information, refer to Clean or Replace Individual Cuvettes.

Inspect the Lamp

Select **Home** > **Analyzer Maintenance** > **Consumption**.

Confirm the number of hours the lamp has been in use. If the lamp has been in use for over 1,000 hours, replace the lamp.

For information on how to replace the photometer lamp, refer to Replace the Photometer Lamp.

Troubleshooting the Beckman Coulter Laboratory Automation System Connection

Recovering from Rack Jams at the Rack Loader and Rack Unloader Units

When a rack jam occurs at the rack loader unit, the analyzer moves to *Measure 2* mode and generates one of the following alarms:

- LA rack carry-in procedure Error
- Rack Jam at carry-in from LA

1 Remove the rack(s) from the rack loader unit.

2 Select **Start**. Racks start moving from the Beckman Coulter laboratory automation system to the AU5800 again.

3 Place the rack(s) that are removed on the retrieval lane of the connection unit.

IMPORTANT

Repeat analysis for all samples on the racks removed from the rack jam.

When a rack jam occurs at the rack unloader unit, the analyzer moves to *Pause* mode and generates one of the following alarms:

- LA rack carry-out procedure Error
- Rack Jam at carry-out to LA

1. Remove the rack(s) from the rack unloader unit.
2. Select **Start.**

   The system initializes the rack unloader unit and restarts analysis. When the Beckman Coulter laboratory automation system can receive racks, the racks are returned to the Beckman Coulter laboratory automation system. When the Beckman Coulter laboratory automation system is not in operation, the racks are returned to the rack output component.
3. Place the rack(s) that are removed on the retrieval lane of the connection unit.

TIP

The retrieval lane of the connection unit is part of the Beckman Coulter laboratory automation system.

Recovering from Mechanical Errors

When any mechanical error occurs, the system moves to *Stop* mode.

1 Remove all the racks from the system.

2 Select **STOP/STANDBY**. The system initializes and then moves to *Standby* mode.

3 Select **Start**. The system starts analysis.
If the error occurs again, contact Beckman Coulter.

Operating the AU5800 when the Beckman Coulter Laboratory Automation System is Down

The AU5800 can be operated independently if the Beckman Coulter laboratory automation system is not in operation.

1 Load the racks on the rack input component or priority rack input component.

2 Select **Start.**

For more information, refer to Add Racks Directly to the System in the AU5800 Laboratory Automation Connecting Kit addendum.

APPENDIX A

System Specifications

System Specifications

This section summarizes AU5800 information such as size, required clearances, power requirements, and temperature requirements. For more information on other configurations, contact Beckman Coulter.

Placement

To operate this system safely and accurately, confirm that the installation room:

- Is not subject to direct sunlight.
- Is not excessively dusty or subject to large amounts of airborne particles. This system withstands up to pollution degree 2 as defined by IEC and UL standards.
- Is level, with a gradient less than 1/200.
- Is not subject to vibration.
- Has a floor that can support the weights listed below. This weight includes the personal computer attached to the system. If the ISE unit is used, add 150 kg (330 pounds) to the weight of each system.
  - 920 kg (2,030 pounds) for one-unit system
  - 1,520 kg (3,350 pounds) for two-unit system
  - 2,120 kg (4,670 pounds) for three-unit system
  - 2,720 kg (6,000 pounds) for four-unit system
- Is located less than 6,561 feet or 2,000 meters above sea level.
- Contains no corrosive gases.

Electrical and Noise Conditions

Prepare the power source before system delivery.

- Have a power connector within 33 feet, or 10 meters of the location of the system.
- Have the following capacity of the circuit breaker on the power switchboard:
  - 30 A (for one-unit system)
  - 50 A (for two-unit system)
  - 50 A (for three-unit system)
  - 60 A (for four-unit system)
- Have a power source with maximum voltage fluctuations (± 10%) and transient overvoltage less than 2,500 V.

NOTE

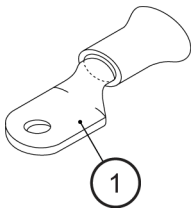
To avoid electrical damage to the system caused by uneven current, use an uninterruptible power supply (UPS) to connect the system to electrical power. For more information, contact Beckman Coulter.

- Confirm that the system is always grounded. The grounding terminal is be less than 100 Ω of grounding resistance defined in the technical standards for electrical facilities.
- Do not locate this system near equipment that generates extreme levels of electromagnetic or electrical noise.
- Do not use mobile or cordless telephones and transceivers in the room where the system is installed.
- Do not use medical equipment that can be susceptible to malfunctions caused by Electric Magnetic Field (EMF) near the analyzer Data Processing Module (DPR) or the monitor.

WARNING

Connect all the grounding terminals provided on the system and distribution panel to ground. Failure to ground the terminals can cause electric shock and system malfunction.

Figure A.1 Crimp Terminal Hole



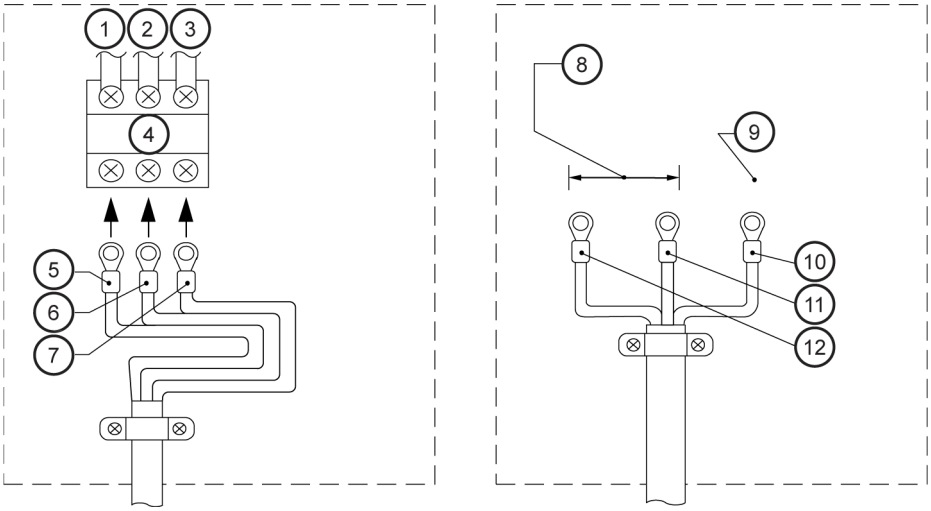
1. Crimp terminal hole diameter 5.4 mm

CAUTION

Only a Beckman Coulter Representative can connect the power cable.

- **When connecting the power cables to the system, connect the grounding terminal first. To disconnect the cables, disconnect the grounding terminal last.**
- **Connect the power cables to the distribution panel.**

Figure A.2 Distribution Panel



1. Gray
2. White
3. Green
4. Terminal board
5. Black
6. White (All markets except Europe), or Blue (Europe market)
7. Green (All markets except Europe) or Yellow/Green (Europe market)
8. Connect these terminals to the power source specified for this system
9. Connect this terminal to a grounding terminal that measures less than 100 Ω
10. Green (All markets except Europe), or Yellow/Green (Europe market)
11. White (All markets except Europe), or Blue (Europe market)
12. Black

For Europe, Black/Blue/Yellow Green is required for Live/Neutral/Ground.

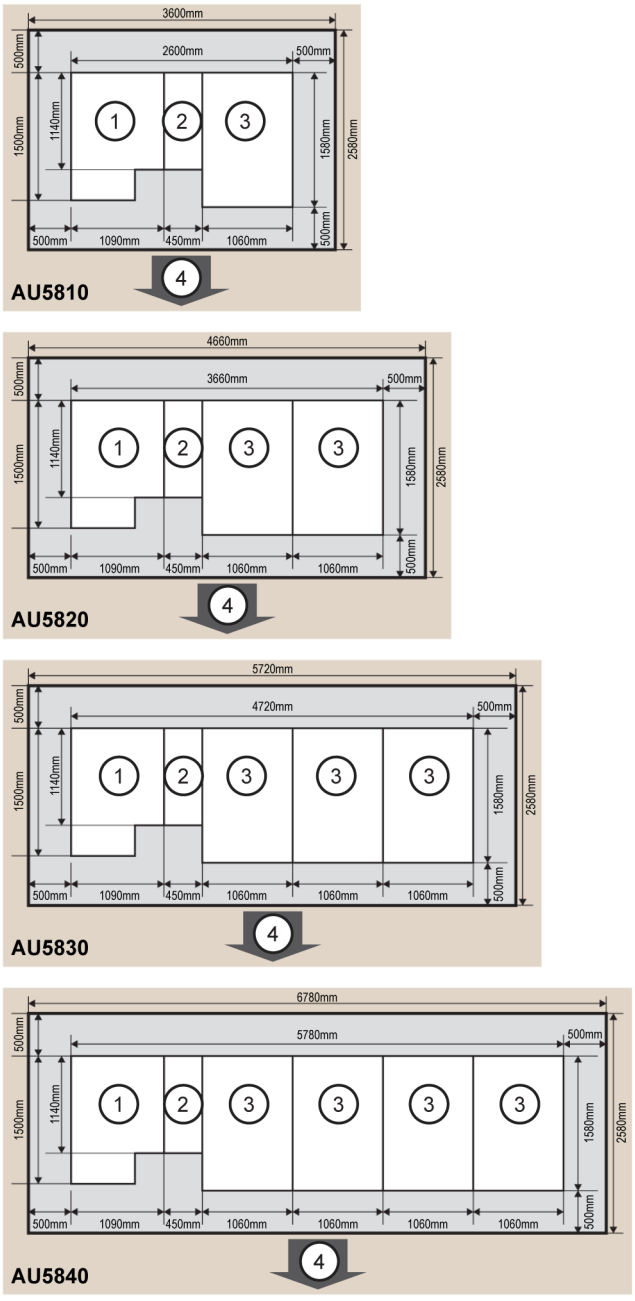
For all markets except Europe, Black/White/Green is required for Live/Neutral/Ground.

Clearance

The system includes the rack feeder unit, analyzer unit (1, 2, 3, or 4), and ISE unit (optional).

This system requires space of a minimum of 500 mm (20 inches) from the wall around it for safe installation and maintenance.

Figure A.3 System Dimensions and Clearance Requirements



1. Rack Feeder unit
2. ISE unit (optional)
3. Analyzer unit
4. FRONT

Dimensions

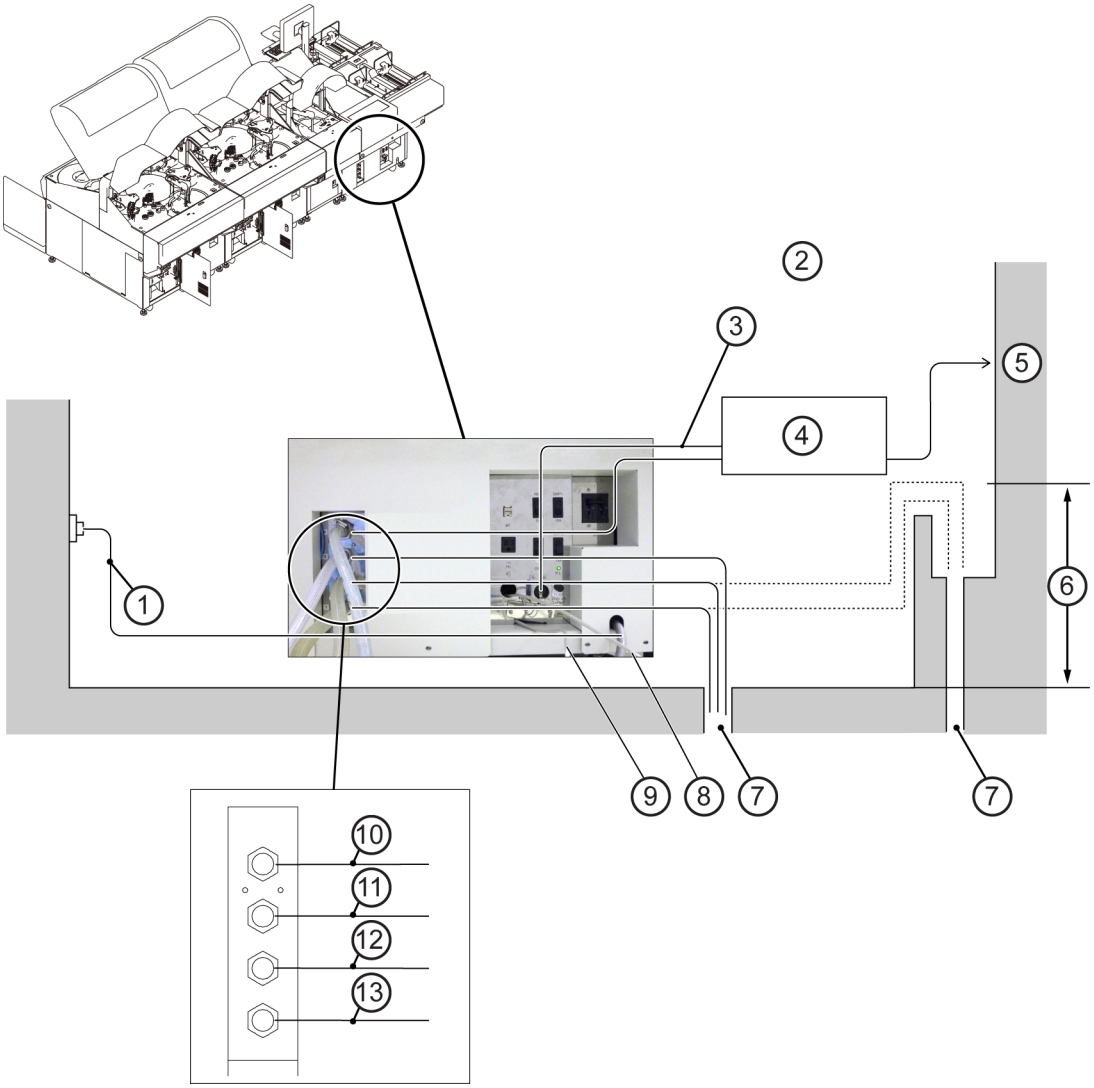
Table A.1 Unit Dimensions

Unit	Dimensions			
	Length	**Height**	**Depth**	**Weight**
	mm	**mm**	**mm**	**kg**
Analyzer Unit	1,060	1,260	1,580	600
Rack Feeder Unit	1,090	1,600	1,500	320
ISE Unit	450	1210	1,140	150

Table A.2 System Dimensions

System	Dimensions			
	Length	**Height**	**Depth**	**Weight**
	mm	**mm**	**mm**	**kg**
1 Unit	2,600	1,600	1,580	1,070
2 Units	3,600	1,600	1,580	1,670
3 Units	4,720	1,600	1,580	2,270
4 Units	5,780	1,600	1,580	2,870
System with separate DPR (option):		1,350 height		
System without ISE unit (option):		-450-mm length, -150-kg weight		

Figure A.4 System Connections



1. Power cable (10 m)
2. Back of rack feeder unit
3. Water supply equipment connector
4. Water supply equipment (option)
5. To main water valve
6. 1.5 m or less
7. Drain hole
8. Printer cable
9. TCP/IP cable or RS232C cable
10. Water supply hose (10 m)
11. Exhaust air hole (10 m)
12. Washing waste liquid hose (10 m)
13. Concentrated waste liquid hose (10 m)

⚠ CAUTION

The printer should use a power outlet located in the facility and not a system power outlet located on the system. Use of a system outlet could trip the system circuit breaker interrupting power.

Water Supply

Specification	Requirement
Deionized water conductivity	2.0 µS/cm or less (water transmitted through a filter of 0.5 µm or less)
Water pressure	0.49×10^5 to 3.92×10^5 Pa (or 7 to 57 psi)
Water consumption	Average water consumption (50 Hz/60 Hz): • 62 L/hour (for one-unit system) • 124 L/hour (for two-unit system) • 186 L/hour (for three-unit system) • 248 L/hour (for four-unit system) • 2 L/hour (for an ISE unit with one or two flowcells) Maximum water demand (50 Hz/60 Hz): • 2.5 L/minute (for one-unit system) • 3.5 L/minute (for two-unit system) • 4.0 L/minute (for three-unit system) • 5.0 L/minute (for four-unit system)
Deionized water temperature	5 to 28 °C (41 to 83 °F)
Water-supply facility	More requirements for the water supply: • The system is located within 10 m (33 feet) of the deionized water outlet. • Deionized water supplied to the system does not contain excessive air bubbles. The system includes the following tubing: • Water supply hose: Braided hose 12 mm (ID) x 18 mm (OD), L=10 m (33 feet), 1 piece.

CAUTION

If the tap water temperature exceeds the optimal temperature range for the deionizer, consult the deionizer manufacturer. When using the existing water supply tubing and deionizer, confirm that it is micro-organism free.

NOTE

The water pressure for this system operates at a range from 0.49 x 10^5 to 3.92 x 10^5 Pa. For the correct water pressure for the deionizer, contact the deionizer manufacturer. Beckman Coulter recommends use of a reverse osmotic membrane as the deionizer. For more information, contact Beckman Coulter.

Drainage and Exhaust

Table A.4 Drainage and Exhaust

Specification	Requirement
Concentrated waste solution hose, diluted waste solution hose	Braided hose 15 mm (ID) x 22 mm (OD), L=10 m (33 feet), 2 pieces
Exhaust hose	Braided hose 12 mm (ID) x 18 mm (OD), L=10 m (33 feet), 1 piece.

WARNING

Follow your laboratory procedure for disposal of all liquid and infectious waste.

The system discharges waste liquids by forced drain and moist air containing the components of waste liquids.

- Condensed waste liquid: Compound liquid of sample and reagent retrieved from cuvettes and wash solution.
- Diluted waste liquid: Waste liquid used for washing cuvettes, mix bars, and so on.

Requirements:

- Place the drain hole within 10 m (33 feet) from this system.
- Connect the drain to an infectious waste collection tank as required by law.
- The drain must be located no higher than 1.5 m and the exhaust no higher than 0.1 m above the system installation floor.
- Keep the ends of exhaust air hoses and the waste liquid hoses, which are inserted into the drain, above the liquid level of the drain.
- Confirm that the liquid waste hoses are not bent or crushed.
- Drainage capability for concentrated and diluted liquid waste is:
  - Concentrated waste liquids (reagent + sample + wash solution):
    - 24 liters /hour (for one-unit system)
    - 48 liters/hour (for two-unit system)
    - 72 liters/hour (for three-unit system)
    - 96 liters/hour (for four-unit system)
    - 2.5 liters/hour (for an ISE unit with one flowcell)
    - 3 liters/hour (for an ISE unit with two flowcells)
  - Diluted waste liquid (washing water):
    - 38 liters/hour (for one-unit system)
    - 76 liters/hour (for two-unit system)
    - 114 liters/hour (for three-unit system)
    - 152 liters/hour (for four-unit system)

Environmental Requirements

Temperature and Humidity Conditions When in Use

Heat output by the system during operation:

- Approximately 16227 kJ/h (15381 BTU) for one-unit system
- Approximately 21856 kJ/h (20717 BTU) for two-unit system
- Approximately 29804 kJ/h (28250 BTU) for three-unit system
- Approximately 35160 kJ/h (33327) BTU) for four-unit system

When the specified room temperature and humidity ranges fluctuate, the system data can not be reliable. When the system is in operation, confirm that the following requirements are met.

Confirm that the system is not exposed to direct airflow from air conditioners.

Table A.5 Temperature and Humidity

Specification	Requirement
Temperature	18 to 32 °C (64 to 90 °F)
Acceptable range of temperature fluctuation	Within 4 °C (7.2 °F) during analysis
Humidity	20 to 80% RH (without condensation)

CAUTION

The installation site must be well ventilated. For more information, refer to Clearance.

Temperature and Humidity Conditions When Not in Use

- The temperature is between 5 °C (41° F) and 40 °C (104° F).
- The humidity is between 15% RH and 90% RH.

Power Requirements

Table A.6 Power Requirements

Specification	Requirement
Voltage, Frequency	AC 208 V 50/60 Hz (USA) AC 230 V 50/60 Hz (Europe) AC 220 V 50/60 Hz (Asia) AC 240 V 50/60 Hz (Australia) AC 200 V 50/60 Hz (Japan)
Maximum rated power consumption	6 kVA (for one-unit system) 8 kVA (for two-unit system) 10 kVA (for three-unit system) 12 kVA (for four-unit system)

Bar Code Reader

Table A.7 Sample ID Bar Code Reader Specifications

Item	Specification
Wave length	650 nm
Maximum output	85 µW
Beam divergence	60 degrees
Pulse width	112 µS
Scan rate	500 Hz
Class	2

Hand Scanner

Table A.8 Hand Scanner Specifications

Item	Specification
Wavelength	630 to 680 nm
Output	1.0 mW
Class	2

Regulatory Compliance

This system complies with IEC60825-1: 2007.

General Specifications

Method of Analysis

Discrete method

Configuration

Rack Feeder Unit
Analyzer Unit
Data Processor

Option

ISE
Printer
PROService kit
Hand scanner
Water supply equipment
External storage device
Laboratory Automation Connecting kit

Type of Sample

Serum, plasma, urine, or other fluids with viscosities in the same range as serum

Maximum Number of Simultaneous Analytes

One-unit system (including ISE): 57 analytes
Two-unit system (including ISE): 111 analytes
Three-unit system (including ISE): 120 analytes
Four-unit system (including ISE): 120 analytes

Maximum Throughput

One-unit system: 2000 tests/hour
Two-unit system: 4000 tests/hour
Three-unit system: 6000 tests/hour
Four-unit system: 8000 tests/hour
ISE (1 flowcell): 900 tests/hour
ISE (2 flowcells): 1800 tests/hour

Data Input Methods

Touch screen
Keyboard
Mouse
Online (RS232C and TCP/IP)
Hand scanner
CD

Data Output Methods

Monitor display
Printer (option)
Online (RS232C and TCP/IP)
External storage device (option)
PROService (option)
Internal hard disk

Cups or Tubes Specifications

NOTE

BD indicates a Becton Dickinson PN. The BD tube or its equivalent can be used.

CAUTION

Beckman Coulter adjusts the sample probes for optimal dispensing with the cup or tubes selected for use by each laboratory at installation. If you change the cup or tubes in use on the system, contact Beckman Coulter so any required adjustments can be made.

Table A.9 Cup or Tube Available for Racks

Cup or Tube	Size	PN	Dead Volume (µL)
Hitachi cup	2.0 mL	MU853200	70
Auto aliquot tube	13 mm	2910034	90
Serum Separator Tube	13 x 100 mm	BD 367986	4 mm above the non-sample (cells or gel) layer
Serum Separator Tube	16 x 100 mm	BD 367988	4 mm above the non-sample (cells or gel) layer
Lithium heparin with gel separator (light green top)	13 x 75 mm	BD 367960	4 mm above the non-sample (cells or gel) layer
Lithium heparin with gel separator (light green top)	13 x 100 mm	BD 367962	4 mm above the non-sample (cells or gel) layer
Lithium heparin (green top)	13 x 75 mm	BD 367884	4 mm above the non-sample (cells or gel) layer
Lithium heparin (green top)	13 x 100 mm	BD 367886	4 mm above the non-sample (cells or gel) layer
Primary tube (red top)	13 x 75 mm	BD 366668	140
Primary tube (red top)	13 x 100 mm	BD 367815	140

Table A.10 Cup Nested (Inserted) in Tube Available for Racks

Cup, Size	PN	Tube	PN	Dead Volume (µL)
DxC cup, 2.0 mL	652730	DxC transfer	979272	70
Access 2 cup, 2.0 mL	81902	DxC transfer	979272	70
Access 2 cup, 1.0 mL	81915	13 x 75 mm	BD 367960 BD 367884 BD 366668	140

Table A.10 Cup Nested (Inserted) in Tube Available for Racks (Continued)

Cup, Size	PN	Tube	PN	Dead Volume (µL)
Access 2 cup, 1.0 mL	81915	13 x 100 mm	BD 367962 BD 367886 BD 367815	140
Hitachi cup, 2.0 mL	MU853200	SST 16x100 mm	BD 367988	70
EZ Nest cup	1270013000	13 x 75 mm	BD 367960 BD 367884 BD 366668	50
EZ Nest cup	1270013000	13 x 100 mm	BD 367962 BD 367886 BD 367815	50
EZ Nest cup	1270016000	16 x 75 mm	BD 364976	80
EZ Nest cup	1270016000	16 x 100 mm	BD 367988	80

IMPORTANT

You can only use nested cups on racks supplied by the rack input tray or priority rack input component.

Sampling Specifications

Sample Capacity

Maximum 400 samples (40 racks)
Maximum 200 samples (20 racks) when the AU5800 connects to a laboratory automation system

Sample Dispensing System

Micro-syringe system

The system is provided with the following functions:

- Liquid level detection
- Clot detection
- Collision detection
- Pre-dilution

Sample Volume

Table A.11 Sample Volume

Pre-Dilution Rate	Dilution (µL)	Sample Volume (µL) in 1.0 µL increments
3 or 5	0	1.0 to 8.5
	10	1.0 to 3.5
Other than 3 or 5	0	1.0 to 17.0
	10	1.0 to 7.0

Rack Type

NE racks are required on the system. For more information on NE racks, refer to Place the Sample Cups or Tubes in a Rack.

- Blue rack
- Yellow rack
- Green rack
- White rack
  - White rack with or without black adapters (without a laboratory automation system)
  - White rack with light blue adapters (with a laboratory automation system)
- Red rack
- Orange rack

CAUTION

Supply only the white racks with the light blue adapters to the Beckman Coulter laboratory automation system.

Rack Jam errors can occur if racks other than white racks with light blue adapters are supplied to the Beckman Coulter laboratory automation system.

Reagent Specifications

Storage Capacity

Table A.12 Storage Capacity

Component	Capacity
R1 refrigerator	54 with serial reagent bottle capability
R2 refrigerator	54 with serial reagent bottle capability

Refrigeration

Refrigeration temperature: 4 to 12 °C (39.2 to 53.6 °F)

Reagent Setting Method

- Turn table method

Type of Reagent

- Normal concentration reagent
- Highly concentrated reagent

Reagent Dispensing System

Micro-syringe with collision detection function for the probe

Number of Reagent Steps

Maximum 3 steps

Reagent Volume Setting Range

Table A.13 Reagent Volume

Reagent	Volume
Normal dispensing	10 to 170 µL in 1.0 µL increments R1 volume: ≤170 µL R2 volume: ≤170 µL Total reagent volume (R1 + R2): ≤270 µL For 3 steps reagent R1-1 + R1-2 ≤170 µL Total reagent volume (R1-1 + R1-2 + R2): ≤270 µL
Dilution dispensing	10 to 170 µL in 1.0 µL increments R1 volume including dilution water: ≤ 170 µL R2 volume including dilution water: ≤ 170 µL Total reagent volume including dilution water: ≤ 270 µL Dilution water volume: 10 to 160 µL

Reaction System Specifications

Reaction Incubation Method

Dry bath system

Reaction Temperature

Dry bath: 37± 0.3 °C (98.6± 0.5 °F)

Reaction Solution Amount

- 80 to 287 µL

Reaction Time

Maximum 8 minutes 40 seconds

Mixing System

Rotative mixing bar system

Reaction Cell

Glass square cuvette (optical path length: 5 mm)

Reaction Line

Rotary disk system: 204 cuvettes x 2 lines

Analytical Method Specifications

Photometric points

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Type of Measurement

- End point assay
- Rate assay
- Fixed point assay
- Electrode method (ISE) (option)

Optical System Specifications

Photometer

Multi-wavelength diffraction grating spectrophotometer

Photometric Modes

Monochromatic or bichromatic

Wavelengths

340 to 800 nm (13 steps of 340, 380, 410, 450, 480, 520, 540, 570, 600, 660, 700, 750, and 800 nm)

Photodetector

Silicon photodiode array

Light Source

Halogen lamp 12 V/100 W

Measurable Absorbance Range

0 to 3.0 Abs (converted in units of 10 mm of optical path length)

Photometric resolution

0.0001 Abs

Data Processing Specifications

Storage Capacity

Table A.14 Data Storage Capacity

Data	Hard Disk Storage Capacity
Patient Samples	100,000 samples 9999 samples/index Maximum 300 indexes Reaction Monitor data: A maximum of 40,000 tests per index and a maximum of 400,000 tests in multiple indexes
QC Samples	999 samples/index Maximum 300 indexes

Data Processing Configuration

- Hard disk: 150 GB or more
- Memory capacity: 2 GB or more
- Keyboard: 101 to 109 keyboard
- Touch-panel monitor
- CD-R drive
- Printer (option)

Calculation Processing Specifications

Calculation

- Calibration
  - Analytical method
    - End point assay
    - Rate assay
    - Fixed point assay
    - Electrode method (ISE)

  - Calibration method
    - ACAL AA
    - ACAL AB
    - ACAL 2AB to ACAL 7AB
    - 4 MC to 10 MC
    - MCAL MB
    - MCAL 2MB to MCAL 7MB
  - Calibration curve type
    - Straight line
    - Polygonal line
    - Quadratic expression
    - Tertiary expression (2 types)
    - EIA-TYPE 1 to 4
    - Spline
- Correction
  - Water blank correction
  - Reagent blank correction
  - Sample blank correction
  - Data correction

Quality control (QC)

- QC samples
  - Maximum 10 types/test
  - Maximum 100 types in total
- Quality control method
  - Shewhart day-to-day management (Levey-Jennings method)
  - Multi-rule control (Westgard method)
  - Twin-plot control

Input and Output Specifications

Worksheet

- Routine sample worksheet
- Emergency sample worksheet
- Repeat sample worksheet
- QC sample worksheet
- Calibration worksheet

Data Input and Output

- Test requisitions: Keyboard entry, real-time online, batch online
- Analysis result output: Real-time, batch online

Input and Output To and From an External Device

- Online input and output
  - — RS232C and TCP/IP
- Offline output
  - — CD-R
  - — External storage device (HD) (option)

ISE Specifications

Reagents

- ISE Buffer Solution: 2L bottle
- ISE MID Standard Solution: 2L bottle
- ISE Reference Solution: 1L bottle

Measurement Method

Indirect (diluted) ion-selective electrode

Measurement Items

Na, K, and Cl ions in serum or urine

Throughput

One flowcell: 300 samples per hour
Two flowcells: 600 samples per hour

Sample Volume

20 µL plus 10 µL deionized water

Dilution Ratio

32.4 times (deionized water 10 µL, ISE Buffer Solution 618 µL)

Measuring Range (mmol/L)

Table A.15 Measuring Range (mmol/L)

Test	Serum	Urine
Na	50 to 200	10 to 400
K	1.0 to 10.0	2.0 to 200
Cl	50 to 200	15 to 400

Calibration Curve

Automatic calibration curve:

Measures the high concentration ISE Standard Solution and low concentration ISE Standard Solution to create a two-point calibration curve.

Data Correction

Enables manual calibration chart correction (MCAL) and automatic calibration chart correction (ACAL, 3-point regression CAL).

Drift Correction

Automatic correction:

Measures the electrical potential of ISE MID Standard Solution for each sample to perform drift correction.

Types of Consumables and Approximate Consumption

Table A.16 Types of Consumables and Approximate Consumption

Name	Approximate Daily Consumption
ISE Buffer Solution	Approx. 900 mL (based on 1,000 serum samples per day)
ISE MID Standard Solution	Approx. 1,300 mL (based on 1,000 serum samples per day)
ISE Reference Solution	Approx. 175 mL (based on 1,000 serum samples per day)
ISE Cleaning Solution	Approx. 1 mL (based on 1,000 serum samples per day)

Glossary

ACAL (Auto Calibration) — The AB type (or ACAL) uses calibrator material to calculate a calibration factor automatically and create a calibration curve each time the system calibrates. The calibration types are defined in parameters as AB (single point), AA, or 2AB-7AB (multi-point) for each test.

Alarm Shots (Tests) — The Alarm Shots (Tests) function enables the operator to set the quantity of remaining reagent tests (shots) which, when reached, prompts a reagent short alarm.

Advanced Calibration — The system can calibrate a maximum of 5 bottles or lot numbers of the same reagent before the system uses the reagent.

Auto Power On — Allows the operator to set a date and time when the system automatically powers on the analyzer.

Calibration Curve — A curve calculated from the absorbance and concentration of the calibrator. The system then calculates the analyte concentration for a sample using the calibration curve.

Calibration History — The system saves a maximum of 100 points of calibration data per sample type per test. View calibration data and status in the Calibration Monitor screen.

Calibrator — Material with a known value that the system uses to establish the measurement relationship.

Consumable — Analyzer parts replaced by the operator if they are damaged or on a periodic basis to maintain optimum performance of the analyzer. Includes photometer lamps, probes, and syringes.

Cuvette — A glass vessel the system uses as the reaction vessel, containing the sample and reagent.

Dead Volume (Reagent) — Reagent volume that the reagent probe cannot aspirate, and remains in the bottle. The dead volume depends on the size of the reagent bottle.

Dead Volume (Sample) — Sample volume that the sample probe cannot aspirate, and remains in the tube or cup. The dead volume depends on the type of cup or tube.

Deciding Test — Generates an automatic repeat order (requisition) for the Related Test when resulting in a repeat, fl, or fh flag. The system also orders (requisitions) the Deciding Test with a repeat flag, but does not order (requisition) it with a fh or fl flag. You can program a maximum of 10 tests as Deciding Test.

Deionized Water (DI Water) — Deionized water, also known as demineralized water, is water that has had its mineral ions removed, such as ions from sodium, calcium, iron, copper, and anions such as chloride and bromide.

Disabling (a Test) — Prevents the system from performing ordered (requisitioned) tests during analysis. Use this function when the preceding calibration or QC has failed for a test for samples that are loaded on the rack supply component. Only tests for patient samples can be disabled (unavailable). Tests for reagent blank, calibration, or QC cannot be disabled (unavailable).

Dynamic Range — The range the analyzer can measure for a reagent. If the range is exceeded, the system generates an F (over) or G (under) flag.

End Point Assay (END) — The three types of end point assays:

- 1-point assay is a general end-point assay that determines the optical density of the reaction mixture from the optical density measured at a specified photometric measuring point.
- 2-Point assay (self-blank method) provides sample blank adjustment. The optical density values before dispensing reagent are eliminated as the sample blank. This optical density value is then subtracted from the values calculated after dispensing the second reagent. Any contribution to the final reaction optical density from the sample (turbidity, icterus, and so on) is removed to improve measurement reliability.
- Sample blank correction measures the blank item and then subtracts the value from the measured optical density, to calculate the optical density of the reaction. This method requires an extra blank.

END1 does not use the reagent blank absorbance as the reference for measurement data at each photometric point.

Fixed Point Assay (FIXED) — A method of calculation that determines the difference between the optical densities at two specific time points within a reaction. FIXED1 does not use the reagent blank absorbance as the reference for measurement data at each photometric point.

Flag — Symbols that display on analysis results, indicating that a problem or an error has occurred during analysis. A result with a flag must be reviewed and have corrective actions performed before reporting results.

Group — An operator-defined group of tests that are selected in the Start Condition screen. The tests in the selected Group have reagents on-board the analyzer and are available to perform analysis. You can program three Groups in **Menu List > Parameters > Common Test Parameters > Group of Tests**. For example, designate the tests frequently used for routine analysis to Group 1, and the tests used for specific analysis to Group 2. Perform routine analysis under Group 1 and switch to Group 2 for specific analysis as required.

Index — A data file identified by date and time, used to retrieve reagent blank, calibration, QC, and patient results.

LAG_TIME Check — If a reaction is terminated too quickly, effective data at two points or more may not be acquired. In this situation, the system can be set up to calculate the analysis result using the data in the lag phase. Used for tests in the rate assay method. Refer to the individual method parameters to determine the correct setting for the test.

LIH Testing - Serum Index — Evaluates and performs test of lipemia (L), icterus (I), and hemolysis (H) in serum and plasma. LIH is the symbol used for testing lipemia (L), icterus (I), and hemolysis (H).

Linearity — Ability of a measuring method to generate results that are proportional to the analyte concentration in a sample.

MCAL (MB) — A type of calibration that does not use any calibrator material. A preset MB factor has been determined and is entered per the chemistry setting sheet provided for this type of test.

Optical Density (OD) — The measurement of the amount of light absorbed by a solution in the cuvette with the use of a photometer. The higher the optical density the lower the transmittance.

Panic Value — An operator-defined critical range. If the range is exceeded, the system generates a ph (high) or pl (low) flag. If the panic range is exceeded, the system also generates an audible alarm.

Photocal Measurement — Evaluates the integrity of the cuvettes used to obtain accurate analysis results. Confirm the photocal data obtained from a photocal measurement from **Home > Analyzer Maintenance > Photocal Monitor**. For more information, refer to Perform a Photocal.

QC Monitor — The QC Monitor gives an instant visual summary of QC analysis results.

QC Sample — Material used to confirm the performance characteristics of an in vitro diagnostic medical device.

Quality Control (QC) Analysis — The process of analyzing samples with known concentrations of analytes to test the quality of reagents, calibrators, analyzer, and procedures.

Rate Assay (RATE) —

- Normal rate assay measures the variation in the rate of absorbance per minute by calculating the average change in absorbance between two photometric points, using the least squares method.
- Double rate assay determines the rate of absorbance variation per minute by calculating the average of the absorbance variations between two measuring points, using the least squares method. The rate of absorbance before dispensing reagent 2 is subtracted from the value calculated after dispensing the second reagent.

RATE1 does not use the reagent blank absorbance as the reference for measurement data at each photometric point.

Reagent Blank (RB) — In routine analysis, the reagent blank serves as the reference value for the reagents at each photometric point of individual analysis tests. It also becomes the Y-intercept of calibration curves created by ACAL.

Reagent — A combination of chemicals that react with the target analyte in the sample. The AU5800 uses either one (R1) or two reagents (R1 and R2) per analyte.

Reagent ID — The analyzer identifies reagents placed on-board the analyzer using the bar code label.

Reflex Testing — A function to generate a repeat order (requisition) automatically for the Related Test by linking the Related Test to the Deciding Test. Reflex testing occurs when the Deciding Test has resulted in a repeat, fl, or fh flag.

Related Test — The system automatically orders (requisitions) the test for repeat when the Deciding Test has resulted in a repeat, fl, or fh flag. A maximum of five tests can be programmed as Related Test in combination with a Deciding Test.

Rerun — A process whereby the analyzer tests the samples again, either manually or automatically.

Sample Diluent — Solution the system uses for a manual or automatic dilution of samples.

Sample ID — An alphanumeric code assigned and used to identify each

sample. The system reads the sample bar code label attached to the sample cup to identify the sample ID.

Sample Number (Sample No.) — A 4-digit number the analyzer generates and uses to identify each sample. The system displays a sample data prefix in front of the sample number indicating the sample type and repeat.

Standard Deviation — Measurement of statistical dispersion. In multiple measurements of the same sample, the standard deviation measures how spread out the values are.

Test Order (Requisition) — An instruction to perform tests on a sample. When a sample is placed on the analyzer, the system uses the test order (requisition) information to link the sample to the required tests.

Twin Plot — Determines whether the analyzer causes a problematic variation in QC or if the variation is a random error. Perform QC analysis using two controls: normal and abnormal. The twin plot function displays the first control on the x-axis of a 2-dimensional plot and the second control on the y-axis.

W1 — A maintenance procedure that automatically cleans cuvettes using the wash nozzle component before and after analysis in routine operation. For more information, refer to Perform a W1.

W2 — A maintenance procedure that automatically cleans cuvettes, the sample probe, reagent probes, and mix bars using either sodium hypochlorite solution (0.5%) or 1N hydrochloric acid. After performing the W2, perform a photocal. For more information, refer to Perform a W2.

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