ABBOTT SPECTRUM®

MAINTENANCE AND TROUBLESHOOTING

SERIES II

MAINTENANCE & TROUBLESHOOTING

FOREWORD

The Maintenance & Troubleshooting Manual is intended as an instructional and reference manual to aid in the maintenance and troubleshooting of the ABBOTT SPECTRUM® SERIES II™ System. It contains detailed descriptions of instrument features, basic operational procedures, and discussions of individual screen functions. The organization of this manual provides quick access to the location of needed information. Do not operate the System before becoming thoroughly familiar with the information in this manual.

In addition to the Maintenance & Troubleshooting Manual, the ABBOTT SPECTRUM® SERIES II™ Manual Set includes an Operation Manual and a Reagent Manual. Additional copies of the manual set may be ordered.

- ◇ A separate Maintenance Log is supplied with the instrument. An annual Maintenance Log should be maintained to document scheduled and unscheduled maintenance. Additional logs may be ordered.
- ◇ Direct inquiries regarding equipment problems to the Customer Support Center.

ABBOTT INSTRUMENT WARRANTY

Abbott Laboratories warrants instruments sold by the Abbott Diagnostic Division to be free from defects in workmanship and materials during normal use by the original purchaser. This warranty shall continue for a period of one year, commencing twenty-one (21) days from the date of shipment to the original purchaser, or until title is transferred from the original purchaser, whichever occurs first (the "Warranty Period").

If any defects occur during the Warranty Period, contact the Abbott Customer Support Center immediately, and be prepared to furnish pertinent details concerning the defect, the model number and the serial number.

Warranty service is provided 8:30 a.m. through 5:00 p.m., Monday through Friday, except on Abbott-observed holidays. Any service performed at other times, and all service required to correct defects or malfunctions not covered by this Warranty, will be billed at Abbott's labor rates then in effect.

This Warranty does not cover defects or malfunctions which: (1) are not reported to Abbott during the Warranty Period and within one week of occurrence; (2) result from chemical decomposition or corrosion; (3) are described in the applicable Abbott Operation Guide; or (4) result from maintenance, repair, or modification performed without Abbott's prior written authorization.

Abbott's liability for all matters arising from the supply, installation, use, repair, and maintenance of the instrument, whether arising under this Warranty or otherwise, shall be limited solely to the repair or (at Abbott's sole discretion) replacement of the instrument or of components thereof. In no event shall Abbott be liable for injuries sustained by third parties, incidental or consequential damages, or lost profits. Replaced parts shall become the property of Abbott Laboratories.

THE FOREGOING IS THE SOLE WARRANTY MADE BY ABBOTT LABORATORIES REGARDING THE INSTRUMENT, AND ABBOTT SPECIFICALLY DISCLAIMS ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND OF FITNESS FOR A PARTICULAR PURPOSE.

REVISION STATUS

The ABBOTT SPECTRUM® SERIES II™ System is manufactured by Abbott Laboratories, Diagnostics Division, 1921 Hurd, P.O. Box 152020, Irving, Texas 75015, U.S.A. Please direct all inquiries concerning information in this manual to the foregoing address.

The Revision Status of the manual is indicated below. Be sure that the manual contains the latest revision number of all pages.

Note: *Direct all inquires regarding equipment problems to the Customer Support Center (CSC).*

New technical information (◊) and revised technical information (♦) will be so noted in this manual.

Document Control Number	Revision Date	Pages Revised and Added
Originally Issued – 18474-101	11/90	Not applicable
18474-102	4/91	All pages
18474-103	4/92	iii, 1-26, 1-27, 1-28, 2-23 through 2-36
18474-104	5/92	iii, v through vii, Section 1, Section 2, Section 3, 4-11, 4-28, 4-33, 4-35, 5-7, 5-9, 5-11 through 5-22, and 6-11
18474-105	10/92	i through iv, 1-2 through 1-4, 1-9, 1-10, 1-13, 1-17 through 1-20, 1-26, 1-29, 1-30, 2-5, 2-6, 2-9, 2-17, 2-18, 2-35, 2-36, 2-41, 3-17, and 5-19
18474-106	2/93	All pages
18474-107	12/93	i through xii, Section 1, Section 2, 3-11 through 3-38, 4-15, 4-16, and 4-29 through 4-50
18474-108	12/94	iii, ix through xi, 1-5 through 1-52, 2-25 through 2-44, 3-7, 3-11 through 3-18, and 3-20
18474-109	12/95	i through iv, ix through xii, 1-1 through 1-6, 1-17 through 1-50, 2-1, 2-2, 2-5, 2-6, 2-11 through 2-16, 2-19, 2-20, 2-23 through 2-42, Section 3, 4-1 through 4-12, 4-19, 4-20, 4-27, 4-28, 4-31 through 4-42, 4-47 through 4-50, 6-7 through 6-12, Section 7, and Section 8

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REVISION LOG

This log provides a record of incorporation of revised pages.

1. Remove and replace revised pages.
2. Record the following information in the appropriate columns:
   - The document control number*
   - The revision date*
   - The initials of person incorporating revised pages
   - The date revised pages are incorporated

Document Control Number	Revision Date	Revision Incorporated by	Date Incorporated

*Refer to the Revision Status page for this information.

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REVIEW STATUS

This page provides a record of persons who review this manual on a periodic basis.

Signature	Date

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TABLE OF CONTENTS

TABLE OF CONTENTS

TABLE OF CONTENTS

TABLE OF CONTENTS

MAINTENANCE

Introduction

The performance of maintenance procedures facilitates proper instrument operation, minimal downtime and necessary records for inspection and accreditation. This section provides a summary of the required maintenance and the instructions for each procedure. It is recommended that maintenance procedures be performed in the maximum efficiency sequence. Refer to the Specific Maintenance & Component Replacement section for procedures in a stand-alone format.

Important Information

Users of the System must be familiar with and heed important precautionary and informational text, presented as follows.

WARNING	Indicates a clear and present danger to personnel or questionable result efficacy. Failure to comply may result in incorrect instrument performance leading to instrument failure, generation of erroneous results, or hazard to the operator.
◇ WARNING Potential Biohazard	Indicates the actual or potential presence of a biological hazard.
◇ WARNING Electrical Shock Hazard	Indicates possible danger from electrical shock.
CAUTION	Indicates a minor hazard situation where unsafe practices or a non-immediate or potential hazard presents a lesser threat of injury. Failure to comply may result in unexpected instrument performance or hazard to the operator.
ATTENTION	Indicates general information. Failure to comply may result in damage to the instrument.
NOTE	Indicates general information. Failure to comply will present no efficacy, performance, or safety issues.

Screens

Screens in this manual display example data. Data displayed on screens during System operation may be different.

General Biosafety

◆ Consider all clinical specimens and reagent controls, calibrators, etc. that contain human blood or serum and contaminated instruments as potentially infectious. Wear gloves, lab coats, and safety glasses, and follow other biosafety practices as specified in the OSHA Bloodborne Pathogen Rule, 29 CFR 1910.1030, or other equivalent biosafety procedures.

Instrument Decontamination

The OSHA Bloodborne Pathogen Rule, 29 CFR 1910.1030, requires the decontamination of laboratory equipment prior to the following:

- Service and maintenance
  - FSR service
  - Component replacement, e.g., probe change
- Shipment

Use the following procedure to decontaminate the instrument.

1. Touch HOME ROBOTICS to flush the probes and mixer arm tip, and purge waste and reagents from the tubing.
2. Remove all samples, reagents, controls, calibrators, standards, cuvettes, and other disposables from the instrument. Dispose of in accordance with local, state, and federal regulations governing the treatment of regulated medical waste.
3. Empty all waste containers and rinse with disinfectant or water.
4. Wipe the surface of the instrument with a detergent solution to remove any soiling. Then wipe the unit down with a tuberculocidal disinfectant, such as 10% chlorine bleach solution.

Contaminated Sharps

Exercise caution when contacting the sample probe, reagent probe, and mixer arm tip. They are sharp and potentially contaminated with infectious materials. Avoid any contact with the probes or the mixer arm tip.

Waste Treatment

Dispose of all clinical specimens, reagents, controls, calibrators, standards, cuvettes, and other disposables that may be contaminated in accordance with local, state, and federal regulations governing the treatment of regulated medical waste.

Sharps

Sharps, such as contaminated probes, must be placed in an appropriately marked, puncture-resistant container prior to treatment and disposal.

Solid Waste

Generally accepted procedures for the treatment of potentially infectious solid waste include incineration or autoclaving. If an autoclave is used, the effectiveness of the decontamination cycle must be verified.

General Biosafety
(continued)

Liquid Waste

◆ Liquid waste containing acid should be neutralized prior to the addition of a disinfectant and disposal. Addition of disinfectant to the waste container helps inactivate the infectious organisms that may collect with the waste.

Spills

◆ Consider all samples, reagents, calibrators and controls that contain human blood or serum as potentially infectious. Clean up spills of potentially infectious materials in accordance with established biosafety practices. A generally accepted procedure for cleaning such spills is to absorb the spill with toweling or other absorbent material, wipe the area with a detergent solution, and then wipe the area with an appropriate tuberculocidal disinfectant, such as 10% chlorine bleach solution.

◇ **Electrical Safety**

Operators must practice good habits of electrical safety for the safe operation of any system, such as the following:

- Periodically inspect electrical cabling into and on the System for signs of wear or damage.
- Do not disconnect any electrical connection while the power is on.
- Keep liquids away from all connectors of electrical or communication components.
- Keep the floor dry and clean under and around the System.
- Disconnect the power cord before servicing.
- In the event of a blown fuse or thrown circuit breaker, determine and correct the cause before attempting to resume operation of the equipment.

High Voltage Areas

- High voltage areas exist near the Main power switch and the Maintenance power switch. The operator must visually locate the power switches before turning power on or off.
- When Maintenance power is off, power remains on for the ISE module electronics.

◇ **Physical Safety**

The operator must follow basic rules of mechanical equipment operation, including the following:

- Keep all protective covers and barriers in place.
- Never allow any part of the body to enter a range of mechanical movement during System operation.
- Do not wear articles of clothing or accessories that could catch on the System.
- Avoid haste. Be especially cautious when performing adjustment, maintenance, cleaning, or repair procedures.

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SUMMARY

To maximize efficiency, utilize the following summary:

◆ 1. Performe decontaminatione procedure.e Refere toe Instrument Decontamination earlier in this section.

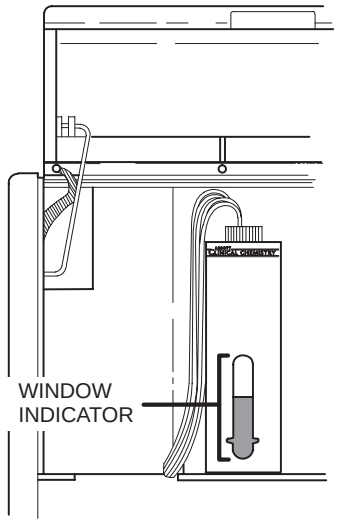
> ◇ **WARNING**
>
> **POTENTIAL BIOHAZARD.** INDIVIDUAL COMPONENT PARTS, HOWEVER, MAY REMAIN CONTAMINATED WITH BIOLOGICAL HAZARDS. FOLLOW BIOSAFETY PRACTICES WHEN HANDLING.

2. Check level and mix ISE reagent cartridge pack.
3. Clean ISE septum.
4. Perform potassium conditioning (if fewer than 10 ISE samples are analyzed per day).
5. Perform ISE set-up.
6. Perform temperature calibration set-up.
7. Rinse and refill sample diluent reservoir.
8. Initiate the automated Daily Maintenance.
9. Continue by verifying reagent stability dates and mixing reagents.
10. Clean and inspect reagent probe.

◆ 11. Inspect sample probe.

12. At the time the audible alarm sounds, verify and document incubator temperature.
13. Verify and document ISE slope values, ISE controls and flow rates.
14. Verify sample probe and reagent probe positioning.
15. Clean, inspect and verify mix arm tip stroke and position.
16. Verify and document water quality station incoming pressure and water quality light status.
17. Clean sample conductive plate.
18. Request, run, and record quality control results.

ISE Reagent Cartridge Pack



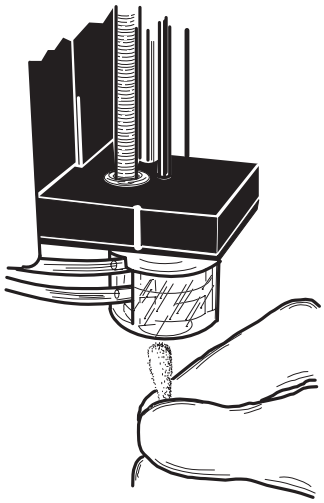
1. Open the upper left access door.
2. Verify the ISE reagent cartridge pack fluid level by observing the window indicator.
3. Gently shake the pack to mix solutions.
4. If the ISE reagent cartridge pack requires replacement, refer to Component Replacement, ISE Reagent Cartridge Pack Replacement.

NOTE

REPLACEMENT OF THE ISE SEPTUM IS REQUIRED WHEN THE ISE REAGENT CARTRIDGE PACK IS REPLACED. REFER TO COMPONENT REPLACEMENT, ISE REAGENT CARTRIDGE PACK REPLACEMENT.

Septum Cleaning/Inspection

1. Moisten a cotton swab with Type II water. Wipe the ISE septum bottom probe opening to remove crystallized solution(s).
2. Inspect the ISE septum for leakage. If fluid is observed on the top surface, remove and reseat the ISE septum. If leakage persists, replace the ISE septum. Refer to Component Replacement, ISE Reagent Cartridge Pack Replacement.
3. Observe the ISE septum bottom probe opening. Some moisture around the opening is normal. However, if a drop of fluid is observed which increases in size or drips, over a period of 10 to 15 seconds, replace the ISE septum.



ISE Septum

Potassium Conditioning

Follow this procedure if fewer than ten ISE samples are processed per day.

1. Fill a sample cup with 0.5 ml of serum and place it in sample carousel position 1.
2. From the ISE STATUS screen, touch MOVE TO OUTER.
3. Touch MOVE CAROUSEL, type 1, and press ENTER.
4. Touch ANALYZE SERUM. After sequence completes, repeat ANALYZE SERUM.
5. Touch FLUSH.
6. Remove the sample cup. Dispose of the used sample cup in accordance with local, state, and federal regulations governing the treatment of regulated medical waste.
7. Touch EXIT.

◆ ISE Set-up

Introduce a minimum of 500 µl of solution into sample cups and place them on the outer ring of the sample carousel in the following sequence:

- Cup 1 —
  - Empty cup, if fewer than 200 samples per day are processed
  - ISE Conditioning Solution, if more than 200 samples per day are processed.
- ◆ Cup 2 — ISE Control 1
- ◆ Cup 3 — ISE Control 2
- ◆ Cup 4 — ISE Control 4

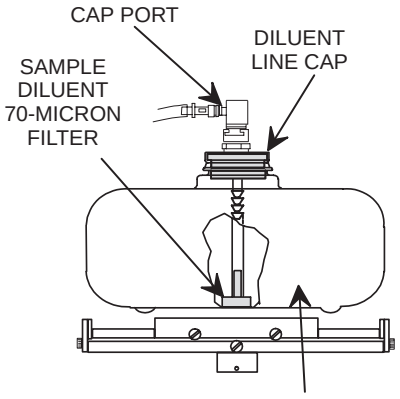
NOTE

WHEN PERFORMING THIS PROCEDURE AS PART OF WEEKLY MAINTENANCE, CUP 1 MUST CONTAIN ISE CONDITIONING SOLUTION.

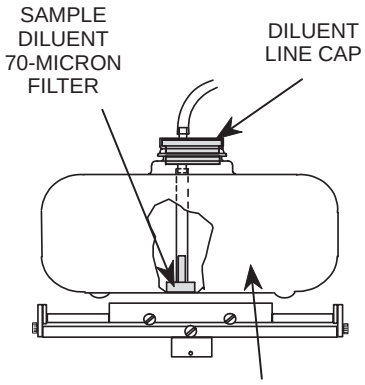
Temperature Calibration Set-up

1. Dispense 500 µl of Type II water into the temperature calibrator cuvette that contains the thermistor. Dispense 500 µl of Type II water into the cuvette cell on each side of the thermistor.
2. Insert the temperature calibrator cuvette into cuvette segment 2 or 3. Verify cuvettes are in all remaining segments.

Sample Diluent Reservoir



SAMPLE DILUENT RESERVOIR



SAMPLE DILUENT RESERVOIR

Two types of sample diluent reservoirs are available on the ABBOTT SPECTRUM® SERIES II™ System. Refer to the illustrations below.

1. Open the sample diluent reservoir access door. Remove the sample diluent reservoir from the platform and discard the residual water.
2. Rinse the sample diluent reservoir with Type II water. Fill the sample diluent reservoir with Type II water and insert the diluent line into the reservoir. Verify the diluent line cap is properly installed, and that the tubing is secure on the cap port.
3. If automated Daily Maintenance is to be performed, proceed with Initiation of Automated Daily Maintenance. If performed independently of automated Daily Maintenance, from the Main menu, touch SPECIAL PROCEDURES, SELECT. Touch ROBOTICS, SELECT. Touch PUMPS & VALVES, SELECT.
4. Touch DILUENT VALVE CLOSED to display DILUENT VALVE OPENED.

ATTENTION

TO PREVENT DAMAGE TO THE SAMPLE DILUENT VALVE, **DO NOT** LEAVE THE VALVE OPEN FOR LONGER THAN TWO MINUTES WITHOUT FLUID FLOW.

5. Touch SINGLE STROKE to display PURGE # PURGES 1. Highlight 1, type 2, and touch DILUENT PUMP. During the purge cycles, inspect the sample diluent tubing from the sample diluent reservoir for bubbles. Gently tap the tubing during the purge cycle to clear bubbles. Repeat until all bubbles have been purged.
6. After the purge cycles are complete, touch DILUENT VALVE OPENED to display DILUENT VALVE CLOSED. Touch PURGE to display SINGLE STROKE. Touch EXIT.
7. Replace the sample diluent reservoir on the platform and close the access door.

Initiation of Automated Daily Maintenance

Option 1

Initiate automated Daily Maintenance by pressing the SHIFT key and DAILY MAINT. key simultaneously. CODE 00318 DAILY MAINTENANCE STARTED will display.

Option 2

Automated Daily Maintenance may also be initiated by touching CALIBRATION, SELECT from the Main menu, then MAINTENANCE, SELECT. Touch DAILY MAINTENANCE, SELECT to initiate. CODE 00318 DAILY MAINTENANCE STARTED will display.

The automated daily maintenance routine, when activated, performs the following:

- Temperature calibration
- ISE Maintenance
- Sample probe purged 80 strokes

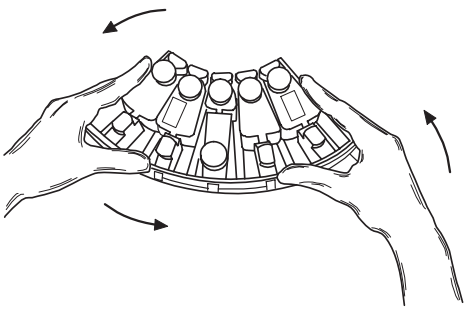
Initiation of Automated Daily Maintenance (continued)

- When SELECT is chosen in the Maintenance screen, the operation will begin immediately; therefore, it is advised to have all preparation completed before touching SELECT. To halt daily maintenance, press the SHIFT key and the HALT key simultaneously (CODE 00274 SYSTEM HALTED will display). To deactivate halt, allow the Activity field to clear. Simultaneously press the SHIFT key and the HALT key. STATUS CODE 00314, ROBOTICS ABORT DURING DAILY MAINT. RESTART MAINT. will be generated, and an audible alarm will sound. Depending on the timing of the System halt request, STATUS CODE 00175 MOTOR LIMITS ERROR MOTOR NUMBER [redacted] could also be generated. To reinitiate automated Daily Maintenance, simultaneously press the SHIFT key and the DAILY MAINT. key to home robotics. After robotics are complete, simultaneously press the SHIFT key and the DAILY MAINT. key to reinitiate automated Daily Maintenance.
- At the time DAILY MAINTENANCE and SELECT are chosen, the Activity field of the screen will display MAINTENANCE. No activities which require robotics will be allowed on the Analyzer.
- As each routine is activated, a banner message will appear at the bottom of the screen indicating which routine has been initiated.
- A report that includes the time the maintenance procedure was performed and errors encountered during the procedure will print automatically, if the printer is on-line.
- The Instrument Status screen lists information regarding the most recent performance of daily maintenance, temperature calibration, and ISE maintenance under TIME OF MOST RECENT MAINTENANCE.

When automated Daily Maintenance is complete, perform the following:

1. Replace the sample diluent reservoir on the platform and close the access door.
2. Remove and dispose of the used sample cups in accordance with local, state, and federal regulations governing the treatment of regulated medical waste.

Reagent Stability and Mixing



1. Verify the stability dates for each on-board reagent cartridge. Replace the outdated cartridges. Dispose of the outdated cartridges in accordance with local, state, and federal regulations governing the treatment of regulated medical waste.
2. Thoroughly mix each on-board reagent. Remove each reagent quadrant and gently rotate on a flat surface to prevent reagent from splashing on the under side of the septum, which results in false fluid sense errors.

NOTE

LDH — LDH MUST BE MIXED AT LEAST ONCE PER SHIFT. REMOVE THE SEPTUM AND REPLACE THE CARTRIDGE SCREW CAP. INVERT GENTLY FIVE TIMES.

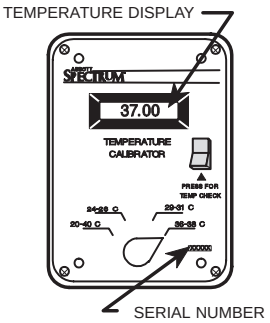
Reagent Probe Cleaning and Inspection

1. Lightly wipe the reagent probe with an alcohol pad.
2. Lightly wipe the probe with a moist, lint-free tissue.
3. Inspect the reagent probe and replace it if burrs, abrasions, or damage are observed. Refer to Component Replacement, Reagent Probe Replacement, in this manual.

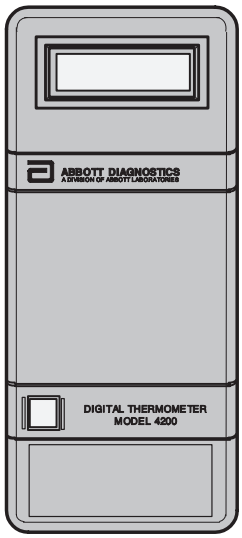
Sample Probe Inspection

Inspect the sample probe and replace if damage is observed. Refer to Component Replacement, Sample Probe Replacement, in this manual.

Temperature Calibration



Temperature Calibrator with Variable Temperature Range



Model 4200 Temperature Calibrator

Two different models of temperature calibrator are available for use with the analyzer: the Digital Thermometer Model 4200 and the Temperature Calibrator with variable temperature range settings. Where operation of the calibrators differ, separate instructions are included.

NOTE

IF THE TEMPERATURE CALIBRATION PROCEDURE IS PERFORMED INDEPENDENTLY OF AUTOMATED DAILY MAINTENANCE, BEGIN WITH STEP 1. IF PERFORMED AS PART OF AUTOMATED DAILY MAINTENANCE, BEGIN WITH STEP 4.

1. Dispense 500 µl of Type II water into the temperature calibrator cuvette that contains the thermistor. Dispense 500 µl of Type II water into the cuvette cell on each side of the thermistor.
2. Insert the temperature calibrator cuvette into cuvette segment 2 or 3. Verify cuvettes are in all remaining segments.
3. From the Main menu, touch CALIBRATION, SELECT. Touch MAINTENANCE, SELECT. Touch TEMPERATURE CALIBRATION, SELECT. Touch ROTATE CUVETTE.
4. An audible alarm will sound when the cuvette carousel rotation is complete and STATUS CODE 00299—ROTATION COMPLETE. PLEASE VERIFY TEMPERATURE CALIBRATION will be generated.

CAUTION

ON BATTERY-POWERED TEMPERATURE CALIBRATORS, A BLINKING DISPLAY INDICATES THE BATTERY IS LOW. IF **LOW BAT** DISPLAYS CONSTANTLY, THE TEMPERATURE DISPLAYED IS INVALID. REPLACE THE BATTERY.

5. Insert the temperature calibration monitor plug into the temperature cuvette.

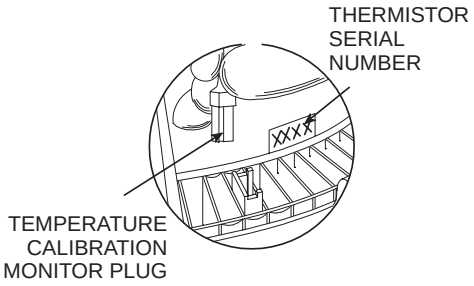
   If you are using a Temperature Calibrator with variable range setting, verify the switch is set to the appropriate range setting. Press TEMP CHECK on the monitor and the measured temperature will be displayed.

   If you are using a Digital Thermometer Model 4200, press the switch on the calibrator front panel.

NOTE

TEMPERATURE MUST BE VERIFIED WITHIN 10 TO 20 SECONDS AFTER ROTATION STOPS.

Temperature Calibration (continued)



Temperature Monitor with Thermistor

6. The displayed temperature reading must be within ±0.1 of the desired temperature.

   If the measured temperature is within range, touch YES. Record the temperature displayed on the monitor and the current offset values in the Maintenance Log. Proceed to step 10.

   If the temperature reading is not within range, touch NO and proceed.

7. The screen will display ENTER MEASURED TEMP .0000. Touch the .0000 field and type in the measured temperature, including two decimal places. Press the ENTER key. Detach the temperature calibration monitor plug.

8. The message WAITING ON TEMPERATURE will be displayed. Wait until this message disappears. Verify the rotation time is five minutes, then touch ROTATE CUVETTE.

9. Repeat Steps 4 through 6.

10. Touch EXIT.

11. Remove the temperature calibrator cuvette from the incubator, shake out the water from the cuvette cells, and allow it to air dry.

12. Store the calibrator cuvette in a dry location.

◆ ISE Conditioning and ISE Controls

This procedure is performed when the automated Daily Maintenance routine is initiated. (Refer to Initiation of Automated Daily Maintenance earlier in this section.)

If performed **independently** of automated Daily Maintenance, follow the procedure below.

◆ 1. Pipette 500 µl of the following solutions into the appropriate sample cup. Place the sample cups on the outer ring of the sample carousel in the following positions:

- Cup 1
  - Empty cup, if fewer than 200 samples per day are processed
  - ISE Conditioning Solution, if more than 200 samples per day are processed.
- Cup 2 ISE Control 1
- Cup 3 ISE Control 2
- Cup 4 ISE Control 4

NOTE

WHEN PERFORMING THIS PROCEDURE AS PART OF WEEKLY MAINTENANCE, CUP 1 MUST CONTAIN ISE CONDITIONING SOLUTION.

2. From the Main menu, touch CALIBRATION, SELECT. Touch ISE STATUS, SELECT. Touch MOVE TO OUTER. Touch MOVE CAROUSEL. Type the cup number of the ISE conditioning solution and press ENTER.
3. Touch ANALYZE SERUM. Wait until the cycle is complete and touch ANALYZE SERUM again.
4. Touch PURGE. When the cycle is complete, touch CALIBRATE. Verify the calibration values against recommended acceptance criteria on the Maintenance Log and record. Repeat the calibration and value check.

◆ 5. Move the carousel to the second cup and touch ANALYZE SERUM. Verify the values against the stated values. Record on the Maintenance Log and repeat for the ISE Controls 2 and 4.

◆ 6. After the analysis of ISE Control 4, touch FLOW. Verify the FFT and AFT against the recommended ranges on the Maintenance Log and record.

7. Touch EXIT.
8. Remove the sample cups. Dispose of the used sample cups in accordance with local, state, and federal regulations governing the treatment of regulated medical waste.

◆ Verification and Documentation of ISE Maintenance

1. From the printed calibration data report, verify the ISE slope precision and record the values on the Maintenance Log. Troubleshoot failure to calibrate by utilizing the ISE Status Codes & Diagnostics section of this manual. Document troubleshooting under the Corrective Action section of the Maintenance Log.

ISE SLOPE ACCEPTANCE CRITERIA	
Na	10.20 –12.85
K	9.43 –11.69
Cl	9.06 –13.28

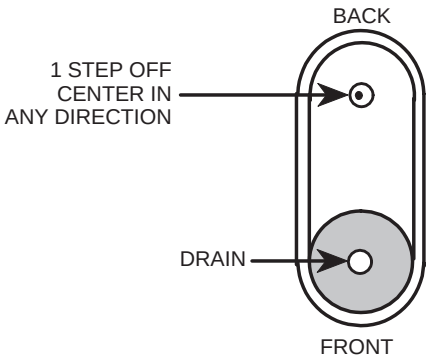
CAUTION

A VARIANCE OF MORE THAN ±0.1 SLOPE UNITS BETWEEN SUCCESSIVE CALIBRATIONS OF EACH CHANNEL INDICATES AN ISE PROBLEM.

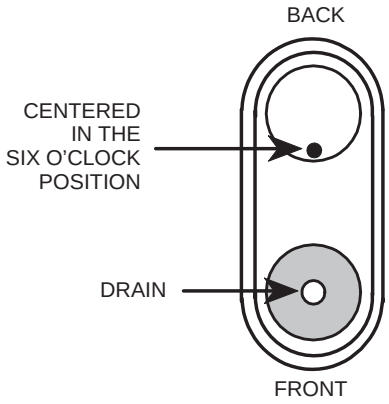
◆ 2. Verify the ISE Controls accuracy and record the values on the Maintenance Log. Troubleshoot failure to meet criteria by first analyzing the control again separately. Refer to the ISE Status Codes & Diagnostics section of this manual if the control still fails to meet criteria. (Refer to the Reagent Manual for ISE Control values.) Document troubleshooting in the Maintenance Log.

3. Verify the ISE flow times against the recommended ranges on the Maintenance Log and record. Troubleshoot failure to meet criteria by referring to the ISE Status Codes & Diagnostics section of this manual. Document troubleshooting in the Maintenance Log.

Sample Probe and Reagent Probe Positioning



Sample Probe Wash Station



Reagent Probe Wash Station

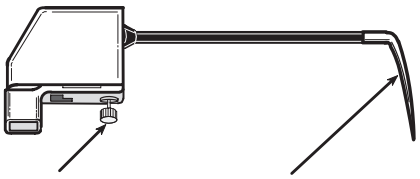
1. From the Main menu, touch SPECIAL PROCEDURES, SELECT. Touch ROBOTICS, SELECT.
2. Touch SAMPLE ARM, SELECT. Touch CUVETTE TOP. Remove sample probe wash station cover.
3. Touch REAGENT ARM. Touch REAGENT 1 TOP. Remove reagent probe wash station cover.
4. Touch HOME ROBOTICS. Observe the probes as each probe enters its respective wash station, beginning with the sample probe.
5. Compare the observed position of the sample probe to the illustration. The probe should be left or right of center in the wash apex and below the liquid. Diluent is pumped through the probe the second time it goes to the bottom of the wash station. When the LED light on the sample arm goes out or flickers, fluid is being sensed.
6. Compare the observed position of the reagent probe to the illustration. The probe should be in a six o'clock position in the water inlet circle and in front of the pronounced peak of water flowing into the wash station. When the LED light on the reagent arm goes out, fluid is being sensed.

CAUTION

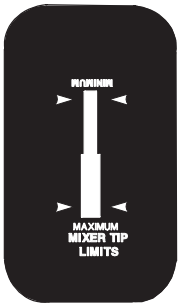
IF THE POSITIONING OR FLUID SENSE IS INCORRECT, REFER TO THE PROBE POSITIONING & ROBOTIC TRAINING SECTION OF THIS MANUAL.

7. Touch REAGENT 1 TOP. Replace the reagent probe wash station cover. Touch WASH CUP TOP.
8. Touch SAMPLE ARM. Touch CUVETTE TOP. Replace the sample probe wash station cover. Touch WASH CUP TOP.
9. Touch EXIT.

Mix Arm Tip Cleaning and Positioning



Mix Arm



MINIMUM

MAXIMUM

Mix Arm Tip Gauge

1. Touch MIX ARM and SELECT. Touch HOME ROBOTICS. Remove the cuvette carousel cover and touch CUVETTE TOP.
2. Thoroughly clean the mix arm tip with an alcohol pad. Wipe the mix arm tip with a lint-free tissue moistened with Type II water.
3. Inspect the mix arm tip for abrasions or damage, which will affect the mixer stroke and cause carryover. If damage is observed, contact the Abbott Customer Support Center.

WARNING

CORRECT POSITIONING AND STROKE OF THE MIX ARM ARE ESSENTIAL FOR PROPER INSTRUMENT PERFORMANCE. IMPROPER ADJUSTMENT WILL AFFECT RESULTS.

4. Touch MIXER OFF to display MIXER ON. Place the mix arm tip gauge under the mix arm tip. Verify the mixer stroke is within the minimum and maximum range on the gauge. If an adjustment is required, use the adjustment screw under the mix arm body. Carefully turn the adjustment screw clockwise to decrease the width and counterclockwise to increase the width.

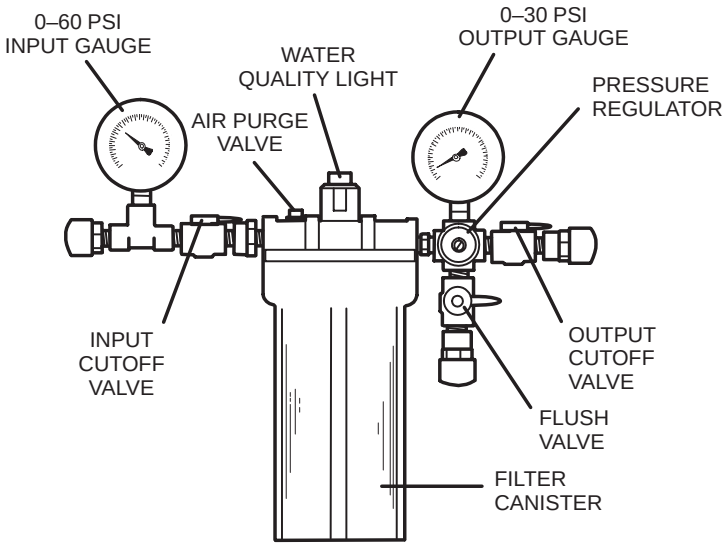
ATTENTION

DO NOT TURN THE ADJUSTMENT SCREW MORE THAN THREE FULL TURNS CLOCKWISE. THE SCREW MAY FALL OUT OF THE MIX ARM BODY, CAUSING PERMANENT DAMAGE TO THE MIX ARM.

5. When the stroke is adjusted, touch CUVETTE BOTTOM. It may be necessary to open the shutter from the Other Devices screen to verify the positioning of the mix arm tip. It should be centered and should not touch the bottom of the cuvette cell. If an adjustment is required, refer to the Probe Positioning section of this manual.
6. Touch MIXER ON to display MIXER OFF. Touch CUVETTE TOP.
7. Remove the mixer wash cup cover.
8. Touch WASH OFF to display WASH ON.
9. Use the mirror and flashlight to verify that water is flowing in the wash cup.
10. Touch WASH CUP BOTTOM. Verify that the mix arm tip is centered in the mixer wash station. If an adjustment is required, refer to the Probe Positioning section of this manual.
11. Touch CUVETTE TOP. Replace the mixer wash cup cover.
12. Touch WASH CUP TOP.
13. Touch WASH ON to display WASH OFF.
14. Replace the cuvette carousel cover.
15. Touch EXIT.

Water Quality Station

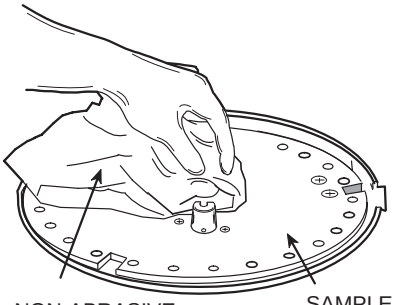
1. Touch PUMPS & VALVES from the Mix Arm screen. Touch REAGENT WASH VALVE CLOSED to display REAGENT WASH VALVE OPENED.
2. Verify the water pressure on the output gauge meets the 5 to 7 psi criteria and record the value. If adjustment is required, use the pressure regulator below the gauge. Turn the regulator clockwise to increase pressure, counterclockwise to decrease pressure. The valve must be open to make adjustments.
3. Verify the status of the water quality light. If the light does not indicate one megohm resistivity, close the output cutoff valve and open the flush valve for three minutes. The water quality light should indicate one megohm resistivity at the end of three minutes. If not, contact the Customer Support Center.
4. Close the flush valve and open the output cutoff valve.
5. Touch REAGENT WASH VALVE OPENED to display REAGENT WASH VALVE CLOSED.
6. Touch EXIT and return to the Main menu.



Water Quality Station

Sample Conductive Plate

Remove the inner and outer sample carousel trays. Moisten a lint-free tissue with Type II water and clean the sample conductive plate. Replace the sample carousel inner and outer trays.



Quality Control

Request, run, and record quality control sera values in accordance with Good Laboratory Practice Procedures.

- Clean incubator/lenses.
- Flush electrodes individually.
- Replace reagent probe.
- Clean sample, reagent and mixer wash stations.
- Check source lamp voltage.
- Perform ISE cleaning procedure.

To maximize efficiency, combine weekly and daily maintenance:

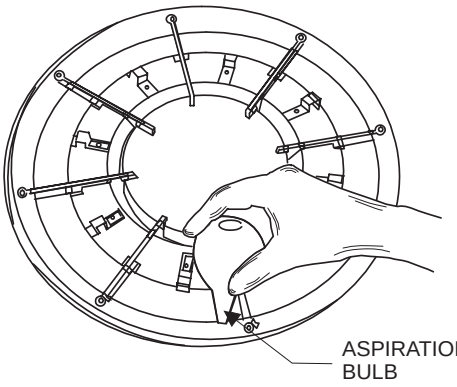
◆ 1. Perform decontamination procedure.

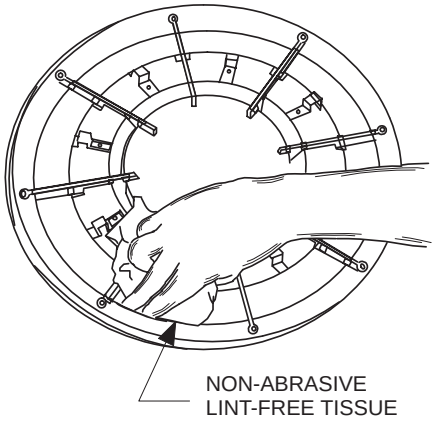
◇ **WARNING**

POTENTIAL BIOHAZARD. INDIVIDUAL COMPONENT PARTS, HOWEVER, MAY REMAIN CONTAMINATED WITH BIOLOGICAL HAZARDS. FOLLOW BIOSAFETY PRACTICES WHEN HANDLING.

2. Clean incubator/lenses.
3. Flush electrodes individually.
4. Check level and mix ISE reagent cartridge pack.
5. Clean ISE septum.
6. Perform ISE cleaning procedure.
7. Perform potassium conditioning (if fewer than 10 ISE samples are analyzed per day).
8. Perform ISE set-up.
9. Perform temperature calibration set-up.
10. Rinse and refill sample diluent reservoir.
11. Initiate the automated Daily Maintenance. Ensure that Cup 1 contains ISE Conditioning Solution.
12. Continue by verifying reagent stability dates and mixing reagents.
13. Replace reagent probe.
14. Inspect sample probe.
15. At the time the audible alarm sounds, verify and document incubator temperature.
16. Verify and document ISE slope values, ISE controls and flow rates.
17. Clean sample and reagent wash stations.
18. Verify sample probe and reagent probe positioning.
19. Clean, inspect and verify mix arm tip stroke and position. Clean mixer wash station.
20. Check source lamp voltage.
21. Verify and document water quality station incoming pressure and water quality light status.
22. Clean sample conductive plate.
23. Request, run, and record quality control results.

Incubator/Lens Cleaning Procedure





All reaction cuvettes are optically read through the incubator water. It is important to keep the incubator free of debris.

1. Remove all cuvettes. Dispose of the used cuvettes in accordance with local, state, and federal regulations governing the treatment of regulated medical waste.
2. Touch SPECIAL PROCEDURES, SELECT. Touch ROBOTICS, SELECT. Touch PUMPS & VALVES, SELECT. If the incubator valve displays OPENED, touch OPENED to display CLOSED.
3. Aspirate water from the incubator using the blue aspiration bulb in the accessory kit. Wipe the incubator thoroughly using a non-abrasive, lint-free tissue. Carefully clean around the incubator water level sensor located at the three o'clock position in the incubator.

ATTENTION

- DO NOT TOUCH THE OPTICAL PORTION OF THE LENSES WITH THE LINT-FREE TISSUE BECAUSE IT MAY SCRATCH THE LENSES. FINGERPRINTS WILL INTERFERE WITH OPTICAL READINGS.
- DO NOT REMOVE THE LENSES. IMPROPER REPLACEMENT MAY CAUSE WATER LEAKAGE.

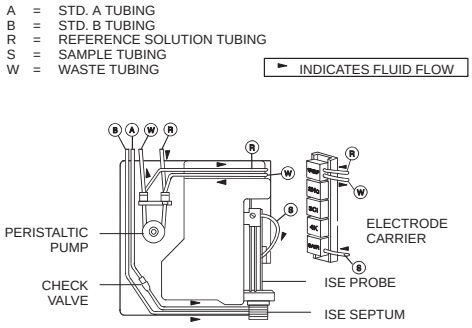
4. Clean the optical portion of the lenses with lens paper slightly moistened with Type II water.
5. Touch INCUBATOR VALVE CLOSED to display INCUBATOR VALVE OPENED. Observe the incubator as it fills. Aspirate and discard floating debris.

WARNING

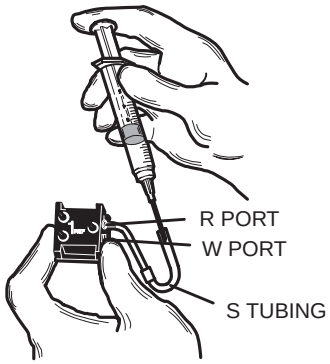
BUBBLES ON THE LENSES WILL CAUSE ERRATIC RESULTS.

6. Inspect the lenses for bubbles. If bubbles are observed, dislodge them with a transfer pipette and remove by aspiration.
7. Once the incubator has filled, place new cuvettes into the cuvette carousel, then touch HOME ROBOTICS.
8. Press SHIFT and CUVETTE CHANGE keys simultaneously.

ISE Electrode Flushing



ISE Module



Flushing the electrode helps prevent protein buildup and removes potential obstructions.

1. Place absorbent paper toweling under the ISE module.
2. From the Main menu, touch CALIBRATION, SELECT, then ISE STATUS, SELECT.
3. To prevent dripping, place the ISE reagent cartridge pack on the instrument deck.
4. Carefully remove the A, B, and R tubing from the ISE reagent cartridge pack, in a motion away from the operator to avoid aerosol spray. To prevent contamination, wipe the tubing individually with a clean, lint-free tissue. Do not remove the W tubing from the pack.
5. Place the A, B, and R tubing on a clean, lint-free tissue. Touch PURGE to draw air through the tubing. Allow the cycle to complete.
6. Place the A, B, and R tubing in Type II water. Touch PURGE to draw water through the tubing. Allow the cycle to complete.
7. Remove the tubing from the water and place it on a clean, lint-free tissue. Touch PURGE to draw air through the tubing. Allow the cycle to complete.
8. Touch MOVE TO INNER.
9. Remove the clear ISE shield, if so equipped, by pulling the connector on the top of the shield straight out.
10. Grasp the electrode carrier and gently pull it from the ISE module.
11. Carefully disconnect the R, W, and S tubing from the electrodes, in a motion away from the operator to avoid aerosol spray.
12. Disengage the electrode latch and slide the electrodes out.
13. Fill a 5cc syringe with warm Type II water. Attach a length of S tubing to the blunt-tipped needle on the syringe.
14. Attach the syringe with tubing to the W port of the reference electrode, cover the R port, and flush the electrode with water. A steady stream of water should be observed at the bottom port.
15. Remove the tubing from the W port.
16. Attach the syringe with tubing to the R port of the reference electrode, cover the W port, and flush the electrode with water. A steady stream of water should be observed at the bottom port.
17. Remove the tubing from the R port.
18. Flush each electrode individually with warm Type II water.

ISE Electrode Flushing
(continued)

19. Reassemble the electrode train and engage the electrode carrier latch.
20. Reconnect the R, W, and S tubing.
21. Replace the electrode carrier on the ISE module.
22. Replace the ISE shield.
23. Replace the A, B, and R tubing in the ISE reagent cartridge pack.
24. Replace the reagent cartridge pack on the ISE reagent shelf.
25. Remove and dispose of the absorbent toweling in accordance with local, state, and federal regulations governing the treatment of regulated medical waste.
26. Touch EXIT, then touch MAINTENANCE, SELECT.
27. Touch ISE PACK CHANGE, SELECT. During this activity, the ISE will purge twice and calibrate. A calibration report will print. Verify the report against acceptance criteria on the Maintenance Log. Request, run, and record quality controls.

ISE Cleaning

This procedure should be performed after 400 patient samples are processed, or **weekly**, whichever occurs first.

◆ **CAUTION**

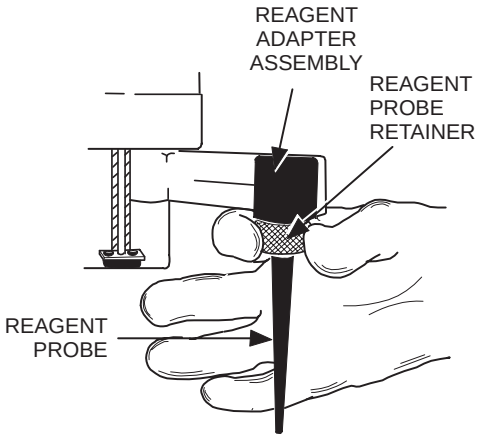
CHEMICAL HAZARD. ISE CLEANING SOLUTION CONTAINS HYPOCHLORITE (BLEACH) SOLUTION. AVOID CONTACT WITH SKIN AND EYES. IN CASE OF EXPOSURE TO SKIN OR EYES, RINSE THOROUGHLY WITH WATER FOR 15 MINUTES AND CONSULT A PHYSICIAN.

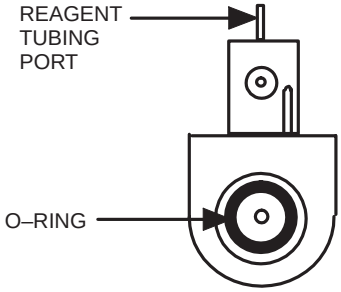
NOTE

SAMPLE CUPS MAY BE PLACED IN ANY POSITION IN THE OUTER CAROUSEL. HOWEVER, TO MAXIMIZE EFFICIENCY, PLACE THE SAMPLE CUPS IN THE POSITIONS STATED IN THIS PROCEDURE.

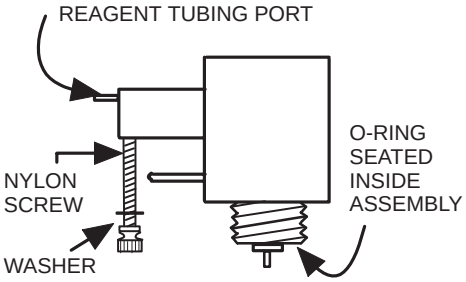
1. Pipette 500 µl of ISE cleaning solution into a sample cup and place it in position 44 of the sample carousel.
2. Pipette 500 µl of Type II water into a sample cup and place it in position 45 of the sample carousel.
3. From the Main menu, touch CALIBRATION, SELECT.
4. Touch ISE STATUS, SELECT.
5. Touch MOVE TO OUTER.
6. Touch MOVE CAROUSEL, type 44, and press ENTER.
7. Touch ANALYZE SERUM. Allow cycle to complete. Touch ANALYZE SERUM again.
8. Touch MOVE CAROUSEL. Type 45 and press ENTER.
9. Touch ANALYZE SERUM. Allow cycle to complete. Touch ANALYZE SERUM again.
10. Touch PURGE.
11. Touch CALIBRATE. Allow the cycle to complete and record the slopes.
12. Touch CALIBRATE again. Allow the cycle to complete and record the slopes. Verify the slopes against the acceptance criteria in the Maintenance Log.
13. Remove and dispose of the used sample cups in accordance with local, state, and federal regulations governing the treatment of regulated medical waste.

Reagent Probe





BOTTOM VIEW OF REAGENT ADAPTER ASSEMBLY



SIDE VIEW OF REAGENT ADAPTER ASSEMBLY

The reagent probe is replaced to ensure accurate reagent dispense and to prevent reagent carryover. Replace the reagent probe:

- Weekly, if fewer than 500 optical assays per day are performed; twice per week, if more than 500 optical assays per day are performed.
- If probe rubs or collides with another object.
- If reagent arm robotic training has been performed.

WARNING

FLUID SENSITIVITY AND ROBOTIC ADJUSTMENT ARE ESSENTIAL FOR PROPER INSTRUMENT PERFORMANCE. FAILURE TO FOLLOW THIS PROCEDURE WILL CAUSE VARIATIONS IN FLUID SENSE AND IMPRECISION DURING REAGENT DISPENSE.

1. Loosen the metal reagent probe retainer connecting the reagent probe to the reagent adapter assembly. Remove the reagent probe.
2. Remove the O-ring from the reagent adapter assembly and inspect. Replace the O-ring with each third probe change or if damage is observed.
3. Coat the flat top of the probe and the O-ring with a light film of DOW CORNING® Compound 111.
4. Position the O-ring into the reagent adapter assembly. Ensure that only one O-ring is installed.
5. Position the new probe into the reagent probe retainer and tighten the retainer until the probe is secure.
6. Touch HOME ROBOTICS. Verify the reagent probe is positioned correctly in the wash cup and fluid sensitivity is properly adjusted. Refer to Robotic Training, Reagent Arm.
7. Dispose of the used reagent probe and O-ring in accordance with local, state, and federal regulations governing the treatment of regulated medical waste.

Sample Probe, Reagent Probe and Mixer Wash Station Cleaning

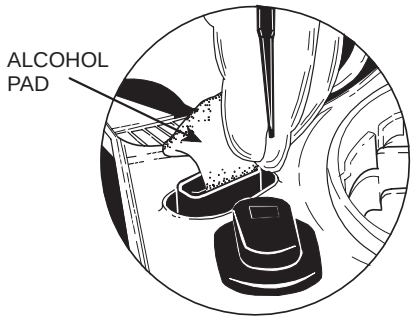
The wash stations are inspected and cleaned to prevent bacterial contamination which can affect reagent integrity.

1. Wipe the inside of the wash stations with an alcohol pad.

CAUTION

DO NOT USE A COTTON SWAB TO CLEAN THE WASH STATIONS. THE COTTON FIBERS MAY CLING TO THE PROBES CAUSING ERRONEOUS TEST RESULTS.

2. If residue or bacterial buildup persists, prepare 50 ml of 5% benzalkonium chloride solution by mixing 5 ml of 50% benzalkonium chloride* in 45 ml of Type II water.
3. Slowly pour the 5% benzalkonium chloride solution into the wash station until the residue or bacteria is flushed. Open the appropriate wash station valve.
4. If Step 3 is performed, HOME ROBOTICS several times to purge all benzalkonium chloride.



*Benzalkonium chloride is an antimicrobial agent used to inhibit growth and reduce build-up.

Source Lamp Voltage Check

Verify that the source lamp voltage is between 6.8 and 7.3 volts.

To assure maximum lamp life, perform this procedure **only** after cleaning the incubator and lenses. Refer to Weekly Maintenance, Incubator/Lens Cleaning Procedure.

CAUTION

COMPONENTS ARE HOT. DO NOT TOUCH THE LAMP HOUSING.

1. From the Main menu, touch SPECIAL PROCEDURES, SELECT.
2. From the Special Procedures screen, touch AD OFFSET, SELECT.
3. Remove cuvette segment one from the cuvette carousel.
4. From the AD Offset screen, touch RECALCULATE.
5. After the numerical values change on the screen, touch EXIT to display the Special Procedures screen.
6. Touch AD READ, SELECT.
7. Edit the following parameters on the AD Read Parameters screen. Use the CYCLE key to set MODE and SCALE FACTOR.

REPEATU	=	5
INTERVALU	=	1
MODEU	=	CHAN 1
SCALE FACTORU	=	VOLTS

8. Touch START.
9. Touch REVIEW DATA to display the AD Read Data screen.
10. Observe the 340 channel wavelength voltage.
11. Record the average voltage reading in the Maintenance Log. The average voltage of the 1-5 readings must be between 6.8 and 7.3. If necessary, adjust the R-39 potentiometer to achieve the correct reading. Refer to Component Replacement, Source Lamp, for specific instructions. Document maintenance and troubleshooting in the Maintenance Log.

CAUTION

IF LAMP VOLTAGE IS 6.7 OR LESS, REPLACE THE SOURCE LAMP. REFER TO COMPONENT REPLACEMENT, SOURCE LAMP.

12. Replace cuvette segment one into the cuvette carousel.
13. Touch EXIT and return to the Main menu.

- Replace ISE R and W tail segments.

To maximize efficiency, combine biweekly, weekly, and daily maintenance:

◆ 1. Perform decontamination procedure.

◇ **WARNING**

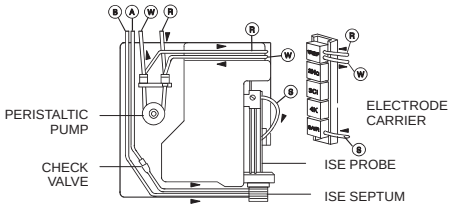
POTENTIAL BIOHAZARD. INDIVIDUAL COMPONENT PARTS, HOWEVER, MAY REMAIN CONTAMINATED WITH BIOLOGICAL HAZARDS. FOLLOW BIOSAFETY PRACTICES WHEN HANDLING.

2. Clean incubator/lenses.
3. Replace ISE R and W tail segments.
4. Flush electrodes individually.
5. Check level and mix ISE reagent cartridge pack.
6. Clean ISE septum.
7. Perform ISE cleaning procedure.
8. Perform potassium conditioning (if fewer than 10 ISE samples are analyzed per day).
9. Perform ISE set-up.
10. Perform temperature calibration set-up.
11. Rinse and refill sample diluent reservoir.
12. Initiate the automated Daily Maintenance. Ensure that Cup 1 contains ISE Conditioning Solution.
13. Continue by verifying reagent stability dates and mixing reagents.
14. Replace reagent probe.
15. Inspect sample probe.
16. At the time the audible alarm sounds, verify and document incubator temperature.
17. Verify and document ISE slope values, ISE controls and flow rates.
18. Clean sample and reagent wash stations.
19. Verify sample probe and reagent probe positioning.
20. Clean, inspect and verify mix arm tip stroke and position. Clean mixer wash station.
21. Check source lamp voltage.
22. Verify and document water quality station incoming pressure and water quality light status.
23. Clean sample conductive plate.
24. Request, run, and record quality control results.

ISE R and W Tail Segment Replacement

A = STD. A TUBING
B = STD. B TUBING
R = REFERENCE SOLUTION TUBING
S = SAMPLE TUBING
W = WASTE TUBING

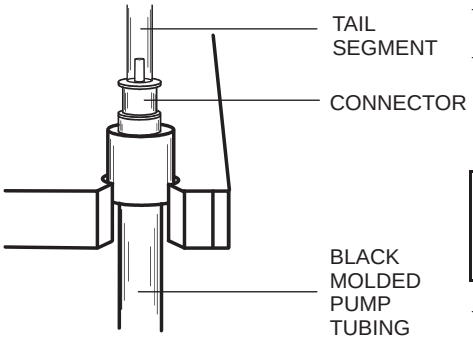
INDICATES FLUID FLOW



ISE Module

Follow the procedure below to replace the R and W tail segments.

1. Place absorbent paper toweling under the ISE module.
2. To prevent dripping, place the ISE reagent cartridge pack on the instrument deck.
3. From the Main menu, touch CALIBRATION, SELECT.
4. Touch ISE STATUS, SELECT.
5. Carefully remove the A, B, and R tubing from the ISE reagent cartridge pack, in a motion away from the operator to avoid aerosol spray. Do not remove the W tubing from the reagent cartridge. To prevent contamination, wipe the tubing individually with a clean, lint-free tissue.
6. Place the A, B, and R tubing on a clean, lint-free tissue. Touch PURGE to draw air through the tubing. Allow the cycle to complete.
7. Place the A, B, and R tubing in Type II water. Touch PURGE to draw water through the tubing. Allow the cycle to complete.
8. Remove the tubing from the water and place it on a clean, lint-free tissue. Touch PURGE to draw air through the tubing. Allow the cycle to complete.
9. Touch MOVE TO INNER.
10. Remove the clear plastic ISE shield, if so equipped, by pulling the connector on the top of the shield straight out.
11. Grasp the electrode carrier and gently pull it from the ISE module.
12. Touch MOVE HOME.
13. Release the black molded pump tubing from the peristaltic pump.
14. Disconnect and dispose of the used tail segments in accordance with local, state, and federal regulations governing the treatment of regulated medical waste.



ATTENTION

THE CONNECTOR MAY BECOME DISCONNECTED FROM THE BLACK MOLDED PUMP TUBING. IF THIS OCCURS, REINSTALL THE CONNECTOR.

15. Spin the rollers on the peristaltic pump to verify movement of the rollers is not restricted. If movement is restricted, contact the Customer Support Center.
16. Connect the new R and W tail segments to the black molded pump tubing.
17. Position the R tubing around the right side of the peristaltic pump rollers and attach it to the left side of the mounting bracket.
18. Position the W tubing around the left side of the peristaltic pump rollers and attach it to the right side of the mounting bracket.

ATTENTION

DO NOT TWIST THE R AND W TUBING WHEN MOUNTING IT AROUND THE PERISTALTIC PUMP ROLLERS.

ISE R and W Tail Segment Replacement
(continued)

19. Connect the R and W tail segments to the appropriate ports on the reference electrode. Verify the S tubing is connected.
20. Touch MOVE TO INNER.
21. Replace the electrode carrier on the ISE module.
22. Press the tubing into the appropriate grooves.
23. Replace the clear plastic ISE shield.
24. Insert the A, B, and R tubing into the ISE reagent cartridge pack.
25. Replace the ISE reagent cartridge pack on the ISE reagent shelf.
26. Remove and dispose of the absorbent toweling in accordance with local, state, and federal regulations governing the treatment of regulated medical waste.
27. Touch EXIT, then touch MAINTENANCE, SELECT.
28. Touch ISE PACK CHANGE, SELECT. During this activity, the ISE will purge twice and calibrate. A calibration report will print. Verify the report against acceptance criteria on the Maintenance Log. Request, run, and record quality controls.

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- Clean sample diluent system.
- Replace sample diluent 35-micron filter.
- Replace sample syringe quad rings and reagent syringe quad rings.
- Clean barcode reader window.
- Clean incubator and reagent fan screens.
- Replace ISE chloride electrode inner element.
- Replace ISE S tubing.
- Verify step tables.

To maximize efficiency, combine monthly, biweekly, weekly, and daily maintenance:

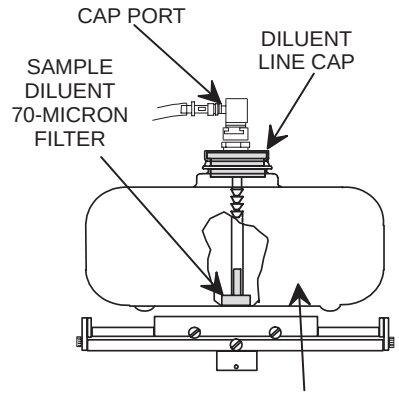
◆ 1. Perform decontamination procedure.

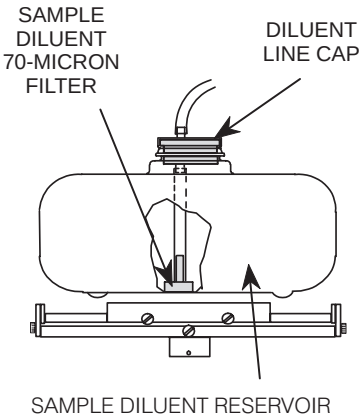
◇ **WARNING**

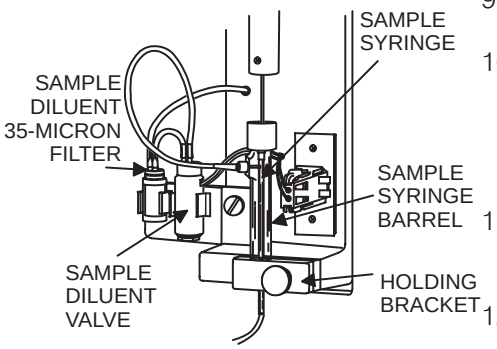
POTENTIAL BIOHAZARD. INDIVIDUAL COMPONENT PARTS, HOWEVER, MAY REMAIN CONTAMINATED WITH BIOLOGICAL HAZARDS. FOLLOW BIOSAFETY PRACTICES WHEN HANDLING.

2. Clean sample diluent system.
3. Replace sample diluent 35-micron filter.
4. Replace sample syringe quad rings and reagent syringe quad rings.
5. Clean incubator/lenses.
6. Clean barcode reader window.
7. Clean incubator and reagent fan screens.
8. Replace ISE S tubing and R and W tail segments.
9. Flush electrodes individually.
10. Replace ISE chloride electrode inner element.
11. Check level and mix ISE reagent cartridge pack.
12. Clean ISE septum.
13. Perform ISE cleaning procedure.
14. Perform potassium conditioning (if fewer than 10 ISE samples are analyzed per day).
15. Perform ISE set-up.
16. Perform temperature calibration set-up.
17. Initiate the automated Daily Maintenance. Ensure that Cup 1 contains ISE Conditioning Solution.
18. Continue by verifying reagent stability dates and mixing reagents.
19. Replace reagent probe.
20. Inspect sample probe.
21. At the time the audible alarm sounds, verify and document incubator temperature.
22. Verify and document ISE slope values, ISE controls and flow rates.
23. Clean sample and reagent wash stations.
24. Verify step tables.
25. Verify sample probe and reagent probe positioning.
26. Clean, inspect and verify mix arm tip stroke and position. Clean mixer wash station.
27. Check source lamp voltage.
28. Verify and document water quality station incoming pressure and water quality light status.
29. Clean sample conductive plate.
30. Request, run, and record quality control results.

Clean Sample Diluent System







This procedure decontaminates the sample diluent system. Bacterially contaminated water in the sample diluent system may cause imprecise results.

WARNING

FAILURE TO ADHERE TO THIS PROCEDURE MAY RESULT IN CONTAMINATION AND POSSIBLE INTERFERENCE DURING THE MEASUREMENT OF OPTICAL ASSAYS.

1. Prepare a 0.5% benzalkonium chloride solution by mixing 1 ml of the 50% benzalkonium chloride* in 99 ml of Type II water.
2. From the Main menu, touch SPECIAL PROCEDURES, SELECT. Touch ROBOTICS, SELECT. Touch HOME ROBOTICS to ensure that the sample probe is in the home position over the wash station.
3. Open the sample diluent reservoir access door and remove the sample diluent reservoir from the platform.
4. Remove the diluent line cap from the sample diluent reservoir.
5. Set the reservoir bottle aside.
6. Immerse the end of the sample diluent tubing in a beaker containing 50 ml of the solution, reserving the remaining 50 ml.
7. Touch PUMPS & VALVES, SELECT.
8. Touch DILUENT VALVE CLOSED to display DILUENT VALVE OPENED.

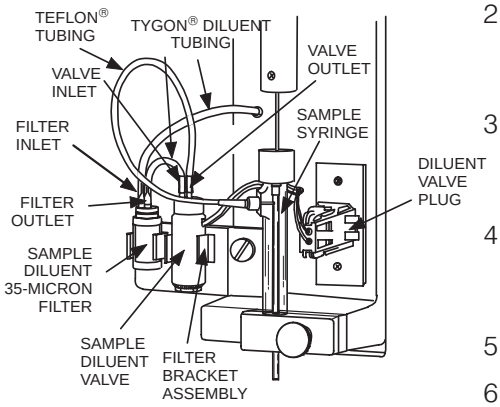
ATTENTION

TO PREVENT DAMAGE TO THE SAMPLE DILUENT VALVE, **DO NOT** LEAVE THE VALVE OPEN FOR LONGER THAN TWO MINUTES WITHOUT FLUID FLOW.

9. Touch SINGLE STROKE to display PURGE # PURGES 1. Highlight 1, type 10, and touch DILUENT PUMP.
10. While the solution is being aspirated, disconnect the sample syringe from the holding bracket. Manually move the syringe barrel up and down on the plunger to dislodge debris or bubbles. Take care not to bend the plunger. Replace the sample syringe in the holding bracket and tighten the knurled knob.
11. Use the remaining 50 ml of 0.5% benzalkonium chloride solution to clean the sample diluent reservoir. Thoroughly rinse the reservoir with Type II water. Fill the reservoir with Type II water.
12. Attach a 5cc syringe to the end of the diluent line at the cap. Backflush with Type II water to clean the filter screen. Insert the diluent line into a container of 100 ml of Type II water and PURGE a minimum of 10 times.
13. Insert the diluent line into the reservoir. Verify the diluent line cap is properly installed and that the tubing is secure on the cap port. Return the reservoir to the platform and close the access door.
14. Touch DILUENT VALVE OPENED to display DILUENT VALVE CLOSED.
15. Replace the sample diluent 35-micron filter. Refer to the procedure in this section of the manual.

*Benzalkonium chloride is an antimicrobial agent used to inhibit growth and reduce build-up.

Sample Diluent 35-Micron Filter Replacement



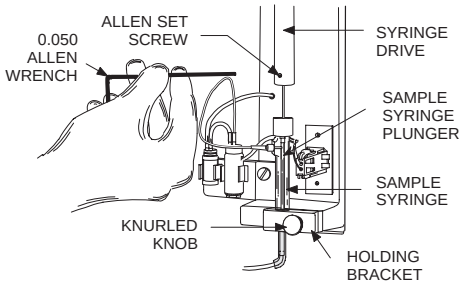
1. Detach the TYGON® diluent tubing from the sample diluent filter inlet port located on the outer rim of the sample diluent filter.
2. Detach and discard the 2 inch TYGON® diluent tubing from the sample diluent filter outlet port (centered on the sample diluent filter) and the sample valve inlet port.
3. Remove the used sample diluent filter from the harness clip and discard. Place the new sample diluent filter securely in the harness clip.
4. Attach the 2 inch TYGON® diluent tubing (provided in the sample diluent filter kit) to the sample valve inlet port and sample diluent filter outlet port.
5. Reattach the TYGON® tubing to the sample diluent filter inlet port.
6. Verify the TEFLON® tubing connecting the sample diluent valve outlet port to the sample syringe inlet port is securely attached. Inspect for crimping.
7. From the Main menu, touch SPECIAL PROCEDURES, SELECT. Touch ROBOTICS, SELECT. Touch PUMPS & VALVES, SELECT.
8. Touch DILUENT VALVE CLOSED to display DILUENT VALVE OPENED.

ATTENTION

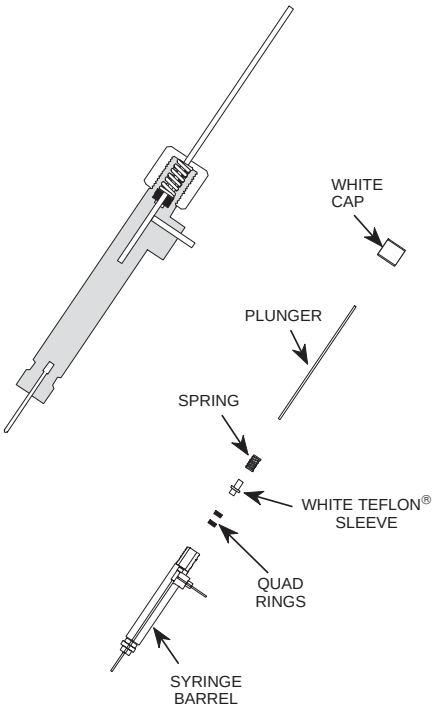
TO PREVENT DAMAGE TO THE SAMPLE DILUENT VALVE, **DO NOT** LEAVE THE VALVE OPEN FOR LONGER THAN TWO MINUTES WITHOUT FLUID FLOW.

9. Touch SINGLE STROKE to display PURGE # PURGES 1. Touch 1 and type 10.
10. Touch DILUENT PUMP. Remove air bubbles from the filter, valve, and syringe. To remove bubbles from the filter, gently tap on the filter and tubing while the System is purging. To remove bubbles from the syringe, disconnect the syringe from the holding bracket by loosening the knurled knob and gently pulling the syringe out. Move the syringe barrel up and down on the plunger while the System is purging. Take care not to bend the plunger. Replace the sample syringe in the holding bracket and tighten the knurled knob.
11. After cycle is complete, touch DILUENT VALVE OPENED to display DILUENT VALVE CLOSED.
12. Touch HOME ROBOTICS.

Sample Syringe Quad Rings



Sample Syringe Mounted



Sample Syringe Components

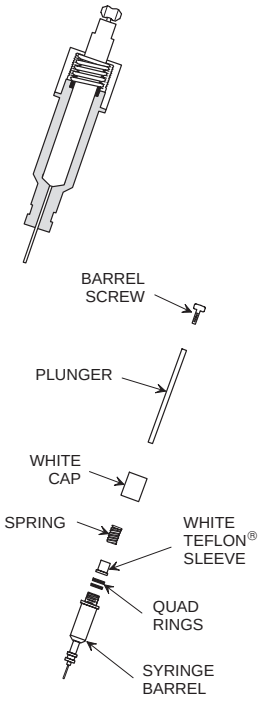
1. Place a lint-free tissue over the incubator and mixer areas to prevent parts from being lost.
2. Disconnect tubing from the side port and bottom of the syringe. Retain the yellow TYGON® tubing. Loosen the silver knurled knob on the black holding bracket at the bottom of the syringe.
3. Loosen the Allen set screw with the 0.050 Allen wrench one to two turns. Push the plunger down into the syringe and pull the entire syringe and plunger out of the drive.
4. Disassemble the sample syringe by unscrewing the white cap and removing the plunger.
5. Place the white cap, spring, and white TEFLON® sleeve aside.
6. Remove and discard the two quad rings.
7. Apply a light film of DOW CORNING® Compound 111 inside each new quad ring and place each ring between your fingers. Apply slight pressure to evenly distribute the lubricant.
8. Slide the quad rings onto the plunger shaft and move the quad rings to the opposite end of the plunger. Remove the residual lubricant from the plunger end with your fingers.

WARNING

DO NOT USE FIBROUS MATERIAL TO REMOVE THE RESIDUAL LUBRICANT. FIBERS ADHERING TO THE PLUNGER WILL CAUSE ERRORS IN DISPENSE PRECISION.

9. Slide the quad rings to the opposite end of the plunger and remove the residual lubricant from the plunger end with your fingers.
10. Remove residual lubricant from the outside of the quad rings with your fingers.
11. Reassemble the syringe by placing the spring, TEFLON® sleeve, and quad rings on the plunger in the order indicated in the illustration. Replace the plunger and apply slight pressure to the spring that seats the quad rings securely in the syringe body. Replace and tighten the white cap.
12. Reinstall the plunger in the drive so the plunger is seated as far into the drive as possible, and tighten the set screw. Seat the syringe in the black holding bracket and tighten the silver knurled metal knob.
13. Reconnect the sample syringe tubing. (Reuse the yellow TYGON tubing.) If the syringe tubing is damaged, replace it. Refer to Component Replacement, Sample System Tubing.
14. Remove and discard the lint-free tissue.
15. Clear top deck area and HOME ROBOTICS. Follow recommended troubleshooting protocol in the ISE Status Codes & Diagnostics section if an error is generated by homing robotics.

Reagent Syringe Quad Rings



1. Place a lint-free tissue over the incubator and mixer areas to prevent parts from being lost.
2. Disconnect the reagent syringe tubing.
3. Loosen the silver knurled knob on the black holding bracket at the bottom of the syringe.
4. Using a $^{7}/_{32}$ open-end wrench (supplied in the accessory kit), loosen the plunger in a clockwise direction so that it can be removed from the drive block socket.
5. Pull the reagent syringe forward to disengage the barrel screw from the drive block socket. Disassemble the reagent syringe by unscrewing the white cap and removing the plunger.
6. Place the white cap, spring, and white TEFLON® sleeve aside.
7. Remove and discard the two quad rings.
8. Apply a light film of DOW CORNING® Compound 111 inside each new quad ring. Place each ring between your fingers and apply slight pressure to evenly distribute the lubricant.
9. To lubricate the plunger, slide the quad rings on the plunger shaft and move the quad rings to the opposite end of the plunger. Remove the residual lubricant from the plunger end with your fingers.

WARNING

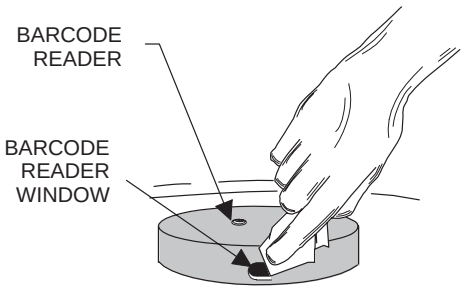
DO NOT USE FIBROUS MATERIAL TO REMOVE THE RESIDUAL LUBRICANT. FIBERS ADHERING TO THE PLUNGER WILL CAUSE ERRORS IN DISPENSE PRECISION.

10. Slide the quad rings to the opposite end of the plunger and remove the residual lubricant from the plunger end with your fingers.
11. Remove residual lubricant from the outside of the quad rings with your fingers.
12. Reassemble the syringe by placing the quad rings in the syringe body and seating each quad ring separately. Mount the white cap, spring, and white TEFLON® sleeve on the plunger in the order indicated in the illustration. Insert the plunger into the syringe body and tighten the white cap.
13. Reinstall the syringe plunger in the drive block socket. The flat sides of the ball face outward, parallel to the back panel of the instrument. Turn the plunger counterclockwise until it is finger tight. Tighten the plunger with a $^{7}/_{32}$ open-end wrench in a counterclockwise direction. Seat the syringe in the black holding bracket. Tighten the silver knurled metal knob.
14. Reconnect the reagent syringe tubing. If the tubing is damaged, replace it. Refer to Component Replacement, Reagent Tubing.
15. Remove and discard the lint-free tissue.
16. Clear top deck area and HOME ROBOTICS. Follow recommended troubleshooting protocol in the ISE Status Codes & Diagnostics section if an error is generated by homing robotics.

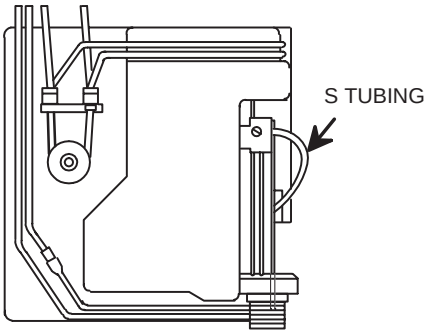
Clean Barcode Reader Window

A dirty window may result in incorrect reading of reagent barcode labels.

Wipe the window of the barcode reader with lens paper.



Replace ISE S Tubing



1. Place absorbent paper toweling under the ISE module.
2. From the Main menu, touch **CALIBRATION, SELECT**, then **ISE STATUS, SELECT**. Touch **MOVE TO INNER**, and then **TOP OF CUP**.
3. To prevent dripping, place the ISE reagent cartridge pack on the instrument deck.
4. Remove the clear ISE shield, if so equipped, by pulling the connector on the top of the shield straight out.
5. Grasp the electrode carrier and gently pull it from the module.
6. Disconnect the S tubing from the air detector electrode and ISE sample probe, in a motion away from the operator to avoid aerosol spray.
7. Dispose of the used S tubing in accordance with local, state, and federal regulations governing the treatment of regulated medical waste.
8. Connect the new S tubing to the air detector.
9. Replace the electrode carrier on the ISE module.
10. Connect the new S tubing to the ISE sample probe.
11. Replace the ISE shield.
12. Replace the reagent cartridge pack on the ISE reagent shelf.
13. Remove and dispose of the absorbent toweling in accordance with local, state, and federal regulations governing the treatment of regulated medical waste.
14. Touch **FLUSH**. Touch **CALIBRATE**. Record the slope. Touch **CALIBRATE** again and record the slope. Troubleshoot failure to calibrate with the ISE Status Codes & Diagnostics section of this manual.
15. Verify and record calibration data on the Maintenance Log.

Clean Fan Screens

Dirty fan screens cause electronic components to experience exposure to higher temperatures.

NOTE

A LABORATORY THAT IS EXCEPTIONALLY DUSTY OR UNDER RENOVATION MAY REQUIRE MORE FREQUENT CLEANING OF BOTH FAN SCREENS.

◇ **WARNING**

ELECTRICAL SHOCK HAZARD. HIGH VOLTAGE EXISTS IN THE SYSTEM WHEN THE MAINTENANCE POWER IS **OFF** AND THE MAIN POWER IS **ON**. VISUALLY LOCATE THE POWER SWITCHES BEFORE TOUCHING THEM. REFER TO POWER ON/OFF IN THE SPECIFIC PROCEDURES SECTION OF THE OPERATION MANUAL.

◆ 1. Visually locate the Maintenance power switch and turn it to the OFF position.

◆ 2. Visually locate the Main power switch and turn it to the OFF position.

3. Locate the three turn screws on the panel behind the reagent arm. Turn each screw counterclockwise, one quarter turn, with a flat-head screwdriver.

4. Tilt the top of the panel toward the front of the instrument and remove. (The reagent arm may be manually moved to facilitate removal of the panel.)

5. Remove the incubator and reagent cooler assembly fan screens by pulling straight up on the white tabs located on top of each fan screen.

6. Clean the screens with running water and pat dry. Verify the screens are completely dry.

7. Reinstall the fan screens. Verify the airflow directional arrows point toward the front of the instrument.

8. Replace the panel and return the reagent arm to the wash cup position.

◆ 9. Visually locate the Main power switch and turn it to the ON position.

◆ 10. Visually locate the Maintenance power switch and turn it to the ON position.

ISE Chloride Electrode Inner Element Replacement

The ISE chloride electrode inner element must be replaced after 1200 samples have been processed, or every four weeks, whichever occurs first.

1. Place absorbent paper toweling under the ISE module.

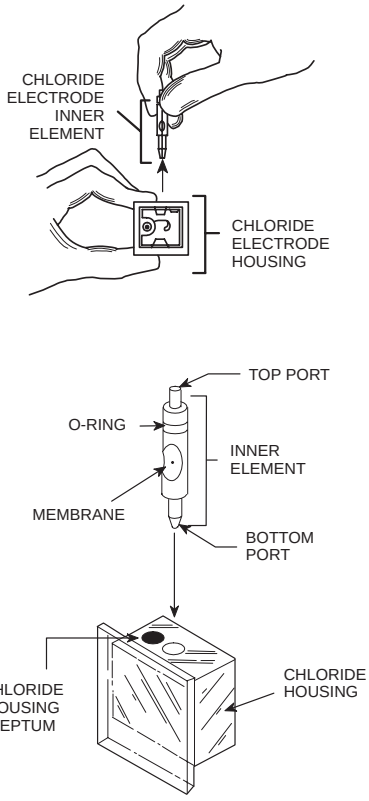
2. From the Main menu, touch CALIBRATION, SELECT.

3. Touch ISE STATUS, SELECT.

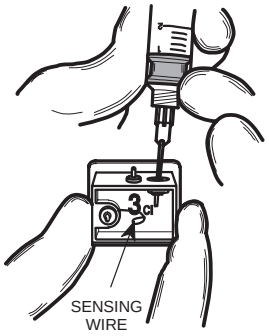
4. To prevent dripping, place the ISE reagent cartridge pack on the top deck.

5. Carefully remove the A, B, and R tubing from the ISE reagent cartridge pack, in a motion away from the operator to avoid aerosol spray. Do not remove the W tubing from the pack. To prevent contamination, wipe the tubing individually with a clean, lint-free tissue.

ISE Chloride Electrode Inner Element Replacement
(continued)



◇ Replacing the ISE Chloride Electrode Inner Element



◇ Filling the Chloride Housing

6. Place the A, B, and R tubing on a clean, lint-free tissue. Touch PURGE to draw air through the tubing. Allow the cycle to complete.
7. Place the A, B, and R tubing in Type II water. Touch PURGE to draw water through the tubing. Allow the cycle to complete.
8. Remove the tubing from the water and place it on a clean, lint-free tissue. Touch PURGE to draw air through the tubing. Allow the cycle to complete.
9. Touch MOVE TO INNER.
10. Remove the clear plastic ISE shield, if so equipped, by pulling the connector straight out.
11. Grasp the electrode carrier and gently pull it from the ISE module.
12. Carefully disconnect the R and W tail segments and S tubing from the electrodes, in a motion away from the operator to avoid aerosol spray.
13. Release the electrode carrier latch and remove the electrodes.
14. Place a clean towel on a hard surface. Position the chloride electrode, bottom port down, with the lip of the housing over the edge of the hard surface. Press down on the housing.
15. Pull out the chloride electrode inner element and drain the filling solution into a waste container.
16. Dispose of the used chloride electrode inner element in accordance with local, state, and federal regulations governing the treatment of regulated medical waste.
17. With a 5cc syringe and blunt-tipped needle, rinse the chloride housing with Type II water and drain.
18. Rinse the housing with a small amount of chloride internal filling solution and drain. Repeat.

ATTENTION

DO NOT TOUCH THE MEMBRANE PORTION OF THE INNER ELEMENT.

19. Remove and discard the clear rubber protective cap from the tip of the inner element. Align the inner element O-ring opposite the permanent O-ring in the housing. Insert the new inner element into the electrode housing and press the element into position.
20. With the syringe and blunt-tipped needle, aspirate approximately 5 ml of chloride internal filling solution. Insert the needle through the chloride housing septum and fill the chloride housing to cover the internal silver sensing wire and inner element membrane.
21. Wipe any solution from the outside of the electrode.
22. Reassemble the electrode train and engage the electrode carrier latch.
23. Reconnect the R and W tail segments to the reference electrode ports.
24. Reconnect the S tubing to the air detector.
25. Replace the electrode carrier on the ISE module.

ISE Chloride Electrode Inner Element Replacement (continued)

26. Replace the ISE shield.
27. Reinsert the A, B, and R tubing in the ISE reagent cartridge pack.
28. Replace the ISE reagent cartridge pack on the ISE reagent shelf.
29. Remove and dispose of the absorbent toweling in accordance with local, state, and federal regulations governing the treatment of regulated medical waste.
30. Touch EXIT until the Main menu displays.

Step Tables

1. From the Main menu, touch SPECIAL PROCEDURES, SELECT. Touch ROBOTICS, SELECT. Touch STEP TABLE, SELECT.
2. Compare the screen values to the last printed step tables in your maintenance records. When robotics are retrained, a new copy of the step tables should be printed with the PRINT SCREEN key. Keep the printout with maintenance records.

WARNING

FLUID SENSITIVITY AND ROBOTIC POSITIONING ARE ESSENTIAL FOR PROPER INSTRUMENT PERFORMANCE. AN OVERLY SENSITIVE OR INSENSITIVE SAMPLE PROBE AND/OR REAGENT PROBE MAY CAUSE SHORT ASPIRATION OF SAMPLE OR REAGENT. IMPRECISION WILL RESULT IF IMPROPERLY FUNCTIONING.

- Clean inlet water system.
- Replace water quality station filter.
- Replace ISE R and W tubing and tail segments.

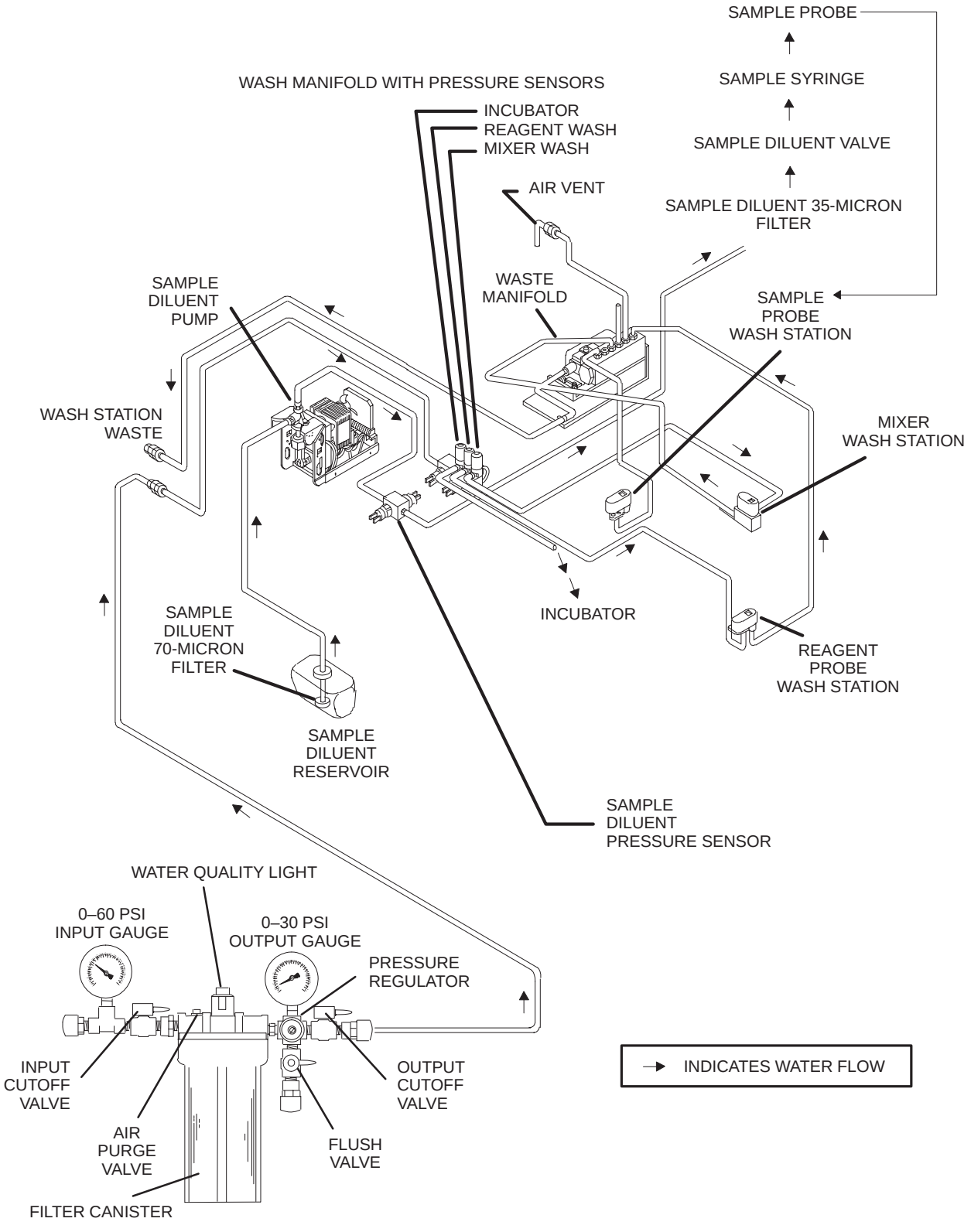
To maximize efficiency, combine quarterly, monthly, biweekly, weekly, and daily maintenance:

◆ 1. Perform decontamination procedure.

◇ **WARNING**

POTENTIAL BIOHAZARD. INDIVIDUAL COMPONENT PARTS, HOWEVER, MAY REMAIN CONTAMINATED WITH BIOLOGICAL HAZARDS. FOLLOW BIOSAFETY PRACTICES WHEN HANDLING.

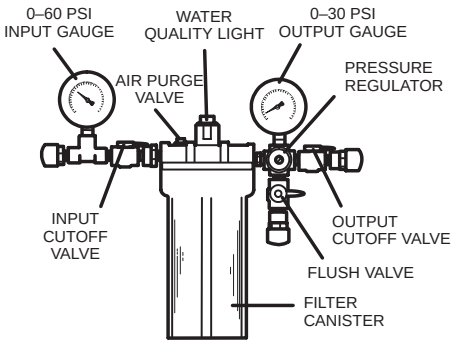
2. Clean inlet water system. During the minimum two hour flushing of the system, proceed with Steps 3 through 17.
3. Clean sample diluent system.
4. Replace sample diluent 35-micron filter.
5. Replace sample syringe quad rings and reagent syringe quad rings.
6. Replace ISE S tubing and R and W tubing and tail segments.
7. Flush electrodes individually.
8. Replace ISE chloride electrode inner element.
9. Check level and mix ISE reagent cartridge pack.
10. Clean ISE septum.
11. Perform ISE cleaning procedure.
12. Perform potassium conditioning (if fewer than 10 ISE samples are analyzed per day).
13. Verify reagent stability dates and mix reagents.
14. Replace reagent probe.
15. Inspect sample probe.
16. Clean sample conductive plate.
17. Verify step tables.
18. Clean, inspect, and verify mix arm tip stroke and position.
19. Clean barcode reader window.
20. Clean incubator and reagent fan screens.
21. Perform temperature calibration set-up.
22. Perform ISE set-up.
23. Initiate the automated Daily Maintenance. Ensure that Cup 1 contains ISE Conditioning Solution.
24. At the time the audible alarm sounds, verify and document incubator temperature.
25. Verify and document ISE slope values, ISE controls and flow rates.
26. Clean sample, reagent, and mixer wash stations.
27. Verify sample probe and reagent probe positioning.
28. Check source lamp voltage.
29. Verify and document water quality station incoming pressure and water quality light status.
30. Request, run, and record quality control results.



WATER QUALITY STATION

WATER SYSTEM

Inlet Water System Maintenance



Water Quality Station

WARNING

FAILURE TO ADHERE TO THIS PROCEDURE WILL RESULT IN CONTAMINATION OF THE INCUBATOR AND INTERFERENCE DURING THE MEASUREMENT OF OPTICAL ASSAYS.

The filter on the water quality station must be changed each quarter or more frequently if the output water pressure repeatedly drops below 5 psi.

1. Remove and dispose of the used cuvettes in accordance with local, state, and federal regulations governing the treatment of regulated medical waste.
2. Turn off the water to the water quality station at the input cutoff valve or at the water source.
3. Drain excess water from the lines by opening the flush valve. Close the flush valve when the pressure is relieved.
4. Remove the filter canister by turning it clockwise (right to left). Discard the filter.
5. Clean the canister with 1-3 ml of 50% benzalkonium chloride.*
6. Rinse the canister thoroughly with Type II water.
7. Add 20 ml of 50% benzalkonium chloride to the canister. Fill the canister with Type II water and reconnect.
8. Slowly turn on the water to the water quality station at the input cutoff valve or at the water source.
9. From the Main menu, touch SPECIAL PROCEDURES, SELECT.
10. Touch ROBOTICS, SELECT.
11. Touch PUMPS & VALVES, SELECT.
12. Touch REAGENT WASH VALVE, MIX WASH VALVE, and INCUBATOR VALVE to display OPENED.
13. Ensure WASTE PUMP displays ON.
14. Flush for two hours with 50% benzalkonium chloride and water.

NOTE

DURING THE FLUSH CYCLE, OTHER MAINTENANCE PROCEDURES MAY BE PERFORMED, I.E., PROBE CLEANING, SYRINGE CHECKS, AND DILUENT RESERVOIR CLEANING. HOWEVER, IF HOME ROBOTICS IS PERFORMED, THE REAGENT WASH, MIX WASH AND INCUBATOR VALVES MUST BE REOPENED TO CONTINUE THE FLUSH CYCLE.

*Benzalkonium chloride is an antimicrobial agent used to inhibit growth and reduce build-up.

Inlet Water System Maintenance (continued)

15. Touch EXIT to continue the maintenance sequence during the two-hour flushing.
16. At the completion of the two-hour flush, from the Pumps & Valves screen, touch REAGENT WASH VALVE, MIX WASH VALVE, and INCUBATOR VALVE to display CLOSED.
17. Touch EXIT until the Special Procedures screen displays.
18. Turn off the water at the input cutoff valve or at the water source.
19. Drain excess water from the lines by opening the flush valve. Close the flush valve when pressure is relieved.
20. Remove the filter canister by turning it clockwise (right to left). Rinse thoroughly with Type II water. Install a new filter on the water quality station and reconnect the canister.
21. Close the output cutoff valve.
22. Adjust the flush valve so it is one quarter to one third open.
23. Turn on the water at the input cutoff valve or at the water source.
24. Press the air purge valve (red button) on the top of the water quality station until water is visible.
25. Fully open the flush valve and allow water to flow for 7 to 10 minutes.
26. Slowly open the output cutoff valve and close the flush valve.

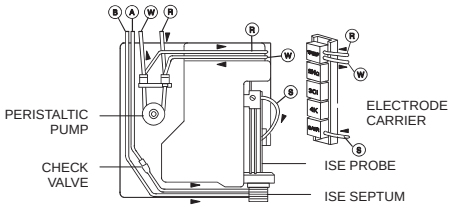
WARNING

THE INCUBATOR AND LENSES MUST BE CLEANED AT THE COMPLETION OF INLET WATER SYSTEM MAINTENANCE. REFER TO WEEKLY MAINTENANCE, INCUBATOR/LENS CLEANING.

ISE R and W Tubing Replacement

A = STD. A TUBING
B = STD. B TUBING
R = REFERENCE SOLUTION TUBING
S = SAMPLE TUBING
W = WASTE TUBING

INDICATES FLUID FLOW

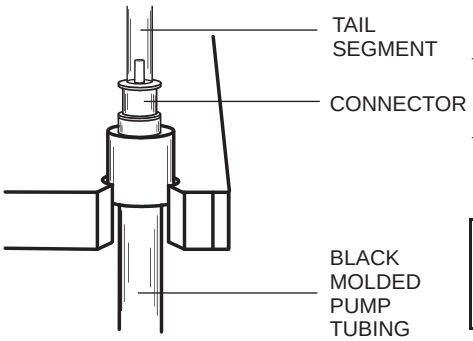


ISE Module

NOTE

IF REPLACING TAIL SEGMENTS ONLY, REFER TO BIWEEKLY MAINTENANCE.

1. Place absorbent paper toweling under the ISE module.
2. To prevent dripping, place the ISE reagent cartridge pack on the instrument deck.
3. From the Main menu, touch CALIBRATION, SELECT.
4. Touch ISE STATUS, SELECT.
5. Carefully remove the A, B and R tubing from the ISE reagent cartridge pack, in a motion away from the operator to avoid aerosol spray. Do not remove the W tubing from the reagent cartridge. To prevent contamination, wipe the tubing individually with a clean, lint-free tissue.
6. Place the A, B, and R tubing on a clean, lint-free tissue. Touch PURGE to draw air through the tubing. Allow the cycle to complete.
7. Place the A, B, and R tubing in Type II water. Touch PURGE to draw water through the tubing. Allow the cycle to complete.
8. Remove the tubing from the water and place it on a clean, lint-free tissue. Touch PURGE to draw air through the tubing. Allow the cycle to complete.
9. Touch MOVE TO INNER.
10. Remove the clear plastic ISE shield, if so equipped, by pulling the connector on the top of the shield straight out.
11. Grasp the electrode carrier and gently pull it from the ISE module.
12. Touch MOVE HOME.
13. Disconnect and dispose of the black molded pump tubing and tail segments in accordance with local, state, and federal regulations governing the treatment of regulated medical waste.
14. Spin the rollers on the peristaltic pump to verify movement of the rollers is not restricted. If movement is restricted, contact the Customer Support Center.
15. Connect the new black molded pump tubing to the R and W tubing harness connections.
16. Position the R tubing around the right side of the peristaltic pump rollers and attach it to the left side of the mounting bracket.
17. Position the W tubing around the left side of the peristaltic pump rollers and attach it to the right side of the mounting bracket.



ATTENTION

DO NOT TWIST THE R AND W TUBING WHEN MOUNTING IT AROUND THE PERISTALTIC PUMP ROLLERS.

ISE R and W Tubing Replacement
(continued)

18. Connect the tail segments to the appropriate ports on the reference electrode. Verify the S tubing is connected.
19. Touch MOVE TO INNER.
20. Replace the electrode carrier on the ISE module.
21. Press the tubing into the appropriate grooves.
22. Replace the clear plastic ISE shield.
23. Insert the A, B, and R tubing into the ISE reagent cartridge pack.
24. Replace the ISE reagent cartridge pack on the ISE reagent shelf.
25. Remove and dispose of the absorbent toweling in accordance with local, state, and federal regulations governing the treatment of regulated medical waste.
26. Touch EXIT, then touch MAINTENANCE, SELECT.
27. Touch ISE PACK CHANGE, SELECT. During this activity, the ISE will purge twice and calibrate. A calibration report will print. Verify the report against acceptance criteria on the Maintenance Log. Request, run, and record quality controls.

- Replace sample diluent 70-micron filter.
- Replace ISE tubing harness.
- Replace ISE electrode interconnects.

To maximize efficiency, combine semi-annual, quarterly, monthly, biweekly, weekly, and daily maintenance:

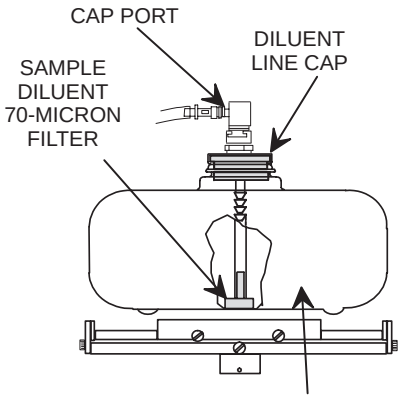
◆ 1. Perform decontamination procedure.

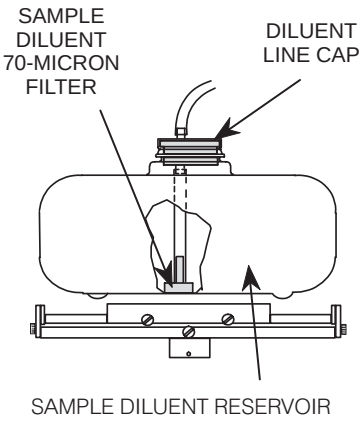
◇ **WARNING**

POTENTIAL BIOHAZARD. INDIVIDUAL COMPONENT PARTS, HOWEVER, MAY REMAIN CONTAMINATED WITH BIOLOGICAL HAZARDS. FOLLOW BIOSAFETY PRACTICES WHEN HANDLING.

2. Clean inlet water system. During the minimum two-hour flushing of the System, proceed with Steps 3 through 19.
3. Clean sample diluent system.
4. Replace sample diluent 35-micron filter.
5. Replace sample diluent 70-micron filter.
6. Replace sample syringe quad rings and reagent syringe quad rings.
7. Replace ISE R and W black molded tubing and tail segments, S tubing, and tubing harness.
8. Flush electrodes individually.
9. Replace ISE chloride electrode inner element.
10. Replace ISE electrode interconnects.
11. Check level and mix ISE reagent cartridge pack.
12. Clean ISE septum.
13. Perform ISE cleaning procedure.
14. Perform potassium conditioning (if fewer than 10 ISE samples are analyzed per day).
15. Verify reagent stability dates and mix reagents.
16. Replace reagent probe.
17. Inspect sample probe.
18. Clean sample conductive plate.
19. Verify step tables.
20. Clean, inspect and verify mix arm tip stroke and position.
21. Clean barcode reader window.
22. Clean incubator and reagent fan screens.
23. Perform temperature calibration set-up.
24. Perform ISE set-up.
25. Initiate the automated Daily Maintenance. Ensure that Cup 1 contains ISE Conditioning Solution.
26. At the time the audible alarm sounds, verify and document incubator temperature.
27. Verify and document ISE slope values, ISE controls and flow rates.
28. Clean sample, reagent, and mixer wash stations.
29. Verify sample probe and reagent probe positioning.
30. Check source lamp voltage.
31. Verify and document water quality station incoming pressure and water quality light status.
32. Request, run, and record quality control results.

Sample Diluent 70-Micron Filter





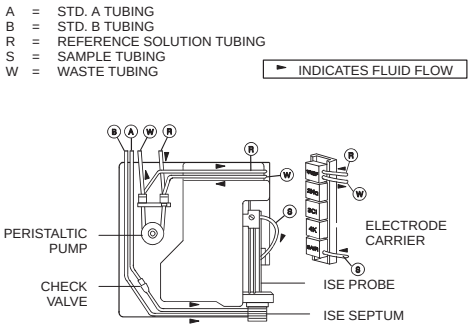
1. Open the sample diluent reservoir access door. Remove the sample diluent reservoir from the platform.
2. Remove the diluent line cap (with the diluent tubing attached) from the sample diluent reservoir. Discard the residual water.
3. Disconnect the sample diluent 70-micron filter from the end of the diluent tubing. Install a new filter. Discard the used filter.
4. Fill the sample diluent reservoir with Type II water.
5. Replace and tighten the diluent line cap.
6. Replace the sample diluent reservoir on the platform and close the access door.
7. From the Main menu, touch SPECIAL PROCEDURES, SELECT. Touch ROBOTICS, SELECT. Touch PUMPS & VALVES, SELECT.
8. Touch DILUENT VALVE CLOSED to display DILUENT VALVE OPENED.

ATTENTION

TO PREVENT DAMAGE TO THE SAMPLE DILUENT VALVE, **DO NOT** LEAVE THE VALVE OPEN FOR LONGER THAN TWO MINUTES WITHOUT FLUID FLOW.

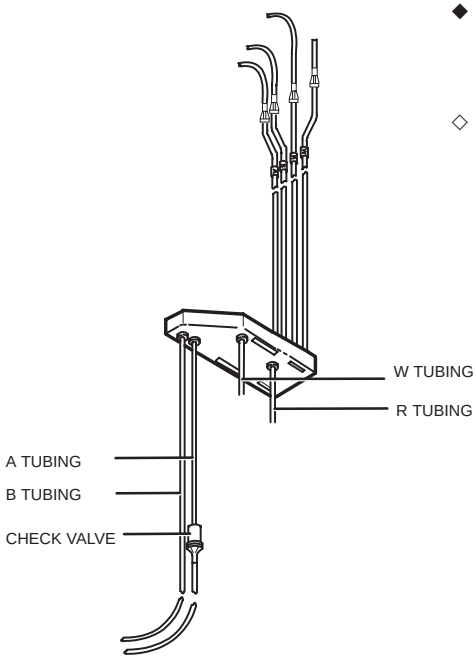
9. Touch SINGLE STROKE to display PURGE # PURGES 1, then touch the 1 and type 2. Touch DILUENT PUMP. During purge cycle, gently tap tubing from the sample diluent reservoir to the sample diluent pump to dislodge bubbles. To remove bubbles from the syringe, remove the sample syringe from the holding bracket by loosening the knurled knob and gently pulling the syringe out. Manually move the syringe barrel up and down on the plunger. Take care not to bend the plunger. Replace the sample syringe in the holding bracket and tighten the knurled knob.
10. Touch DILUENT VALVE OPENED to display DILUENT VALVE CLOSED.
11. Touch EXIT.

ISE Maintenance



ISE Module

1. Place absorbent paper toweling under the ISE module.
2. To prevent dripping, place the ISE reagent cartridge pack on the instrument deck.
3. From the Main menu, touch CALIBRATION, SELECT.
4. Touch ISE STATUS, SELECT.
5. Carefully remove the A, B, and R tubing from the ISE reagent cartridge pack, in a motion away from the operator to avoid aerosol spray. Do not remove the W tubing from the pack. To prevent contamination, wipe the tubing individually with a clean, lint-free tissue.
6. Place the A, B, and R tubing on a clean, lint-free tissue. Touch PURGE to draw air through the tubing. Allow the cycle to complete.
7. Place the A, B, and R tubing in Type II water. Touch PURGE to draw water through the tubing. Allow the cycle to complete.
8. Remove the tubing from the water and place it on a clean, lint-free tissue. Touch PURGE to draw air through the tubing. Allow the cycle to complete.
9. Remove the W tubing from the ISE reagent cartridge pack.
10. Touch MOVE TO INNER.
11. Remove the clear plastic ISE shield, if so equipped, by pulling the connector on the top of the shield straight out.
12. Grasp the electrode carrier and gently pull it from the ISE module.
13. ◆ Remove the S tubing from the side port of the air detector electrode and the ISE sample probe, in a motion away from the operator to avoid aerosol spray.
14. ◇ Touch MOVE HOME.
15. Disconnect the R and W tubing from the reference electrode and the peristaltic pump.
16. Remove the ISE septum by turning it clockwise until the white lines on the ISE sampler assembly and the ISE septum align. Gently pull down until the ISE septum clears the ISE probe.
17. Disconnect the A and B tubing from the ISE septum.
18. Disconnect the R and W tubing from the used tubing harness.
19. Dispose of the used ISE tubing harness and tubing in accordance with local, state, and federal regulations governing the treatment of regulated medical waste.
20. Verify that the ISE reagent cartridge pack has an adequate fluid level. If replacement of the pack is necessary, refer to Component Replacement, ISE Reagent Cartridge Pack.



ISE Tubing Harness

ISE Maintenance
(continued)

21. To install the new tubing harness, seat the fitting on the tubing harness bracket so that the A, B, and R tubing is on the top right side.
22. Insert the A, B, R, and W tubing into the corresponding ports on the ISE reagent cartridge pack. Ensure the connectors are firmly seated.
23. Connect the A tubing (top) and B tubing (bottom) to the respective ports on the ISE septum.
24. Reinstall the ISE septum by positioning the ISE septum opening beneath the ISE probe. Align the white lines on the ISE sampler assembly and the ISE septum. Push the ISE septum up into place and turn one quarter turn counterclockwise.
25. Connect the new black molded R and W tubing (with tail segments) to the R and W tubing harness connections.
26. Spin the rollers on the peristaltic pump to verify movement of the rollers is not restricted. If movement is restricted, contact the Customer Support Center.
27. Position the R tubing around the right side of the peristaltic pump rollers and attach to the left side of the mounting bracket.
28. Position the W tubing around the left side of the peristaltic pump rollers and attach to the right side of the mounting bracket.

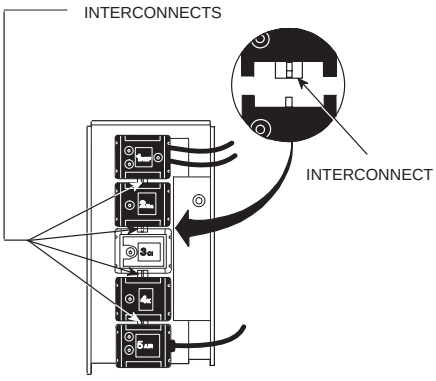
ATTENTION

DO NOT TWIST THE R AND W TUBING WHEN MOUNTING IT AROUND THE PERISTALTIC PUMP ROLLERS.

29. Release the electrode carrier latch and remove the electrodes.
30. Remove and dispose of the used interconnects in accordance with local, state, and federal regulations governing the treatment of regulated medical waste.
31. Flush the electrodes and replace the chloride electrode inner element. Refer to the appropriate ISE Electrode Flushing and ISE Chloride Electrode Inner Element Replacement procedure.
32. With a lint-free tissue, wipe any solution from the outside of the electrodes.

ATTENTION

THE OUTSIDE OF THE ELECTRODES SHOULD BE DRY BEFORE INSTALLATION.



33. Install new interconnects.

ISE Maintenance
(continued)

34. Reassemble the electrode train and engage the electrode carrier latch.
35. Connect the new R and W tail segments to the reference electrode ports.
36. Connect the new S tubing to the air detector.
37. Touch MOVE TO INNER.
38. Replace the electrode carrier on the ISE module.
39. Connect the new S tubing to the ISE sample probe.
40. Press the R and W tubing into the appropriate grooves.
41. Replace the ISE shield.
42. Press the A tubing check valve into the corresponding groove on the ISE cover. Beginning at the check valve, press the A and B tubing into the appropriate grooves.
43. Replace the ISE reagent cartridge pack on the ISE reagent shelf.
44. Remove and dispose of the absorbent toweling in accordance with local, state, and federal regulations governing the treatment of regulated medical waste.
45. Purge twice.
46. Continue with daily maintenance procedures on the ISE.

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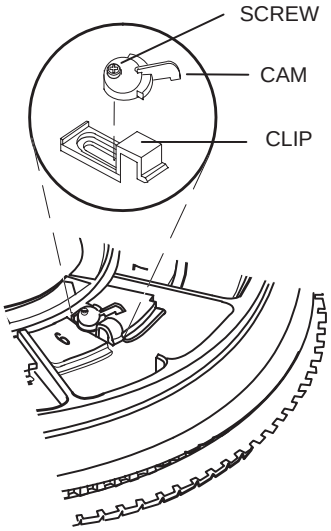
Introduction

This section provides stand-alone component replacement procedures. Component replacement may be necessary because the life of the component is exhausted, the operator has been directed to perform the procedure by a status code, or a problem has been observed.

◇ **WARNINGS**

- **POTENTIAL BIOHAZARD.** CONSIDER ALL CLINICAL SPECIMENS AND REAGENT CONTROLS THAT CONTAIN HUMAN BLOOD OR SERUM (CALIBRATORS, ETC.) AND CONTAMINATED INSTRUMENTS AS POTENTIALLY INFECTIOUS. WEAR GLOVES, LAB COATS, AND SAFETY GLASSES, AND FOLLOW OTHER BIOSAFETY PRACTICES AS SPECIFIED IN THE OSHA BLOODBORNE PATHOGEN RULE (29 CFR 1910.1030) OR OTHER EQUIVALENT BIOSAFETY PROCEDURES. REFER TO THE GENERAL BIOSAFETY DISCUSSION IN THE MAINTENANCE SECTION.
- **ELECTRICAL SHOCK HAZARD**. HIGH VOLTAGE EXISTS IN THE SYSTEM WHEN THE MAINTENANCE POWER IS **OFF** AND THE MAIN POWER IS **ON**. VISUALLY LOCATE THE POWER SWITCHES BEFORE TOUCHING THEM. FOR ADDITIONAL INFORMATION, REFER TO THE POWER ON/OFF PROCEDURE IN THE OPERATION MANUAL.

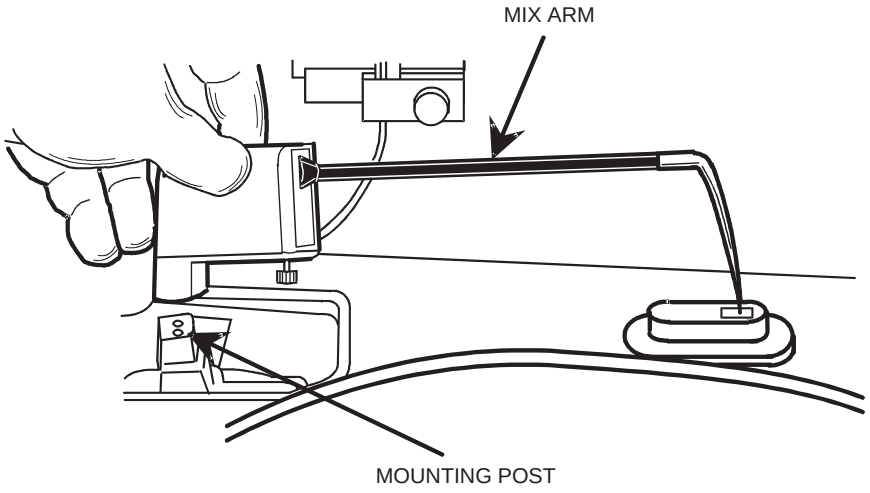
Cuvette Clip Replacement



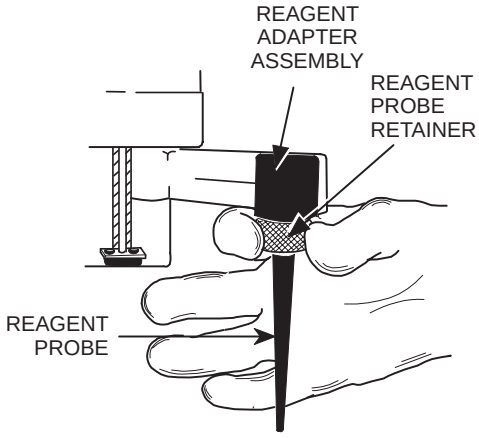
1. Remove the cuvette cover.
2. Remove the cuvette segment.
3. Remove the screw securing the cuvette clip, and discard the used parts.
4. Position the new cuvette clip on the cuvette carousel, placing the cam on top of the clip so the handle of the cam is to the right, and secure both with the screw provided.
5. Rotate the handle of the cam counterclockwise and install the cuvette segment.
6. Rotate the handle of the cam clockwise to lock the cuvette segment in place.
7. Replace the cuvette cover.
8. Check for clearance between the screws securing the cuvette clips and the inner ring of the cuvette cover. If any of the screws are touching the cuvette cover, additional adjustments may be required. Contact the Customer Support Center.

Mix Arm Replacement

1. Secure the plastic plate at the base of the mixer with one hand and pull the mix arm straight up and off the mix drive. Do not rock the mix arm from side to side.
2. Dispose of the used mix arm in accordance with local, state, and federal regulations governing the treatment of regulated medical waste.
3. Lightly lubricate the mix arm mounting post with DOW CORNING® Compound 111.
4. Push the replacement mix arm securely into place.
5. Clean the tip with an alcohol wipe, then rinse with water.
6. From the Main menu, touch CALIBRATION, SELECT. Touch TEMPERATURE CALIBRATION, SELECT. Touch HOME ROBOTICS. Touch EXIT.
7. Verify positioning in the cuvette and wash station. Refer to Probe Positioning, Mix Arm, if adjustment is required.



◆ Reagent Probe Replacement



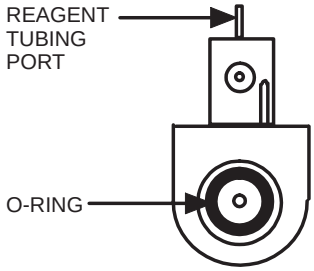
The reagent probe is replaced to ensure accurate reagent dispense and to prevent reagent carryover. Replace the reagent probe:

- Weekly, if fewer than 500 optical assays per day are performed.
- Twice per week, if more than 500 optical assays per day are performed.
- If the probe rubs or collides with another object.
- If reagent arm robotic training has been performed.

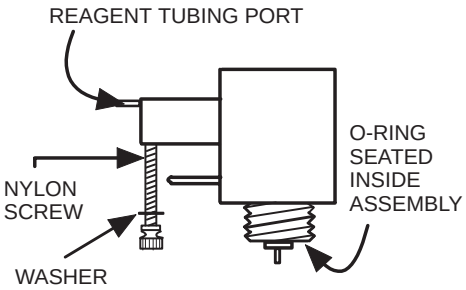
WARNING

FLUID SENSITIVITY AND ROBOTIC POSITIONING ARE ESSENTIAL FOR PROPER INSTRUMENT PERFORMANCE. FAILURE TO FOLLOW THIS PROCEDURE WILL CAUSE VARIATIONS IN FLUID SENSE AND IMPRECISION DURING REAGENT DISPENSE.

1. Loosen the metal reagent probe retainer connecting the reagent probe to the reagent adapter assembly. Remove the reagent probe.
2. Remove the O-ring from the reagent adapter assembly and inspect. Replace the O-ring in the reagent adapter assembly with each third probe change or if damage is observed.
3. Coat the flat top of the probe and the O-ring with a light film of DOW CORNING® Compound 111.
4. Position the O-ring into the reagent adapter assembly. Ensure that only one O-ring is installed.
5. Position the new probe into the reagent probe retainer and tighten the retainer until the probe is secure.
6. Dispose of the used reagent probe and O-ring in accordance with local, state, and federal regulations governing the treatment of regulated medical waste.
7. Touch HOME ROBOTICS. Verify the reagent probe is positioned correctly in the wash cup and fluid sensitivity is properly adjusted. Refer to Robotic Training, Reagent Arm.
8. Document maintenance and troubleshooting in the Maintenance Log.

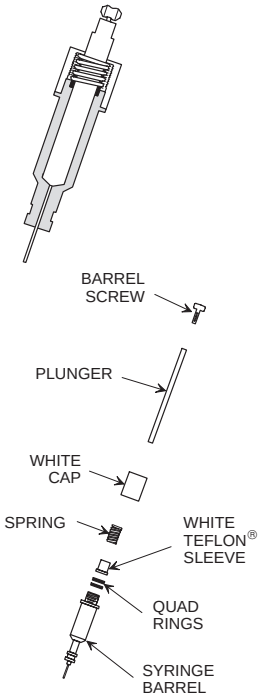


Bottom View of Reagent Adapter Assembly



Side View of Reagent Adapter Assembly

Reagent Syringe Replacement



1. Place a lint-free tissue over the incubator and mixer areas to prevent parts from being lost.
2. Disconnect the reagent syringe tubing.
3. Loosen the silver knurled knob on the black holding bracket at the bottom of the syringe.
4. Using a $^{7}/_{32}$ open-end wrench (supplied in the accessory kit), loosen the plunger in a clockwise direction so it can be removed from the drive block socket.
5. Pull the reagent syringe forward to disengage the barrel screw from the drive block socket.
6. Dispose of the used reagent syringe.
7. Disassemble the new syringe by unscrewing the white cap and removing the plunger.
8. Place the white cap, spring, and white TEFLON® sleeve aside.
9. Remove the two quad rings.
10. Apply a light film of DOW CORNING® Compound 111 to each new quad ring. Place each ring between your fingers, and apply slight pressure to evenly distribute the lubricant.
11. To lubricate the plunger, slide the quad rings onto the plunger shaft and move the quad rings to the opposite end of the plunger. Remove the residual lubricant from the end of the plunger with your fingers.

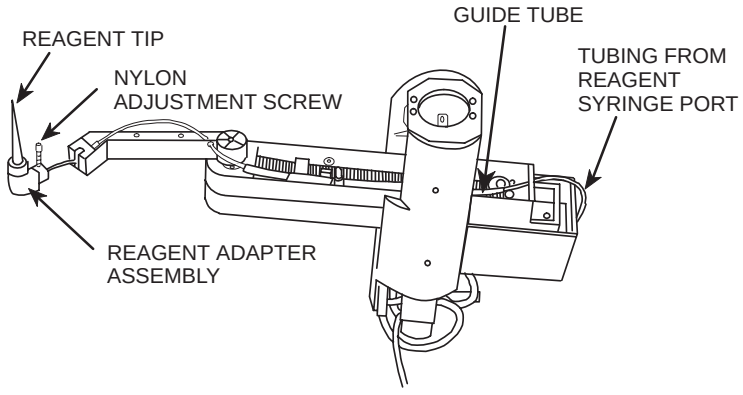
WARNING

DO NOT USE FIBROUS MATERIAL TO REMOVE THE RESIDUAL LUBRICANT. FIBERS ADHERING TO THE PLUNGER WILL CAUSE ERRORS IN DISPENSE PRECISION.

12. Slide the quad rings to the opposite end of the plunger and remove the residual lubricant from the end of the plunger with your fingers.
13. Remove residual lubricant from the outside of the quad rings with your fingers.
14. Reassemble the syringe by placing the quad rings in the syringe body and seating each quad ring separately. Mount the white cap, spring, and white TEFLON® sleeve on the plunger in the order indicated in the illustration. Insert the plunger into the syringe body and tighten the white cap.
15. Install the syringe plunger in the drive block socket. The flat sides of the ball face outward, parallel to the back panel of the instrument. Turn the plunger counterclockwise until it is finger tight. Tighten the plunger with a $^{7}/_{32}$ open-end wrench in a counterclockwise direction. Seat the syringe in the black holding bracket. Tighten the silver knurled metal knob.
16. Reconnect the reagent syringe tubing. If the syringe tubing is damaged, replace it. Refer to Reagent Tubing in this section.
17. Remove and discard the lint-free tissue.
18. Clear top deck area and touch HOME ROBOTICS from the Reagent Arm screen. Follow recommended troubleshooting protocol.

Reagent Tubing Replacement

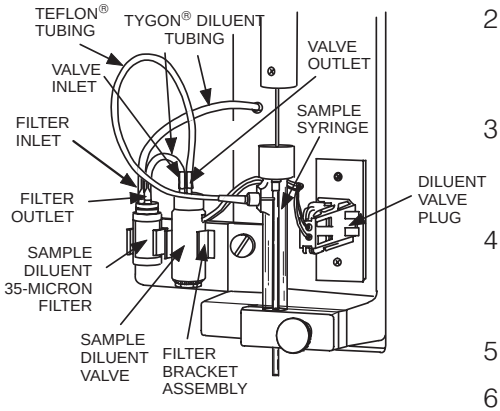
1. Remove the reagent adapter assembly by loosening the knurled nylon adjustment screw under the assembly and pulling the assembly from the reagent arm. Disconnect the tubing from the reagent adapter assembly and the reagent syringe port. Pull the tubing out through the reagent arm and discard.
2. Cut 28 inches of rigid TEFLON® tubing. Insert one end of the syringe tubing in the guide tube opening at the back of the arm. Push the syringe tubing through the guide tube until it emerges at the opening near the junction of the outer and inner arm. Insert the tubing through the opening on the side of the outer arm. Push the tubing under the outer arm and route it through the front opening.
3. Insert the tubing through the opening on the side of the outer reagent arm near the outer and inner arm junction. Push the tubing under the outer arm and route it through the front opening.
4. ◆ Flare one end of the tubing. Follow instructions in the flaring kit or grasp the end of the tubing with emery cloth and insert and gently twist a round, blunt instrument, such as a toothpick or plastic pipette tip.
5. Attach the tubing to the port on the reagent adapter assembly.
6. Reconnect the reagent adapter assembly to the reagent arm and gently tighten the adjustment screw.
7. Insert the other end of the tubing into the guide tube on the underside of the inner arm. Push the tubing until it emerges from the back of the guide tube.
8. Place a 1-$^{1}/_{2}$ inch piece of yellow TYGON® sleeving over the end of the tube to provide support. Flare the end of the TEFLON® tubing.
9. From the right of the reagent syringe, route the tubing behind the syringe and connect to the bottom syringe port. Push the yellow TYGON® sleeving up until it is flush against the syringe base.



Reagent Arm

SAMPLE DILUENT 35-MICRON FILTER

◆ Sample Diluent 35-Micron Filter Replacement



1. Detach the TYGON® diluent tubing from the sample diluent filter inlet port located on the outer rim of the sample diluent filter.
2. Detach and discard the 2 inch TYGON® diluent tubing from the sample diluent filter outlet port (centered on the sample diluent filter) and the sample valve inlet port.
3. Remove the used sample diluent filter from the harness clip and discard. Place the new sample diluent filter securely in the harness clip.
4. Attach the 2 inch TYGON® diluent tubing (provided in the sample diluent filter kit) to the sample valve inlet port and sample diluent filter outlet port.
5. Reattach the TYGON® tubing to the sample diluent filter inlet port.
6. Verify the TEFLON® tubing connecting the sample diluent valve outlet port to the sample syringe inlet port is securely attached. Inspect for crimping.
- ◆ 7. From the Main menu, touch SPECIAL PROCEDURES, SELECT. Touch ROBOTICS, SELECT. Touch PUMPS & VALVES, SELECT.
8. Touch DILUENT VALVE CLOSED to display DILUENT VALVE OPENED.

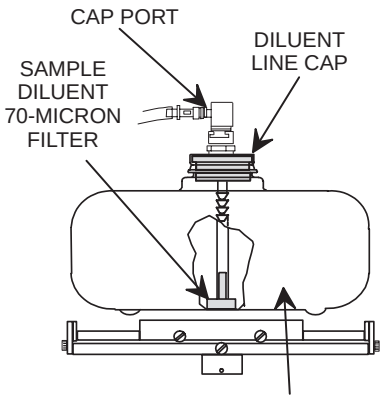
ATTENTION

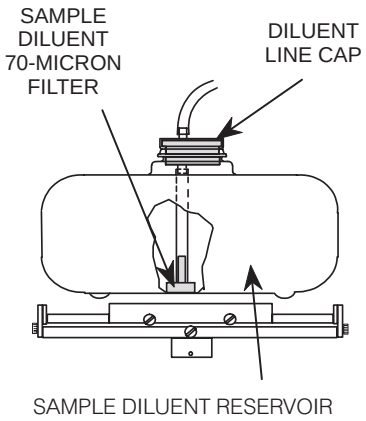
TO PREVENT DAMAGE TO THE SAMPLE DILUENT VALVE, **DO NOT** LEAVE THE VALVE OPEN FOR LONGER THAN TWO MINUTES WITHOUT FLUID FLOW.

9. Touch SINGLE STROKE to display PURGE # PURGES 1. Touch 1 and type 10.
- ◆ 10. Touch DILUENT PUMP. Remove air bubbles from the filter, valve and syringe. To remove bubbles from the filter, gently tap on the filter and tubing while the System is purging. To remove bubbles from the syringe, disconnect the syringe from the holding bracket by loosening the knurled knob and gently pulling the syringe out. Move the syringe barrel up and down on the plunger while the System is purging. Take care not to bend the plunger. Replace the sample syringe in the holding bracket and tighten the knurled knob.
11. After the cycle is complete, touch DILUENT VALVE OPENED to display DILUENT VALVE CLOSED.
12. Touch HOME ROBOTICS.
13. Touch EXIT.

SAMPLE DILUENT 70-MICRON FILTER

◆ Sample Diluent 70-Micron Filter Replacement





1. Open the sample diluent reservoir access door. Remove the sample diluent reservoir from the platform.
2. Remove the diluent line cap (with the diluent tubing attached) from the sample diluent reservoir and discard the residual water.
3. Disconnect the sample diluent 70-micron filter from the end of the diluent tubing and discard. Install a new filter.
4. Fill the sample diluent reservoir with Type II water.
5. Replace and tighten the diluent line cap.
6. Replace the sample diluent reservoir on the platform and close the access door.
7. From the Main menu, touch SPECIAL PROCEDURES, SELECT. Touch ROBOTICS, SELECT. Touch PUMPS & VALVES, SELECT.
8. Touch DILUENT VALVE CLOSED to display DILUENT VALVE OPENED.

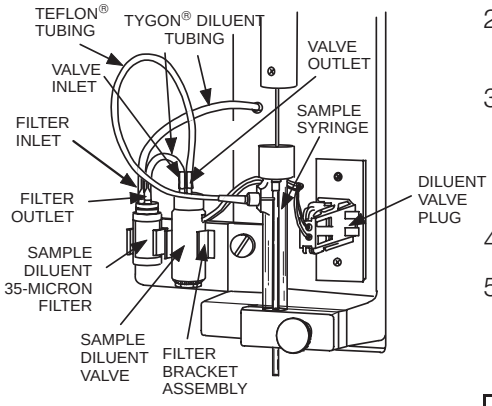
ATTENTION

TO PREVENT DAMAGE TO THE SAMPLE DILUENT VALVE, **DO NOT** LEAVE THE VALVE OPEN FOR LONGER THAN TWO MINUTES WITHOUT FLUID FLOW.

◆ 9. Touch SINGLE STROKE to display PURGE # PURGES 1, then touch the 1 and type 2. Touch DILUENT PUMP. During the purge cycle, gently tap tubing from the sample diluent reservoir to the sample diluent pump to dislodge bubbles. To remove bubbles from the syringe, remove the sample syringe from the holding bracket by loosening the knurled knob and gently pulling the syringe out. Manually move the syringe barrel up and down on the plunger. Take care not to bend the plunger. Replace the sample syringe in the holding bracket and tighten the knurled knob.

10. Touch DILUENT VALVE OPENED to display DILUENT VALVE CLOSED.
11. Touch EXIT.

Sample Diluent Valve Replacement



1. Detach the TEFLON® tubing from the sample diluent valve outlet port (centered on the top of the valve).
2. Detach the TYGON® tubing from the sample diluent valve inlet port (located on the outer rim of the valve).
3. Disconnect the diluent valve electrical plug. Then, grasp the sample diluent valve and remove it from the harness clip. Place the new sample diluent valve securely in the harness clip. Discard the used sample diluent valve.
4. Reconnect the diluent valve electrical plug.
5. Reattach the TEFLON® tubing to the valve outlet port. Replace tubing if required. Refer to Sample System Tubing in this section. Reattach the TYGON® tubing to the valve inlet port.

ATTENTION

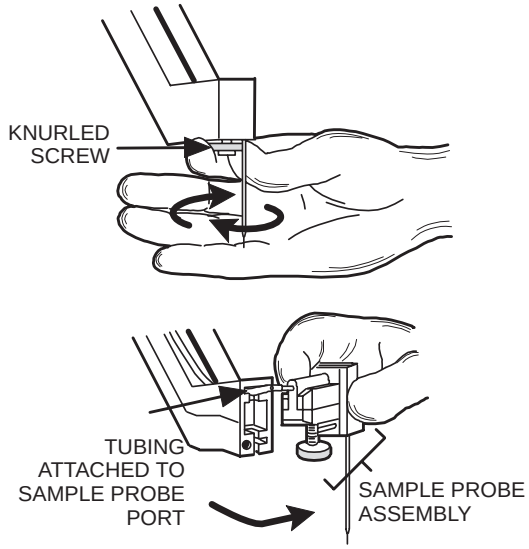
THE SAMPLE DILUENT 35-MICRON FILTER MUST BE REPLACED WHEN A NEW SAMPLE DILUENT VALVE IS INSTALLED.

6. Replace the sample diluent 35-micron filter. Refer to Sample Diluent 35-Micron Filter in this section.

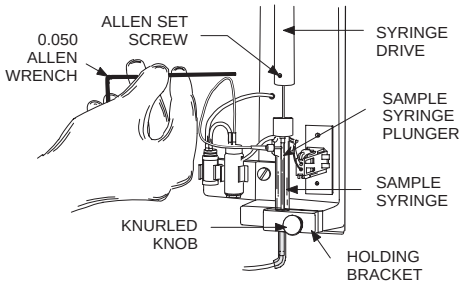
SAMPLE PROBE

Sample Probe Replacement

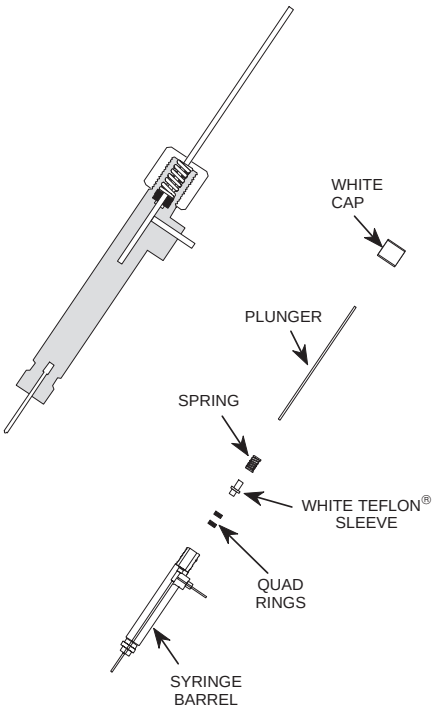
1. Loosen the knurled screw that holds the probe to the sample arm. Carefully slide the sample probe assembly forward and free of the arm. Disconnect the tubing, in a motion away from the operator to avoid aerosol spray.
2. Dispose of the used sample probe in accordance with local, state, and federal regulations governing the treatment of regulated medical waste.
3. Connect the tubing to the replacement probe. Slide the sample probe assembly onto the sample arm, and tighten the knurled screw.
4. Refer to the Probe Positioning, Sample Arm, and follow protocol for positioning the sample probe and fluid sense adjustment.



Sample Syringe Replacement



Sample Syringe Mounted



Sample Syringe Components

1. Place a lint-free tissue over the incubator and mixer areas to prevent parts from being lost.
2. Disconnect the tubing from the side port and bottom of the syringe and retain the yellow TYGON® tubing. Loosen the silver knurled knob on the black holding bracket at the bottom of the syringe.
3. Loosen the Allen set screw with the 0.050 Allen wrench one to two turns. Pull the entire syringe and plunger out of the drive.
4. Discard the used sample syringe.
5. Disassemble the new syringe by unscrewing the white cap and removing the plunger.
6. Place the white cap, spring, and white TEFLON® sleeve aside.
7. Remove the two quad rings.
8. Apply a light film of DOW CORNING® Compound 111 to each quad ring. Place each ring between your fingers. Apply slight pressure to evenly distribute the lubricant.
9. To lubricate the plunger, slide the quad rings onto the plunger shaft and move the quad rings to the opposite end of the plunger. Remove the residual lubricant from the plunger end with your fingers .

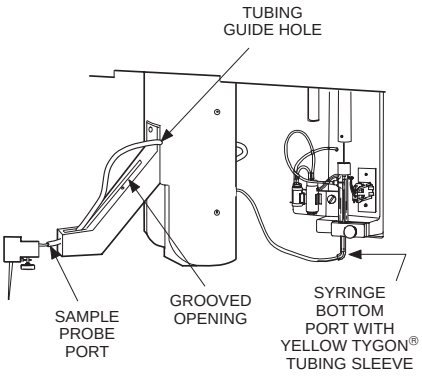
WARNING

DO NOT USE FIBROUS MATERIAL TO REMOVE THE RESIDUAL LUBRICANT. FIBERS ADHERING TO THE PLUNGER WILL CAUSE ERRORS IN DISPENSE PRECISION.

10. Slide the quad rings to the opposite end of the plunger and remove the residual lubricant from the plunger end with your fingers.
11. Remove residual lubricant from the outside of the quad rings with your fingers.
12. Reassemble the syringe by placing the spring, TEFLON® sleeve, and quad rings on the plunger in the order indicated in the illustration. Replace the plunger and apply slight pressure to the spring that seats the quad rings securely in the syringe body. Replace the white cap and tighten.
13. Install the plunger in the drive so the plunger is seated as far into the drive as possible and tighten the set screw. Seat the syringe in the black holding bracket and tighten the silver knurled metal knob.
14. Connect the sample syringe tubing. (Reuse the yellow TYGON® tubing.) If the syringe tubing is damaged, replace it. Refer to Sample System Tubing in this section.
15. Remove and discard the lint-free tissue.
16. Clear the top deck area and touch HOME ROBOTICS from the Sample Arm screen. Follow recommended troubleshooting protocol in the Status Codes section of this manual if an error is generated by homing robotics.

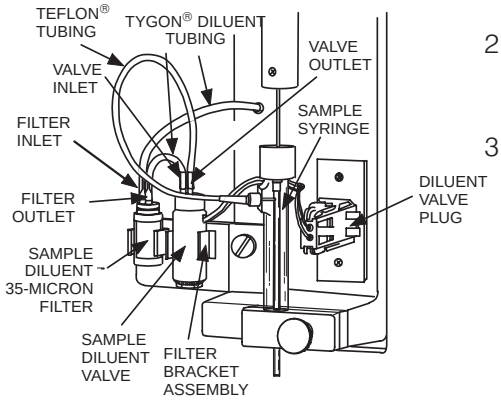
Sample System Tubing Replacement

Sample Syringe to Sample Probe



1. Cut 20 inches of rigid TEFLON® tubing. Loosen the knurled screw under the sample probe and remove the sample probe. Remove the syringe tubing from the groove opening and pull the sample probe assembly away from the arm. Disconnect the syringe tubing from the probe assembly.
2. ◆ Disconnect the used tubing from the sample syringe bottom port. Pull the tubing from the sample arm and discard. Insert one end of the new tubing through the tubing guide hole near the top of the sample arm. Push the tubing until it emerges from the back of the sample arm cover. Place a 1-$^1/_2$ inch piece of yellow TYGON® tubing over the end of the syringe tubing. Flare the end of the syringe tubing. Follow instructions in the flaring kit or insert and gently twist a round, blunt object, such as a toothpick or plastic pipette tip. Attach the tubing to the syringe bottom port.
3. Insert the other end of the tubing into the grooved opening on the sample arm. Flare the end of the tubing. Attach the tubing to the sample probe and attach the probe to the sample arm. Replace the sample probe assembly on the sample arm and tighten the knurled screw. Press the tubing into the sample arm groove.
4. PURGE. Refer to Daily Maintenance, Sample Diluent Reservoir, for the procedure.

Sample Valve to Syringe



1. Detach the TEFLON® tubing from the sample valve outlet port (centered on the top of the valve) to the sample syringe side port, and discard.
2. Cut a 6 inch length of rigid TEFLON® tubing. Do not use the soft tubing supplied with the sample diluent valve. Flare each end of the tubing and attach to the appropriate port.
3. PURGE. Refer to Daily Maintenance, Sample Diluent Reservoir, for the procedure.

Sample Diluent Filter to Sample Valve

1. Detach the 2 inch TYGON® diluent tubing from the sample diluent filter outlet port (centered on the sample diluent filter) to the sample diluent valve inlet port, and discard.
2. Attach the 2 inch pre-cut TYGON® tubing to the appropriate ports on the sample diluent filter and the sample diluent valve. (The 2 inch pre-cut tubing is provided with the sample diluent filter kit.)
3. PURGE. Refer to Daily Maintenance, Sample Diluent Reservoir, for the procedure.

Source Lamp

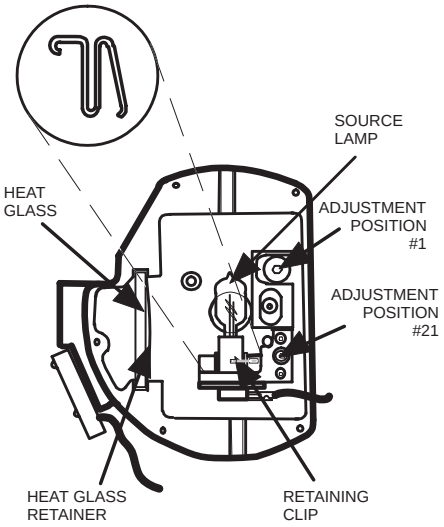
Two types of source lamp housings are available on the ABBOTT SPECTRUM® SERIES II™ System.

- Screw Release Configuration, where the center of the cuvette carousel cannot be removed.
- Quick Release Configuration, where the center of the cuvette carousel can be removed by pushing down on the carousel and lifting up on the center of the cover.

Lamp replacement and adjustment procedures for both configurations are provided. Refer to the appropriate procedure.

SOURCE LAMP – SCREW RELEASE

Screw Release Replacement



Source Lamp Housing

1. From the Main menu, touch SPECIAL PROCEDURES, SELECT. Touch AD OFFSET, SELECT.
2. Touch HOME SLAVE to move cuvette cell 1 to the home position.

◇ WARNING

ELECTRICAL SHOCK HAZARD. HIGH VOLTAGE EXISTS IN THE SYSTEM WHEN THE MAINTENANCE POWER IS **OFF** AND THE MAIN POWER IS **ON**. VISUALLY LOCATE THE POWER SWITCHES BEFORE TOUCHING THEM. FOR ADDITIONAL INFORMATION, REFER TO THE POWER ON/OFF PROCEDURE IN THE OPERATION MANUAL.

◆ 3. Visually locate the Maintenance power switch and turn it to the OFF position. Visually locate the Main power switch and turn it to the OFF position.

4. Remove the cuvette cover and all eight cuvettes from the carousel. Dispose of the used cuvettes in accordance with local, state, and federal regulations governing the treatment of regulated medical waste.
5. Remove all eight Phillips-head screws from the outer ring of the cuvette carousel. Gently lift the carousel by the spokes.

CAUTION

COMPONENTS MAY BE HOT. ALLOW COMPONENTS TO COOL FOR FIVE MINUTES BEFORE PROCEEDING.

6. Remove the five Phillips-head screws on the perimeter of the lamp housing cover. Remove both the pie-shaped lamp adjustment cover and the main cover.
7. Remove the retaining clip on the right side of the lamp base. Loosen the vertical adjustment screw, labeled #2, to allow access to the lamp socket. Grasp the ceramic base and pull the lamp straight out. Discard the used lamp.

CAUTION

DO NOT APPLY PRESSURE ON THE GLASS, AS IT MAY BREAK.

Screw Release Replacement (continued)

8. Open the plastic bag, exposing the base of the new lamp. Do not remove the lamp from the plastic bag.

ATTENTION

DO NOT TOUCH THE GLASS PORTION OF THE LAMP, AS FINGERPRINTS WILL CAUSE THE LAMP TO BE UNUSABLE.

9. Hold the replacement lamp by the ceramic base.
10. Align the lamp with the large post on the bottom and push the lamp into the socket until the base is flush with the socket. Remove the plastic bag.
11. Replace the retaining clip. Replace the socket and turn the adjustment screw clockwise until the housing cover will fit flush on top of the lamp housing.
12. Remove the heat glass and heat glass retainer. Clean the glass with lens paper. Reinstall the heat glass and the retainer, with the retainer on the right of the heat glass. If the heat glass is cracked, contact the Customer Support Center.

ATTENTION

HANDLE THE GLASS BY THE EDGES ONLY. DO NOT TOUCH THE SURFACE.

13. Replace the lamp adjustment cover. Replace the main lamp housing cover and secure it with two screws.
14. ◆ Visually locate the Main power switch and turn it to the ON position. Visually locate the Maintenance power switch and turn it to the ON position.
15. The new lamp requires 15 minutes to stabilize. While waiting, clean the incubator and lenses. Refer to Weekly Maintenance.
16. After the incubator and lenses have been cleaned, and the incubator level is OK, ensure that there are no bubbles on the lenses. Perform the Lamp Adjustment procedure.

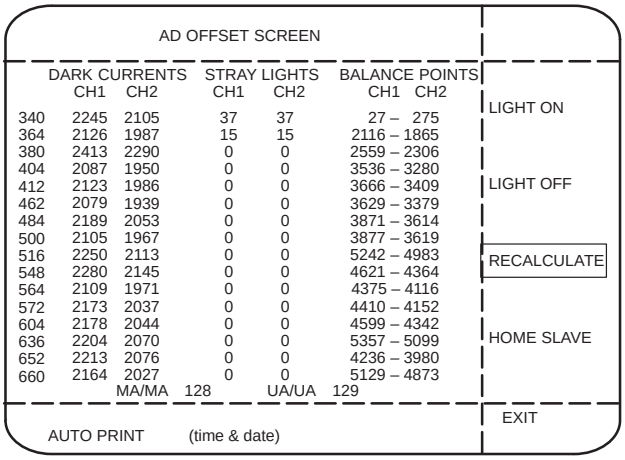
Screw Release Adjustment

The purpose of this procedure is to align the lamp so that a minimum amount of voltage is required to power the lamp. To assure maximum lamp life, this procedure should be performed **only** after the lamp has been replaced and the incubator and lenses have been cleaned.

CAUTION

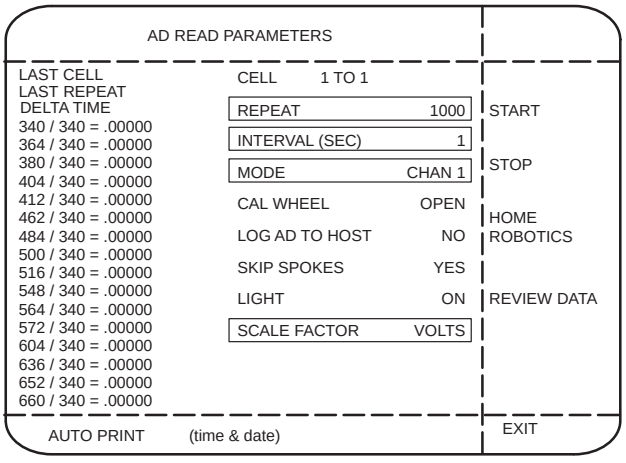
THE LAMP MUST HAVE BEEN ON FOR AT LEAST 15 MINUTES BEFORE PERFORMING THIS PROCEDURE.

17. From the Main menu, touch SPECIAL PROCEDURES, SELECT, then touch AD OFFSET, SELECT. Touch RECALCULATE. After the screen changes, touch EXIT.



18. Touch AD READ, SELECT. Edit the following parameters on the AD Read screen. Use the CYCLE key for MODE and SCALE FACTOR.

    REPEAT = 1000
    INTERVAL = 1
    MODE = CHAN 1
    SCALE FACTOR = VOLTS



Screw Release Adjustment
(continued)

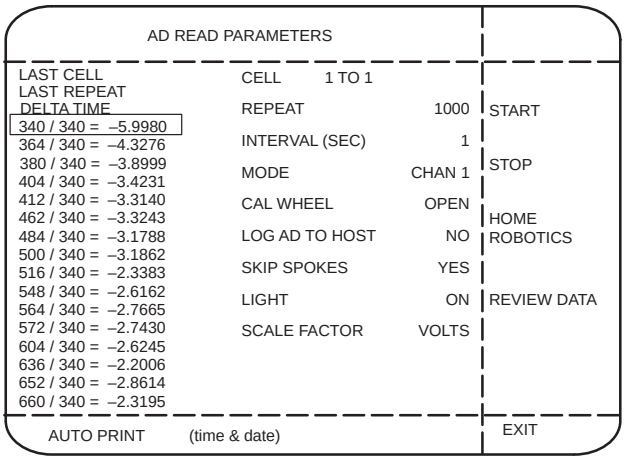
NOTE

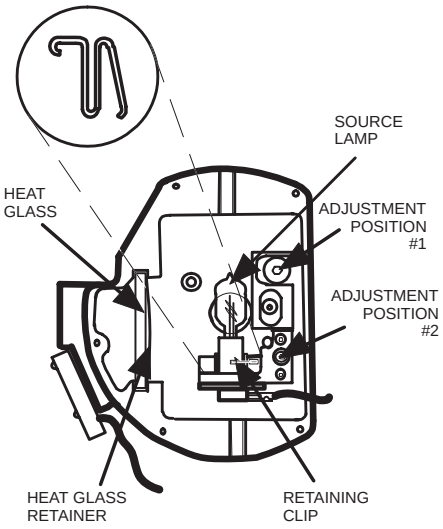
IF THIS PROCEDURE IS BEING USED FOR LAMP VOLTAGE CHECK **ONLY**, REMOVE CUVETTE SEGMENT ONE BEFORE PROCEEDING.

19. Touch START and observe the 340/340 channel wavelength voltage (all readings will be assumed to be absolute values). The voltage reading should be less than 7.3 volts. If the voltage is greater than 7.3 volts, use the plastic adjustment tool to adjust the R-39 potentiometer on the Lamp Servo Board for a reading less than 7.3 volts. (The Lamp Servo Board is located in slot 11 of the Master Card Cage, located above the CRT.)

CAUTION

COMPONENTS WILL BE HOT. AVOID TOUCHING LAMP HOUSING.





Source Lamp Housing

20. With the voltage less than 7.3 volts, use a 9/64 Allen wrench and turn the #1 adjustment screw on the lamp housing slowly. This will move the lamp front to back in the housing.

    While observing the screen, continue adjusting until the voltage reaches its maximum reading. If the voltage becomes greater than 7.3 volts, repeat Steps 19 and 20. When the maximum voltage is achieved, continue this procedure.

NOTE

IF THE LED ON THE LAMP SERVO BOARD LIGHTS DURING ANY OF THE ADJUSTMENTS, TURN R-39 IN THE OPPOSITE DIRECTION AND ALLOW THE SYSTEM TO STABILIZE. THEN REPEAT THE LAMP ADJUSTMENTS. IF UNABLE TO OBTAIN CORRECT VOLTAGE, CONTACT THE CUSTOMER SUPPORT CENTER.

21. Adjust the #2 screw in the same manner. This moves the lamp up and down in the housing. Monitor the screen and continue adjusting. When maximum voltage is achieved, proceed to the next step.

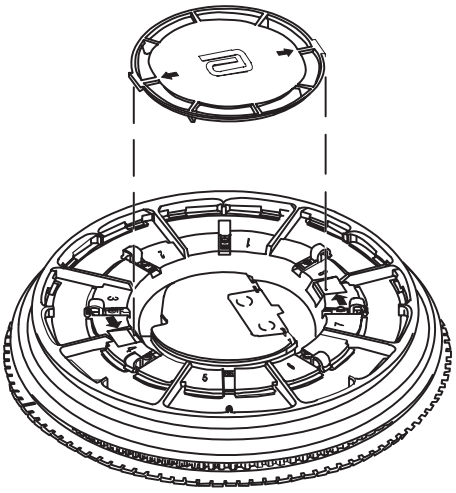
22. Once maximum voltage has been achieved by adjusting the lamp position, adjust R-39 potentiometer to achieve a voltage reading of 6.8 to 7.3 volts.

Screw Release Adjustment (continued)

23. Once the voltage is set, touch STOP.
24. Replace the lamp adjustment cover and the three screws.
25. Touch HOME ROBOTICS and wait for the sequence to complete successfully. If an error code occurs, touch HOME ROBOTICS again. This step must not be omitted, as the appropriate replacement of the carousel is dependent on this homing sequence.
26. Replace the cuvette carousel. Verify that cuvette cell 1 is in the Home position (adjacent to the sample wash station).
27. Install and tighten the eight Phillips-head screws on the outer ring of the cuvette carousel.
28. Place new cuvettes in the carousel and verify that the cuvette change panel reflects the change.
29. Run controls to verify System operation.

SOURCE LAMP – QUICK RELEASE

Quick Release Replacement



1. Remove the cuvette cover and the eight cuvettes. Dispose of the used cuvettes in accordance with local, state, and federal regulations governing the treatment of regulated medical waste.

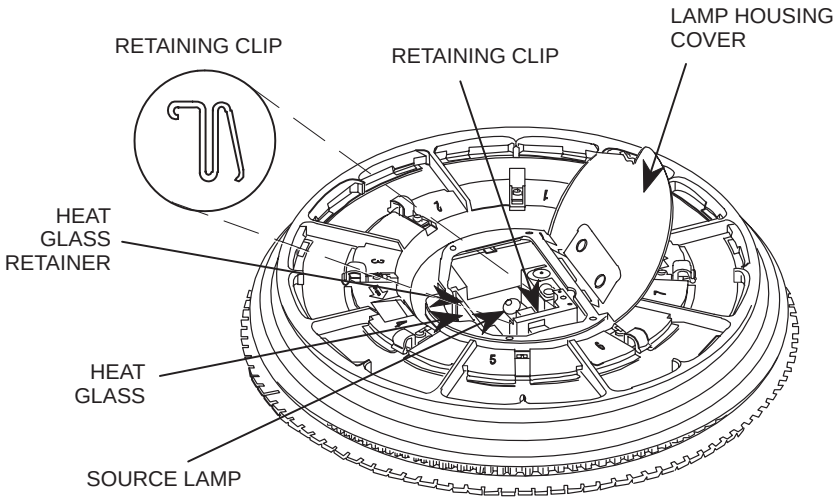
> ◇ **WARNING**
>
> **ELECTRICAL SHOCK HAZARD.** HIGH VOLTAGE EXISTS IN THE SYSTEM WHEN THE MAINTENANCE POWER IS **OFF** AND THE MAIN POWER IS **ON**. VISUALLY LOCATE THE POWER SWITCHES BEFORE TOUCHING THEM. FOR ADDITIONAL INFORMATION, REFER TO THE POWER ON/OFF PROCEDURE IN THE OPERATION MANUAL.

◆ 2. Visually locate the Maintenance power switch and turn it to the OFF position. Visually locate the Main power switch and turn it to the OFF position.

3. Snap out the center of the carousel by pushing down on the carousel as indicated by the arrows and lifting up on the center cover.

> **CAUTION**
>
> COMPONENTS MAY BE HOT. ALLOW THE COMPONENTS TO COOL FOR FIVE MINUTES BEFORE PROCEEDING.

4. Snap open the large lamp housing cover by lifting the cover as indicated by the label LIFT HERE.



5. Remove the retaining clip from the right side of the lamp base.

6. Remove the lamp by grasping the ceramic base and pulling the lamp straight out. Discard the used lamp.

> **CAUTION**
>
> DO NOT APPLY PRESSURE ON THE GLASS, AS IT MAY BREAK.

Quick Release Replacement (continued)

7. Open the plastic bag, exposing the ceramic base of lamp. Do not remove the lamp from the plastic bag.

ATTENTION

DO NOT TOUCH THE GLASS PORTION OF THE REPLACEMENT LAMP, AS FINGERPRINTS WILL CAUSE THE LAMP TO BE UNUSABLE.

8. Hold the replacement lamp by the ceramic base.
9. Align the lamp with the larger post on the bottom and push the lamp into the socket until the base is flush with the socket. Remove the plastic bag.
10. Replace the retaining clip.
11. Carefully remove the heat glass and heat glass retainer. If the heat glass is cracked, contact the Customer Support Center. Clean the glass with lens paper. Reinstall the glass and the retainer so the retainer is to the right of the glass.

ATTENTION

HANDLE THE HEAT GLASS BY THE EDGES ONLY. DO NOT TOUCH THE SURFACE.

12. Close the lamp housing cover.
13. ◆ Visually locate the Main power switch and turn it to the ON position. Visually locate the Maintenance power switch and turn it to the ON position.
14. While waiting 15 minutes for the lamp to stabilize, clean the incubator and lenses. Refer to Weekly Maintenance.
15. After the incubator and lenses have been cleaned, and the incubator is full, ensure that there are no bubbles on the lenses. Perform the Lamp Adjustment procedure.

Quick Release Adjustment

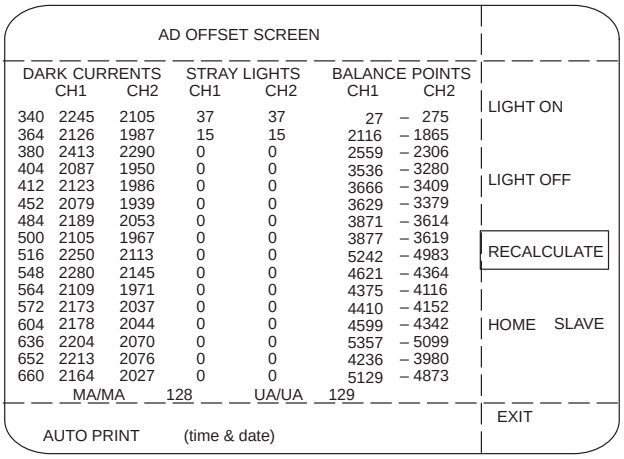
The purpose of this procedure is to adjust the lamp so a minimum voltage is required to power the lamp. To assure maximum lamp life, this procedure should be performed **only** after the lamp has been replaced and the incubator and lenses have been cleaned.

CAUTION

THE LAMP MUST HAVE BEEN ON FOR AT LEAST 15 MINUTES AND CUVETTE SEGMENT ONE MUST BE REMOVED BEFORE PERFORMING THIS PROCEDURE.

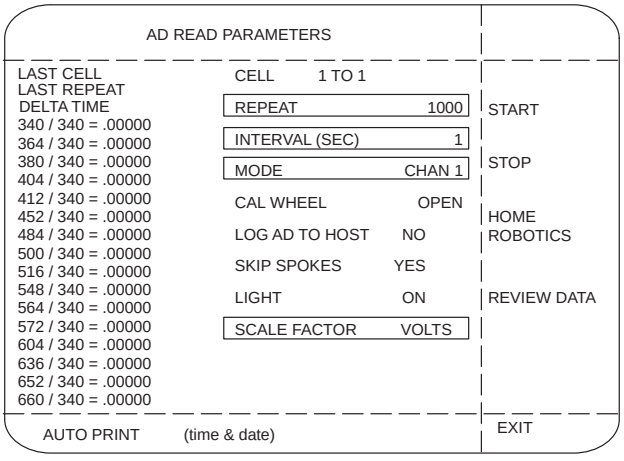
16. From the Main menu, touch SPECIAL PROCEDURES, SELECT. Touch AD OFFSET, SELECT, then touch RECALCULATE.

    After the screen changes, touch EXIT.



17. Touch AD READ, SELECT, and edit the following parameters on the AD Read screen. Use the CYCLE key to set the MODE AND SCALE FACTOR.

    REPEAT = 1000
    INTERVAL = 1
    MODE = CHAN 1
    SCALE FACTOR = VOLTS

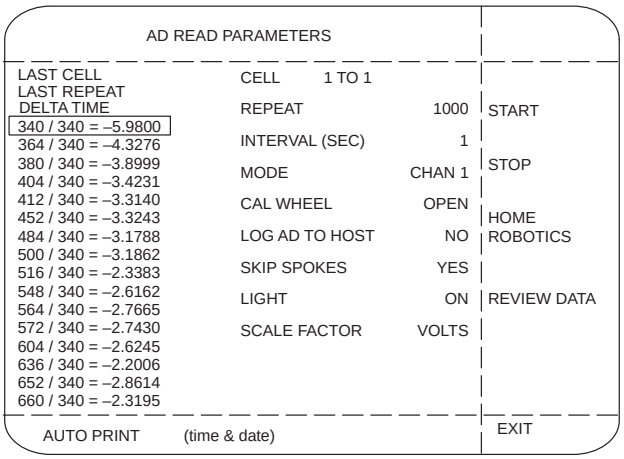


NOTE

IF THIS PROCEDURE IS BEING USED FOR LAMP VOLTAGE CHECK **ONLY**, REMOVE CUVETTE SEGMENT ONE BEFORE PROCEEDING.

Quick Release Adjustment (continued)

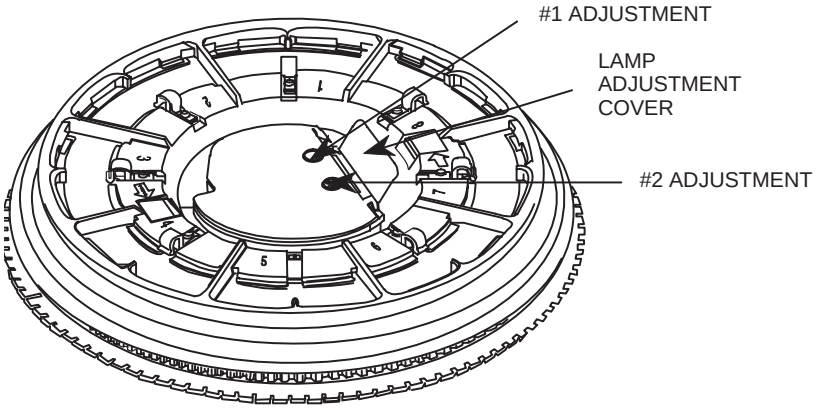
18. Touch START and observe the 340/340 channel wavelength voltage (all readings will be assumed to be absolute values). The voltage reading must be less than 7.3 volts. If the voltage is greater than 7.3, use the plastic adjustment tool to adjust potentiometer R-39 on the Lamp Servo Board until the reading is less than 7.3 volts. (The Lamp Servo Board is located in slot 11 of the Master Card Cage, located above the CRT.)



CAUTION

COMPONENTS WILL BE HOT. AVOID TOUCHING THE LAMP HOUSING.

19. Open the Lamp Adjustment Cover.



NOTE

IF THE LED ON THE LAMP SERVO BOARD LIGHTS DURING ANY OF THE ADJUSTMENTS, TURN R-39 IN THE OPPOSITE DIRECTION AND ALLOW THE SYSTEM TO STABILIZE, THEN REPEAT THE LAMP ADJUSTMENT. IF UNABLE TO OBTAIN THE CORRECT VOLTAGE, CONTACT THE CUSTOMER SUPPORT CENTER.

20. With the voltage less than 7.3, use a 9/64 Allen wrench to turn the #1 adjustment screw in the lamp housing as follows. While observing the screen, turn the screw clockwise, then counterclockwise, to achieve the highest number possible. If the voltage exceeds 7.3, repeat Step 18.

Quick Release Adjustment (continued)

21. Adjust the #2 screw in the same manner.
22. Once the maximum voltage has been achieved by adjusting the lamp position, adjust potentiometer R-39 to achieve a reading of 6.8 to 7.3 volts.
23. When the voltage is properly set, touch STOP.
24. Close the lamp adjustment cover.
25. Snap the center of the cuvette carousel into place.
26. Place new cuvettes in the carousel. Verify that the cuvette change panel reflects the change.
27. Run controls to verify System operation.

TOP DECK COVER

Top Deck Cover Removal

◇ **WARNING**

ELECTRICAL SHOCK HAZARD. HIGH VOLTAGE EXISTS IN THE SYSTEM WHEN THE MAINTENANCE POWER IS **OFF** AND THE MAIN POWER IS **ON**. VISUALLY LOCATE THE POWER SWITCHES BEFORE TOUCHING THEM. FOR ADDITIONAL INFORMATION, REFER TO THE POWER ON/OFF PROCEDURE IN THE OPERATION MANUAL.

◆ 1. Visually locate the Maintenance power switch and turn it to the OFF position. Visually locate the Main power switch and turn it to the OFF position.

2. Remove the sample probe and reagent probe. Remove the reagent, cuvette, and sample carousel covers and the mix arm. Remove the wash station covers.

3. Remove the following screws:
   - 2 on the top deck ($^{3}/_{32}$ Allen wrench)
   - 1 inside the sample diluent reservoir compartment ($^{3}/_{32}$ Allen wrench)
   - 6 securing the louvered front panel ($^{1}/_{8}$ Allen wrench)

4. Grasp the top deck cover at the reagent and sample carousel openings, lift it 1 to 2 inches, then pull forward until it is clear of the instrument.

Top Deck Cover Replacement

1. Position the top deck cover over the carousels.
2. Secure the louvered front panel without tightening the screws.
3. Position the deck for proper fit.
4. Replace the screw for the sample diluent reservoir compartment, and tighten all screws.
5. Replace the wash station covers. Replace the reagent, cuvette, and sample carousel covers. Replace the sample probe, reagent probe, and the mix arm.

◆ 6. Visually locate the Main power switch and turn it to the ON position. Visually locate the Maintenance power switch and turn it to the ON position.

◇ Main Power Fuse Replacement

The main power fuse protects all AC power to the System. When the fuse blows, there is no response from the System.

WARNINGS

- **ELECTRICAL SHOCK HAZARD.** HIGH VOLTAGE EXISTS IN THE SYSTEM WHEN THE MAINTENANCE POWER IS **OFF** AND THE MAIN POWER IS **ON**. VISUALLY LOCATE THE POWER SWITCHES BEFORE TOUCHING THEM. FOR ADDITIONAL INFORMATION, REFER TO THE POWER ON/OFF PROCEDURE IN THE OPERATION MANUAL.
- REMOVE LATEX GLOVES BEFORE PERFORMING PROCEDURE.

1. Visually locate the Maintenance power switch and turn it to the OFF position.
2. Visually locate the Main power switch and turn it to the OFF position.
3. Visually locate the main power fuse. It is above, and to the right, of the Maintenance power switch, in a black fuse holder, labeled FUSE.
4. Push the fuse holder in and turn it counterclockwise, one quarter turn, until it is released.
5. Remove and discard the fuse.
6. Insert a new fuse in the fuse holder.

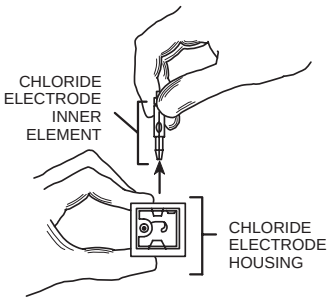
NOTE

FOR 110 VAC SYSTEMS USE A 15 AMP FUSE.
FOR 220 VAC SYSTEMS, USE A 10 AMP FUSE.

7. Reinstall the fuse holder by pushing it in and turning it clockwise, one quarter turn, until it is properly seated.
8. Visually locate the Main power switch and turn it to the ON position.
9. Visually locate the Maintenance power switch and turn it to the ON position.
10. When the System Power On screen displays and OK displays for each System-controlled diagnostic check, resume normal operation.

ISE Chloride Electrode Inner Element Replacement

1. Place absorbent paper toweling under the ISE module.
2. From the Main menu, touch CALIBRATION, SELECT, then ISE STATUS, SELECT.
3. To prevent dripping, place the ISE reagent cartridge pack on the instrument deck.
4. Carefully remove the A, B, and R tubing from the ISE reagent cartridge pack, in a motion away from the operator to avoid aerosol spray. Do not remove the W tubing from the pack. To prevent contamination, wipe the tubing individually with a clean, lint-free tissue.
5. Place the A, B, and R tubing on a clean, lint-free tissue. Touch PURGE to draw air through the tubing. Allow the cycle to complete.
6. Place the A, B, and R tubing in Type II water. Touch PURGE to draw water through the tubing. Allow the cycle to complete.
7. Remove the tubing from the water and place it on a clean, lint-free tissue. Touch PURGE to draw air through the tubing. Allow the cycle to complete.
8. Touch MOVE TO INNER.
9. Remove the clear plastic ISE shield, if so equipped, by pulling the connector on the top of the shield straight out.
10. Grasp the electrode carrier and gently pull it from the ISE module.
11. Carefully disconnect the R, W, and S tubing from the electrodes, in a motion away from the operator to avoid aerosol spray.
12. Disengage the electrode latch and slide the electrodes out.
13. Place a clean towel on a hard surface and position the chloride electrode, bottom port down, with the lip over the edge. Press down on the housing.
14. Pull the inner element out and drain the internal solution into a waste container.
15. Dispose of the used chloride electrode inner element in accordance with local, state, and federal regulations governing the treatment of regulated medical waste.
16. With a 5cc syringe and blunt-tipped needle, rinse the housing with Type II water and drain.
17. Rinse the housing with a small amount of filling solution and drain. Repeat.



ISE Chloride Electrode Inner Element Replacement (continued)

ATTENTION

DO NOT TOUCH THE MEMBRANE PORTION OF THE INNER ELEMENT.

◇ 18. Remove and discard the clear rubber protective cap from the tip of the inner element.

19. Align the inner element so the O-ring on the element is opposite the O-ring in the housing. Insert the new inner element into the electrode housing. Press the element into position.

20. Using the syringe and blunt-tipped needle, aspirate approximately 5 ml of Chloride Internal Filling Solution. Insert the needle through the chloride housing septum and fill the chloride housing to cover the internal silver wire and inner element membrane.

21. Wipe any filling solution from the outside of the electrode.

22. Reassemble the electrode train and engage the electrode carrier latch.

23. Reconnect the R, W, and S tubing.

24. Replace the electrode carrier on the ISE module.

25. Replace the ISE shield.

26. Replace the A, B, and R tubing in the ISE reagent cartridge pack.

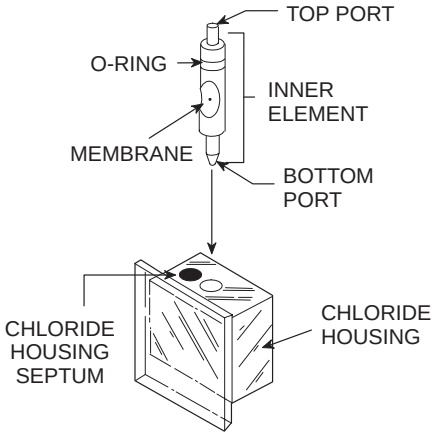
27. Replace the ISE reagent cartridge pack on the ISE reagent shelf.

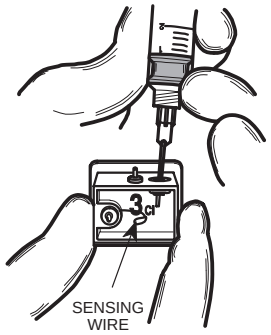
28. Remove and dispose of the absorbent toweling in accordance with local, state, and federal regulations governing the treatment of regulated medical waste.

29. Touch EXIT, then touch MAINTENANCE, SELECT.

30. Touch ISE PACK CHANGE, SELECT. During this activity, the ISE will purge twice and calibrate. A calibration report will print. Verify the report against acceptance criteria on the Maintenance Log. Request, run, and record quality controls.

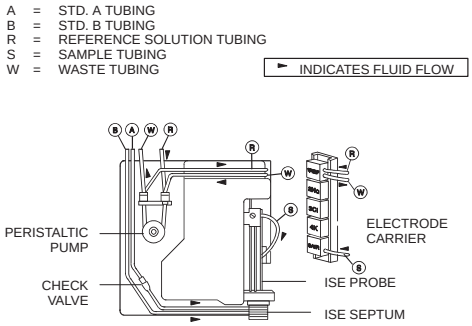
31. Touch EXIT.





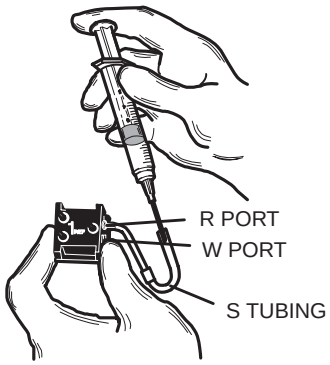
ISE Electrode Flushing

Flushing the electrodes helps prevent protein buildup and removes potential obstructions.



ISE Module

1. Place absorbent paper toweling under the ISE module.
2. From the Main menu, touch CALIBRATION, SELECT, then ISE STATUS, SELECT.
3. To prevent dripping, place the ISE reagent cartridge pack on the instrument deck.
4. Carefully remove the A, B, and R tubing from the ISE reagent cartridge pack, in a motion away from the operator to avoid aerosol spray. Do not remove the W tubing from the pack. To prevent contamination, wipe the tubing individually with a clean, lint-free tissue.
5. Place the A, B, and R tubing on a clean, lint-free tissue. Touch PURGE to draw air through the tubing. Allow the cycle to complete.
6. Place the A, B, and R tubing in Type II water. Touch PURGE to draw water through the tubing. Allow the cycle to complete.
7. Remove the tubing from the water and place it on a clean, lint-free tissue. Touch PURGE to draw air through the tubing. Allow the cycle to complete.
8. Touch MOVE TO INNER.
9. Remove the clear ISE shield, if so equipped, by pulling the connector on the top of the shield straight out.
10. Grasp the electrode carrier and gently pull it from the ISE module.
11. Carefully disconnect the R, W, and S tubing from the electrodes, in a motion away from the operator to avoid aerosol spray.
12. Disengage the electrode latch and slide the electrodes out.
13. Fill a 5cc syringe, fitted with a blunt-tipped needle, with warm Type II water. Attach a length of S tubing to the blunt-tipped needle.
14. Attach the syringe with tubing to the W port of the reference electrode, cover the R port, and flush the electrode with water. A steady stream of water should be observed at the bottom port.



15. Remove the tubing from the W port.
16. Attach the syringe with tubing to the R port of the reference electrode, cover the W port, and flush the electrode with water. A steady stream of water should be observed at the bottom port.
17. Remove the tubing from the R port.
18. Flush each electrode individually with warm Type II water.

> ◇ **ATTENTION**
>
> THE OUTSIDE OF THE ELECTRODES SHOULD BE DRY BEFORE INSTALLATION.

19. Replace the electrodes in the electrode train. Verify that the electrode latch is engaged.
20. Reconnect the R, W, and S tubing.

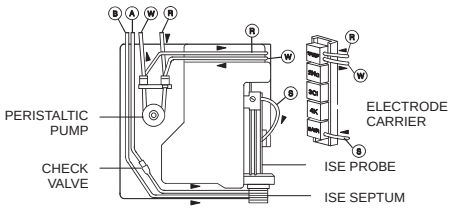
ISE Electrode Flushing
(continued)

21. Replace the electrode carrier on the ISE module.
22. Replace the ISE shield.
23. Replace the A, B, and R tubing in the ISE reagent cartridge pack.
24. Replace the ISE reagent cartridge pack on the ISE reagent shelf.
25. Remove and dispose of the absorbent toweling in accordance with local, state, and federal regulations governing the treatment of regulated medical waste.
26. Touch EXIT, then touch MAINTENANCE, SELECT.
27. Touch ISE PACK CHANGE, SELECT. During this activity, the ISE will purge twice and calibrate. A calibration report will print. Verify the report against acceptance criteria on the Maintenance Log. Request, run, and record quality controls.
28. Verify and record calibration data on the Maintenance Log.

ISE Electrode Replacement

A = STD. A TUBING
B = STD. B TUBING
R = REFERENCE SOLUTION TUBING
S = SAMPLE TUBING
W = WASTE TUBING

INDICATES FLUID FLOW



ISE Module

1. Place absorbent paper toweling under the ISE module.
2. From the Main menu, touch CALIBRATION, SELECT, then ISE STATUS, SELECT.
3. To prevent dripping, place the ISE reagent cartridge pack on the instrument deck.
4. Carefully remove the A, B, and R tubing from the ISE reagent cartridge pack, in a motion away from the operator to avoid aerosol spray. Do not remove the W tubing from the pack. To prevent contamination, wipe the tubing individually with a clean, lint-free tissue.
5. Place the A, B, and R tubing on a clean, lint-free tissue. Touch PURGE to draw air through the tubing. Allow the cycle to complete.
6. Place the A, B, and R tubing in Type II water. Touch PURGE to draw water through the tubing. Allow the cycle to complete.
7. Remove the tubing from the water and place it on a clean, lint-free tissue. Touch PURGE to draw air through the tubing. Allow the cycle to complete.
8. Touch MOVE TO INNER.
9. Remove the clear plastic ISE shield, if so equipped, by pulling the connector on the top of the shield straight out.
10. Grasp the electrode carrier and gently pull it from the ISE module.
11. Carefully disconnect the R, W, and S tubing from the electrodes, in a motion away from the operator to avoid aerosol spray.
12. Disengage the electrode latch and slide the electrodes out.
13. Replace the appropriate electrode.

◇ **CAUTION**

- NEW POTASSIUM ELECTRODES MUST BE SERUM CONDITIONED. REFER TO ISE POTASSIUM ELECTRODE INSTALLATION IN THIS SECTION.
- NEW SODIUM ELECTRODES MUST BE REHYDRATED. REFER TO ISE SODIUM ELECTRODE REHYDRATION IN THIS SECTION.

14. Dispose of the used electrode in accordance with local, state, and federal regulations governing the treatment of regulated medical waste.
15. Reassemble the electrode train and engage the electrode carrier latch.
16. Reconnect the R, W, and S tubing.
17. Replace the electrode carrier on the ISE module.
18. Replace the ISE shield.
19. Replace the A, B, and R tubing in the ISE reagent cartridge pack.
20. Replace the ISE reagent cartridge pack on the ISE reagent shelf.
21. Remove and dispose of the absorbent toweling in accordance with local, state, and federal regulations governing the treatment of regulated medical waste.
22. Touch EXIT, then touch MAINTENANCE, SELECT.
23. Touch ISE PACK CHANGE, SELECT. During this activity, the ISE will purge twice and calibrate. A calibration report will print. Verify the report against acceptance criteria on the Maintenance Log. Request, run, and record quality controls.

ISE Potassium Electrode Installation

Conduct the following potassium electrode performance evaluation procedure prior to reporting results.

1. From the Main menu, touch PATIENT SAMPLES, SELECT.
2. Verify that the carousel to be used is completely deleted. Touch the POS# field and type /35. Touch K and NEXT SAMPLE.
3. Touch the POS# field and type /10. Touch K and NEXT SAMPLE.
4. Touch REVIEW & RUN.
5. Touch REVIEW adjacent to SAMPLE LOADLIST. Utilize normal human serum control or pooled fibrin-free serum for samples 1-35, and ISE control 4 for samples 36-45.
6. After the run is complete, review the data for any of the following rejection criteria:
   a. Potassium Electrode Instability Error Code(s).
   b. Any individual potassium results differing from the mean of the serum samples or the ISE Control 4 samples by more than 0.3 mEq/L.
   c. Greater than 1.0 % C.V. for serum or ISE Control 4 potassium results.
7. If any of the above rejection criteria are determined to be valid, contact the Customer Support Center.
8. Remove and dispose of the used sample cups in accordance with local, state, and federal regulations governing the treatment of regulated medical waste.

ISE Sodium Electrode Rehydration

Prior to calibrating a replacement sodium electrode, perform the following procedure.

1. After the purge cycle in the ISE electrode replacement procedure is complete, **wait a minimum of 30 minutes** to rehydrate the electrode.

ATTENTION

FAILURE TO WAIT 30 MINUTES WILL RESULT IN DAMAGE TO THE ELECTRODE.

2. Place a sample cup containing ISE Conditioning Solution in sample carousel position 1.
3. From the ISE Status screen, touch MOVE CAROUSEL, type 1, and press ENTER.
4. Touch MOVE TO OUTER; then touch ANALYZE SERUM and allow the cycle to complete.
5. Touch PURGE. After the cycle completes, touch PURGE again.
6. Touch CALIBRATE. Record the values. Touch CALIBRATE again and record the values.

CAUTION

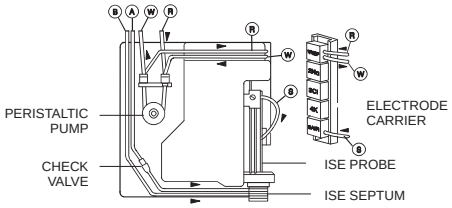
A VARIANCE OF MORE THAN ±0.1 SLOPE UNITS BETWEEN SUCCESSIVE CALIBRATIONS INDICATES AN ELECTRODE PROBLEM. REFER TO THE ISE STATUS CODES & DIAGNOSTICS SECTION OF THIS MANUAL.

7. Remove and dispose of the used sample cups in accordance with local, state, and federal regulations governing the treatment of regulated medical waste.

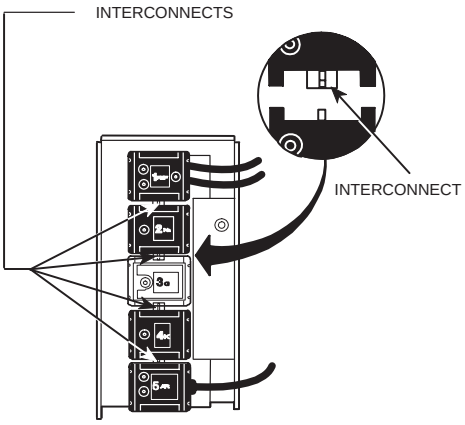
ISE Electrode Interconnect Replacement

A = STD. A TUBING
B = STD. B TUBING
R = REFERENCE SOLUTION TUBING
S = SAMPLE TUBING
W = WASTE TUBING

► INDICATES FLUID FLOW



ISE Module

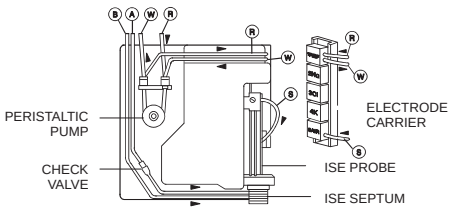


1. Place absorbent paper toweling under the ISE module.
2. From the Main menu, touch CALIBRATION, SELECT. Touch ISE STATUS, SELECT. Touch MOVE TO INNER, then TOP OF CUP.
3. To prevent dripping, place the ISE reagent cartridge pack on the instrument deck.
4. Remove the clear ISE shield, if so equipped, by pulling the connector on the top of the shield straight out.
5. Grasp the electrode carrier and gently pull it from the ISE module.
6. Carefully disconnect the R and W tail segments and S tubing from the electrodes, in a motion away from the operator to avoid aerosol spray.
7. Disengage the electrode latch and remove all electrodes from the carrier.
8. Separate the electrodes.
9. Remove and dispose of the used interconnects in accordance with local, state, and federal regulations governing the treatment of regulated medical waste.
10. Install new interconnects.
11. Reassemble the electrode train and engage the electrode carrier latch.
12. Reconnect the R and W tail segments and S tubing to the electrodes.
13. Replace the electrode carrier on the ISE module.
14. Replace the ISE shield.
15. Replace the ISE reagent cartridge pack on the ISE reagent shelf.
16. Remove and dispose of the absorbent toweling in accordance with local, state, and federal regulations governing the treatment of regulated medical waste.
17. Touch EXIT, then touch MAINTENANCE, SELECT.
18. Touch ISE PACK CHANGE, SELECT. During this activity, the ISE will purge twice and calibrate. A calibration report will print. Verify the report against acceptance criteria on the Maintenance Log. Request, run, and record quality controls.

ISE Reagent Cartridge Pack Replacement

A = STD. A TUBING
B = STD. B TUBING
R = REFERENCE SOLUTION TUBING
S = SAMPLE TUBING
W = WASTE TUBING

INDICATES FLUID FLOW



ISE Module

NOTE

REPLACEMENT OF THE ISE SEPTUM IS REQUIRED WHEN THE ISE REAGENT CARTRIDGE PACK IS REPLACED.

1. Place absorbent paper toweling under the ISE module.
2. From the Main menu, touch CALIBRATION, SELECT. Touch ISE STATUS, SELECT.
3. To prevent dripping, place the ISE reagent cartridge pack on the instrument deck.
4. Remove the A, B, and R tubing from the pack, in a motion away from the operator to avoid aerosol spray. Note the W tubing remains in the pack. To prevent contamination, wipe the tubing individually with a clean, lint-free tissue.
5. Place the A, B, and R tubing on a clean, lint-free tissue. Touch PURGE to draw air through the tubing harness. Allow the cycle to complete.
6. Place the A, B, and R tubing in Type II water and repeat PURGE. Allow the cycle to complete.
7. Remove the A, B, and R tubing from the Type II water and place it on a clean, lint-free tissue. Repeat the air purge.
8. Remove the septum by turning it clockwise until the white line on the septum is aligned with the white line on the ISE sampler assembly, and pull down until the septum clears the ISE probe.
9. Disconnect the A and B tubing from the ISE septum. Disconnect the W tubing from the ISE reagent cartridge pack.
10. Connect the A and B tubing to the new ISE septum.
11. Install the new septum by positioning the septum opening beneath the ISE probe. Align the white lines on the ISE sampler assembly and septum, push the septum up into place, and turn counterclockwise one quarter turn.
12. Insert the A, B, R, and W tubing into the corresponding ports on the ISE reagent cartridge pack. Ensure the connectors are firmly seated.
13. Replace the ISE reagent cartridge pack on the ISE reagent shelf.
14. Remove the absorbent toweling. Dispose of the used ISE reagent cartridge pack, ISE septum, and toweling in accordance with local, state, and federal regulations governing the treatment of regulated medical waste.
15. Touch EXIT, then touch MAINTENANCE, SELECT.
16. Touch ISE PACK CHANGE, SELECT. During this activity, the ISE will purge twice and calibrate. A calibration report will print. Verify the report against acceptance criteria on the Maintenance Log. Request, run, and record quality controls.

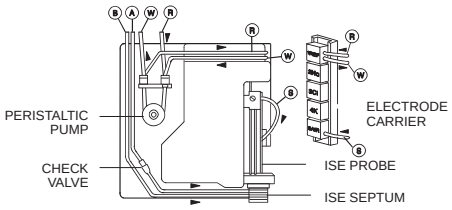
ISE Sample Probe Replacement

1. Place absorbent paper toweling under the ISE module.
2. From the Main menu, touch CALIBRATION, SELECT.
3. Touch ISE STATUS, SELECT.
4. Touch MOVE TO INNER.
5. To prevent dripping, place the ISE reagent cartridge pack on the instrument deck.
6. Remove the ISE septum by turning it clockwise until the white lines on the ISE sampler assembly and the ISE septum align. Gently pull down until the ISE septum clears the ISE sample probe. Do not disconnect the A and B tubing from the ISE septum. Set the ISE septum aside.
7. Disconnect the S tubing from the ISE sample probe, in a motion away from the operator to avoid aerosol spray.
8. Loosen the holding screw and star washer from the ISE sample probe. Remove the ISE sample probe from the ISE sampler assembly.
9. Dispose of the used ISE sample probe in accordance with local, state, and federal regulations governing the treatment of regulated medical waste.
10. Install a new ISE sample probe.
11. Tighten the star washer, then tighten the holding screw.
12. Connect the S tubing to the ISE sample probe.
13. Replace the ISE septum. Position the ISE septum opening beneath the ISE probe. Align the white lines on the ISE sampler assembly and the ISE septum. Push the ISE septum up into place and turn one quarter turn counterclockwise. Verify that the A and B tubing is connected.
14. ◇ Verify the ISE sample probe is positioned properly. Refer to ISE Sample Probe and Module Robotic Training in the Probe Positioning & Robotic Training section.
15. Purge and calibrate. Refer to Daily Maintenance, ISE Conditioning and ISE Controls.
16. Replace the ISE reagent cartridge pack on the ISE reagent shelf.
17. Remove and dispose of the absorbent toweling in accordance with local, state, and federal regulations governing the treatment of regulated medical waste.
18. Touch EXIT until the Main menu displays.
19. Document maintenance and troubleshooting in the Maintenance Log.

ISE R and W Tubing Replacement

A = STD. A TUBING
B = STD. B TUBING
R = REFERENCE SOLUTION TUBING
S = SAMPLE TUBING
W = WASTE TUBING

► INDICATES FLUID FLOW

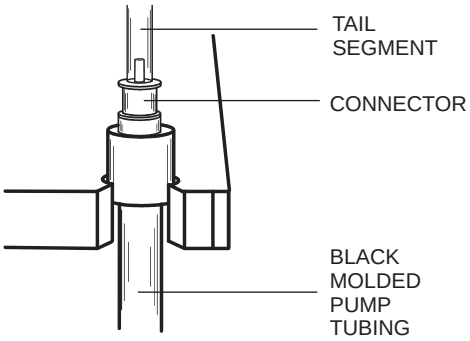


ISE Module

NOTE

IF REPLACING THE TAIL SEGMENTS ONLY, REFER TO ISE R AND W TAIL SEGMENT REPLACEMENT IN THIS SECTION.

1. Place absorbent paper toweling under the ISE module.
2. To prevent dripping, place the ISE reagent cartridge pack on the instrument deck.
3. From the Main menu, touch CALIBRATION, SELECT.
4. Touch ISE STATUS, SELECT.
5. Carefully remove the A, B, and R tubing from the ISE reagent cartridge pack, in a motion away from the operator to avoid aerosol spray. Do not remove the W tubing from the reagent cartridge. To prevent contamination, wipe the tubing individually with a clean, lint-free tissue.
6. Place the A, B, and R tubing on a clean, lint-free tissue. Touch PURGE to draw air through the tubing. Allow the cycle to complete.
7. Place A, B, and R tubing in Type II water. Touch PURGE to draw water through the tubing. Allow the cycle to complete.
8. Remove the tubing from the water and and place it on a clean, lint-free tissue. Touch PURGE to draw air through the tubing. Allow the cycle to complete.
9. Touch MOVE TO INNER.
10. Remove the clear plastic ISE shield, if so equipped, by pulling the connector on the top of the shield straight out.
11. Grasp the electrode carrier and gently pull it from the ISE module.
12. Touch MOVE HOME.
13. Disconnect and dispose of the used black molded pump tubing and tail segments in accordance with local, state, and federal regulations governing the treatment of regulated medical waste.
14. Spin the rollers on the peristaltic pump to verify movement of the rollers is not restricted. If movement is restricted, contact the Customer Support Center.
15. Connect the new black molded pump tubing to the R and W tubing harness connections.
16. Position the R tubing around the right side of the peristaltic pump rollers and attach it to the left side of the mounting bracket.
17. Position the W tubing around the left side of the peristaltic pump rollers and attach it to the right side of the mounting bracket.



ATTENTION

DO NOT TWIST THE R AND W TUBING WHEN MOUNTING IT AROUND THE PERISTALTIC PUMP ROLLERS.

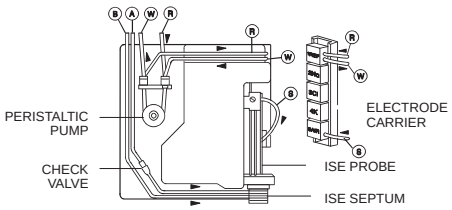
ISE R and W Tubing Replacement
(continued)

18. Connect the tail segments to the appropriate ports on the reference electrode. Verify the S tubing is connected.
19. Touch MOVE TO INNER.
20. Replace the electrode carrier on the ISE module.
21. Press the tubing into the appropriate grooves.
22. Replace the clear plastic ISE shield.
23. Insert the A, B, and R tubing into the ISE reagent cartridge pack.
24. Replace the ISE reagent cartridge pack on the ISE reagent shelf.
25. Remove and dispose of the absorbent toweling in accordance with local, state, and federal regulations governing the treatment of regulated medical waste.
26. Touch EXIT, then touch MAINTENANCE, SELECT.
27. Touch ISE PACK CHANGE, SELECT. During this activity, the ISE will purge twice and calibrate. A calibration report will print. Verify the report against acceptance criteria on the Maintenance Log. Request, run, and record quality controls.

ISE R and W Tail Segment Replacement

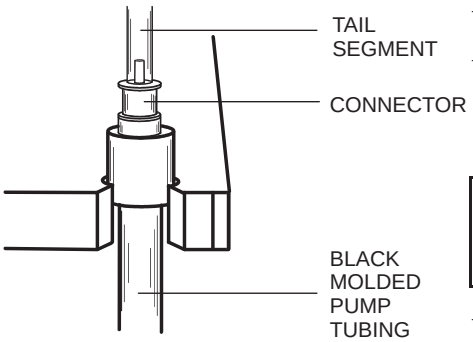
A = STD. A TUBING
B = STD. B TUBING
R = REFERENCE SOLUTION TUBING
S = SAMPLE TUBING
W = WASTE TUBING

INDICATES FLUID FLOW



ISE Module

1. Place absorbent paper toweling under the ISE module.
2. To prevent dripping, place the ISE reagent cartridge pack on the instrument deck.
3. From the Main menu, touch CALIBRATION, SELECT.
4. Touch ISE STATUS, SELECT.
5. Carefully remove the A, B, and R tubing from the ISE reagent cartridge pack, in a motion away from the operator to avoid aerosol spray. Do not remove the W tubing from the reagent cartridge. To prevent contamination, wipe the tubing individually with a clean, lint-free tissue.
6. Place the A, B, and R tubing on a clean, lint-free tissue. Touch PURGE to draw air through the tubing. Allow the cycle to complete.
7. Place A, B, and R tubing in Type II water. Touch PURGE to draw water through the tubing. Allow the cycle to complete.
8. Remove the tubing from the water and and place it on a clean, lint-free tissue. Touch PURGE to draw air through the tubing. Allow the cycle to complete.
9. Touch MOVE TO INNER.
10. Remove the clear plastic ISE shield, if so equipped, by pulling the connector on the top of the shield straight out.
11. Grasp the electrode carrier and gently pull it from the ISE module.
12. Touch MOVE HOME.
13. Release the black molded pump tubing from the peristaltic pump.
14. Disconnect and dispose of the used tail segments in accordance with local, state, and federal regulations governing the treatment of regulated medical waste.



ATTENTION

THE CONNECTOR MAY BECOME DISCONNECTED FROM THE BLACK MOLDED PUMP TUBING. IF THIS OCCURS, REINSTALL THE CONNECTOR.

15. Spin the rollers on the peristaltic pump to verify movement of the rollers is not restricted. If movement is restricted, contact the Customer Support Center.
16. Connect the new tail segments to the black molded pump tubing.
17. Position the R tubing around the right side of the peristaltic pump rollers and attach it to the left side of the mounting bracket.
18. Position the W tubing around the left side of the peristaltic pump rollers and attach it to the right side of the mounting bracket.

ATTENTION

DO NOT TWIST THE R AND W TUBING WHEN MOUNTING IT AROUND THE PERISTALTIC PUMP ROLLERS.

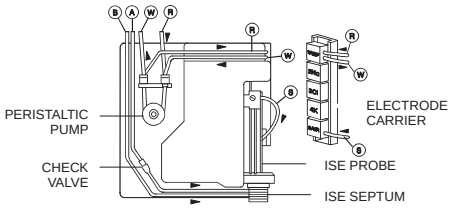
ISE R and W Tail Segment Replacement
(continued)

19. Connect the tail segments to the appropriate ports on the reference electrode. Verify the S tubing is connected.
20. Touch MOVE TO INNER.
21. Replace the electrode carrier on the ISE module.
22. Press the tubing into the appropriate grooves.
23. Replace the clear plastic ISE shield.
24. Insert the A, B, and R tubing into the ISE reagent cartridge pack.
25. Replace the ISE reagent cartridge pack on the ISE reagent shelf.
26. Remove and dispose of the absorbent toweling in accordance with local, state, and federal regulations governing the treatment of regulated medical waste.
27. Touch EXIT, then touch MAINTENANCE, SELECT.
28. Touch ISE PACK CHANGE, SELECT. During this activity, the ISE will purge twice and calibrate. A calibration report will print. Verify the report against acceptance criteria on the Maintenance Log. Request, run, and record quality controls.

ISE S Tubing Replacement

A = STD. A TUBING
B = STD. B TUBING
R = REFERENCE SOLUTION TUBING
S = SAMPLE TUBING
W = WASTE TUBING

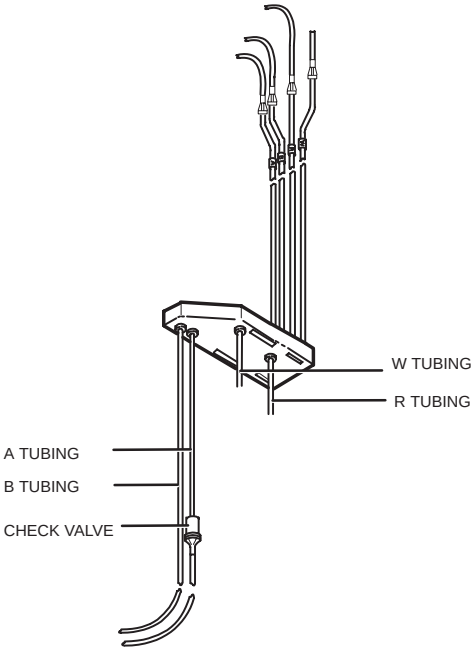
INDICATES FLUID FLOW



ISE Module

1. Place absorbent paper toweling under the ISE module.
2. From the Main menu, touch CALIBRATION, SELECT, then ISE STATUS, SELECT. Touch MOVE TO INNER, and then TOP OF CUP.
3. To prevent dripping, place the ISE reagent cartridge pack on the instrument deck.
4. Remove the clear plastic ISE shield, if so equipped, by pulling the connector on the top of the shield straight out.
5. Grasp the electrode carrier and gently pull it from the ISE module.
6. Disconnect the S tubing from the air detector and the ISE sample probe, in a motion away from the operator to avoid aerosol spray.
7. Dispose of the used S tubing in accordance with local, state, and federal regulations governing the treatment of regulated medical waste.
8. Connect the new S tubing to the air detector.
9. Replace the electrode carrier on the ISE module.
10. Connect the new S tubing to the ISE sample probe.
11. Replace the ISE shield.
12. Replace the ISE reagent cartridge pack on the ISE reagent shelf.
13. Remove and dispose of the absorbent toweling in accordance with local, state, and federal regulations governing the treatment of regulated medical waste.
14. Touch PROBE UP.
15. Touch FLUSH. Touch CALIBRATE. Troubleshoot failure to calibrate with the ISE Status Codes & Diagnostics section of this manual.
16. Verify and record calibration data on the Maintenance Log.

ISE Tubing Harness Replacement



ISE Tubing Harness

1. Place absorbent paper toweling under the ISE module.
2. From the Main menu, touch CALIBRATION, SELECT.
3. Touch ISE STATUS, SELECT.
4. To prevent dripping, place the ISE reagent cartridge pack on the instrument deck.
5. Carefully remove the A, B, and R tubing from the ISE reagent cartridge pack, in a motion away from the operator to avoid aerosol spray. Do not remove the W tubing from the pack. To prevent contamination, wipe the tubing individually with a clean, lint-free tissue.
6. Place the A, B, and R tubing on a clean, lint-free tissue. Touch PURGE to draw air through the tubing. Allow the cycle to complete.
7. Place the A, B, and R tubing in Type II water. Touch PURGE to draw water through the tubing. Allow the cycle to complete.
8. Remove the A, B, and R tubing from the water and place it on a clean, lint-free tissue. Touch PURGE to draw air through the tubing. Allow the cycle to complete.
9. Remove the W tubing from the ISE reagent cartridge pack.
10. Remove the ISE septum by turning it clockwise until the white lines on the ISE sampler assembly and the ISE septum align. Gently pull down until the ISE septum clears the ISE sample probe.
11. Disconnect the A and B tubing from the ISE septum.
12. Disconnect the R and W tubing from the used tubing harness and connect it to the new tubing harness.
13. Dispose of the used ISE tubing harness in accordance with local, state, and federal regulations governing the treatment of regulated medical waste.
14. Verify the ISE reagent cartridge pack has an adequate fluid level. If replacement of the pack is necessary, refer to ISE Reagent Cartridge Pack in this section.
15. To install the new tubing harness, seat the fittings on the tubing harness bracket so that the A, B, and R tubing is on the top right side.

ISE Tubing Harness Replacement (continued)

16. Insert the A, B, R, and W tubing into the corresponding ports on the ISE reagent cartridge pack. Ensure the connectors are firmly seated.
17. Connect the A tubing (top) and B tubing (bottom) to the respective ports on the ISE septum.
18. Reinstall the ISE septum by positioning the ISE septum opening beneath the ISE probe. Align the white lines on the ISE sampler assembly and the ISE septum. Push the ISE septum up into place and turn one quarter turn counterclockwise.
19. Press the A tubing check valve into the corresponding groove on the ISE cover. Beginning at the check valve, press the A and B tubing into the appropriate grooves.
20. Connect the R and W tubing, with tail segments, to the R and W tubing harness connections.
21. Spin the rollers on the peristaltic pump to verify movement of the rollers is not restricted. If movement is restricted, contact the Customer Support Center.
22. Position the R tubing around the right side of the peristaltic pump rollers and attach to the left side of the mounting bracket.
23. Position the W tubing around the left side of the peristaltic pump rollers and attach to the right side of the mounting bracket.

ATTENTION

DO NOT TWIST THE R AND W TUBING WHEN MOUNTING IT AROUND THE PERISTALTIC PUMP ROLLERS.

24. Replace the ISE reagent cartridge pack on the ISE reagent shelf.
25. Touch EXIT, then touch MAINTENANCE, SELECT.
26. Touch ISE PACK CHANGE, SELECT. During this activity, the ISE will purge twice and calibrate. A calibration report will print. Verify the report against acceptance criteria on the Maintenance Log. Request, run, and record quality controls.
27. Remove and dispose of the absorbent toweling in accordance with local, state, and federal regulations governing the treatment of regulated medical waste.
28. Touch EXIT until the Main menu displays.
29. Document maintenance and troubleshooting in the Maintenance Log.

Introduction

This section contains a discussion of Status Codes specific to the ISE, a numerical listing of the codes, and a discussion of the probable cause and resolution of each code. Codes specific to other categories are discussed in the Status Codes section.

ISE Status Codes display as a result of problems within the ISE module. Status Codes rarely indicate a serious concern. They are frequently informational and may be normal consequences of operation.

On-screen messages display when an incorrect entry is made. Additional banner messages may display above the AUTO PRINT field. If banner messages display, record the code and contact the Customer Support Center.

◇ **WARNINGS**

- **POTENTIAL BIOHAZARD.** CONSIDER ALL CLINICAL SPECIMENS AND REAGENT CONTROLS THAT CONTAIN HUMAN BLOOD OR SERUM (CALIBRATORS, ETC.) AND CONTAMINATED INSTRUMENTS AS POTENTIALLY INFECTIOUS. WEAR GLOVES, LAB COATS, AND SAFETY GLASSES, AND FOLLOW OTHER BIOSAFETY PRACTICES AS SPECIFIED IN THE OSHA BLOODBORNE PATHOGEN RULE (29 CFR 1910.1030) OR OTHER EQUIVALENT BIOSAFETY PROCEDURES. REFER TO THE GENERAL BIOSAFETY DISCUSSION IN THE MAINTENANCE SECTION.
- **ELECTRICAL SHOCK HAZARD.** HIGH VOLTAGE EXISTS IN THE SYSTEM WHEN THE MAINTENANCE POWER IS **OFF** AND THE MAIN POWER IS **ON**. VISUALLY LOCATE THE POWER SWITCHES BEFORE TOUCHING THEM. FOR ADDITIONAL INFORMATION, REFER TO THE POWER ON/OFF PROCEDURE IN THE OPERATION MANUAL.

Accessing the Status Screen

When Status Codes are generated, STATUS displays in the upper right corner of the screen. Touch STATUS to display the Status screen. From the Review & Run screen or the Special Procedures screen, enter the Main menu to access the Status screen.

Cancelling Status Codes

Rather than accumulating a list of Status Codes, it is recommended that the Status Codes be deleted immediately after resolving the condition. The PRINT SCREEN key can be utilized to document Status Codes. STATUS will be displayed until all conditions are cancelled.

Individual Status Code

Touch to highlight the desired Status Code. (Touch NEXT PAGE to display additional Status Codes.) Touch CANCEL. The screen will automatically update and scroll the remaining Status Codes.

All Status Codes

Touch CANCEL ALL. The screen will automatically update and cancel all Status Codes on all pages.

Troubleshooting

When an ISE Status Code is generated, use the following procedure.

1. Touch STATUS to display the Status screen.
2. Press PRINT SCREEN to print the Status screen.
3. Cancel the Status Codes.
4. Refer to the ISE Status Code listing to determine the probable cause and corrective action for each ISE Status Code on the printed list.
5. Verify that the ACTIVITY field is not highlighted.
6. Resolve the concern. If "Cycle the power" is indicated as the corrective action, refer to Cycling Power in the Power On/Off procedure in the Operation Manual.
7. Continue normal operation.

Code 00000

ISE RESULT ERROR ON INTERNAL SAMPLE ID # [redacted]
ISE ERROR CODES ARE

Category: ISE

01 **PROBE DID NOT REACH FLUID FOR ALIQUOT.**

Probable Cause: Sampler probe took too long to get into position to sample fluid. Could be caused by a dirty or dry leadscrew, bent probe, misadjusted drive belt, septum leaking.

Corrective Action: Clean and lube leadscrew, clean or replace probe, replace septum, replace sampler assembly.

---

02 **PROBE DID NOT REACH AIR FOR ALIQUOT.**

Probable Cause: Sampler probe took too long to get into position to sample air. Could be caused by a dirty or dry leadscrew, bent probe, misadjusted drive belt, septum leaking.

Corrective Action: Clean and lube leadscrew, clean or replace probe, replace septum, replace sampler assembly.

---

03 **NO CUP TOP TRAINED OR RECEIVED.**

Probable Cause: TOP OF CUP is outside the 175-289 range.

Corrective Action: Check TOP OF CUP position.

---

06 **CUP TOP TOO HIGH.**

Probable Cause: TOP OF CUP step below 175.

Corrective Action: Check TOP OF CUP position.

---

07 **CUP TOP TOO LOW.**

Probable Cause: TOP OF CUP step position above 288.

Corrective Action: Check TOP OF CUP position.

---

10 **CONVERTER BUSY.**

Corrective Action: Touch HARDWARE RESET. If this does not resolve the problem, cycle the power.

---

11 **CONVERTER INPUT BUFFER FULL.**

Corrective Action: Touch HARDWARE RESET. If this does not resolve the problem, cycle the power.

Code 00000
(continued)

12 **CONVERTER NOT READY.**

Corrective Action: Touch HARDWARE RESET. If this does not resolve the problem, cycle the power.

---

13 **CONVERTER SCAN CODE.**

Corrective Action: Touch HARDWARE RESET. If this does not resolve the problem, cycle the power.

---

14 **CHANNEL NUMBER CHANGED DURING CALCULATION.**

Probable Cause: Multiplexer on controller PCB not sequencing properly.

Corrective Action: Touch HARDWARE RESET. If this does not resolve the problem, cycle the power.

---

15 **CONVERTER SEQUENCE CODE.**

Probable Cause: Converter sequence code. Multiplexer on controller PCB not sequencing properly.

Corrective Action: Touch HARDWARE RESET. If this does not resolve the problem, cycle the power.

---

16 **CONVERTER BUFFER NOT FULL.**

Corrective Action: Touch HARDWARE RESET. If this does not resolve the problem, cycle the power.

---

25 **ONE POINT CALIBRATION FAILED FOR SODIUM.**

Probable Cause: When Standard A was measured during analysis, the mV signal for the sodium electrode drifted more than 10 mV from last calibration. Standard A low, poor flow, air bubbles in tubing, plugged or defective sodium or reference electrodes, septum.

Corrective Action: Check level of Standard A; flush or change S, W, R tubing and harness; flush or change sodium or reference electrode; replace septum; clean sensor plate.

---

26 **ONE POINT CALIBRATION FAILED FOR POTASSIUM.**

Probable Cause: When Standard A was measured during analysis, the mV signal for the potassium electrode drifted more than 10 mV from last calibration. Standard A low, poor flow, air bubbles in tubing, septum, reference or potassium electrodes.

Corrective Action: Check level Standard A; flush or change S, W, R tubing and harness; replace septum; see electrode troubleshooting in this section; flush or replace potassium and reference electrodes; clean sensor plate.

Code 00000
(continued)

27 **ONE POINT CALIBRATION FAILED FOR CHLORIDE.**

Probable Cause: When Standard A was measured during analysis, the mV signal for the chloride electrode drifted more than 10 mV from last calibration. Standard A level low, poor flow, air bubbles in tubing, septum, chloride electrode inner element or reference electrode.

Corrective Action: Check level Standard A, flush or change S, W, R tubing and harness; replace chloride electrode inner element; clean chloride housing; change chloride filling solution; replace reference electrode, septum, and sodium electrode; clean sensor plate.

---

32 **LOWER AIR DETECTOR RATIO TOO LOW.**

Probable Cause: When calculated air threshold potential from voltage readings taken on air and fluid by air detector during last calibration, air reading was less than 1.7 times the fluid reading. Not enough sample to detect, poor flow, air bubbles present, blocked reference electrode, Standard A low.

Corrective Action: Check sample to be sure there is sufficient quantity, no fibrin, and probe is going deep enough. The water test in this section may aid in identifying the faulty component. Flush or change S, W, R tubing and harness; check level of Standard A; flush probe; flush or replace electrodes.

---

34 **NO AIR SLUG DETECTED WHEN REQUIRED – LOWER DETECTOR.**

Probable Cause: Air intake blocked, poor flow, leaking septum, blocked probe, plug in electrode train.

Corrective Action: Check sample for fibrin plugs; the water test may aid in identifying faulty component; flush or change S, W, R tubing and harness; clean and flush probe; clean and lube leadscrew; flush or replace electrodes, replace septum.

---

36 **AIR SLUG DETECTED WHEN NONE ALLOWED – LOWER DETECTOR.**

Probable Cause: Blocked or leaking S, W tubing or harness, septum, blocked probe, dirty or dry leadscrew, reagent pack low, Top Of Cup improperly trained, plugged or defective electrodes.

Corrective Action: Check levels in reagent pack; check for adequate sample volume and no fibrin; flush or change S, W tubing and harness; the water test may aid in identifying faulty component; replace septum; clean and flush probe; check Top Of Cup; clean and lube leadscrew; flush or change electrodes.

Code 00000
(continued)

37 **NO AIR SLUG DETECTED WHEN REQUIRED DURING TIME WINDOW.**

Probable Cause: Inadequate fluid volume; fibrin plugs; blocked or leaking S, W tubing or harness; septum; blocked probe; plugged or defective electrodes; Top Of Cup improperly trained; dirty or dry leadscrew.

Corrective Action: Check FFT. Check sample for adequate volume, no fibrin. The water test may aid in identifying faulty component. Flush or change S, W tubing and harness; replace septum; clean and flush probe; flush or replace electrodes; check Top Of Cup position; clean and lube leadscrew.

---

38 **NO FLUID DETECTED WHEN REQUIRED DURING TIME WINDOW.**

Probable Cause: Inadequate sample volume, fibrin plugs; blocked or leaking S, W tubing or harness; septum; Standard A low; blocked probe; plugged or defective electrodes; Top Of Cup improperly trained; dirty or dry leadscrew.

Corrective Action: Check level of Standard A; check sample volume; look for fibrin plugs. The water test may aid in identifying faulty component. Flush or replace S, W tubing and harness; replace septum; clean and flush probe; flush or replace electrodes; check Top Of Cup position; clean and lube leadscrew.

---

39 **ELECTRODE FILL TOO FAST.**

Probable Cause: Blocked or leaking S, W, R tubing or harness; Standard A low; blocked or defective electrodes; blocked probe.

Corrective Action: Check level of Standard A. The water test may aid in determining faulty component. Flush or replace S, W, R tubing and harness; flush or replace electrodes; clean and flush probe.

---

41 **NON-HOME SAMPLER COMMAND RECEIVED WHILE SEEKING HOME.**

Probable Cause: A command was sent to the sampler before it finished a homing sequence.

Corrective Action: Touch HARDWARE RESET. If this does not resolve the problem, cycle the power.

---

42 **SAMPLER SLOW CODE.**

Probable Cause: Rotation of leadscrew too slow as monitored by leadscrew encoder disc. Bent probe; sampler belt tension too loose or too tight; dirty or dry leadscrew, septum, sampler motor.

Corrective Action: Replace septum; replace probe; clean and lube leadscrew.

Code 00000
(continued)

43 **SAMPLER TIME OUT CODE.**

Probable Cause: Sampler block did not reach its final destination in time allowed. Bent probe; septum; sampler belt tension too loose or tight; dirty or dry leadscrew; sampler motor.

Corrective Action: Replace septum; replace probe; adjust sampler belt tension; clean and lube leadscrew.

---

44 **SAMPLER MOVE TO CUP ATTEMPTED WHILE ROTATIONAL DRIVE OUT OF POSITION.**

Probable Cause: Analyzer was not in position over inner or outer ring when a sampler move command was received. During System operation, rotational drive motor or circuit, belt tension too loose or too tight. During access from the ISE Status screen, too many commands given.

Corrective Action: Touch RESET on the ISE Status screen.

◇ **45** **ROTATIONAL DRIVE MOVE ATTEMPTED WHILE SAMPLER OUT OF POSITION.**

Probable Cause: Sampler assembly failure.

Corrective Action: Contact the Customer Support Center.

---

46 **ROTATIONAL DRIVE MOVE DURING LOCKOUT (ROTATIONAL DRIVE IS NOT TO MOVE DURING ANALYSIS).**

Probable Cause: Motor moved or was commanded to move during analysis.

Corrective Action: Touch HARDWARE RESET. If this does not resolve the problem, cycle the power.

---

50 **NO AVERAGE, WOULD HAVE DIVIDED BY ZERO.**

Probable Cause: Code in A/D converter circuits on controller PCB.

Corrective Action: Touch HARDWARE RESET. If this does not resolve the problem, cycle the power.

---

51 **INSTABILITY OF SODIUM ELECTRODE.**

Probable Cause: Voltage from sodium electrode not stable (±0.25 mV) immediately before accumulation of data; poor flow or air bubbles caused by plugged or leaking S, W, R tubing or harness; plugged or defective electrodes, septum; Standard A low; or blocked probe.

Corrective Action: Check level of Standard A; flush or replace S, W, R tubing and harness; flush or replace electrodes; flush probe; replace septum.

Refer to ISE Instability Procedure in the ISE Diagnostic section.

Code 00000
(continued)

52 **INSTABILITY OF POTASSIUM ELECTRODE.**

Probable Cause: Voltage from potassium electrode not stable (±0.25 mV) immediately before accumulation of data; poor flow or air bubbles caused by plugged or leaking S, W, R tubing or harness; blocked or defective electrodes; septum; Standard A low; or blocked probe.

Corrective Action: Check level of Standard A; flush or replace S, W, R tubing and harness; see electrode troubleshooting in this section; flush probe; replace septum.

Refer to ISE Instability Procedure in the ISE Diagnostic section.

---

53 **INSTABILITY OF CHLORIDE ELECTRODE.**

Probable Cause: Voltage from chloride electrode not stable (±0.25 mV) immediately before accumulation of data; poor flow or air bubbles caused by plugged or leaking S, W, R tubing or harness; chloride inner element; chloride housing; blocked or defective electrodes; septum; Standard A low; or blocked probe.

Corrective Action: Check level of Standard A; flush or replace S, W, R tubing and harness; replace chloride electrode inner element; replace chloride housing; flush or replace electrodes; flush probe; replace septum.

Refer to ISE Instability Procedure in the ISE Diagnostic section.

---

54 **CHLORIDE mM TOO HIGH.**

Probable Cause: Chloride electrode inner element or filling solution; chloride housing; reference electrode.

Corrective Action: Check sample for adequate volume and no fibrin. Replace chloride electrode inner element and filling solution; flush or replace reference electrode; replace chloride housing if cracked or leaking.

---

55 **CHLORIDE mM TOO LOW.**

Probable Cause: Inner element or filling solution; chloride housing; reference electrode.

Corrective Action: Check sample for adequate volume and no fibrin. Replace chloride electrode inner element and filling solution; flush or replace reference electrode; replace chloride housing if cracked or leaking.

---

65 **SODIUM CALIBRATION SLOPE OUT OF RANGE.**

Probable Cause: Slope calculated for sodium electrode during the last calibration is not within the allowed range. Poor flow; blocked reference electrode; blocked or defective electrodes; Standard A low; pinched tubing; blocked or leaking septum; reagent pack contaminated; blocked probe.

Corrective Action: Check level of Standard A; flush or replace S, W, R tubing and harness; flush or replace electrodes; flush probe; replace septum.

Code 00000
(continued)

66 **POTASSIUM CALIBRATION SLOPE OUT OF RANGE.**

Probable Cause: Slope calculated for potassium electrode during the last calibration is not within the allowed range. Poor flow caused by leaking or plugged S, W, R tubing or harness; blocked or defective electrodes; Standard A low; septum; blocked probe; or contaminated reagent pack.

Corrective Action: Check level of Standard A; flush or replace S, W, R tubing and harness; flush or replace electrodes; flush probe; replace septum.

---

67 **CHLORIDE CALIBRATION SLOPE OUT OF RANGE.**

Probable Cause: Slope calculated for chloride electrode during last calibration is not within the allowed range. Poor flow caused by plugged or leaking S, W, R tubing or harness; chloride electrode inner element; chloride housing; Standard A low; blocked or defective electrodes; septum; blocked probe; or contaminated reagent pack.

Corrective Action: Check level of Standard A; flush or replace S, W, R tubing and harness; replace chloride electrode inner element and filling solution; flush or replace electrodes; replace chloride housing if leaking or cracked; replace septum.

---

71 **OVERLOAD SODIUM.**

Probable Cause: A/D converter overloaded (greater than +200 or less than -200 mV) during accumulation of data. Poor flow or air bubbles caused by leaking or plugged S, W, R tubing or harness; Standard A low; poor electrode connection; blocked or defective electrodes; poor fluid ground; septum; or blocked probe.

Corrective Action: Check level of Standard A; flush or replace S, W, R tubing and harness; flush or replace electrodes; replace septum; flush probe.

---

72 **OVERLOAD POTASSIUM.**

Probable Cause: A/D converter overloaded (greater than +200 or less than -200 mV) during accumulation of data. Poor flow or air bubbles caused by plugged or leaking S, W, R tubing or harness; Standard A low; plugged or defective electrodes; poor fluid ground; septum; or blocked probe.

Corrective Action: Check level of Standard A; flush or replace S, W, R tubing and harness; flush or replace electrodes; flush probe; replace septum.

Code 00000
(continued)

73 **OVERLOAD CHLORIDE.**

Probable Cause: A/D converter overloaded (greater than +200 or less than -200 mV) during accumulation of data. Poor flow or air bubbles caused by plugged or leaking S, W, R tubing or harness; Standard A low; plugged or defective electrodes; poor fluid ground; septum; or blocked probe.

Corrective Action: Check level of Standard A; flush or replace S, W, R tubing and harness; replace chloride electrode inner element and filling solution; flush probe; replace chloride housing if cracked or leaking; replace septum.

---

75 **OVERLOAD LOWER AIR DETECTOR (+200mV).**

Probable Cause: Plugged S, W tubing or harness; septum; Standard A low; blocked probe; blocked or defective reference electrode or air detector.

Corrective Action: Check level of Standard A; flush or replace S, W, R tubing and harness; flush or replace reference electrode or air detector; flush probe; replace septum.

---

80 **+15 VOLTS OUT OF RANGE.**

Corrective Action: Touch HARDWARE RESET. If this does not resolve the problem, cycle the power.

---

81 **ZERO VOLT OUT OF RANGE.**

Corrective Action: Touch HARDWARE RESET. If this does not resolve the problem, cycle the power.

---

82 **+1 VOLT STANDARD OUT OF RANGE.**

Corrective Action: Touch HARDWARE RESET. If this does not resolve the problem, cycle the power.

---

83 **–1 VOLT STANDARD OUT OF RANGE.**

Corrective Action: Touch HARDWARE RESET. If this does not resolve the problem, cycle the power.

---

84 **MOTOR VOLTAGE OUT OF RANGE.**

Corrective Action: Touch HARDWARE RESET. If this does not resolve the problem, cycle the power.

---

85 **MATH CODE FOR SODIUM.**

Probable Cause: During analysis, an illegal math function occurred on sodium channel.

Corrective Action: Touch HARDWARE RESET. If this does not resolve the problem, cycle the power.

Code 00000
(continued)

86 **MATH CODE FOR POTASSIUM.**

Probable Cause: During analysis, an illegal math function occurred on potassium channel.

Corrective Action: Touch HARDWARE RESET. If this does not resolve the problem, cycle the power.

---

87 **MATH CODE FOR CHLORIDE.**

Probable Cause: During analysis, an illegal math function occurred on chloride channel.

Corrective Action: Touch HARDWARE RESET. If this does not resolve the problem, cycle the power.

---

88 **MATH CODE ALL CHANNELS.**

Probable Cause: During analysis, an illegal math function occurred on all channels.

Corrective Action: Touch HARDWARE RESET. If this does not resolve the problem, cycle the power.

---

96 **STACK OVERFLOW PRESUMED – LSRAM ALT (LOGIC CODE).**

Probable Cause: ISE was trying to execute subroutine that overflowed section of program that keeps track of commands to be executed and command locations.

Corrective Action: Touch HARDWARE RESET. If this does not resolve the problem, cycle the power.

---

97 **STACK POINTER MIXED UP IN MAIN LOOP (LOGIC CODE).**

Probable Cause: ISE trying to execute section of program that keeps track of commands to be executed and command location.

Corrective Action: Touch HARDWARE RESET. If this does not resolve the problem, cycle the power.

---

98 **AIR DETECTOR LOGIC CODE.**

Probable Cause: Computer code in multiplexer.

Corrective Action: Touch HARDWARE RESET. If this does not resolve the problem, cycle the power.

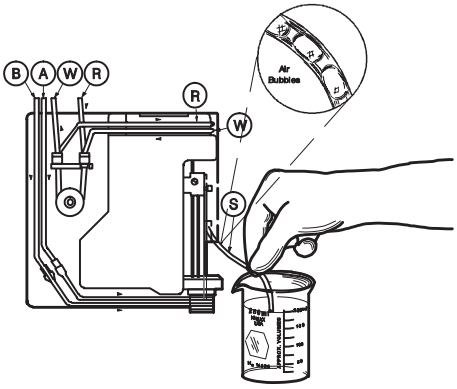
---

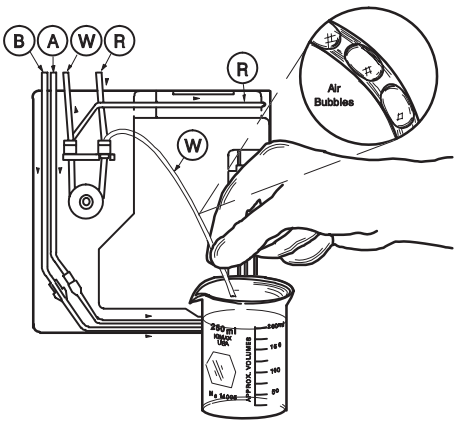
99 **PROGRAM LOGIC CODE IN ABTDAT.**

Probable Cause: Code in program data files.

Corrective Action: Touch HARDWARE RESET. If this does not resolve the problem, cycle the power.

Water Test





1. Place absorbent paper toweling under the ISE module.
2. To prevent dripping, place the ISE reagent cartridge pack on the instrument deck.
3. From the ISE Status screen, touch MAINTENANCE MODE to display ISE Maintenance Screen A. Press ENTER to display ISE Maintenance Screen B.
4. Type 6 in the COMMAND field and press ENTER to move the ISE sample probe to the inner carousel.
5. Remove the A, B, and R tubing from the ISE reagent cartridge pack, in a motion away from the operator to avoid aerosol spray. To prevent contamination, wipe the tubing individually with a clean, lint-free tissue. Do not remove the W tubing from the pack.
6. Place the ends of the A, B, and R tubing in a container of Type II water.
7. Remove the clear plastic ISE shield, if so equipped, by pulling the connector on the top of the shield straight out.
8. Disconnect the S tubing from the top of the ISE sample probe and place the disconnected end in a separate container of Type II water.
9. Type 20 in the COMMAND field and press ENTER to start the pump.
10. Observe speed and consistency of flow through the S tubing by creating a bubble pattern in the tubing. Move the S tubing in and out of the water, alternately aspirating air and water.

    If the flow is unrestricted, type 21 in the COMMAND field and press ENTER to stop the pump. Reconnect the S tubing and proceed to step 25.

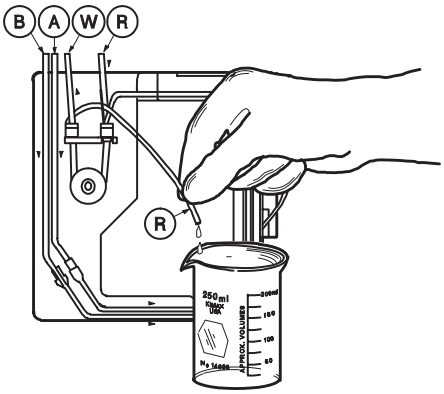
    If the flow is restricted, type 21 in the COMMAND field and press ENTER to stop the pump. Place the S tubing on absorbent paper toweling on the deck and proceed to step 11.
11. Grasp the electrode carrier and gently pull it from the ISE module. Place the carrier on absorbent paper toweling on the deck.
12. Disconnect the W tubing from the reference electrode and place the disconnected end in a container of Type II water.
13. Type 20 in the COMMAND field and press ENTER to start the pump.
14. Observe speed and consistency of flow through the W tubing by creating a bubble pattern in the tubing. Move the W tubing in and out of the water, alternately aspirating air and water.

    If the flow is unrestricted, type 21 in the COMMAND field and press ENTER to stop the pump. Reconnect the W tubing and proceed to step 15.

    If the flow is restricted, type 21 in the COMMAND field and press ENTER to stop the pump. Inspect the W tubing and fittings around the pump and the ISE tubing support/harness to the waste bottle for leaks, crimps, or blocks. If damage is observed, replace the faulty component. Repeat steps 13 and 14 to ensure smooth flow through the W tubing. If flow is unrestricted, proceed to step 15.

    If the flow remains restricted, contact the Customer Support Center.

Water Test (continued)



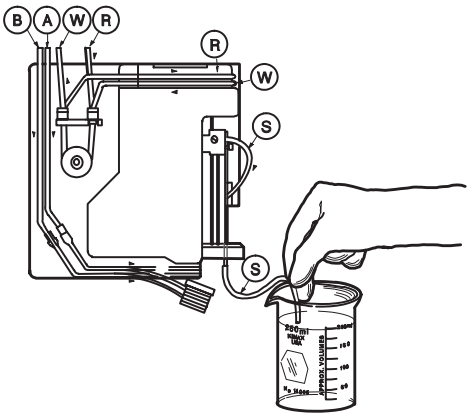
15. Disconnect the R tubing from the reference electrode. To contain dripping, place the R tubing in an empty beaker.
16. Type 20 in the COMMAND field and press ENTER to start the pump.
17. Observe the delivery of fluid through the R tubing.

    If 4 to 6 drops of fluid are delivered per 10 seconds, type 21 in the COMMAND field and press ENTER to stop the pump. Reconnect the R tubing to the reference electrode and proceed to step 18.

    If the flow is restricted, type 21 in the COMMAND field and press ENTER to stop the pump. Inspect the R tubing and fittings around the pump, ISE tubing harness, and ISE reagent cartridge for leaks, crimps, or blocks. If damage is observed, replace the faulty component. Repeat steps 16 and 17 to ensure fluid delivery through the R tubing. Proceed to step 18.
18. Release the electrode latch and remove the electrodes from the electrode carrier.
19. Flush each electrode individually with warm Type II water. Inspect the electrode interconnects.

> ◇ **ATTENTION**
>
> THE OUTSIDE OF THE ELECTRODES SHOULD BE DRY BEFORE INSTALLATION.

20. Reconnect electrodes and interconnects.
21. Reassemble the electrode train. Engage the electrode latch.
22. Reconnect the R and W tubing to the reference electrode.
23. Reconnect the S tubing to the air detector electrode.
24. Replace the electrode carrier on the ISE module. Reconnect the S tubing to the ISE sample probe.
25. Remove the ISE septum from the ISE module.
26. Attach an extra S tubing to the sample end of the probe.
27. Type 20 in the COMMAND field and press ENTER to start the pump.
28. Alternately aspirate air and water with the attached S tubing.

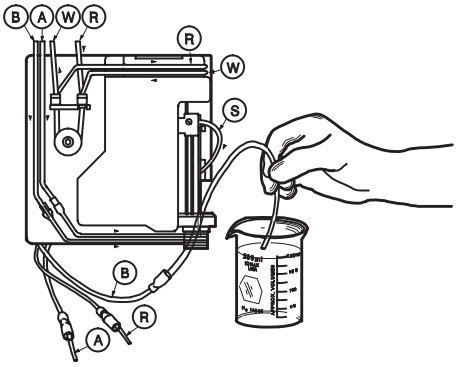


29. Observe speed and consistency of flow through the normal S tubing.

    If the flow is unrestricted, remove the extra S tubing and reseat the ISE septum. Type 21 in the COMMAND field and press ENTER to stop the pump. Proceed to step 30.

    If the flow is restricted, type 21 in the COMMAND field and press ENTER to stop the pump. Remove the ISE sample probe and flush with Type II water. Repeat steps 27 through 29 to ensure fluid delivery through the S tubing. Replace the ISE sample probe, reseat the ISE septum, and proceed to step 30.
30. Type 99 in the COMMAND field and press ENTER to initiate a purge.
31. Remove the B tubing from the container of water.

Water Test (continued)



32. Observe speed and consistency of flow through the B tubing by creating a bubble pattern in the tubing. Move the B tubing in and out of the water, alternately aspirating air and water.

    If the flow is unrestricted, replace the B tubing in the container of Type II water and proceed to step 33.

    If the flow is restricted, verify that the ISE sample probe is properly positioned in the lower chamber of the ISE septum. Inspect the ISE tubing harness for crimps and replace if necessary. Proceed to step 33.

33. Halfway through the purge cycle, the ISE sample probe positions itself in the upper chamber of the ISE septum. Repeat steps 31 and 32 with the A tubing.

34. Remove the A, B, and R tubing from the container of water.

35. Wipe the tubing individually with a clean, lint-free tissue and place it on a clean, lint-free tissue.

36. Type 99 in the COMMAND field and press ENTER to initiate a purge.

37. When the purge cycle is complete, reconnect the tubing to the ISE reagent cartridge pack.

38. Type 99 in the COMMAND field and press ENTER to initiate another purge.

39. When the purge cycle is complete, type 86 in the COMMAND field and press ENTER to exit Maintenance Mode.

40. Replace the ISE reagent cartridge pack on the ISE reagent shelf.

41. Remove the absorbent toweling. Dispose of the used toweling in accordance with local, state, and federal regulations governing the treatment of regulated medical waste.

42. If the preceding procedure does not identify the faulty component, contact the Customer Support Center.

Electrode Troubleshooting/ Reconditioning

This procedure establishes the proper methods for troubleshooting, cleaning and reconditioning the electrodes. Follow the troubleshooting guidelines in this manual to isolate the problem to a specific electrode, then perform the reconditioning/cleaning procedures listed on the following pages.

Causes of Electrode Failures

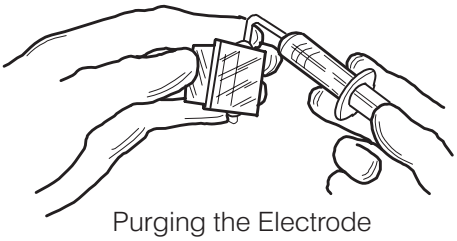
A common cause of electrode failure is the build-up of serum protein on the ion selective membrane inside the electrode. Because of the physical structure of the electrode membrane, protein from serum samples adheres to its surface. This inhibits ionic transfer between the sample and the ion exchange material in the membrane and causes the electrode to require more time for millivolt (mV) stabilization.

Electrode Warranty

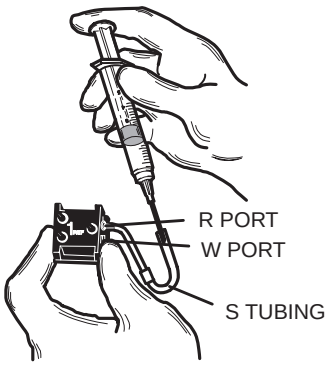
Prior to troubleshooting electrodes, verify that all electrodes are within the stated usage period. For your convenience, electrodes have the expiration date printed on the label of the packing box and must be utilized during the time frame indicated.

All electrodes, except chloride inner elements, are warranted for a period of six months after installation on the instrument or until the expiration date on the package label, whichever occurs first. Chloride electrode inner elements are warranted for 4 weeks after installation, or 1200 samples, whichever occurs first.

Potassium Electrode, Reference Electrode, ◆ Sodium Electrode, Air Detector



Purging the Electrode



Flushing the Electrode

1. Place absorbent paper toweling under the ISE module.
2. To prevent dripping, place the ISE reagent cartridge pack on the top deck.
3. Carefully remove the A, B, and R tubing from the ISE reagent cartridge pack, in a motion away from the operator to avoid aerosol spray. To prevent contamination, wipe the tubing individually with a clean, lint-free tissue. Do not remove the W tubing from the pack.
4. Place the A, B, and R tubing on a clean, lint-free tissue. From the ISE status screen, touch PURGE to draw air through the tubing. Allow the cycle to complete.
5. Place the A, B, and R tubing in Type II water. Touch PURGE to draw water through the tubing. Allow the cycle to complete.
6. Remove the tubing from the water and place it on a clean, lint-free tissue. Touch PURGE to draw air through the tubing. Allow the cycle to complete.
7. Touch MOVE TO INNER.
8. Remove the clear plastic ISE shield, if so equipped, by pulling the connector on the top of the shield straight out.
9. Grasp the electrode carrier and gently pull it from the ISE module.
10. Disconnect the R, W, and S tubing, in a motion away from the operator to avoid aerosol spray.
11. Release the electrode latch and remove the electrodes from the electrode carrier.
12. Gently purge the electrode with air.

ATTENTION

APPLICATION OF EXCESSIVE PRESSURE DURING FLUSHING WILL DAMAGE THE DELICATE MEMBRANE.

Potassium Electrode,
Reference Electrode,
Sodium Electrode,
Air Detector (continued)

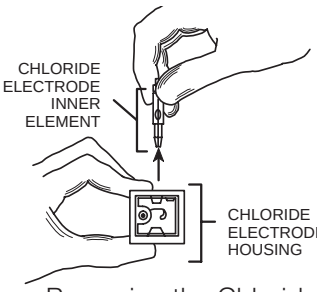
13. Fill a 5cc syringe with warm Type II water. Attach an S tubing to the syringe blunt-tipped needle.
14. Attach the syringe and S tubing to the W port of the reference electrode, cover the R port, and flush with water. A steady stream of water should be observed at the bottom port.
15. Flush the R port in the same manner. Remove the syringe and S tubing.
16. Flush the potassium and sodium electrodes, from the top to the bottom, with warm Type II water.
17. Purge each electrode with air.

NOTE

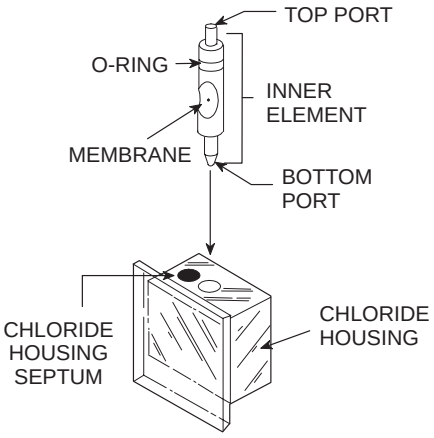
WHEN TROUBLESHOOTING A SODIUM ELECTRODE, A NEW SODIUM ELECTRODE MUST BE REHYDRATED. REFER TO COMPONENT REPLACEMENT, ISE SODIUM ELECTRODE REHYDRATION.

18. Replace the electrodes in the electrode carrier. Verify the electrode latch is engaged.
19. Reconnect the R, W, and S tubing.
20. Replace the electrode carrier on the ISE module.
21. Replace the ISE shield.
22. Replace the A, B, and R tubing in the ISE reagent cartridge pack.
23. Replace the ISE reagent cartridge pack on the ISE reagent shelf.
24. Remove the absorbent toweling. Dispose of the used toweling in accordance with local, state, and federal regulations governing the treatment of regulated medical waste.
25. Purge and calibrate. Refer to Daily Maintenance, ISE Conditioning and ISE Controls.
26. If the problem is resolved, proceed with normal operation. If the problem persists, contact the Customer Support Center.

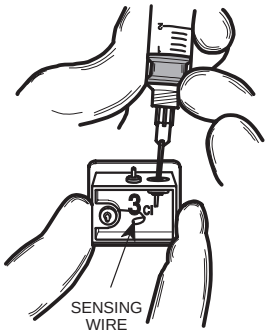
Chloride Electrode



Removing the Chloride Electrode Inner Element



Installing the Chloride Electrode Inner Element



Filling the Chloride Electrode Housing

1. Place absorbent paper toweling under the ISE module.
2. To prevent dripping, place the ISE reagent cartridge pack on the top deck.
3. Remove the clear plastic ISE shield, if so equipped, by pulling the connector on the top of the shield straight out.
4. Grasp the electrode carrier and gently pull it from the ISE.
5. Disconnect the R, W, and S tubing, in a motion away from the operator to avoid aerosol spray.
6. Release the electrode latch and remove the electrodes from the electrode carrier.
7. Gently purge the chloride electrode with air.
8. Place a clean towel on a hard surface. Position the chloride electrode, bottom port down, with the lip of the housing over the edge of the hard surface. Press down on the housing.
9. Pull the chloride electrode inner element out and drain the filling solution into a waste container.
10. Dispose of the used chloride electrode inner element in accordance with local, state, and federal regulations governing the treatment of regulated medical waste.
11. Rinse the chloride housing with Type II water and drain.
12. Rinse the chloride housing with a small amount of chloride internal filling solution and drain. Repeat.
13. ◇ Remove and discard the clear rubber protective cap from the tip of the inner element.
14. Align the inner element O-ring opposite the permanent O-ring in the housing. Insert the new inner element into the electrode housing and press the element into position.

CAUTION

DO NOT TOUCH THE MEMBRANE PORTION OF THE INNER ELEMENT.

15. With the syringe and blunt-tipped needle, aspirate approximately 5 ml of chloride internal filling solution. Insert the needle through the chloride housing septum and fill the chloride housing to cover the internal silver sensing wire and inner element membrane.
16. Wipe excess filling solution from the outside of the electrode.
17. Replace the electrodes in the electrode carrier. Verify that the electrode latch is engaged.
18. Reconnect the R, W, and S tubing.

Chloride Electrode
(continued)

19. Replace the electrode carrier on the ISE module.
20. Replace the ISE shield.
21. Replace the ISE reagent cartridge pack on the ISE reagent shelf.
22. Remove the absorbent toweling. Dispose of the used toweling in accordance with local, state, and federal regulations governing the treatment of regulated medical waste.
23. Purge twice and calibrate twice. Refer to Daily Maintenance, ISE Conditioning and ISE Controls.
24. If replacing the chloride electrode inner element and filling solution does not resolve the problem, recondition the chloride electrode wire in the housing by following the same procedure. However, after removing the chloride inner element and draining the filling solution, rinse the housing with a 10% bleach solution before rinsing with Type II water.

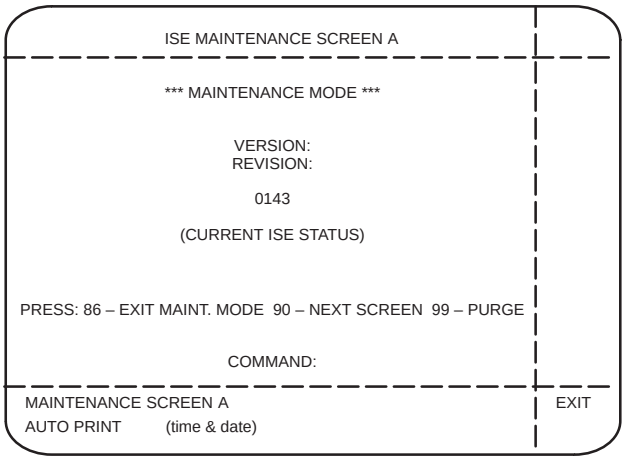
Maintenance Mode

This field is used to access the ISE Maintenance screens from the ISE screen. A detailed description of the screens and their functions follows.

Function

The Maintenance screens display the current millivolt readings and other functions of the ISE module for use in troubleshooting. The touchscreen is not functional in the Maintenance screens. The keyboard is used to type in selections.

ISE Maintenance Screen A



Version/Revision

These numbers display the current ISE maintenance software version and revision.

0143

This is an internal software number and has no operational use.

Current ISE Status

This field displays the current ISE activity.

86–Exit Maint. Mode
90–Next Screen
99–Purge

These three options displayed across the bottom of the screen allow access to other screens. To exit the maintenance mode and go back to the ISE Status screen, highlight the COMMAND field, type **86** and press **ENTER**.

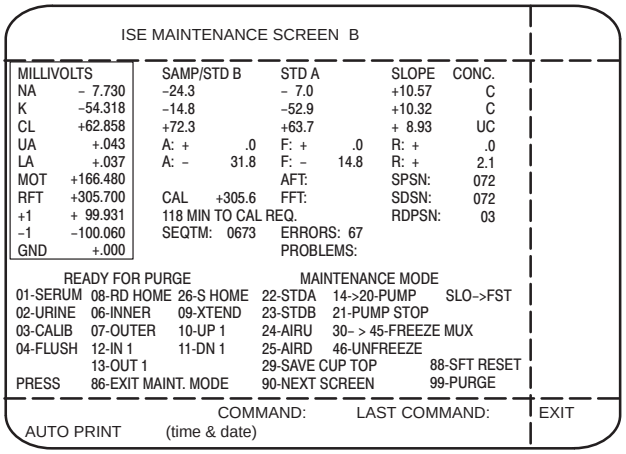
To go to the next Maintenance screen, type **90** and press **ENTER**.

To initiate a purge cycle from this screen, type **99** and press **ENTER**.

Command

The codes required to execute specific functions are entered next to COMMAND at the bottom of the screen.

ISE Maintenance Screen B



Displays the current millivolt readings for the ISE function (or channels) as they are being monitored.

(In this section, all numbers on the screens are examples and will be different on the actual displayed screens.)

NA — Sodium millivolt readings.

K — Potassium millivolt readings.

Cl — Chloride millivolt readings.

UA — Not used in the ABBOTT SPECTRUM® SERIES II™ System configuration.

LA — Lower Air Detector millivolt readings. Used to monitor the correct fluid to air flow through the system during various cycles. A fluid to air ratio of > 1.8 indicates correct sample aspiration during any given cycle. (This is not the same measurement as the aspirate or fill flow time.)

NOTE

THIS IS ACCURATE WHEN THE AIR DETECTOR IS ENABLED. (CODE 27 DESCRIBED LATER IN THIS SECTION.)

MOT — 28-volt motor, voltage monitor. This reading is monitored by the ISE microprocessor continuously and is an indication of the ISE AC line voltage. The MOT varies directly as the AC line voltage varies. The actual 28-volt motor supply voltage is calculated from the displayed number as follows:

Actual supply voltage = displayed number × 16/100.

ISE Maintenance
Screen B (continued)

RFT

Reference Temperature in degrees Kelvin (degrees C + 173). Electrode output will change as the temperature changes. For this reason, the temperature is monitored constantly. If the temperature changes ±2 degrees from the last ISE calibration, the electrode status will change to uncalibrated and a mandatory calibration cycle will be required before the next sodium, potassium or chloride will be run. The temperature at calibration will display just to the right of the RFT reading.

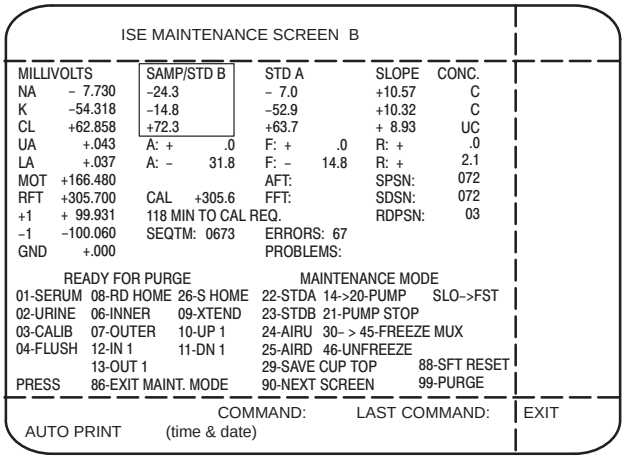
+1 and –1

These are the ± volt A/D converter reference voltages that are used in the A/D conversion of the millivolt signal from the electrodes. The readings displayed are the actual voltages in millivolts/10. The specifications are:

+1 = +100.00 ± 1.5 mV
–1 = –100.00 ± 1.5 mV

GND

This is the signal ground reading in millivolts/10. The specification is 00.0 ±1.0mV.



Displays the sodium, potassium and chloride millivolt readings for Standard B during a calibration cycle, or the sample during a serum analysis.

ISE Maintenance Screen B (continued)

```
                    ISE MAINTENANCE SCREEN  B
MILLIVOLTS        SAMP/STD B      STD A          SLOPE   CONC.
NA    - 7.730     -24.3           - 7.0          +10.57    C
K     -54.318     -14.8           -52.9          +10.32    C
CL    +62.858     +72.3           +63.7          + 8.93   UC
UA      +.043     A: +      .0    F: +      .0   R: +       .0
LA      +.037     A: -    31.8    F: -     14.   R: +      2.1
MOT   +166.480                    AFT:      8    SPSN:    072
RFT   +305.700    CAL   +305.6    FFT:           SDSN:    072
+1    + 99.931    118 MIN TO CAL REQ.            RDPSN:    03
-1    -100.060    SEQTM:  0673    ERRORS:   67
GND     +.000                     PROBLEMS:

        READY FOR PURGE                  MAINTENANCE MODE
01-SERUM  08-RD HOME  26-S HOME  22-STDA  14->20-PUMP    SLO->FST
02-URINE  06-INNER    09-XTEND   23-STDB  21-PUMP STOP
03-CALIB  07-OUTER    10-UP 1    24-AIRU  30- > 45-FREEZE MUX
04-FLUSH  12-IN 1     11-DN 1    25-AIRD  46-UNFREEZE
          13-OUT 1               29-SAVE CUP TOP      88-SFT RESET
PRESS     86-EXIT MAINT. MODE    90-NEXT SCREEN       99-PURGE

                          COMMAND:        LAST COMMAND:      EXIT
AUTO PRINT      (time & date)
```

Displays the sodium, potassium and chloride millivolt readings for Standard A during a calibration or serum analysis cycle. Specifications are:

Na	–10 to +70 mV
K	–50 to +80 mV
Cl	+45 mV to +85 mV

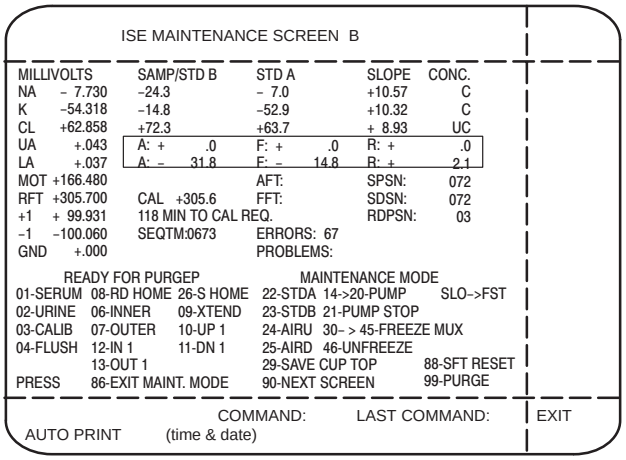
```
                    ISE MAINTENANCE SCREEN  B
MILLIVOLTS        SAMP/STD B      STD A          SLOPE   CONC.
NA    - 7.730     -24.3           - 7.0          +10.57    C
K     -54.318     -14.8           -52.9          +10.32    C
CL    +62.858     +72.3           +63.7          + 8.93   UC
UA      +.043     A: +      .0    F: +      .0   R: +       .0
LA      +.037     A: -    31.8    F: -     14.8  R: +      2.1
MOT   +166.480                    AFT:           SPSN:    072
RFT   +305.700    CAL   +305.6    FFT:           SDSN:    072
+1    + 99.931    118 MIN TO CAL REQ.            RDPSN:    03
-1    -100.060    SEQTM:0673      ERRORS:  67
GND     +.000                     PROBLEMS:

        READY FOR PURGE                  MAINTENANCE MODE
01-SERUM  08-RD HOME  26-S HOME  22-STDA  14->20-PUMP    SLO->FST
02-URINE  06-INNER    09-XTEND   23-STDB  21-PUMP STOP
03-CALIB  07-OUTER    10-UP 1    24-AIRU  30- > 45-FREEZE MUX
04-FLUSH  12-IN 1     11-DN 1    25-AIRD  46-UNFREEZE
          13-OUT 1               29-SAVE CUP TOP      88-SFT RESET
PRESS     86-EXIT MAINT. MODE    90-NEXT SCREEN       99-PURGE

                          COMMAND:        LAST COMMAND:      EXIT
AUTO PRINT      (time & date)
```

Displays the slope numbers calculated during calibration or concentration values at the end of a serum analysis cycle.

ISE Maintenance Screen B (continued)



Displays the readings for the upper (which is not used on the ABBOTT SPECTRUM® SERIES II™ System ISE module) and lower air detector.

A

Displays the millivolt reading from the air detector when air is present in the electrode. The air reading obtained during the last calibration cycle is recorded by the microprocessor, and used as a reference during subsequent analysis cycles.

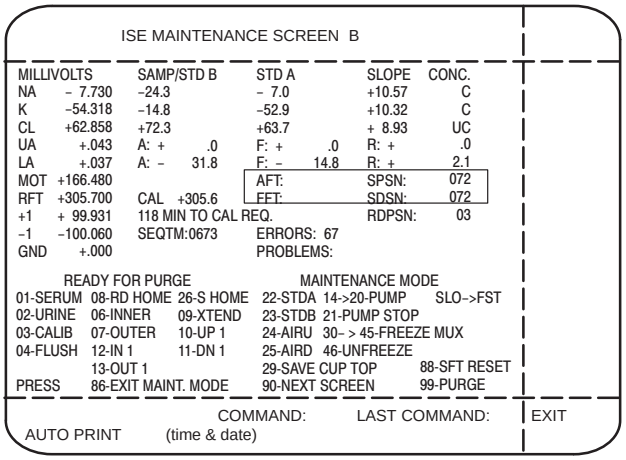
F

Displays the millivolt reading from the air detector when fluid is present in the electrode. The air reading obtained during the last calibration cycle is recorded by the microprocessor and used as a reference during subsequent analysis cycles.

R

Displays the air to fluid ratio of A to F. When this ratio is < 1.7, error code 32 displays. When fluid is detected and air is expected, error code(s) 34 and/or 37 display. When air is detected and fluid is expected, error code(s) 36 and/or 38 display. Refer to the appropriate Status Code in this section.

ISE Maintenance Screen B (continued)



AFT

Displays the Aspirate Flow Time (in 0.1 seconds) for the beginning of the sample fluid to reach the air detector.

Specification = 0.0 to 1.0 second

FFT

Displays Fill Flow Time (in 0.1 seconds) required to aspirate the sample fluid into the electrodes. This measurement is made by the air detector monitoring air at the end of the sample segment.

Specification = 0.5 to 3.0 seconds

SPSN

Displays Sampler Position Step Number or the number of quarter turns the sampler leadscrew has taken from its home position.

SDSN

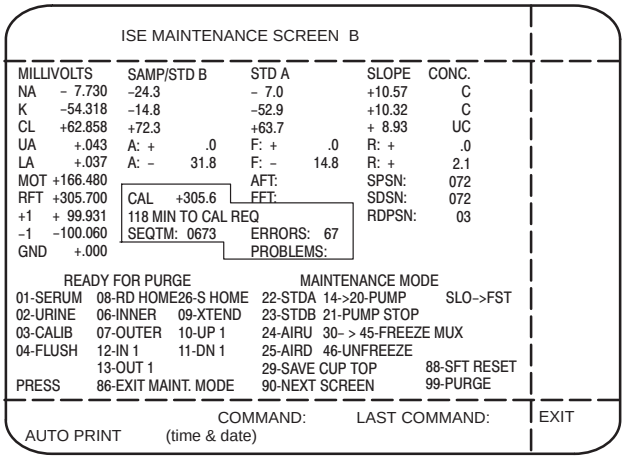
Displays Sampler Destination Step Number or the number of quarter turns allowed by the microprocessor for the leadscrew to make on a specific sampler move command.

RDPSN

Displays Rotational Drive Position Step Number or the current rotation drive (ISE module) position identified by one of the following code numbers.

- 00 Outer sample carousel position
- 01 Between Home and Outer
- 02 Between Outer and Inner carousel positions
- 03 Home position
- 06 Inner sample carousel position
- 07 Beyond the Inner carousel position

ISE Maintenance Screen B (continued)



CAL

Displays the temperature (in Kelvin) at the time of the last calibration.

MIN TO CAL REQ

Displays the minutes until ISE calibration changes to Not Calibrated (NC). This is a clock that begins counting down from 119 minutes at the completion of a calibration cycle.

ERRORS

Displays the error codes that occur as required during calibration or analysis. These are the same codes that display in the Status screen.

PROBLEMS

Displays the code for one of the thirty-two areas monitored by the microprocessor. Up to eight problem codes can be displayed at one time.

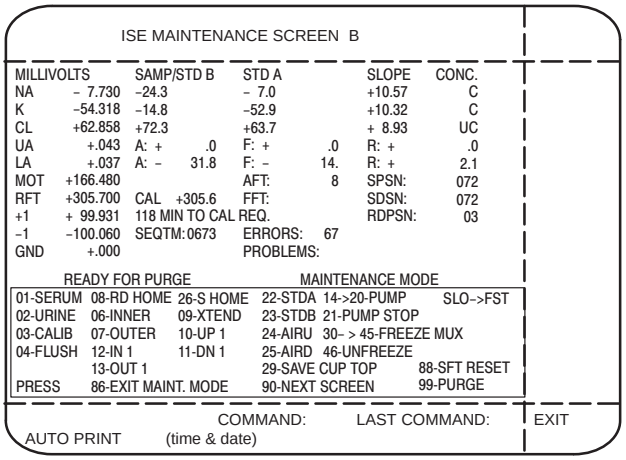
Following is a list and definition of the codes. They are useful for Field Service troubleshooting. No further explanation or knowledge of the codes is required.

B5	XMT queue full (inside EXTENZ)
B6	XMT queue full (inside XMTMGR)
B7	received command letter unknown
B8	received command letter unknown
B9	response problem in ENFLEX
C0	temperature delta out of range
C1	zero volt reference out of range
C2	+1 volt reference out of range
C3	–1 volt reference out of range
C4	motor voltage reference out of range
C5	digital voltage (15V) out of range
C6	rotational drive home inconsistency
C7	rotational drive illegal destination
C8	rotational drive illegal request
C9	response problem in ENPUEX
D0	stack overflow presumed
D1	stack pointer out of sequence

SEQTM

The time (in 0.1 seconds) of a given sequence.

ISE Maintenance Screen B (continued)



Displays some of the menu of sequences or operations available in the Maintenance mode. The sequences are initiated by typing the desired code, followed by pressing ENTER in the COMMAND field. The sequences are defined as follows:

01	A serum analysis cycle that corresponds to ANALYZE SERUM on the ISE Status screen or the sequence performed during routine System RUNNING
02	Not available for use at this time
03	A calibration sequence
04	A flush cycle
06	Rotates the analysis module to the Inner carousel position
07	Rotates the analysis module to the Outer carousel position
08	Rotates the analysis module to the Home position
09	Extends the probe to the bottom of the cup. This position is 186 steps beyond the TOP OF CUP trained position.
10	Moves the probe up one step, or one quarter turn of the sampler leadscrew.
11	Moves the probe down one step.
12	Rotates the analysis module HOME one step.
13	Rotates the analysis module one step toward the inner carousel.
14→20	Allows running the pump at different speeds.
21	Stops the pump.
22	Moves the probe to Standard A in the septum.
23	Moves the probe to Standard B in the septum.
24	Moves the probe to the AIR UP position just above the septum.
25	Moves the probe to the AIR DOWN position just below the septum.

ISE Maintenance Screen B (continued)

26 Moves the probe to the Home position.

The microprocessor drives the probe until the flag (on the side of the sampler block) is in the optical sensor or the ABSOLUTE position. At this point, the probe is driven down a predetermined number of steps, to the Home position.

The flag on the side of the sampler block (which is adjustable) is set so that when the probe is at Home, the tip is in the Standard A septum.

27 Turns the Air Detector circuits on. (The circuits must be turned on to accurately monitor air and fluid flow through the system. They are turned on automatically when the calibration or analysis sequences are initiated.)

28 Turns the Air Detector circuits off.

29 Saves the present probe position as the TOP OF CUP position.

30→45 Allows monitoring of the various multiplexer Channels (software that continually scans the various ISE functions).

30 Ground (GND) channel (0.0 ±.0 mV)

31 Sodium channel

32 Potassium channel

33 Temperature (RFT) channel

34 +1 volt reference channel (±1.5 mV)

35 -1 volt reference channel (±1.5 mV)

36 Lower Air Detector (LA) channel

37 Currently not used

38 Currently not used

39 Chloride channel

40→43 Currently not used

44 Motor voltage (MOT) channel

45 Currently not used

46 Unlocks the multiplexer and allows it to scan all channels.

47 Initiates the Rotational Drive Window Width Check. This is an automatically sequencing test that checks the operation and sensitivity of the rotational drive optical sensors.

When initiated, the Analysis Module will single step through all of the rotational positions. The RDPSN field displays the code numbers identifying the positions of the module as it rotates.

48 Drives the probe to the top and then to the bottom. Is useful for checking the time required by the sampler to go from top to bottom (traverse time). The time should not exceed 14 (1.4 seconds) and is displayed in the SAMPT: field.

Note: The Analysis Module must be in the Inner or Outer sample position for the probe to drive the full extended position.

49 Drives the Rotational Drive between Home and Outer.

50 Drives the Rotational Drive between Outer and Inner.

51 Drives the Rotational Drive Home.

ISE Maintenance Screen B (continued)	86	Exits the Maintenance mode and goes back to the Main menu. It will also initiate a soft reset, that is, the probe will home, the analysis module will rotate to its home position, and TOP OF CUP position will be stored.
	88	Initiates a soft reset but does not leave the Maintenance screen.
	90	Displays the next Maintenance mode screen. Repetitive use of this code will cycle through each of the three Maintenance screens.
	99	Initiates a purge cycle.

Observed Concern

ISE Air Detector Electrode Malfunction, ISE Codes 32, 34, 36, 37, 38, 39 and 75.

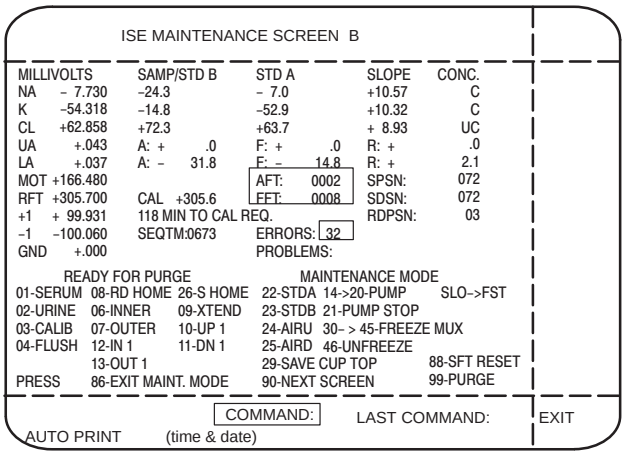
Probable Cause

Flow problem or electrode failure.

Corrective Action

Perform the Flow and Air Detector Test to identify and correct the problem.

1. From the ISE Status screen, analyze a sample.
2. Touch FLOW and record the results. The flow values must be within range prior to proceeding to the next step.
3. Touch MAINTENANCE MODE.
4. Type 90 in the COMMAND field and press ENTER to display Maintenance Screen B.



◆ 5. Type 03 in the COMMAND field and press ENTER to calibrate. When an acceptable calibration is complete, place external Control 2 in the inner carousel position adjacent to the ISE module.

6. Type 06 in the COMMAND field and press ENTER to move to the inner carousel.
7. Type 01 in the COMMAND field and press ENTER to analyze the standard.
8. Check the AFT and the FFT.

(continued)

Corrective Action (continued)

◆ 9. Check the R (> 1.7) flow ratio. If the R is < 1.7, remove the air detector from the train and flush it with ISE Cleaning Solution and then Type II water. Replace the electrode and calibrate. If R remains less than 1.7, replace the air detector.

NOTE

ERROR CODE 32 (LOWER AIR DETECTOR RATIO TOO LOW) WILL DISPLAY WHEN THE RATIO IS < 1.7.

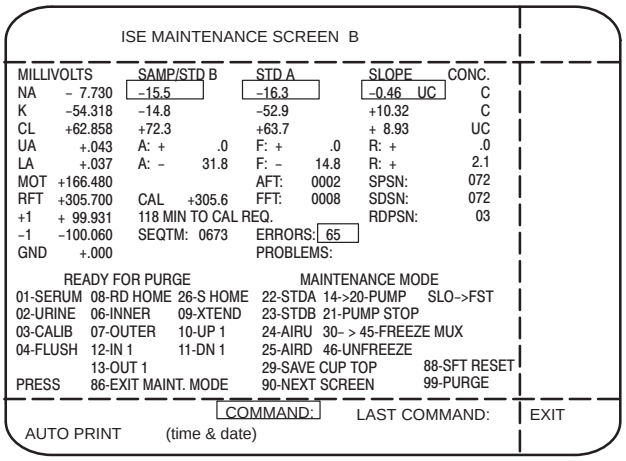
10. Check the A and F fields. The A reading should be 1.7 times greater than the F reading. If the flow check is acceptable, the R, W, and S tubing are in good condition, and the ratio is outside the limits, replace the air detector.

11. Exit by typing 86 in the COMMAND field and pressing ENTER .

Observed Concern	ISE Electrode Malfunction, ISE Codes 65, 66, 67, 71, 72, and 73.
Probable Cause	Electrode failure.
Corrective Action	Perform the electrode test to identify and correct the problem.

1. From the ISE Status screen, touch MAINTENANCE MODE.
2. Type 90 in the COMMAND field and press ENTER to display Maintenance Screen B.

(Example of a defective Sodium electrode.)



3. Type 03 in the COMMAND field and press ENTER to calibrate. When the calibration is complete, record the slope and mV. Repeat the calibration. The slope values should not vary by more than ±0.1
4. Record the mV readings of Standard A and Standard B for Na, K, and Cl (with + or – sign).
5. Subtract Standard B from Standard A.

ACCEPTABLE mV	ACCEPTABLE SLOPE
Na: 16.6-21.0 mV	Na: 10.20-12.85
K: 34.8-43.2 mV	K: 9.43-11.69
Cl: 8.7-12.8 mV	Cl: 9.06-13.28

6. If the electrode displays acceptable values, the electrode is working properly. If the electrode displays unacceptable values, replace it.
7. Exit by typing 86 in the COMMAND field and pressing ENTER of specification.

Observed Concern

ISE Electrode Instability, Codes 51, 52 and 53.

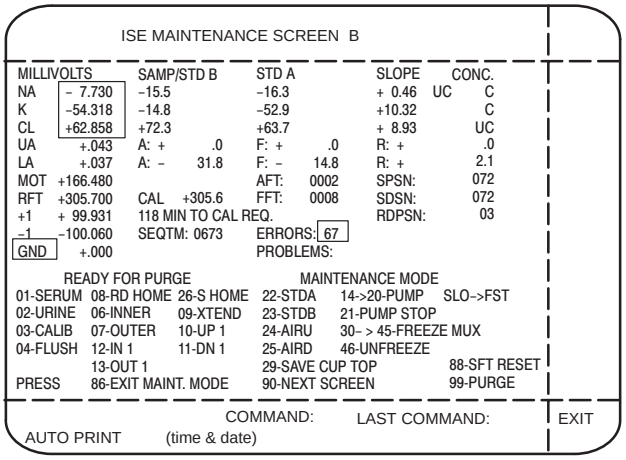
Probable Cause

Flow problem electrode or electronic failure.

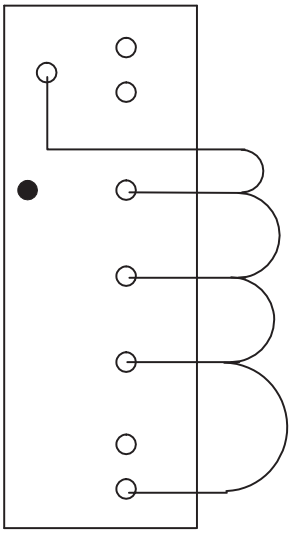
Corrective Action

Flush the electrode train and recalibrate. If the problem persists, follow this procedure to identify the defective component, and replace the malfunctioning electrode or call the Abbott Customer Support Center.

1. From the ISE Status screen, touch MAINTENANCE MODE.
2. Type 90 in the COMMAND field and press ENTER to display Maintenance Screen B.



3. Type 06 in the COMMAND field and press ENTER to move the analyzer to the inner ring.
4. Type 25 in the COMMAND field and press ENTER to move the probe to the AIR DOWN position.



5. Remove the electrode carrier.
6. Disconnect S, W, and R tubing in a motion away from the operator to avoid aerosol spray.
7. Install the shorting strap (supplied in the ISE accessory kit), as shown in the illustration.
8. Type 27 in the COMMAND field and press ENTER to turn on the air detector circuits. (Although 27 does not appear on this screen, the system is capable of accepting 27 as an entry. The command actually appears on Maintenance Screen C, but access to the actual screen is not required.)
9. Look at the mV readings for Na, K, Cl. If the readings are ≤1.0 mV with less than ±0.2 mV change, the electronics are stable. If the values change by more than 0.2 mV, call the Abbott Customer Support Center as the sensor PCB may be defective.

Corrective Action (continued)

10. Observe the GND field reading. It should be –1.0 to +1.0 mV with the grounding strap installed. If the reading is outside the specification, call the Customer Support Center as an electronic problem has occurred.
11. If instability is observed on only one electrode channel, replace that electrode.

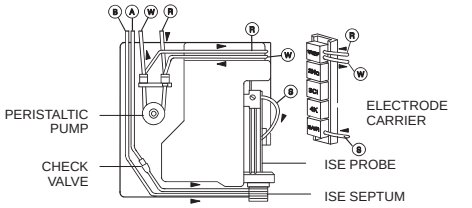
    If two electrodes show instability, replace the reference electrode first.

    If the problem is not resolved, put the original reference electrode back on the module and then replace the electrolyte electrodes.
12. Type 28 in the COMMAND field and press ENTER to turn the air detector circuits off. (Although 28 does not appear on this screen, the system is capable of accepting 28 as an entry. The command actually appears on Maintenance Screen C, but access to the actual screen is not required.)
13. Remove the shorting strap.
14. Replace the electrodes into the train. Then replace the train and the S, W and R tubing on the module.
15. Type 04 in the COMMAND field and press ENTER to flush the module.
16. Type 03 in the COMMAND field and press ENTER to calibrate the module.
17. Type 86 in the COMMAND field and press ENTER to exit the Maintenance screen.

ISE Leadscrew Maintenance, Codes 01 and 02

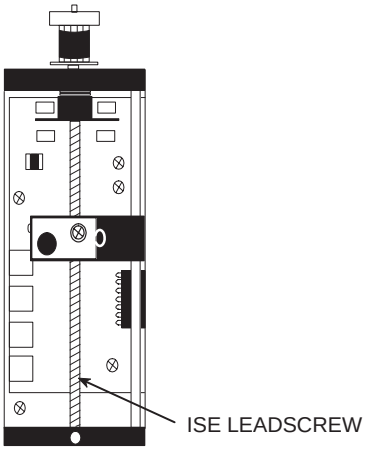
A = STD. A TUBING
B = STD. B TUBING
R = REFERENCE SOLUTION TUBING
S = SAMPLE TUBING
W = WASTE TUBING

INDICATES FLUID FLOW



ISE Module

1. Place absorbent paper toweling under the ISE module.
2. To prevent dripping, place the ISE reagent cartridge pack on the top deck.
3. From the Main menu, touch CALIBRATION, SELECT.
4. Touch ISE STATUS, SELECT.
5. Touch MOVE TO OUTER.
6. Remove the clear plastic ISE shield, if so equipped, by pulling the connector on the top of the shield straight out.
7. Carefully disconnect the A, B, and R tubing from the ISE reagent cartridge in a motion away from the operator to avoid aerosol spray. To prevent contamination, wipe the tubing individually with a clean, lint-free tissue. Do not remove the W tubing from the ISE reagent cartridge pack.
8. Place the A, B, and R tubing on a clean, lint-free tissue. Touch PURGE to draw air through the tubing. Allow the cycle to complete.
9. Place the A, B, and R tubing in Type II water. Touch PURGE to draw water through the tubing. Allow the cycle to complete.
10. Remove the tubing from the water and place on a clean, lint-free tissue. Touch PURGE to draw air through the tubing. Allow the cycle to complete.
11. Grasp the septum and turn it clockwise until the white lines on the ISE module and the ISE septum align.
12. Pull the ISE septum down until it clears the ISE probe.
13. Disconnect the A and B tubing from the ISE septum and set the septum aside.
14. Disconnect the S tubing from the ISE probe.
15. Loosen the knurled screw and remove the ISE probe. Set the probe aside.
16. Touch BOTTOM OF CUP.
17. Clean the exposed top portion of the leadscrew.
    a. Prepare several cleaning pads by folding lint-free tissues into pads approximately $^{1}/_{16}$ inch thick.
    b. **Moisten** the pad with leadscrew cleaner. Do not saturate the pad.
    c. Wipe around the leadscrew in a circular motion. Repeat until the cleaning pad shows no discoloration.

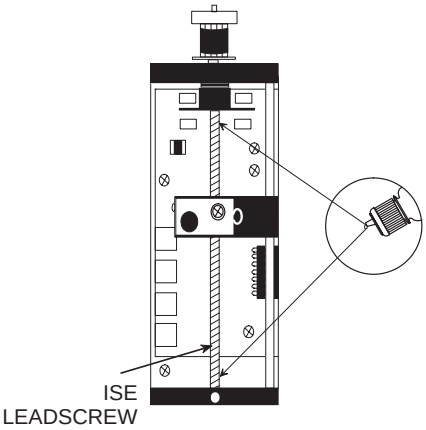


WARNING

DO NOT CLEAN THE LEADSCREW BY MOVING THE CLEANING PAD UP AND DOWN. FIBERS ADHERING TO THE LEADSCREW MAY CAUSE SAMPLER MALFUNCTION.

    d. Dispose of the used cleaning pads in accordance with local, state, and federal regulations governing the treatment of regulated medical waste.

ISE Leadscrew Maintenance, Codes 01 and 02
(continued)



18. Touch PROBE UP.
19. Repeat step 17 to clean the exposed bottom portion of the leadscrew.
20. Lightly lubricate the leadscrew.

CAUTION

DO NOT PERFORM THE LEADSCREW LUBRICATION PROCEDURE INDEPENDENTLY OF THE CLEANING PROCEDURE.

21. From the adapter tip of the lubricant container, squeeze a very small amount of ISE lubricant on the top and bottom of the leadscrew.
22. From the ISE Status screen, touch MAINTENANCE MODE. When Maintenance Screen A displays, press ENTER to display Maintenance Screen B. Press ENTER again to display Maintenance Screen C.

ATTENTION

DO NOT PERFORM THIS PROCEDURE WITH THE ISE SAMPLE PROBE INSTALLED. DAMAGE TO THE PROBE WILL RESULT.

23. Type 48 in the COMMAND field and press ENTER to move the sampler from top to bottom. The sampler will continue to move until commanded to stop.
24. The time in the SAMPT field is given in tenths of seconds (0011 = 1.1 seconds). Field values update with each up/down traverse of the sampler. Typical values should be less than or equal to 1.2 seconds (0012).
25. Record the SAMPT value.
26. Type 88 in the COMMAND field and press ENTER. Movement of the sampler stops and the ISE module returns to the HOME position.
27. Type 86 in the COMMAND field and press ENTER, or touch EXIT, to return to the ISE Status screen.
28. Touch MOVE TO OUTER.
29. Reinstall the ISE probe on the ISE module.
30. Reconnect the S tubing on the ISE probe.
31. Reconnect the A and B tubing to the ISE septum and install the septum.
32. Replace the ISE shield, if appropriate.
33. Reconnect the A, B, and R tubing to the ISE reagent cartridge pack.
34. Place the ISE reagent cartridge pack on the ISE reagent shelf.
35. Touch PURGE. After the cycle completes, touch PURGE again.
36. Touch CALIBRATE. When the cycle completes, record the slope values. Touch CALIBRATE again and record the slope values.
37. Touch MOVE HOME.
38. Touch EXIT until the Main menu displays.
39. Remove and dispose of the toweling in accordance with local, state, and federal regulations governing the treatment of regulated medical waste.

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STATUS CODES

Introduction

This section contains a discussion of Status Codes, a numerical listing of the codes, and a discussion of the probable cause and resolution of each code. Status Codes rarely indicate a serious concern. They are frequently informational and may be normal consequences of operation.

On-screen messages display when an incorrect entry is made. Additional banner messages may display above the AUTO PRINT field. If banner messages display, record the code and contact the Customer Support Center.

◇ **WARNINGS**

- **POTENTIAL BIOHAZARD**. CONSIDER ALL CLINICAL SPECIMENS AND REAGENT CONTROLS THAT CONTAIN HUMAN BLOOD OR SERUM (CALIBRATORS, ETC.) AND CONTAMINATED INSTRUMENTS AS POTENTIALLY INFECTIOUS. WEAR GLOVES, LAB COATS, AND SAFETY GLASSES, AND FOLLOW OTHER BIOSAFETY PRACTICES AS SPECIFIED IN THE OSHA BLOODBORNE PATHOGEN RULE (29 CFR 1910.1030) OR OTHER EQUIVALENT BIOSAFETY PROCEDURES. REFER TO THE GENERAL BIOSAFETY DISCUSSION IN THE MAINTENANCE SECTION.
- **ELECTRICAL SHOCK HAZARD.** HIGH VOLTAGE EXISTS IN THE SYSTEM WHEN THE MAINTENANCE POWER IS **OFF** AND THE MAIN POWER IS **ON**. VISUALLY LOCATE THE POWER SWITCHES BEFORE TOUCHING THEM. FOR ADDITIONAL INFORMATION, REFER TO THE POWER ON/OFF PROCEDURE IN THE OPERATION MANUAL.

◆ Status Code Categories

Status Codes can be grouped into three general categories, based on relative importance to System operation.

1. Normal consequences of operation (for example, CODE 00003: ALL CUVETTES USED—CHANGE TO CONTINUE)
2. A problem with a specific assay (for example, CODE 00008: REAGENT NOT FOUND. CORE REAGENT POSITION: [redacted])
3. Abortion of System operation (for example, CODE 00175: MOTOR LIMITS ERROR. MOTOR NUMBER [redacted])

Status Codes can also be grouped into the following specific categories which reflect the nature of the condition.

- CALIBRATION
- RESULT
- MECHANICAL
- WATER
- MOTOR LIMIT
- ROBOTICS
- SYSTEM
- ISE

Status codes specific to the ISE module are discussed in the ISE Status Codes & Diagnostics section.

STATUS CODES

Accessing the Status Screen

When Status Codes are generated, STATUS displays in the upper right corner of the screen. Touch STATUS to display the Status screen. From the Review & Run screen or the Special Procedures screen, enter the Main menu to access the Status screen.

Cancelling Status Codes

Rather than accumulating a list of Status Codes, it is recommended that the Status Codes be deleted immediately after resolving the condition. The PRINT SCREEN key can be utilized to document Status Codes. STATUS will be displayed until all conditions are cancelled in either of the following ways.

Individual Status Code

Touch to highlight the desired Status Code. (Utilize NEXT PAGE to display additional Status Codes.) Touch CANCEL. The screen will automatically update and scroll the remaining Status Codes.

Multiple Status Codes

Touch CANCEL ALL. The screen will automatically update and cancel all Status Codes on all pages.

Troubleshooting

When a Status Code is generated, use the following procedure.

1. Touch STATUS to display the Status screen.
2. Press PRINT SCREEN to print the Status screen.
3. Cancel the Status Codes.
4. Refer to the Status Code listing to determine the probable cause and corrective action for each Status Code on the printed list.
5. Verify that the ACTIVITY field is not highlighted.
6. Resolve the concern. If "Cycle the power" is indicated as the corrective action, refer to Cycling Power in the Power On/Off procedure in the Operation Manual.
7. Continue normal operation.

Banner Messages

ABBOTT SPECTRUM® SERIES II™ Systems have self-diagnostic capabilities, which indicate potential error conditions by banner messages. Banner messages are numeric sequences which display above the AUTO PRINT field. When a banner message displays, the keyboard and touch screen are non-responsive and operation temporarily ceases.

If a banner message displays, use the following procedure.

1. Record the banner message.
2. Cycle the power. Refer to Cycling Power in the Power On/Off procedure in the Operation Manual.
3. If the banner message displays again, record the numbers and contact the Customer Support Center.

Code 00001 — **INTERNAL ERROR; SID AND/OR TEST REQUEST NUMBER**

Category: System

Probable Cause	A Status Code occurred when the test result was to be assigned to a SID or test request.
Corrective Action	Cycle the power. Check the Patient Samples screen to determine that the SID and test request exist. If not, request the SID or test. Access the Review & Run screen and rerun the test.

Code 00002 — **TEST: [redacted] CALIBRATION CAL FACTOR TOLERANCE HAS FAILED**

Category: Calibration

Probable Cause	The calibration factor measured is greater than allowed in the Test Parameter File.
Corrective Action	The CAL FACT determined has exceeded the allowable tolerance defined in the Test Parameter File for that assay. Check the accepted concentration and A_d versus the new concentration and A_d fields. Look for problems relating to calibrators placed in the wrong position, contamination, evaporation or insufficient sampling due to a bubble in the sample cup. The samples being assayed will be determined by the existing calibration curve if Calibration Override is ON in the Instrument Options screen. The next time a sample is requested for this assay, the instrument will initiate a new calibration. By touching ACCEPT CAL, the System will accept this calibration curve and will not recalibrate until the next calibration interval occurs.

Code 00003 — **ALL CUVETTES USED – CHANGE TO CONTINUE**

Category: Mechanical

Probable Cause	No more cuvettes available for testing.
Corrective Action	When the testing in progress is completed, and ACTIVITY is no longer displayed, replace all cuvettes. Touch SPECIAL PROCEDURES, SELECT, CUVETTE CHANGE, SELECT. Touch EXIT to display the Main menu; then, access the Review & Run screen. (Alternatively, press the SHIFT key and CUVETTE CHANGE key simultaneously.) Load any necessary reagents and calibrators (indicated by highlighted fields). Verify the carousel number. Touch RUN to resume operation.

Code 00004 — **CALIBRATION ABORTED. TEST: [redacted]**

Category: Calibration

Probable Cause: An error occurred causing the System to suspend the endpoint calibration or rate kinetic blank in progress on the test identified. The most likely cause is insufficient reagent or no calibrator. Code 00021 and/or 00102 may also appear.

Corrective Action: Check the fluid level of the reagent and sample. When the problem has been corrected, reschedule the calibration by accessing the Review & Run screen.

Code 00005 — **INTERNAL ERROR**

Category: System

Probable Cause: The number of readings selected and the number of assays selected have exceeded the System's memory capacity. This Status Code will occur from user-selected test files or user-edited parameters, or after the System has aborted several times.

Corrective Action: The test parameters selected by the operator for the number of reads or the number of tests requested for these multiple reads should be decreased. To clear the Status Code, cycle the power. Any tests completed after this Status Code must be rerun.

Code 00006 — **INTERNAL ERROR**

Category: System

Probable Cause: The number of readings for each assay, the number of assays, and the number of math equations have exceeded the System's memory capacity. This Status Code occurs from user-selected test files or user-edited parameters, or after the System has aborted several times.

Corrective Action: Decrease the number of readings, assays or math equations requested in the Test Parameter Files. To clear the Status Code, cycle the power. Any tests completed after this Status Code must be rerun.

Code 00007 — **INTERNAL ERROR**

Category: System

Probable Cause: The A_d reading, when calculated, may be divided by zero. The System will not calculate this invalid data.

Corrective Action: Check for an unacceptable calibration curve and take appropriate steps. Note the type of all tests in operation, the number of calibrations, kinetic blanks and assays in progress. Print all Status Codes, check the water system pressure, and call the Customer Support Center with all information.

Code 00008 — **REAGENT NOT FOUND. CORE REAGENT POSITION: [redacted]**

Category: Mechanical

Probable Cause: No fluid detected in the specified reagent cartridge.

Corrective Action: Look at the reagent cartridge. If it is empty, replace it. Access the Reagent Loadlist screen and touch LOW REAG adjacent to the reagent name. If the cartridge is not empty, look for bubbles or fluid on the septum. If no problem is observed, check the fluid sensitivity.

NOTE

IF THE AUX REAGENT IS NOT DETECTED, THE REAGENT PROBE WILL CONTINUE TO DISPENSE THE PRIMARY REAGENT AND ATTEMPT TO DISPENSE AUX REAGENT.

Code 00009 **WRONG MATH MODEL TEST: [redacted] DATA MAY BE LOST**

Category: System

Probable Cause: An inappropriate math model has been selected in the Test Parameter File. For example, Linear Regression was selected for a rate assay. This Status Code will occur only when a Test Parameter File is edited or a new Test Parameter File is created.

Corrective Action: Correct the parameters in the test file.

Code 00010 **MATH MODEL NEEDS MORE READINGS TEST: [redacted] DATA MAY BE LOST**

Category: System

Probable Cause: The number of readings requested in the Test Parameter File does not meet the requirements of the math model. For example, a kinetic rate test has only one reading requested. This Status Code only occurs when a Test Parameter File is edited or a new Test Parameter File is created.

Corrective Action: Correct the parameters in the test file.

Code 00011 **TEST: [redacted] INITIAL ABSORBANCE "IA" CHECK FAILED FOR REAGENT: # [redacted] , POSSIBLE REAGENT PROBLEM**

Category: Result

Probable Cause: The initial reagent absorbance of the test has exceeded the specification in the Test Parameter Files. The assay affected will be flagged IA on the Recall Result screen.

Corrective Action: Be sure the reagent is loaded in the tray position specified by the Reagent Loadlist. Check the mixer stroke action and adjust as necessary. Refer to the Probe Positioning procedure in this manual. If the problem persists, read the absorbance of the reagent. Use the Reagent A_d Read procedure in the Observed Concerns section under Reagents Flagged IA or MA. If the problem continues, be sure:

- The incubator is free of floating debris.
- Fluid level in cuvette is correct and consistent.
- New reagent is prepared if needed, and proper water or diluent volumes are used for reconstitution.

For Dry Powder Reagents, be sure:

- The water quality has not deteriorated.
- The correct volume of water is used.
- Buffer is used for Uric Acid and Cholesterol.

Code 00012

TEST: [redacted] REACTION ABSORBANCE "MA" EXCEEDS LIMIT REAGENT: # [redacted] PROBABLE HIGH ANALYTE CONCENTRATION.

Category: Result

Probable Cause

This Status Code could result from a high sample value indicating a high sample concentration. At least one absorbance reading taken during the run of the identified test has exceeded the specification in the Test Parameter Files and the reaction is no longer linear. The results will be flagged MA on the Recall Results screen. If this occurs on one sample, rerun it. If it occurs on many samples, suspect a System or reagent problem.

Corrective Action

Be sure the reagent is loaded in the tray position specified by the Reagent Loadlist. Check mixer stroke action and adjust as necessary. Refer to the Probe Positioning procedure in this manual. If the problem persists, read the absorbance of the reagent. Use the Reagent A_d Read procedure in the Observed Concerns section under Reagents Flagged IA or MA. Prepare new reagent if necessary. If the problem continues, be sure:

- The incubator is free of floating debris.
- Fluid level in cuvette is correct and consistent.

For Dry Powder Reagents, be sure:

- The water quality has not deteriorated.
- The correct volume of water is used.
- Buffer is used for Uric Acid and Cholesterol.

Code 00013

LINEAR HIGH OR LOW CHECK FAILURE. TEST: [redacted]

Category: Result

Probable Cause

The minimum or maximum acceptable linear value defined in the Test Parameter Files has been exceeded. The results will be flagged LL or LH in the Recall Results screen.

Corrective Action

If this Status Code occurs with a single sample, suspect a remarkably low or elevated sample and rerun the sample. The sample will be diluted automatically by touching **RUN** from Review & Run (provided the parameters are established in the test file).

If it occurs with multiple samples, suspect an error in the Test Parameter File: Reagent Definition or some change in the reagent. Cross-reference the test parameters with the reagent information to be sure the numbers correspond. If the problem persists, check the mixer action and sample probe fluid sensing using the Probe Positioning procedure in this manual.

◆ **NOTE**

IF THE SAMPLE IS FLAGGED IA (INITIAL ABSORBANCE) OR LE (LOW ENERGY), NO DILUTION OR CONCENTRATION WILL BE PERFORMED. PROTOCOLS ON SAMPLES FLAGGED MA (MAXIMUM ABSORBANCE) WILL BE PERFORMED UNLESS THE SAMPLE WAS IDENTIFIED AS /C AT THE BEGINNING OF THE RUN.

Code 00014 — **INTERNAL ERROR**

Category: System

Probable Cause: An internal communication error occurred. The problem may be serious. If the System is able to recover, proper operation will continue and no other symptoms will occur.

Corrective Action: Cycle the power. If the situation continues to occur, call the Customer Support Center.

Code 00015 — **A_d OFFSET IS ZERO. CHANNEL NUMBER:** [redacted]

Category: System

Probable Cause: During internal calibration of the optics, a malfunction occurred at one of the wavelengths.

Corrective Action: At the completion of testing, cycle the power to clear the Status Code. Access the Special Procedures screen, then touch AD OFFSET. One of the Dark Current or Balance Point Channels will display a 0. Touch RECALCULATE. If the 0 changes to a number displayed by the other channels, the problem was temporary and has been corrected. (The Stray Light Channels should display 0.) If the 0 remains, a malfunction has occurred. Print a copy of the screen and call the Customer Support Center.

Code 00016 — **THE PATIENT SAMPLES DATA FILE IS FULL**

Category: System

Probable Cause: All memory for samples has been used.

Corrective Action: Print the reports, then delete the samples by using the DELETE function from the Patient Samples screen.

Code 00017 — **ROTATION TIME MUST BE 1–10 MINUTES. RETRY.**

Category: System

Probable Cause: In the temperature calibration screen an incorrect number was entered to rotate the cuvette carrier.

Corrective Action: Enter a number between 1 and 10.

Code 00018 — **HOST INTERFACE TIMEOUT**

Category: System

Probable Cause: This message has two probable causes:

1. When BI-HOST INTERFACE is selected from the Main menu and the message BI-HOST INTERFACE TIMEOUT displays immediately on the screen, a hardware problem has occurred on the System. Call the Customer Support Center.
2. When BI-HOST INTERFACE is selected from the Main menu, and the BI-HOST INTERFACE screen displays momentarily, then returns to the Main menu displaying the message BI-HOST INTERFACE TIMEOUT, the host computer has not responded properly.

Corrective Action: Be sure the host is ready to accept transmission. Be sure cables are set. Select BI-HOST INTERFACE once more. If the message reappears, call the Customer Support Center.

Code 00019 — **SAMPLE CAROUSEL STATION NOT DETECTED**

Category: Robotics

Probable Cause	As the sample carousel rotated through the sensor, a station was not detected.
Corrective Action	HOME ROBOTICS to determine whether this is a transient malfunction. If the Status Code does not recur, a temporary malfunction has occurred. If the Status Code persists, call the Customer Support Center.

Code 00020 — **CUVETTE CAROUSEL STATION NOT DETECTED**

Category: Robotics

Probable Cause	As the cuvette carousel rotated through the sensor, a station was not detected.
Corrective Action	HOME ROBOTICS to determine whether this is a transient malfunction. If the Status Code does not recur, the malfunction was temporary and the System will run. If the Status Code persists, call the Customer Support Center.

Code 00021 — **NO REAGENT FOUND AFTER DISPENSE, CUVETTE # [redacted] REAGENT # [redacted] , SAMPLE CUP POSITION # [redacted]**

Category: Mechanical

Probable Cause	After dispensing reagent, the reagent probe should detect fluid and does not.
Corrective Action	Check the level of the dispensed reagent to determine if it is less than other cuvette cells. Check for tubing leaks, bubbles in reagent cartridge and plugged probes. Check the reagent probe fluid sensitivity. Refer to the procedure in the Probe Positioning section.

Code 00022 — **IMPROPER SEQUENCE.**

Category: System

Probable Cause	A communication problem occurred in the System, or the power was cycled while the System was in operation.
Corrective Action	If no other symptom occurred, the problem was transient and should cause no alarm. If other symptoms occur or the System ceases operation, cycle the power. On power up, the Status Code will reappear and should be disregarded if the System is functioning properly. Cancel the previous Status Codes. If the problem persists, call the Customer Support Center.

Code 00023 — **UNKNOWN CONTROL LEVEL, TEST: [redacted]**

Category: System

Probable Cause	In the Patient Samples name field, a control entry other than /C 1, /C 2, or /C 3 was entered.
Corrective Action	Enter /C 1, /C 2 or /C 3.

NOTE

IF THE SPACE BETWEEN C AND THE NUMERAL IS OMITTED, THE SYSTEM WILL NOT ACCEPT THE ENTRY.

Code 00024 **SAMPLE SYRINGE HOME LIMIT NOT FOUND**

Category: Robotics

Probable Cause	As the sample syringe leadscrew moved, the home limit sensor was not detected.
Corrective Action	Use the Other Devices screen to determine whether the problem is transient. Check the syringe to be sure it is seated properly in the housing. Refer to the Component Replacement section for more information. If the problem persists, call the Customer Support Center.

Code 00025 **CANNOT COMMAND ISE.**

Category: ISE

Probable Cause	An internal communications Status Code occurred. This may be caused by static electricity.
Corrective Action	Print the ISE Status screen. Refer to the ISE Status Codes & Diagnostics section. Touch HARDWARE RESET. If this does not resolve the problem, cycle the power. Call the Customer Support Center if unable to resolve the problem.

Code 00026 **PRINTER TIMEOUT ERROR**

Category: System

Probable Cause	The printer was not on-line when accessed by the System.
Corrective Action	Be sure the printer is on. Check the Select light switch on the printer to be sure it is illuminated. Be sure paper is in the printer. Check the interface cable to be sure it is well seated on both the analyzer and the printer. Turn the printer OFF. Wait 60 seconds, and turn the printer ON again. If the problem persists, call the Customer Support Center.

Code 00027 **LOW ENERGY. CALIBRATOR # [redacted] , TEST: [redacted]**

Category: Calibration
Mechanical

Probable Cause	Inadequate light is passing through the identified calibrator. The most common cause is the cuvettes not being changed appropriately. The second most common cause is reagents reconstituted incorrectly.
Corrective Action	If this Status Code occurs with one sample, suspect an interference in the calibrator. If the problem occurs with one test only, suspect the reagent and take the appropriate action. If the Status Code occurs with multiple samples and reagents, check the cuvettes, then check the incubator water for foreign particles. Clean the incubator and lenses.

Code 00028 **REAGENT SYRINGE UPPER LIMIT NOT FOUND**

Category: Robotics

Probable Cause: As the reagent syringe leadscrew moved, the upper sensor was not detected.

Corrective Action: Check the syringe to be sure it is properly seated. HOME ROBOTICS. If the problem persists, call the Customer Support Center.

Code 00029 **LOW ENERGY. TEST: [redacted] SAMPLE ID: [redacted]**

Category: Result

Probable Cause: Inadequate light is passing through the identified sample. The most common cause is the cuvettes not being changed appropriately. The second most common cause is reagents reconstituted incorrectly.

Corrective Action: If this Status Code occurs with one sample, suspect an interference in the sample. If the problem occurs with one test only, suspect the reagent and take the appropriate action. If the Status Code occurs with multiple samples and reagents, check the cuvettes, then check the incubator water for foreign particles. Clean the incubator and lenses. Check lamp voltage.

Code 00030 **REAGENT SYRINGE HOME LIMIT NOT FOUND**

Category: Robotics

Probable Cause: As the reagent syringe leadscrew moved, the home sensor was not detected.

Corrective Action: Check the syringe to be sure it is properly seated. HOME ROBOTICS. From the Other Devices screen, move the syringe up and down to determine whether the problem is transient. If the problem persists, call the Customer Support Center.

Code 00031 **CALIBRATION TIME HAS LAPSED. TEST: [redacted]**

Category: Calibration

Probable Cause: The attempted calibration failed. (Look for Code 2 and/or 46 for the same test.) OVERRIDE CAL is OFF; therefore, the patient assay in process could not be calculated.

Corrective Action: Access the Calibrator Status screen to determine the calibration problem. Take corrective action. When the System completes a run and RUN is touched from the Review & Run screen, the System will initiate a calibration and then testing on the previously requested assays.

Code 00032 **REAGENT Z HOME LIMIT NOT FOUND**

Category: Robotics

Probable Cause: As the reagent arm moved up and down, the home sensor was not detected.

Corrective Action: HOME ROBOTICS. If the problem persists, call the Customer Support Center.

Code 00033	**CUVETTE SPOKE IN PROBE PATH**
Category: Robotics	
Probable Cause	This Status Code may occur when a probe is requested to move to the bottom of a cuvette during special procedures.
Corrective Action	Touch the CUVETTE field, type a number from 1 to 96 and press ENTER or HOME ROBOTICS. This clears the problem and probe adjustment can continue.
Code 00034	**CALIBRATION WHEEL HOME NOT DETECTED**
Category: Robotics	
Probable Cause	As the calibration wheel turned, the home sensor was not detected.
Corrective Action	HOME ROBOTICS. If the problem persists, call the Customer Support Center.
Code 00035	**WARNING: WASTE PUMP IS OFF**
Category: Robotics	
Probable Cause	The waste pump is turned OFF.
Corrective Action	Turn waste pump ON.
Code 00036	**CALIBRATION WHEEL STATION NOT DETECTED**
Category: Robotics	
Probable Cause	As the calibration wheel turned, a station was not detected.
Corrective Action	HOME ROBOTICS. If the problem persists, call the Customer Support Center.
Code 00037	**DILUENT VALVE IS CLOSED**
Category: Robotics	
Probable Cause	From the Robotics screen, a request to pump diluent was entered.
Corrective Action	Touch VALVE CLOSED to display VALVE OPEN, then continue the operation.
Code 00039	**FLUID SENSED TOO HIGH**
Category: Robotics	
Probable Cause	The probe sensed fluid above the detection limit.
Corrective Action	Refer to the Probe Positioning section of this manual.

Code 00040 **REAGENT WASH WATER NOT FOUND**

Category: Robotics

Probable Cause: The reagent probe did not detect water in the reagent wash cup.

Corrective Action: Look in the wash cup. If no water is present, investigate the water flow path in the instrument and the water quality station. If water is present, investigate a physical obstruction between the water and reagent probe (such as the cover incorrectly placed on the wash station). Look at the reagent arm cover and see if the LED is illuminated. Touch the probe to see if the LED goes out as it should. Access the Robotics screen, touch REAGENT ARM and determine at which position fluid can be sensed. The reagent wash cup bottom position may be trained too high. Fluid sense may be at fault. Refer to the Probe Positioning section of this manual for adjustment procedures.

Code 00041 **TEST: [redacted] INITIAL ABSORBANCE "IA" CHECK FAILED. CALIBRATOR NUMBER: [redacted] REAGENT: [redacted]**

Category: Calibration Result

Probable Cause: The initial reagent absorbance of the test specified exceeds that of the calibrator specified in the Test Parameter Files.

Corrective Action: If the Status Code occurs for only one calibrator, investigate the calibrator and individual cuvette sources for the error. If the Status Code occurs for all calibrators and/or samples, investigate the reagent (see Code 12), and the mixer position. The position of the mixer in the cuvette and the wash station as well as the stirring speed are important. (See the Probe Positioning section for more information.) Check the test parameters wavelength specified. If multiple tests using the same wavelength exhibit the problem, check the A_d of the reagent using the initial A_d procedure in the Observed Concerns section. (See Code 11 for more information.)

Code 00042 **TEST: [redacted] REACTION ABSORBANCE "MA" EXCEEDS LIMIT REAGENT # [redacted] CALIBRATOR NUMBER: [redacted] REAGENT: [redacted]**

Category: Calibration Result

Probable Cause: The final reagent absorbance of the test identified exceeds that of the calibrator specified in the Test Parameter Files.

Corrective Action: If the Status Code occurs for only one calibrator, investigate the calibrator and individual cuvette for sources of code. If the Status Code occurs for all calibrators and/or samples, investigate the reagent (see Code 12) and the mixer position. The position of the mixer in the cuvette and the wash station as well as the stirring speed are important. (See the Probe Positioning section for more information.) Check the test parameters for the wavelength specified. If multiple tests using the save wavelength exhibit the problem, check the A_d of the reagent using the initial A_d procedure in the Observed Concerns section. (See Code 12 for more information.)

Code 00043 — **LINEAR HIGH OR LOW CHECK FAILURE. TEST: [redacted] CALIBRATOR NUMBER: [redacted]**

Category: Calibration Result

Probable Cause	The minimum or maximum acceptable linear value defined in the Test Parameter files has been exceeded by the calibrator specified.
Corrective Action	If this Status Code occurs with one or two calibrators, suspect a short sampling error. Look for bubbles in the sample cup. Examine the sample delivery system for holes in the tubing, poor connections between tubing and probe or valve fittings, or a bent or broken sample probe. If this Status Code occurs with multiple calibrators and/or samples, suspect some change in the Reagent or the Test Parameter File: Reagent Definition. Cross reference the information in the file with the information in the Reagent manual. If necessary, check the reagent, sample dispensing action and the mixer action. (See Probe Positioning section for more information).

Code 00044 — **SAMPLE PROBE NOT OVER OR IN SAMPLE PROBE WASH CUP**

Category: Robotics

Probable Cause	The pump diluent field was touched in the Robotics, Sample Arm screen and the sample probe was not at home.
Corrective Action	Touch WASH CUP TOP to move the probe.

Code 00045 — **FLUID POSITIONS ARE NOT ADJUSTABLE**

Category: Robotics

Probable Cause	FLUID was touched followed by UP, DOWN, LEFT, or RIGHT.
Corrective Action	If a fluid position adjustment is necessary, refer to the Fluid Sensitivity adjustment in the Probe Positioning procedures of the Probe Positioning section. To adjust TOP or BOTTOM touch the appropriate field first, then adjust.

Code 00046

TEST: [redacted] CALIBRATOR TOLERANCE HAS FAILED FOR CALIBRATOR #: [redacted]

Category: Calibration

Probable Cause

The calibrator measured during calibration exceeded the tolerance established in the Test Parameter file. This can be due to reagent, calibrator, dispensing, mixing, incubation or reading factors.

Corrective Action

Determine whether the problem is isolated to one calibrator, one chemistry, or, if it is occurring on many tests. If it is occurring on only one chemistry, use the reagent steps listed for STATUS CODES 00041–00043. If the problem is occurring on several chemistries, determine the factors common to all tests. Look at the Calibration Status screen for the test specified. Compare both the CONC and A_d of the ACCEPTED versus the NEW information.

Increased A_d for an up reaction or decreased A_d for a down reaction in the NEW field could indicate the following:

Too much sample
- due to worn sample valve
- bent sample probe
- loose knurled knob
- bent or obstructed probe

Too little reagent
- crimped tubing
- hole in tubing
- poor tubing connection

Mixer position
- stirring too rapidly
- not washed in water

An increased A_d will cause a lowered CAL FAC. Take the appropriate action.

Decreased A_d in the NEW field could indicate the following:

Too little or evaporated calibrator
- hole, crimp or poor tubing connection
- obstructed probe
- broken probe
- bubble in sample cup
- probe positioned on side of cup

Too much reagent
- reagent syringe faulty or not attached properly

Mixer position
- not stirring rapidly enough
- not deep enough in cuvette
- too deep in cuvette (restricting mixing)

A decreased A_d will cause an increased CAL FACT. Take the appropriate action.

Additionally, examine the cuvette segment for proper volume, mixing and color production of the dye binding reactions such as Calcium, Bilirubin, Albumin, Total Protein and Cholesterol. Look at the incubator for any floating debris.

◆ **Code 00047** **ANOTHER DEVICE IS IN PROPOSED PATH**

Category: Robotics

Probable Cause: A request to move a probe or the mixer will cause a collision with an obstruction.

Corrective Action: Touch the field that will move the obstruction or HOME ROBOTICS.

◆ **Code 00048** **A_d ENTERED IS OUT OF RANGE**

Category: System

Probable Cause: A requested A_d in the Test Parameter file exceeds the instrument's linear range of 0 to 2.4A. This will occur with user-edited parameters or new Test Parameter file definitions.

Corrective Action: Enter a value within the acceptable range.

Code 00049 **ISE IO ERROR**

Category: ISE

Probable Cause: An IO error occurred during communication between the system and ISE module.

Corrective Action: Perform Hardware Reset from ISE STATUS screen. If condition persists, contact Customer Support Center.

◆ **Code 00050** REAGENT OUTER ARM LEFT LIMIT NOT FOUND
00052 REAGENT OUTER ARM RIGHT LIMIT NOT FOUND
00053 SYRINGE FAILED TO DETECT UPPER LIMIT
00054 REAGENT OUTER ARM HOME LIMIT NOT FOUND
00057 SAMPLE ARM FAILED TO DETECT LATERAL HOME
00058 SAMPLE ARM FAILED TO DETECT LEFT LIMIT
00059 SAMPLE ARM FAILED TO DETECT RIGHT LIMIT
00060 SAMPLE ARM FAILED TO DETECT UP LIMIT
00061 SAMPLE ARM FAILED TO DETECT VERTICAL HOME
00063 SAMPLE ARM AT LEFT LIMIT
00064 SAMPLE ARM AT RIGHT LIMIT
00065 SAMPLE ARM AT UPPER LIMIT
00066 REAGENT INNER ARM FAILED TO DETECT LATERAL HOME
00067 REAGENT INNER ARM FAILED TO DETECT LEFT LIMIT
00068 REAGENT INNER ARM FAILED TO DETECT RIGHT LIMIT
00075 REAGENT INNER ARM AT LEFT LIMIT
00076 REAGENT INNER ARM AT RIGHT LIMIT
00077 REAGENT ARM AT UPPER LIMIT
00078 MIXER ARM FAILED TO DETECT LATERAL HOME
00079 MIXER ARM FAILED TO DETECT LEFT LIMIT
00080 MIXER ARM FAILED TO DETECT RIGHT LIMIT
00081 MIXER ARM FAILED TO DETECT UP LIMIT

◆ **Codes 00050–00105**
(continued)

Code 00082	MIXER ARM FAILED TO DETECT VERTICAL HOME
00084	MIXER ARM AT LEFT LIMIT
00085	MIXER ARM AT RIGHT LIMIT
00100	SAMPLE CAROUSEL HOME POSITION NOT DETECTED
00104	CUVETTE CARRIER HOME POSITION NOT DETECTED
00105	REAGENT Z UPPER LIMIT NOT FOUND

Category: Robotics

◆ Status Codes 00050-00105 have different probable causes but the same corrective action.

Probable Cause

The System tracks the sample, reagent, and mixer arms; sample and reagent syringes; and sample and cuvette carousels by calculating the time and number of steps required for the flag to go from the left, home, and right sensors. The code(s) indicates that a flag:

- failed to go through a sensor in the time allowed.
- was physically unable to move through a sensor.
- was not detected as it moved through the sensor.

Corrective Action

HOME ROBOTICS. If the concern persists, contact the Customer Support Center.

Code 00055 **CUVETTES FULL. CHANGE AND USE CHANGE KEY.**

Category: Mechanical

Probable Cause

Review and Run was entered when no more cuvettes were available for testing.

Corrective Action

Replace all cuvettes. Simultaneously press the SHIFT key and CUVETTE CHANGE key. Touch RUN to resume operation.

◇ **Code 00106** **DUAL PORT TIMEOUT LOCATION = [redacted] STATUS = [redacted]**
ENTER REVIEW AND RUN TO RESTART

Category: Robotics

Probable Cause

Dual port random access memory has timed out.

Corrective Action

From the Review and Run screen, touch RUN to resume normal operation. If the status code displays again, contact the Customer Support Center.

Code 00108 **THE SPECIFIED CAROUSEL POSITION IS FULL**

Category: System

Probable Cause	On the Patient Sample screen, 48 samples have been requested.
Corrective Action	Touch to highlight the CAR – field and enter the next consecutive carousel number (1–6).

Code 00109 **CUVETTE CHANGED**

Category: Mechanical

Probable Cause	This is an informational message that occurs when the CHANGE CUVETTES field is touched or Shift key and CUVETTE CHANGE key are pressed.
Corrective Action	No action is necessary.

Code 00110 **SAMPLE ID(S) ALREADY EXISTS**

Category: System

Probable Cause	This message is displayed when a slash function (/R) or /#) entry is attempted in order to input SID numbers that have already been created.
Corrective Action	Check the existing SID numbers using the RECALL RESULTS field then assign different numbers.

Code 00111 **SAMPLE ID(S) NOT FOUND**

Category: System

Probable Cause	You attempted to RECALL RESULTS or DELETE SIDs that are not stored in memory occurred.
Corrective Action	Touch EXIT to clear the screen. Type the SID then touch RECALL or DELETE. If the SID is new, NEXT SAMPLE must be touched first to store the SID before RECALL or DELETE will function.

Code 00112 **REAGENT REFRIGERATOR TEMPERATURE UNSTABLE**

Category: System

Probable Cause	Reagent room temperature quadrant has failed.
Corrective Action	Ensure reagent cooler cover is being used. Call Abbott Customer Support Center.

Code 00113 **PROCEED WITH RERUN?**

Category: System

Probable Cause	RERUN ALL has been touched.
Corrective Action	The Operator must type either "Y" (Yes) to proceed with rerun or "N" (No) to continue.

Code 00115 **ONLY ONE SAMPLE ALLOWED PER STAT**

Category: System

Probable Cause	You attempted to request stats by using a /R.
Corrective Action	Clear the screen and enter each STAT individually or use the /R function for routine assays.

Code 00116 **TOO MANY RECORDS SPECIFIED**

Category: System

Probable Cause	An entry was attempted that exceeded the systems memory.
Corrective Action	This message can appear for several reasons. Check the specific Touch Screen section of the Operation Guide for detailed information.

Code 00118 **CAROUSEL NUMBER OUT OF RANGE**

Category: System
Robotics

Probable Cause	Number entered for CAR was not 1-6.
Corrective Action	Enter number between 1-6.

Code 00120 **REQUESTED TEST NOT FOUND**

Category: System

Probable Cause	A typed test entry name was entered but could not be found by the system.
Corrective Action	Check the spelling or typographical entry of the name. Enter the test name as it appears on the Patient Samples screen.

Code 00121 **NO ROOM FOR STATS**

Category: System

Probable Cause	The system will allow up to eight samples for stats at any one time.
Corrective Action	Wait until the system is not running and delete the stat samples from the Patient Samples screen to make more room for stats.

Code 00122 **THIS TEST IS ALREADY BEING RUN**

Category: System

Probable Cause	A scheduled test was touched on a Patient Samples screen as if to cancel it.
Corrective Action	Do not attempt to change an assay whose status is SCH. Touch EXIT to clear the screen.

Code 00123 **THERE ARE (#) READS LEFT**

Category: System

Probable Cause

- This code appears while building reagent files. It is an informational message indicating the number of reads available for the reagent. The System allows the maximum number of reads per test. This is determined by the following formula:

  14 - (2 X number of reagents for that test)

Corrective Action: This is an informational code. No corrective action is necessary.

Code 00128 **NUMBER(S) OUT OF RANGE**

Category: System

Probable Cause: A number was entered that has exceeded the allowable limit.

Corrective Action: Check the specific screen in the Touch Screens section of the Operation Manual for allowable entries.

Code 00130 **BAD RANGE FOR POSITION**

Category: System

Probable Cause: Entry of an illegal range of numbers.

Corrective Action: Check the specific screen in the Touch Screens section of the Operation Manual for allowable entries.

Code 00131 **NOT ENOUGH CAROUSEL POSITIONS AVAILABLE**

Category: System

Probable Cause: A SID entry that will overfill the 48 carousel positions was attempted.

Corrective Action: Change the carousel number to the next consecutive number, then continue entry.

Code 00135 **CANNOT DELETE WHEN PATIENTS ARE SCHEDULED**

Category: System

Probable Cause: Attempt to delete SIDs while the System was running. This is an illegal command.

Corrective Action: Wait until the System is not running to delete SIDs.

Code 00137 **NO MORE ROOM FOR PANELS**

Category: System

Probable Cause: An attempt to enter a panel over-extended the file's storage.

Corrective Action: It will be necessary to delete some assays from the Panel file before more panels can be established.

Code 00139 **SOME TESTS IN PANEL NOT DELETED**

Category: System

Probable Cause	Tests were entered to a SID by panel. Some of the tests were deleted from the Patient file before they were run.
Corrective Action	This is an informational message and requires no action unless the tests were deleted inappropriately.

Code 00140 **SAMPLE FILE FULL**

Category: System

Probable Cause	Attempt to enter a SID that filled the memory (the memory has a storage capacity of 239 SIDs or 2,399 assays).
Corrective Action	When SAMPLE FILE FULL appears, check the last SID entries on the Recall Results screen to ensure that there are no blank spaces in the SID listing. If there are, select and delete that field before proceeding. System interruption may result if the blank field is not removed. Samples must be deleted before more can be entered.

Code 00143 **CONTROL LEVEL MUST BE SPECIFIED**

Category: System

Probable Cause	A /C entry was made with no numerical designation.
Corrective Action	Enter /C 1, /C 2, or /C 3 appropriately.

Code 00145 **REPORT IN PROGRESS**

Category: Mechanical System

Probable Cause	Information from the analyzer is being transferred to a host computer or the printer.
Corrective Action	No action is required. This is an informational message.

Code 00147 **PLEASE WAIT FOR OPERATION TO COMPLETE**

Category: System

Probable Cause	An entry was made to initiate an action while a previous action was in process.
Corrective Action	Wait until the action in process is completed, then enter the next request.

Code 00148 **PROBE MUST BE UP FOR THIS COMMAND**

Category: Robotics

Probable Cause	A request was made that required the probe to be up but it was in a down position.
Corrective Action	Touch the appropriate field to move the probe to an up position and then continue the operation.

Code 00150 — **EXCEPTION MESSAGE OVERFLOW NO SPACE TO ADD EXCEPTION MESSAGES**

Category: System

Probable Cause	The Status file is full.
Corrective Action	Print a copy of the Status Codes (if needed) and touch CANCEL ALL to empty the file. Any Status Codes that occur after this message will be lost until the file is emptied.

Code 00151 — **CREATING REAGENT**

Category: System

Probable Cause	A new Test Parameter File: Reagent Definition is being created by the system.
Corrective Action	No action is required. This is an informational message.

Code 00152 — **TIME OUT WAITING FOR ISE STATUS REPLY**

Category: System

Probable Cause	The ISE attempted to send a result to the system after an abort.
Corrective Action	When the abort is resolved, touch RUN from Review & Run to resume normal operation.

Code 00153 — **NOT ENOUGH CUVETTES TO CALIBRATE TEST: [redacted] THAT TEST WILL NOT BE RUN**

Category: System

Probable Cause	There are not enough clean cuvette cells remaining to allow the designated test to calibrate.
Corrective Action	Change cuvettes and touch RUN.

Code 00154 — **SYSTEM IS RUNNING**

Category: System

Probable Cause	You attempted to enter a screen which is not accessible during operation.
Corrective Action	No action is required. This is an informational message.

Code 00155 — **PATIENTS LOADED, CANNOT EDIT PARMS**

Category: System

Probable Cause	The Test Parameter files were displayed while patients are being stored in the system's memory.
Corrective Action	This is an informational message which requires no action. If a file should be edited, the SIDs must first be deleted. (Deleting the patients and then proceeding to the Test Parameter files causes the Reagent and Calibrator Loadlists to be deleted and then rebuilt when Review & Run is entered).

Code 00156 — **ISE TEST TYPE IS TEST 1–5 ONLY**

Category: System

Probable Cause	An entry of a test number for an ISE test in the Test Parameter file was not 1–5.
Corrective Action	Enter the test number as 1–5.

Code 00157	**TEST TYPE AND # REAGENTS CONFLICT**
Category: System	
Probable Cause	A Test Parameter file has a test in which the TEST TYPE indicates a reagent or multiple reagent and the NUMBER OF REAGENTS indicates an illegal number of reagents.
Corrective Action	Review each field and change either the TEST TYPE or the reagent number.
Code 00158	**REAGENTS DEFINED, CANNOT EDIT**
Category: System	
Probable Cause	You attempted to change the number of reagents or the reagent name after the Test Parameter file was stored.
Corrective Action	To edit either of these fields, the test must be deleted and re-entered.
Code 00159	**NOT ENOUGH REAGENT TEST FILES**
Category: System	
Probable Cause	A Test Parameter Reagent Definition has been entered that exceeds the memory available.
Corrective Action	Delete an inactive Test Parameter file.
Code 00160	**EDITS LOST**
Category: System	
Probable Cause	The screen was exited before the edits were stored.
Corrective Action	Re-enter the changes and store before exiting the system.
Code 00161	**SAMPLE VOLUME OUT OF RANGE**
Category: System	
Probable Cause	An illegal sample volume entry was attempted.
Corrective Action	Enter the sample volume as 1.25-25.0 µl (increments of 0.25 µl).
Code 00162	**# OF REAGENTS MUST BE NON-ZERO**
Category: System	
Probable Cause	A Test Parameter file entry consisting of a REACTION TYPE other than offline and a NUMBER OF REAGENTS as 0.
Corrective Action	This is an informational message that will disappear when the NUMBER OF REAGENTS field is edited to >0.

Code 00163	**CANNOT DELETE ISE TESTS**
Category: System	
Probable Cause	You attempted to delete an ISE test.
Corrective Action	This is an informational message; no action required.
Code 00164	**FILE DELETED**
Category: System	
Probable Cause	The DELETE TEST field was touched.
Corrective Action	This is an informational message; no action required.
Code 00165	**CREATING TEST FILE**
Category: System	
Probable Cause	A test entry name was entered that was not stored in memory, therefore, the system is creating a new file.
Corrective Action	This is an informational message if the intended action was to create a new file. If not, touch to highlight the ENTRY NAME field and enter the test name exactly as it appears on the Patient Sample screen.
Code 00166	**FILE SAVED**
Category: System	
Probable Cause	The SAVE TEST field was touched.
Corrective Action	This is an informational message; no action required.
Code 00167	**REAGENT NOT FOUND**
Category: System	
Probable Cause	An attempt was made to enter parameters to a new reagent definition when no name was defined.
Corrective Action	Enter the REAGENT NAME field and continue.
Code 00168	**REAGENT VOLUME OUT OF RANGE**
Category: System	
Probable Cause	An illegal reagent volume entry was attempted.
Corrective Action	Enter the reagent volume as 25 µl-436 µl in increments of 1.92 µl.

Code 00169 **NO REAGENT DEFINED**

Category: System

Probable Cause: A Test Parameter file: Test Definition was created but no reagent was defined.

Corrective Action: The test parameter must have both files to be stored. Define the reagent.

Code 00170 **WAIT FOR LAMP WARM UP**

Category: System

Probable Cause: RUN was touched on the Review & Run screen and the System is stabilizing the source lamp.

Corrective Action: This is an informational message. No action is required unless the message is displayed for 2-3 minutes. If this should occur, replace the source lamp if it is not illuminated.

Code 00171 **CANNOT MOVE TESTS**

Category: System

Probable Cause: You attempted to change a test number when the Test file was full.

Corrective Action: Since the file is full (127 tests), in order to change a test number, a test must first be deleted.

Code 00172 **REQUESTED POSITION OCCUPIED**

Category: System

Probable Cause: An entry to a TEST NUMBER that is used by another test was attempted.

Corrective Action: Enter a different, unused number. If you wish to use the original number, touch SAVE TEST. The test currently using this number will be moved to the next available unused position.

Code 00173 **VALUE OUT OF ACCEPTABLE RANGE OF 175 to 288**

Category: System

Probable Cause: The ISE top of cup adjustment allowable range is 175-288 steps. An illegal entry was attempted.

Corrective Action: Enter the allowable number of steps. If the entry is being made from the ISE Status screen, be sure the adjustments are made from the TOP OF CUP field. If unable to resolve the problem, call the Customer Support Center.

Code 00174 **UPI TIME OUT ERROR. MOTOR NUMBER**

Category: Robotics

Corrective Action

See Code 00175 for resolution.

Code 00175 **MOTOR LIMITS ERROR. MOTOR NUMBER**

Category: Robotics

Probable Cause

Fourteen motors facilitate the motion of the robotics, carousels, syringes, pumps, valves and barcode reader. A motor controller board controls each of these motors. Each motor controller board has a microprocessor that communicates with the slave microprocessor to enable the motor to move. A UPI TIMEOUT ERROR indicates too much time occurred during the communication phase and the motor controller board was unable to function. A MOTOR LIMITS ERROR indicates the motor attempted to move but exceeded a limit. (Z = Up/Down Fluid) (Azimuth = horizontal)

Motor 0U	Reagent Z
Motor 1U	Reagent Inside Arm
Motor 2U	Reagent Outside Arm
Motor 3U	Sample Z
Motor 4U	Sample Azimuth
Motor 5U	Sample Carousel
Motor 6U	Cuvette Carousel
Motor 7U	Reagent Syringe
Motor 8U	Sample Syringe
Motor 9U	Calibration Wheel
Motor 10U	Mixer Z
Motor 11U	Mixer Azimuth
Motor 18U	Valves
Motor 19U	Pumps

Figure 4.1 is a Motor Controller board diagram indicating the jumper locations (E1, E2, E3, E4 and E5).

Figure 4.2 is a robotics homing sequence diagram. The dotted lines indicate that the following activities cannot occur until all actions on the same line have been completed. This diagram may be useful when troubleshooting robotics aborts.

Corrective Action

When a Code occurs, HOME ROBOTICS. Examine the specified component, as it moves, to see if it is physically obstructed or moves erratically. If it seems the problem is in positioning, refer to the Probe Positioning section. If the problem persists, call the Customer Support Center.

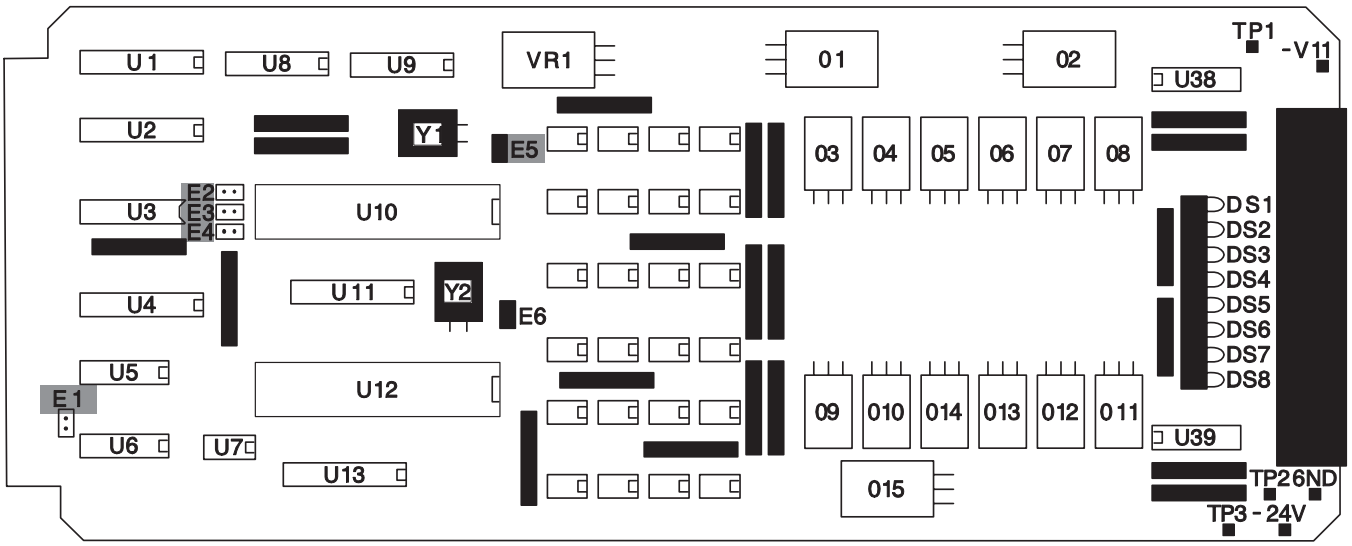


Figure 4.1 Motor Controller Board

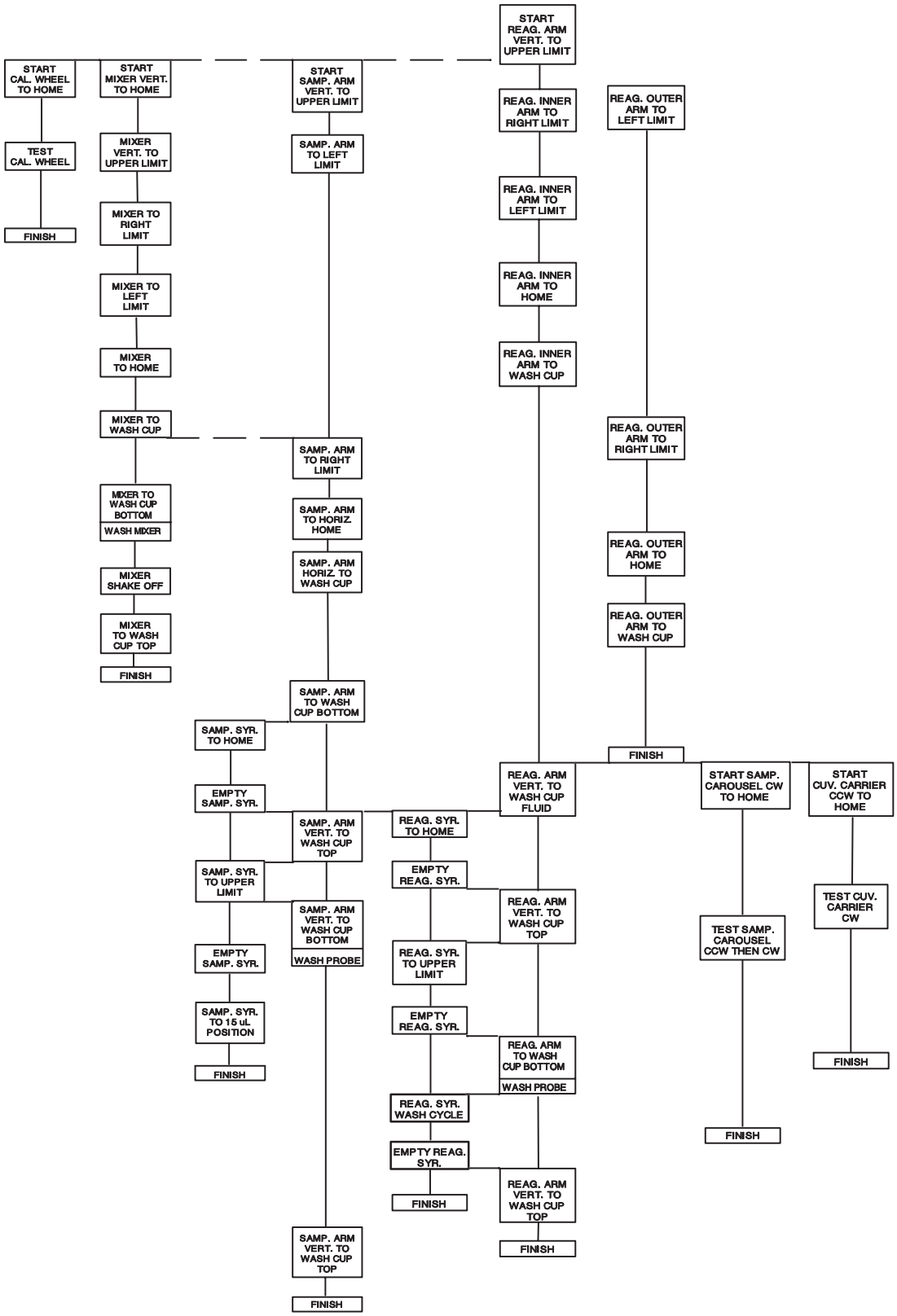


Figure 4.2 Robotics Homing Sequence

Code 00176	**BAR CODE LIMITS ERROR**
Category: Robotics	
Probable Cause	The barcode reader exceeded a limit when it rotated.
Corrective Action	Access the Barcode test in the Special Procedures screen and exercise the barcode reader to identify the problem. If you are unable to correct the problem, the barcode reader can be turned OFF in the Instrument Options screen.
Code 00177	**AD HARDWARE TIMED OUT**
Category: System	
Probable Cause	An optical component failed.
Corrective Action	Cycle the power. If the problem persists, call the Customer Support Center.
Code 00178	**SAMPLE DISPENSED IN AIR**
Category: Mechanical	
Probable Cause	The sample probe found no fluid in the cuvette.
Corrective Action	The sample probe bottom position in the cuvette may be too high. Check the level of dispensed reagent to determine if it is less than other cells. Check for bubbles in the reagent cartridge, tubing leaks, reagent drips, and plugged probes. Check the sample and reagent fluid sensitivity.
Code 00179	**NO REAGENT FOUND AFTER DISPENSE**
Category: Mechanical	
Probable Cause	See Code 00178 for resolution.
Code 00180	**INTERNAL ERROR**
Category: System	
Probable Cause	A communication problem occurred in the System.
Corrective Action	If no other symptom occurred, the problem was transient and should cause no alarm. If other symptoms occur or operation ceases, cycle the power. If the problem persists, call the Customer Support Center.

Code 00181 **INTERNAL ERROR**

Category: System

Probable Cause: The Review & Run screen is entered while the Robotics are homing.

Corrective Action: Exit the screen and allow the homing sequence to complete (at least 30 seconds), then re-enter Review & Run.

◆ **Code 00182** **CAROUSEL COUNTER OFFSET**

Code 00183 **SAMPLE CAROUSEL COUNTER ERROR**

Code 00184 **CUVETTE CAROUSEL COUNTER ERROR**

Code 00185 **CALIBRATION WHEEL COUNTER ERROR**

Category: Robotics

Probable Cause: An optical sensor counts the notches located around the perimeter of the sample and cuvette carousels, and the calibration wheel, as they rotate. This message indicates that the optical sensor is unable to sense the notch as it moves through, or the notch is unable to move.

Corrective Action: HOME ROBOTICS. If the code persists, call the Customer Support Center.

◆ **Code 00186** **SAMPLE DIL. PRESSURE LOW**

Category: Water

Probable Cause: Water pressure from the sample diluent reservoir is below the acceptable level. May occur as a result of damaged sample probe or tubing problems.

Corrective Action: Check for bubbles in the sample diluent system. If bubbles are observed:

1. From the Pumps & Valves screen, touch SINGLE STROKE to display PURGE. # PURGES 1. Highlight 1 and type 10.
2. Ensure DILUENT VALVE OPENED displays.
3. Touch DILUENT PUMP until water is expelled from the sample probe in a smooth, steady stream.

Inspect the sample probe. Replace it if bent or damaged. Refer to Component Replacement, Sample Probe Replacement. Verify sample diluent tubing is not leaking and tubing connections are secure. Replace the tubing if necessary. Refer to Component Replacement, Sample System Tubing Replacement.

Backflush the sample diluent valve. Follow the procedure below to backflush the valve. Replace the valve if necessary. Refer to Component Replacement, Sample Diluent Valve Replacement.

To backflush the sample diluent valve:

1. Place absorbent paper toweling under the sample diluent valve, sample syringe, and around the mix arm opening.
2. Draw 3–5 ml of Type II water into a syringe.
3. Attach an ISE S tubing to a blunt-tipped needle and connect to the syringe containing water.

◆ **Code 00186**
(continued)

4. Disconnect the TEFLON® tubing from the sample diluent valve outlet port (centered on the top of the valve).
5. Attach the free end of the S tubing/syringe to the outlet valve port.
6. Disconnect the TYGON® tubing from the sample valve inlet port (located on the outer rim of the valve).
7. From the Robotics screen, display the Pumps & Valves screen. Touch DILUENT VALVE CLOSED to display DILUENT VALVE OPENED.

ATTENTION

TO PREVENT DAMAGE TO THE SAMPLE DILUENT VALVE, **DO NOT** LEAVE THE VALVE OPEN FOR LONGER THAN TWO MINUTES WITHOUT FLUID FLOW.

8. Hold absorbent toweling at the sample diluent valve inlet port and gently inject the water from the syringe through the valve.
9. Touch DILUENT VALVE OPENED to display DILUENT VALVE CLOSED.
10. Detach the S tubing and syringe from the outlet valve port.
11. Reconnect the TEFLON® tubing to the sample diluent valve outlet port.
12. Inspect for crimps in the tubing and replace as necessary. Refer to Component Replacement, Sample System Tubing Replacement.
13. Reconnect the TYGON® tubing to the sample diluent valve inlet port.
14. Verify that tubing connections are secure at the sample diluent filter inlet and outlet.
15. Touch HOME ROBOTICS.
16. Verify the sample diluent line cap is securely connected.

◆ **Code 00187** **SAMPLE DIL. PRESSURE HIGH**

Category: Water

Probable Cause

Water pressure from the sample diluent reservoir has exceeded the acceptable level. May occur as a result of blocked sample probe, valve, filter, or tubing.

Corrective Action

Verify the sample probe is not bent. Clean the sample probe with the sample probe wire. Backflush with Type II water. Replace the sample probe if necessary. Check for an obstruction or crimp in the sample diluent tubing or in the sample syringe. Backflush the sample diluent valve. Refer to the procedure under Status Code 00186. Replace the valve if necessary. Replace the sample diluent 35-micron filter. Refer to the Component Replacement section for replacement procedures. Verify that the sample probe is not touching the bottom of the wash cup or the cuvette. If positioning is not correct, refer to Robotic Training, Sample Arm.

Code 00188	**WASH WATER PRESSURE LOW**
Category: Water	
Probable Cause	The water pressure from the water quality station is less than 5 psi.
Corrective Action	While water is flowing, increase the water pressure (to 6 psi ±1) at the pressure regulator. If the problem persists, the filter should be changed. Refer to Inlet Water System Maintenance in the Quarterly Maintenance section of this manual for additional information.
Code 00189	**WASH WATER PRESSURE HIGH**
Category: Water	
Probable Cause	The water pressure from the water quality station is greater than 7 psi.
Corrective Action	While water is flowing, decrease the water pressure at the pressure regulator.
Code 00190	**DILUENT LEVEL LOW**
Category: Water	
Probable Cause	The water level is monitored by a microswitch under the diluent platform. When the level is low, this message will appear.
Corrective Action	Empty the reservoir and add Type II water. If the code displays and the reservoir is full, call the Customer Support Center. This status code will abort operation.
Code 00191	**INCUBATOR WILL NOT FILL**
Category: Mechanical	
Probable Cause	The sensor in the incubator detects no water.
Corrective Action	Drain the incubator and clean the incubator level sensor probes with a lint-free tissue moistened with Type II water. Refill the incubator. If water is touching the sensor, but is not detected, contact the Customer Support Center. If no water is present in the incubator, touch HOME ROBOTICS to determine whether the incubator is attempting to fill. Verify the water pressure on the water quality station. If the pressure is correct, but the incubator is not filling, contact the Customer Support Center.
Code 00192	**UPI ID ERROR. UPI NUMBER**
Category: System	
Probable Cause	Wrong software in motor controller board.
Corrective Action	Cycle the power to clear the code. Call the Customer Support Center.

Code 00193	**BAD CODE IN PACKET**
Category: System	
Probable Cause	Dual Port RAM malfunction.
Corrective Action	Cycle the power. If the problem persists, call the Customer Support Center.
Code 00194	**BAD CALC REPLY PACKET**
Category: System	
Probable Cause	Dual Port RAM malfunction.
Corrective Action	Cycle the power. If the problem persists, call the Customer Support Center.
Code 00195	**TOO MANY CONTROLS SPECIFIED. CONTROL NOT ADDED TEST:** [redacted]
Category: System	
Probable Cause	The QC file is full.
Corrective Action	Delete QC information.
Code 00196	**CAN'T MOVE ISE TEST TYPE**
Category: System	
Probable Cause	Attempt to change the ISE test number. This is an illegal command.
Corrective Action	Informational message, no action required.
Code 00199	**SCHED2 BAD STATUS = 0**
Category: On-Screen	
Probable Cause	The error trapping software in the System prevented an ISE RS232 TIMEOUT error.
Corrective Action	Contact the Customer Support Center.
Code 00200	**SAMPLE CAROUSEL # CHANGED**
Category: System	
Probable Cause	The sample carousel ID reader has identified a different carousel number from that of the last sample carousel run.
Corrective Action	Accept the carousel number or type N, and type the desired carousel number to run.
Code 00204	**RMX ERROR CODES ARE** [redacted]
Category: System	
Probable Cause	The System software detected an error in communication.
Corrective Action	Cycle the power. If the problem persists, call the Customer Support Center.

Code 00205 — **UNABLE TO LOAD TEST DATA INTO MEMORY**

Category: System

Probable Cause	Not enough memory available.
Corrective Action	Cycle the power. If the problem persists, call the Customer Support Center.

Code 00209 — **NEEDED CALIBRATOR IS NOT LOADED CALIBRATOR TEST:** [redacted]

Category: Calibration System

Probable Cause	The System is unable to find a needed calibrator because the LOAD NOW field was not touched in the Calibrator Loadlist screen.
Corrective Action	Review the Calibrator Loadlist screen and touch LOAD NOW if needed. Check the calibrator tray and load the sample if needed.

Code 00211 — **ILLEGAL POSITION FOR DOUBLE CARTRIDGE**

Category: System

Probable Cause	Double reagent cartridge specified for single cartridge position.
Corrective Action	Double cartridges can only be specified for reagent positions 1–8.

Code 00212 — **AUX REAGENT NAME MUST BE ENTERED**

Category: System

Probable Cause	A slash was entered in the first space at REAG NAME on the Reagent Loadlist.
Corrective Action	◆ Type any character in the AUX field and press ENTER. Move the cursor to the REAG NAME field and press BACKSPACE.

Code 00213 — **ILLEGAL REAGENT INDEX – MUST BE 1–200 ONLY**

Category: System

Probable Cause	A Reagent Index Number was entered that exceeded the allowable range of 1–200.
Corrective Action	Enter a number between 1–200 and continue.

Code 00214 — **THIS IS NOT A DOUBLE CARTRIDGE**

Category: System

Probable Cause	A second reagent was specified for a single cartridge.
Corrective Action	Designate second reagents only for double cartridge positions.

Code 00216 — **ILLEGAL REAGENT CARTRIDGE TYPE ENTERED**

Category: System

Probable Cause	A reagent cartridge type other than single, double, or empty was specified.
Corrective Action	Only specify empty, single, or double as reagent cartridge type in the Barcode Index screen.

Code 00218 **LAMP DID NOT COME ON**

Category: Mechanical

Probable Cause	The source lamp has burned out or there is a problem in the lamp servo circuit.
Corrective Action	Check the lamp servo circuit board to see if the LED is illuminated. Replace the lamp. See the Component Replacement section for instructions.

Code 00222 **NO CAROUSEL MOUNTED OR MOUNTED CAROUSEL IS EMPTY**

Category: Mechanical System

Probable Cause	When the Review & Run screen is entered, the System identifies the carousel number and calls the corresponding Sample Loadlist from memory. This message indicates there is a conflict because the Sample Loadlist has no assays to be run.
Corrective Action	Check the Sample Loadlist number and the sample tray for agreement. Change the sample tray to match the loadlist number and then proceed.

Code 00223 **ILLEGAL CAROUSEL NUMBER ENTERED**

Category: System

Probable Cause	Carousel numbers are 0–6. An illegal number was entered.
Corrective Action	Verify the typed entry was a number, 0–6.

Code 00224 **SHORT SAMPLE, SAMPLE CUP #**

Category: Mechanical Robotics

Probable Cause	No fluid was found by the sample probe.
Corrective Action	Check the Sample Loadlist for positions, then be sure fluid is in the sample cup (50 µl minimum). Check the fluid sensitivity.

Code 00226 **REAGENT OUTER ARM AT LEFT LIMIT**

Category: Robotics

Probable Cause	The reagent outer arm is at the left limit and cannot move.
Corrective Action	HOME ROBOTICS and watch the arm move. If the problem persists, move the arm away from the limit and HOME ROBOTICS again. Look for a physical obstruction. If the problem persists, call the Customer Support Center.

Code 00227 **REAGENT OUTER ARM AT RIGHT LIMIT**

Category: Robotics

Corrective Action	See Code 00226 for resolution.

Code 00229 — **UNKNOWN ROBOTICS ABORT. CODE #**

Category: Robotics

Probable Cause: A problem in the robotics System.

Corrective Action: When a code occurs, touch HOME ROBOTICS. Examine the robotics system as it moves to see if it is physically obstructed, moves erratically, or requires correction in positioning (refer to the Probe Positioning & Robotic Training section). If the problem persists, call the Customer Support Center.

Code 00231 — **INCUBATOR DID NOT STABILIZE AT TEMPERATURE**

Category: Mechanical

Probable Cause: Incubator temperature is not stable. This may occur after a complete cuvette change and prohibit System operation.

Corrective Action: If this occurred as a result of changing cuvettes, return to Review & Run and initiate a new run. If the problem persists, call the Customer Support Center.

Code 00233 — **TEST: CALIBRATOR LEVEL # IS UNUSED OR NOT FORMATTED CORRECTLY**

Category: System Calibration

Probable Cause: An edit was made to the CALIBRATOR NAME field in the Test Parameter File, creating an invalid entry. For example, MCC1 may appear as MCC 1 or MCCI.

Corrective Action: Check the calibrator name for the test identified and correct the name.

Code 00234 — **UNABLE TO SCHEDULE ALL OPTICAL TESTS**

Category: System

Probable Cause: A condition prevents the tests from being completed.

Corrective Action: A message has displayed with this code. Resolve the problem indicated by the other code, then continue operation. Cuvette change may be necessary.

Code 00235 — **UNABLE TO SCHEDULE ALL ISE TESTS**

Category: System

Probable Cause: This message indicates a problem occurred that has prevented the tests from being completed.

Corrective Action: A message has displayed with this code. Resolve the problem indicated by the other code, then continue operation.

NOTE

THIS MESSAGE WILL ALSO OCCUR IF ISEs ARE SCHEDULED ON A SYSTEM THAT DOES NOT HAVE ISE HARDWARE. THE CORRECTIVE ACTION IS TO TURN THE ISE CHANNELS **OFF** IN THE ISE STATUS SCREEN, AND DESELECT ALL SCHEDULED ISEs IN THE PATIENT SAMPLES SCREEN.

Code 00236 **CALIBRATION CANCELLED. SHORT SAMPLED CUP # TEST:** [redacted]

Category: Mechanical
Robotics

Probable Cause: No fluid was found by the sample probe.

Corrective Action: Check the Sample Loadlist for positions, then look at the cup specified to be sure at least 50 µl of fluid is in the cup. If fluid is present, check the sample probe fluid sensitivity. Refer to Sample Arm Robotic Training in the Probe Positioning & Robotic Training section.

Code 00237 **ROBOTICS COMMANDS ILLEGAL WHEN SYSTEM IS RUNNING**

Category: System
Robotics

Probable Cause: An illegal HOME ROBOTICS command was requested while the System was in operation.

Corrective Action: This is an informational message; no operator action is required.

Code 00238 **SHORT REAGENT FOR CALIBRATION. TEST:** [redacted] **CALIBRATION CANCELLED.**

Category: Mechanical
Robotics

Probable Cause: The System depleted reagent before all of the calibrators could be dispensed. You will also see a Code 8 for the corresponding reagent for this test.

Corrective Action: Prepare fresh reagent. Cancel the Status Codes. When the reagent is reconstituted, go into Review & Run and reinitiate the calibration by loading the reagent, updating the reagent loadlist, and then touching RUN.

Code 00239 **SID RE-ENTERED IN MEMORY, TEST:** [redacted] **SAMPLE ID:** [redacted]

Category: System

Probable Cause: A condition occurred that prevented the identified SID from being completed. Look for other Status Codes identifying the problem. For example CODE 8 REAGENT LOW, or CODE 0 ISE ERROR.

The assay status has been changed to ENT (entered).

Corrective Action: Resolve the problem that prevented the assay from being completed. Enter the Review & Run screen and touch RUN. The System will run the assay again.

Code 00240 **ILLEGAL CHAR "/" IN REAG NAME — REENTER**

Category: System

Probable Cause: The "/" (slash) may not be used in the reagent name.

Corrective Action: Change the spelling of the reagent name to exclude the slash. Reenter the name.

Code 00244 — **ISE TEST SKIPPED DUE TO RECALIBRATE**

Category: System

Probable Cause: The ISE fell out of calibration during the run, causing a test to be reentered.

Corrective Action: Reenter Review & Run. The ISE will recalibrate and the reentered test will be run.

Code 00245 — **ISE RS-232 TIME OUT ERROR. ISE OR I/O BOARD SUSPECT SAMPLE ID: [redacted] CODES: [redacted]**

Category: ISE

Probable Cause: A communication problem between the ISE and the analyzer has occurred.

Corrective Action: When the System is not running, touch RESET/PROBE UP from the ISE Status screen. If the problem persists, cycle the power. If the System will not exit RUNNING, cycle the power.

Code 00246 — **ISE I/O BOARD PORT READS BAD STATUS**

Category: ISE

Corrective Action: See Code 00245 for resolution.

Code 00247 — **ISE WILL NOT CALIBRATE. ISE ERROR CODES ARE**

Category: System

Corrective Action: Refer to the ISE Status Codes & Diagnostics section.

Code 00248 — **ISE CHECK SUM ERROR. COMMUNICATION LINK SUSPECT**

Category: ISE

Corrective Action: See Code 00245 for resolution.

Code 00249 — **THE TIME HAS BEEN INCORRECTLY ENTERED**

Category: System

Probable Cause: An illegal time entry was attempted.

Corrective Action: The time should be entered in the 12 hour format with AM or PM selected. For example: 2 (hour) 37 (min) PM.

Code 00250 — **CASE TOO LARGE FOR DO CASE ENCOUNTERED**

Category: System

Probable Cause: A communication problem occurred within the System.

Corrective Action: Call the Customer Support Center.

Code 00251	**REAGENT NOT LOADED OR UNABLE TO IDENTIFY BARCODE LABEL. TEST: [redacted] PLEASE REVIEW REAGENT LOADLIST**
Category: Mechanical System	
Probable Cause	An assay was requested to be run with no reagent placed in the reagent tray or the LOAD NOW field was not touched.
Corrective Action	If you wish to run the assay, place the reagent in the tray, enter Review & Run, then touch REVIEW adjacent to Reagent Loadlist. Touch LOAD NOW and the status will change to ASSIGNED. This must be done on the first page before touching NEXT PAGE. If you do not wish to run the assay at this time (because the reagent is not fully reconstituted, for example), disregard the Status Code.
Code 00252	**CALIBRATION FOR TEST: [redacted] FAILED — THAT TEST WILL NOT BE RUN**
Category: Calibration	
Probable Cause	The test failed calibration (look for Code 2 and/or 46). OVERRIDE CAL is OFF and AUTO ACCEPT is ON. When the assays in process were to be calculated, no usable calibration was available. (Look for Code 239 also.)
Corrective Action	Resolve the calibration failure. Enter Review & Run and touch RUN. The System will repeat the calibration and the assays.
Code 00253	**THERE IS NO USABLE CAL CURVE FOR TEST: [redacted] THAT TEST WILL NOT BE RUN**
Category: Calibration	
Probable Cause	The calibration options AUTO ACCEPT and OVERRIDE CAL are both OFF. This message indicates that the calibration for this test will be run but the patient samples will not be attempted. (No reagent dispensed.)
Corrective Action	When the calibration is complete and acceptable, you must accept the data from the Calibrator Status sub-screen (the status will change to OK). Enter Review & Run and touch RUN. The System will then run the assays.
Code 00254	**INVALID USE OF /**
Category: System	
Probable Cause	A slash (***/***) function was attempted using an illegal character or illegal field.
Corrective Action	Check entry field (not SID or CAR #) and character entry.
Code 00257	**PROCEED WITH DELETE?**
Category: System	
Probable Cause	The DELETE TEST field was touched on a Test Parameter File.
Corrective Action	If you wish to delete, type Y, then press ENTER. If you do not wish to delete, type N, then press ENTER.

Code 00258 — **USER DELETED CALIBRATOR W/O REPLACEMENT**

Category: System

Probable Cause: A calibrator that was needed was manually deleted from the Calibrator Loadlist.

Corrective Action: Return to Review & Run. Reload the calibrator in an empty position on the Calibrator Loadlist.

Code 0259 — **PROCEED WITH MASTER CAL CHANGE?**

Category: System

Probable Cause: The operator requested a Master Cal.

Corrective Action: Type Y to proceed with Master Cal or N to cancel Master Cal.

Code 00264 — **UNABLE TO REQUEST OR LOAD ALL CALIBRATORS FOR TEST:** [redacted]

Category: System

Probable Cause: More tests require calibration than calibrators can be accommodated on the 16-position carousel at one time.

Corrective Action: Run one calibration run. When complete, reenter Review & Run.

Code 00265 — **REAGENT LOT ID CHANGED FOR TEST:** [redacted] **RECALIBRATING OR REBLANKING**

Category: Calibration

Probable Cause: A new reagent lot number was identified by the barcode reader and the assay is being recalibrated.

Corrective Action: No action required.

Code 00267 — **NO ISE CHANNELS AVAILABLE FOR USE. REVIEW ISE STATUS BEFORE RUNNING.**

Category: ISE

Probable Cause: Review & Run was entered. ISE channels will not calibrate. This code indicates a problem involving all channels and is not necessarily electrode specific. Refer to the ISE Status Codes & Diagnostics section.

Corrective Action: Before touching RUN, exit the Review & Run screen. Enter the ISE Status screen to resolve the problem.

> **NOTE**
>
> THIS MESSAGE WILL ALSO OCCUR IF ISEs ARE SCHEDULED ON A SYSTEM THAT DOES NOT HAVE ISE HARDWARE. THE CORRECTIVE ACTION IS TO TURN THE ISE CHANNELS **OFF** IN THE ISE STATUS SCREEN, AND DESELECT ALL SCHEDULED ISEs IN THE PATIENT SAMPLES SCREEN.

Code 00268 — **PLEASE SELECT REAGENT FIRST**

Category: System

Probable Cause: BEFORE WASH or AFTER WASH was touched before the test in the Wash Matrix screen.

Corrective Action: Clear the screen and touch the REAGENT NAME field before touching BEFORE WASH or AFTER WASH.

Code 00269 — **STOP READER WITHIN 10 MINUTES**

Category: Robotics

Probable Cause	Automatically displays in the Barcode Test screen when START READER is activated.
Corrective Action	Stop barcode reader within 10 minutes to avoid damaging the barcode reader.

Code 00270 — **NO ISE CHANNELS AVAILABLE FOR USE. NO ISE TESTS WILL BE RUN.**

Category: ISE

Probable Cause	This message displays after Status Code 00267 displays and RUN is touched. (Refer to Code 00267.)
Corrective Action	When no activity is displayed in the ACTIVITY field, resolve the ISE problem. Refer to the ISE Status Codes & Diagnostics section.

NOTE

THIS MESSAGE WILL ALSO OCCUR IF ISEs ARE SCHEDULED ON A SYSTEM THAT DOES NOT HAVE ISE HARDWARE. THE CORRECTIVE ACTION IS TO TURN THE ISE CHANNELS **OFF** IN THE ISE STATUS SCREEN AND DESELECT ALL SCHEDULED ISEs IN THE PATIENT SAMPLES SCREEN.

Code 00271 — **PARTIAL ISE OFF. SAMPLES USING ANY UNAVAILABLE CHANNEL(S) WILL NOT BE RUN.**

Category: System

Probable Cause	PARTIAL ISE is OFF in the Instrument Options screen. One or more of the ISE channels failed calibration, so samples using the channel will not be run.
Corrective Action	From the ISE Status screen, touch CALIBRATE. If the channel still fails to calibrate, return to the Instrument Options screen and turn PARTIAL ISE on. This allows results to be generated on calibrated channels.

Code 00272 — **PARTIAL ISE ON. SAMPLES USING ONLY UNAVAILABLE CHANNEL(S) WILL NOT BE RUN.**

Category: System

Probable Cause	A channel on the ISE failed to calibrate. The uncalibrated channel will not be used. However, calibrated channels will generate results.
Corrective Action	From the ISE Status screen, touch CALIBRATE.

Code 00273 — **THE FOLLOWING ISE CHANNEL IS UNAVAILABLE TEST:** [redacted]

Category: ISE

Probable Cause	The ISE test will not calibrate; therefore, tests for samples with acceptable calibrations will be performed. The remaining tests will remain pending.
Corrective Action	When the operation is complete, enter the ISE Status screen and touch CALIBRATE. If the test will not calibrate, perform appropriate troubleshooting. Refer to Daily Maintenance, ISE Conditioning and ISE Controls

Code 00274	**SYSTEM IS HALTED**
Category: System	
Probable Cause	Pressed SHIFT and HALT.
Corrective Action	When RUNNING is not displayed, press SHIFT and HALT simultaneously before resuming operation.
Code 00276	**INDICATED COMB TEST NAME DOES NOT EXIST**
Code 00277	**INDICATED COMB TEST NAME IS NOT SIMULTANEOUS**
Category: System	
Probable Cause	Invalid entry.
Corrective Action	Verify the spelling and re-enter.
Code 00278	**KINETIC BLANK FOR TEST: [redacted] FAILED – THAT TEST WILL NOT BE RUN**
Category: Calibration	
Probable Cause	When the assays in process were to be calculated, no usable kinetic blank was available. OVERRIDE CAL is OFF, and AUTO ACCEPT is ON.
Corrective Action	Resolve the kinetic blank failure. From the Review and Run screen, touch RUN. The System repeats the kinetic blank and the assays.
Code 00279	**THERE IS NO USABLE KINETIC BLANK FOR TEST: [redacted] THAT TEST WILL NOT BE RUN**
Category: Calibration	
Probable Cause	AUTO ACCEPT and OVERRIDE CAL are OFF. The kinetic blank, but no patient samples, will be run.
Corrective Action	When an acceptable kinetic blank is completed, from the Calibrator Status screen touch ACCEPT CAL. The CAL STATUS changes to OK. From the Review and Run screen, touch RUN. The System runs the assays.
Code 00280	**HOST INTERFACE BUSY, PLEASE TRY AGAIN**
Category: System	
Probable Cause	Bi-Host Interface screen was entered while the System was running or transmitting data.
Corrective Action	Wait until RUNNING is not displayed in the ACTIVITY field or the System completes data transmission.

Code 00281 **PROCEED WITH BREAK?**

Category: System

Probable Cause: The BREAK field was touched from the Bi-Host Interface screen.

Corrective Action: If you wish to break, type Y, then press ENTER. If you do not wish to break, type N, then press ENTER.

Code 00282 **KINETIC BLANK HAS FAILED THE TOLERANCE CHECK TEST:** [redacted]

Category: Calibration

Probable Cause: The kinetic blank value is outside the range allowed in the Test Parameter File.

Corrective Action: Check the placement of water on the carousel versus the stated placement on the loadlist. Replace with a clean cup and fresh water. Repeat the blank by touching RUN.

Code 00283 **PRIMARY WAVELENGTH — USE IN MISMATCH**

Category: System

Probable Cause: The wavelength entered was not valid for the USE IN designated.

Corrective Action: Be sure all primary wavelengths are identical for a designated USE IN.

Code 00284 **SECONDARY WAVELENGTH — USE IN MISMATCH**

Category: System

Probable Cause: The wavelength entered was not valid for the USE IN designated.

Corrective Action: Be sure all secondary wavelengths are identical for a designated USE IN.

Code 00285 **TEST:** [redacted] **CONTROL OUT OF RANGE FOR CONTROL LEVEL:** [redacted] **ON SAMPLE ID:** [redacted]

Category: System

Probable Cause: The control value for the SID fell outside of the acceptable range for the test.

Corrective Action: Check the values in the Quality Control Status screen to ensure they were set correctly. Troubleshoot outliers following normal procedures.

Code 00286 **TEST:** [redacted] **INTERCEPT TOLERANCE RANGE CHECK HAS FAILED**

Category: Calibration

Probable Cause: The intercept of the calibration was outside the range defined in the Test Parameter File, or the intercept is entered incorrectly.

Corrective Action: Troubleshoot the problem in the same manner as Code 2 or 46. Resolve the problem and touch RUN to repeat the calibration. Refer to the reagent insert for intercept tolerance ranges.

Code 00287 **TEST:** [redacted] **RATE COEFFICIENT OF CORRELATION CHECK FAILED SAMPLE ID:** [redacted]

Category: System

Probable Cause: The rate coefficient of correlation for the sample was less than the minimum limit set in the Test Parameter File.

Corrective Action: Check for reagent contamination. Troubleshoot the problem as defined for Code 00012. Resolve the problem and touch RUN to repeat the test.

Code 00288 — **TEST: [redacted] POLYCHROMATIC RANGE CHECK FAILED FOR SAMPLE ID: [redacted]**

Category: System

Probable Cause: The calculated value for a wavelength pair is outside the acceptable range set in the Test Parameter file. The SID will be flagged with LE in the Recall Results screen.

Corrective Action: Refer to Status Code 00029 for Corrective Action.

Code 00289 — **TEST: [redacted] POLYCHROMATIC RANGE CHECK FAILED FOR CALIBRATOR: [redacted]**

Category: System

Probable Cause: The calculated value for a wavelength pair is outside the acceptable LOW-HIGH range set in the Test Parameter file.

Corrective Action: Refer to Status Code 00027 for Corrective Action.

Code 00290 — **OLD PASSWORD IS INVALID**

Category: System

Probable Cause: The OLD PASSWORD entered when changing Passwords is not valid.

Corrective Action: Check the spelling and retype the Password, then press Enter. If this does not resolve the problem, contact the primary operator for a change in the password. If the problem is still not resolved, call the Customer Support Center.

Code 00291 — **NEW PASSWORD IS INVALID**

Category: System

Probable Cause: The NEW PASSWORD entered is not acceptable.

Corrective Action: Enter a word consisting of 1-6 alpha-numeric characters. Do not use any punctuation or spaces in the word.

Code 00292 — **INVALID PASSWORD**

Category: System

Probable Cause: The password used to gain entry to the Test Parameter files is incorrect.

Corrective Action: Check the spelling and retype the password, then press Enter. If this does not resolve the problem, contact the primary operator for a change in the password. If the problem is still not resolved, call the Customer Support Center.

Code 00293 — **NO PASSWORD GIVEN. CANNOT EDIT PARMS.**

Category: System

Probable Cause: The Test Parameter files were entered without a password.

Corrective Action: Exit the Test Parameter files and re-enter using a valid password.

Code 00294 — **TEST: [redacted] RATE COEFFICIENT OF CORRELATION CHECK HAS FAILED**

Category: Calibration

Probable Cause: The rate coefficient of correlation for the calibration was less than the minimum limit set in the Test Parameter file.

Corrective Action: Check for reagent contamination. Refer to Status Code 00012 for Corrective Action.

Code 00295 — **ISE REQUIRES CALIBRATION. SAMPLE ID: [redacted] ISE TESTS WILL BE REENTERED**

Category: ISE

Probable Cause: The ISE module requires recalibration because either the time for the ISE calibration expired or the temperature drifted during the run. ISE tests which have not already been run will be reentered.

Corrective Action: Wait until the run is complete, then recalibrate in the ISE Status screen or enter Review & Run to perform a new calibration.

Code 00296 — **END OF RUN**

Category: System

Probable Cause: The run has completed.

Corrective Action: None.

Code 00297 — **ATTEMPT TO RUN ISE ON SAMPLE ID: [redacted] WHILE RUNNING SAMPLE ID: [redacted]**

Category: ISE

Probable Cause: A communication error occurred in the ISE while it was running the sample indicated. The sample will be reentered.

Corrective Action: If the problem persists, enter the ISE Status Screen when the run is complete and select HARDWARE RESET. If the problem continues, call the Customer Support Center.

Code 00298 — **TEST BEING CREATED ON POWER-DOWN WAS DELETED**

Category: System

Probable Cause: The system power was cycled while a Test Parameter file was being created. The file was deleted.

Corrective Action: When power is restored, the file must be recreated.

Code 00299 — **ROTATION COMPLETE. PLEASE VERIFY TEMPERATURE CALIBRATION**

Category: System

Probable Cause: The time requested for cuvette carousel rotation during temperature calibration has expired.

Corrective Action: This is an informational message indicating that it is time for temperature measurement.

Code 00300 — **TEMPERATURE CALIBRATION ABORTED**

Category: Robotics

Probable Cause: The rotation during temperature calibration was stopped by a robotics abort, a Pause or a Halt.

Corrective Action: HOME ROBOTICS and restart the temperature calibration. If problem persists, call the Customer Support Center.

Code 00301 — **SYSTEM PAUSED**

Category: System

Probable Cause: A system pause has been selected.

Corrective Action: Enter Review & Run and select RUN to deactivate the system Pause.

Code 00302 — **BAD BLANK REQUESTED**
SAMPLE ID: [redacted] TEST: [redacted] STATUS # [redacted]

Category: System

Probable Cause: The type of Blank selected for the test is not available for the Test Type selected.

Corrective Action: Check for corrective Tests, types, and blank.

Code 00303 — **SHARED PARAMETER EDITED**

Category: System

Probable Cause: A parameter from the Test Parameter file of a component test of a Simultaneous Assay was edited. Since this is a common parameter for each test of the Simultaneous assay, it was edited in all Simultaneous assay test files.

Corrective Action: If the edit was intentional, no action is necessary. If the edit was not intentional, further changes may be made before the file is saved.

Code 00304 — **REAGENT LOW. POSITION #: [redacted]**

Category: System

Probable Cause: The Reagent Inventory flag level indicates that the reagent level in the cartridge is low.

Corrective Action: Replace the cartridge if necessary.

Code 00305 — **SELECT A LEVEL FIRST**

Category: System

Probable Cause: A QC level was not selected before an activity was requested.

Corrective Action: Select the QC level or ACCEPT the Quality Control files before selecting RERUN.

Code 00306 — **ATTEMPT TO RUN INCOMPLETE SIMULT ASSAY TEST: [redacted]**
THAT ASSAY MUST BE ASSOCIATED WITH ANOTHER TO BE RUN

Category: System

Probable Cause: An attempt was made to run a component test of a simultaneous assay which is not linked to another component test of the same assay.

Corrective Action: Review the Test Parameter file for the assay. If the assay is a simultaneous component test, ensure that is is linked to another test by the COMB TEST NAME. If the assay is not a simultaneous component test, it should not contain a simultaneous Test Type.

Code 00309 — **MISSING CONTROL LEVEL # [redacted] FOR TEST: [redacted] THAT TEST WILL NOT BE RUN**

Category: System

Probable Cause: QC screen is ON. The control level indicated for the test does not have an acceptable value.

Corrective Action: Rerun the indicated control level for the test. Check the range values for the QC in the Quality Control file.

Code 00310 — **TRANSFER FROM CORE REAGENT CARTRIDGE # [redacted] TO CORE REAG CARTRIDGE # [redacted]**

Category: System

Probable Cause: The system has stopped dispensing from the first cartridge because reagent is low or cartridge is empty. It has begun dispensing from the second cartridge indicated.

Corrective Action: This is an informational message. The first cartridge may be removed from the system since it is no longer in use.

Code 00311 — **INTERNAL ERROR CODE 1: [redacted] CODE 2: [redacted]**

Category: ISE

Probable Cause: A communication error has occurred in the ISE. ISE tests may be reentered or HALT has been pressed with only ISEs running.

Corrective Action: Proceed through Review & Run to schedule reentered ISE tests. If problem persists, cycle power. If problem is not resolved, call the Customer Support Center.

Code 00312 — **CONTROL FAILED OR MISSING FOR TEST: [redacted] PLEASE REVIEW QUALITY CONTROL STATUS**

Category: System

Probable Cause: There is no valid Quality Control value for the test indicated.

Corrective Action: Rerun the Quality Control for the test. Check the entered values for each level in the QC file.

Code 00313 — **COMB NAME MUST NOT BE CURRENT TEST**

Category: System

Probable Cause: The COMB NAME entered in the Test Parameter file must be linked to a valid Test file and name.

Corrective Action: Retype the COMB NAME of the Test file to be linked to the current file as a simultaneous assay. Check the spelling of the name to be entered.

Code 00314 — **ROBOTICS ABORT DURING MAINT. RESTART MAINT**

Category: Robotics

Probable Cause: A robotics error occurred while a maintenance routine was being run.

Corrective Action: Home Robotics. Restart the maintenance routine. If problem persists, call the Customer Support Center.

Code 00315 **ROBOTICS BUSY AT START OF MAINT**

Category: Robotics

Probable Cause: The robotics were busy when maintenance was begun.

Corrective Action: HOME ROBOTICS. Restart the maintenance. If the problem persists, call the Customer Support Center.

Code 00316 **ISE DAILY MAINTENANCE STARTED**

Category: ISE

Probable Cause: The ISE Daily Maintenance routine was selected and has begun (see the Daily Maintenance section for detail).

Corrective Action: This is an informational message; no action is required.

Code 00317 **ISE PACK CHANGE STARTED**

Category: ISE

Probable Cause: The ISE Pack Change routine was selected and has begun (see the Daily Maintenance section for detail).

Corrective Action: This is an informational message; no action is required.

Code 00318 **DAILY MAINTENANCE STARTED**

Category: System

Probable Cause: The Daily Maintenance routine was selected and has begun (see the Daily Maintenance section for detail).

Corrective Action: This is an informational message; no action is required.

Code 00320 **ISE IS NOT RESPONDING OR UNAVAILABLE**

Category: ISE

Probable Cause: The System is not equipped with ISE or the ISE is not communicating with the System.

Corrective Action: Check the ISE connection. Call the Customer Support Center.

Code 00321 **PLEASE WAIT — INITIALIZING SAMPLE FILE**

Category: System

Probable Cause: The operator has selected the "Y" for reinitializing the System files while in the diagnostics mode of the power-on sequence.

Corrective Action: All files have been lost. Call the Customer Support Center.

Code 00324 **NO REAGENT FOUND AFTER DISPENSE, CUVETTE # [redacted] PERIMETER REAGENT # [redacted] SAMPLE CUP POSITION # [redacted]**

Category: Mechanical

Probable Cause: After dispensing reagent, the reagent probe should detect fluid and does not.

Corrective Action: Check the level of the dispensed reagent to determine if it is less than other cuvette cells. Check for tubing leaks, bubbles in the reagent cartridge and plugged probes. Check the reagent probe fluid sensitivity and reagent probe cuvette bottom position. Refer to the Probe Positioning & Robotic Training section.

Code 00325 — **REAGENT NOT FOUND. PERIMETER REAGENT POSITION #:** [redacted]

Category: Mechanical

Probable Cause	No fluid detected in the specified reagent cartridge.
Corrective Action	Check the indicated reagent cartridge. If it is empty, replace it. Access the Reagent Loadlist screen and touch NO REAG adjacent to the reagent name. If the cartridge is not empty, look for bubbles or fluid on the septum. If no problem is observed, check the fluid sensitivity.

Code 00327 — **INCUBATOR DAC OUT OF RANGE**

Category: System

Probable Cause	Value entered is too large (>4095).
Corrective Action	Verify value entered is within range (0-4095). If value is valid, exit, then reenter the screen.

Code 00328 — **THIS TEST IS NOT SIMULTANEOUS**

Category: System

Probable Cause	The test type and math model do not agree.
Corrective Action	Enter appropriate test type and math model combinations.

Code 00329 — **CANNOT MIX AUX AND NON AUX SIMULT TESTS**

Category: System

Probable Cause	Aux and non aux tests may not be defined together.
Corrective Action	Define the assay with either aux or non aux test definition.

Code 00331 — **RTP DUAL PORT TIME OUT #** [redacted]

Category: System

Probable Cause	Real time processor has detected a time out on the dual port.
Corrective Action	Cycle the power. If the problem persists, call the Customer Support Center.

Code 00332 — **RTP DUAL PORT RETRY BUFFER FULL #** [redacted]

Category: System

Probable Cause	Real time processor has detected a dual port buffer timeout.
Corrective Action	Cycle the power. If the problem persists, contact the Customer Support Center.

Code 00333 — **TRANSFER FROM CORE REAG CARTRIDGE #** [redacted]
TO PERIM REAG CARTRIDGE # [redacted]

Category: System

Probable Cause	The System is transferring the reagent dispense from a core location to a perimeter location.
Corrective Action	No action is required.

Code 00334

TRANSFER FROM PERIM REAG CARTRIDGE # [redacted]
TO CORE REAG CARTRIDGE # [redacted]

Category: System

Probable Cause: The System is transferring reagent dispense from a perimeter location to a core location.

Corrective Action: No action is required.

Code 00335

TRANSFER FROM A PERIM REAG CARTRIDGE # [redacted]
TO PERIM CARTRIDGE # [redacted]

Category: System

Probable Cause: The System is transferring reagent dispense from one perimeter reagent location to another.

Corrective Action: No action is required.

Code 00336

QC OUT OF RANGE FOR TEST: [redacted]
SAMPLE ID: [redacted] WILL BE REENTERED

Category: System

Probable Cause: QC value is out of designated range, and QC SCREEN is turned ON.

Corrective Action: Rerun QC and associated samples.

Code 00337

POLYCHROMATIC RANGE CHECK FAILED FOR
WAVELENGTH POSITION #: [redacted] TEST: [redacted]

Category: System

Probable Cause: The reading value does not fall within the range specified in the low and high spectral wavelength of the Test Parameter screen.

Corrective Action: No action is required.

Code 00506

REAGENT NOT LOADED FOR TEST: [redacted]
PLEASE REVIEW REAGENT LOADLIST.

Category: System

Probable Cause: While scanning the reagent tray, the barcode reader recognized a discrepancy between the Sample Loadlist and the reagents on-board or the barcode reader failed to recognize the reagent cartridge label.

Corrective Action: Reconstitute required reagent(s) and place on-board. Touch READ REAGENT TRAY to initiate the barcode reader to re-scan the reagent tray. If the barcode reader is not reading correctly, perform Barcode Reader Cleaning procedure in the Monthly Maintenance section of this manual.

Code 00507

PROCEED WITH RESET?

Category: System

Probable Cause: While performing workload analysis, the message prompts the operator before proceeding.

Corrective Action: Touch Yes to proceed with the reset or No to cancel the reset.

Code 00508	**NO PASSWORD GIVEN. CANNOT RESET COUNTERS**
Category: System	
Probable Cause	When entering workload analysis screens, an operator password was not entered.
Corrective Action	Enter the password to proceed.

Code 00509	**BATTERY FAILED, DUMP SYSTEM FILES TO PRINTER**
Category: System	
Probable Cause	The battery that protects the memory has failed.
Corrective Action	DO NOT TURN THE POWER OFF. Print all data files immediately. These files include Step Tables, Test/Reagent/Calibration Definitions, Processing Order, Instrument Options, Print Order, Wash Matrix, Panels, Barcode Index File, Interface Setup screen, Quality Control and Patient Data. Call the Customer Support Center. This message indicates a battery failure and does not indicate a problem with System operation. Continue operation. DO NOT TURN THE POWER OFF. If power is lost, the above files must be reentered manually.

Code 00510	**INTERNAL ERROR**
Category: System	
Probable Cause	A diagnostic internal software error has occurred.
Corrective Action	Call the Customer Support Center.

NMI – Dynamic RAM Parity Error
NMI – Attempt to Access Protected RAM
NMI – Attempt to write ROM
NMI – Power Fail

Category: System	
Probable Cause	A computer problem occurred in the System.
Corrective Action	Cycle the power. If the problem persists, call the Customer Support Center.

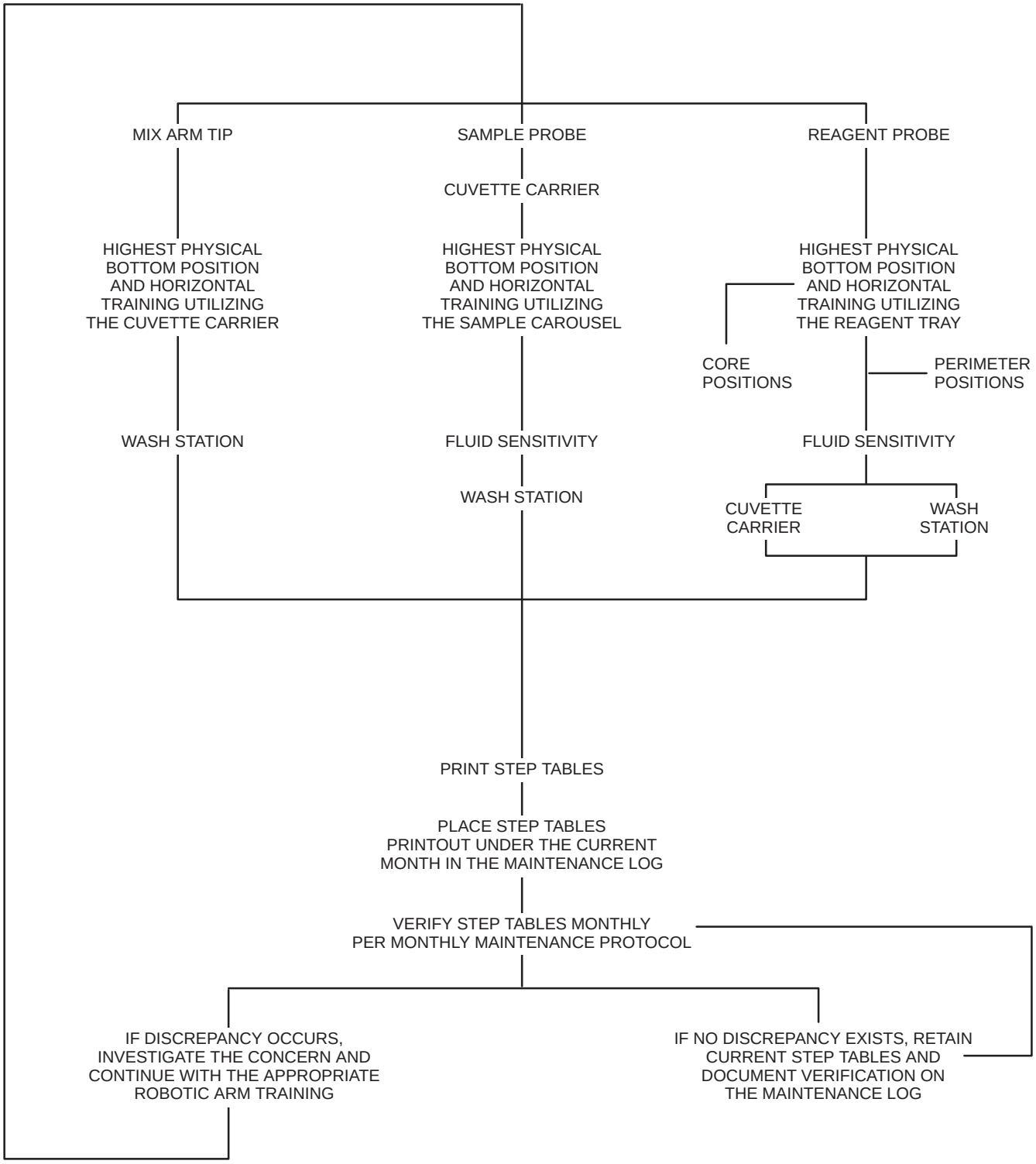
Introduction

Probe positioning and robotic arm training are vital to the accurate and precise operation of the ABBOTT SPECTRUM® SERIES II™ System. Probe positioning involves the determination of highest physical positions. Robotic training of the mix arm, sample probe, reagent probe and ISE probe, utilizes the appropriate highest physical position. The positions are recorded on the Probe Positioning Summary provided in this section. Probe Positioning procedures are normally performed during the initial ABBOTT SPECTRUM® SERIES II™ installation and documented in the Installation manual by the Field Service Engineer. Following the installation, the Step Tables screen is printed and placed under the current month in the Maintenance Log. This Step Table printout is verified monthly against the software in the system and, if a discrepancy exists, the concern is investigated and Probe Positioning is re-verified. Refer to Probe Positioning Flow Map, Figure 5-1 for further clarification on the hierarchy of Probe Positioning and Robotic Arm training.

NOTE

GREY BOXES HAVE BEEN INCORPORATED TO REPRESENT A NUMERIC FIELD IN VARIOUS PROCEDURES.

Figure 5-1. Probe Positioning and Robotic Arm Training Flow Map



ROBOTIC POSITIONING

PROBE POSITIONING SUMMARY

DATE: _____

CUVETTE CARRIER HIGHEST POSITION _____

HIGHEST POSITION TRAINED VERTICAL STEP VALUE _____

CUVETTE CARRIER NUMBER	CUVETTE PHYSICAL BOTTOM VERTICAL STEP
95	_____
10	_____
22	_____
34	_____
46	_____
58	_____
70	_____
82	_____

SAMPLE CAROUSEL HIGHEST POSITION _____

HIGHEST POSITION TRAINED VERTICAL STEP VALUE _____

SAMPLE CAROUSEL NUMBER	SAMPLE CAROUSEL PHYSICAL BOTTOM VERTICAL STEP
1	_____
13	_____
25	_____
37	_____
49	_____
61	_____

REAGENT TRAY HIGHEST POSITION _____

HIGHEST POSITION TRAINED VERTICAL STEP VALUE _____

REAGENT TRAY POSITION NUMBER	REAGENT TRAY PHYSICAL BOTTOM VERTICAL STEP
1	_____
3	_____
6	_____
9	_____
12	_____
15	_____
17	_____
19	_____

NOTE: UPON COMPLETION OF PROBE POSITIONING, PRINT STEP TABLES AND RETAIN FOR DOCUMENTATION WITH THIS FORM.

PROBE POSITIONING SUMMARY

DATE: _____

CUVETTE CARRIER HIGHEST POSITION _____

HIGHEST POSITION TRAINED VERTICAL STEP VALUE _____

CUVETTE CARRIER NUMBER	CUVETTE PHYSICAL BOTTOM VERTICAL STEP
95	
10	
22	
34	
46	
58	
70	
82	

SAMPLE CAROUSEL HIGHEST POSITION _____

HIGHEST POSITION TRAINED VERTICAL STEP VALUE _____

SAMPLE CAROUSEL NUMBER	SAMPLE CAROUSEL PHYSICAL BOTTOM VERTICAL STEP
1	
13	
25	
37	
49	
61	

REAGENT TRAY HIGHEST POSITION _____

HIGHEST POSITION TRAINED VERTICAL STEP VALUE _____

REAGENT TRAY POSITION NUMBER	REAGENT TRAY PHYSICAL BOTTOM VERTICAL STEP
1	
3	
6	
9	
12	
15	
17	
19	

NOTE: UPON COMPLETION OF PROBE POSITIONING, PRINT STEP TABLES AND RETAIN FOR DOCUMENTATION WITH THIS FORM.

ROBOTIC POSITIONING

PROBE POSITIONING SUMMARY

DATE: _____

CUVETTE CARRIER HIGHEST POSITION _____

HIGHEST POSITION TRAINED VERTICAL STEP VALUE _____

CUVETTE CARRIER NUMBER	CUVETTE PHYSICAL BOTTOM VERTICAL STEP
95	_____
10	_____
22	_____
34	_____
46	_____
58	_____
70	_____
82	_____

SAMPLE CAROUSEL HIGHEST POSITION _____

HIGHEST POSITION TRAINED VERTICAL STEP VALUE _____

SAMPLE CAROUSEL NUMBER	SAMPLE CAROUSEL PHYSICAL BOTTOM VERTICAL STEP
1	_____
13	_____
25	_____
37	_____
49	_____
61	_____

REAGENT TRAY HIGHEST POSITION _____

HIGHEST POSITION TRAINED VERTICAL STEP VALUE _____

REAGENT TRAY POSITION NUMBER	REAGENT TRAY PHYSICAL BOTTOM VERTICAL STEP
1	_____
3	_____
6	_____
9	_____
12	_____
15	_____
17	_____
19	_____

NOTE: UPON COMPLETION OF PROBE POSITIONING, PRINT STEP TABLES AND RETAIN FOR DOCUMENTATION WITH THIS FORM.

Introduction

The following protocol is utilized to determine the highest physical bottom position for the cuvette carrier using the mix arm tip. This position, once determined, is recorded and utilized in various robotic procedures. The mix arm tip should be positioned properly in the cuvette cell to ensure complete mixing of reagent, water and sample into a homogeneous solution. Proper training is also necessary in the mix arm tip wash station to ensure complete cleaning.

Items required and provided in the system accessory kit:

- Mix Arm Tip Gauge
- Pen Light
- Mirror

◆ Cuvette Carrier

NOTE

VERIFY ALL CUVETTES ARE CLEAN AND SECURE BEFORE PERFORMING THIS PROCEDURE.

1. From the Main menu, touch SPECIAL PROCEDURES, SELECT. Touch ROBOTICS, SELECT. Touch MIX ARM, SELECT. Touch HOME ROBOTICS.
2. Touch CUVETTE TOP. Touch MIXER OFF to display MIXER ON.

Stroke Adjustment

3. Place the mix arm tip gauge underneath the mix arm tip. Adjust the mix arm tip stroke using the adjustment screw underneath the mix arm body. Turn the adjustment screw clockwise to decrease the width and counterclockwise to increase the width to ensure the stroke falls within the minimum and maximum range on the gauge.

◇

ATTENTION

DO NOT TURN THE ADJUSTMENT SCREW MORE THAN THREE FULL TURNS CLOCKWISE. THE SCREW MAY FALL OUT OF THE MIX ARM BODY, CAUSING PERMANENT DAMAGE TO THE MIX ARM.

4. Once the mix arm tip stroke is adjusted, touch MIXER ON to display MIXER OFF.
5. Touch OTHER DEVICES. Touch SHUTTER OPEN. Visually verify the shutter is open by looking into the cuvette cell #95 underneath the mix arm tip. Touch MIX ARM.

Highest Physical Bottom Determination

6. Touch CUVETTE BOTTOM.

NOTE

VERIFY THE FRONT-TO-BACK POSITION TO ENSURE THAT THE MIXER ARM IS NOT TOUCHING EITHER WALL OF THE CUVETTE. CONTACT THE CUSTOMER SUPPORT CENTER IF POSITIONING IS NOT APPROPRIATE.

The physical bottom of the cuvette cell can be verified either visually or audibly.

- To verify visually, touch DOWN until the actual mix arm tip and the reflection of the mix arm tip in the back cell wall meet one another. This will be the physical bottom of the cuvette as determined visually.
- To verify audibly, touch MIXER OFF to display MIXER ON. Touch DOWN until the mix arm tip pitch changes due to the mix arm tip touching the physical cuvette bottom.

7. Record the vertical step for position 95 on the Probe Positioning Summary provided in this section.
8. To avoid damaging the mix arm tip, touch UP ten times before proceed ing. Touch CUVETTE TOP.
9. Touch the CUVETTE [redacted] field and type 10. Press the ENTER key. After the rotation completes, repeat Steps 6–9 for positions 10, 22, 34, 46, 58, 70 and 82.

CAUTION

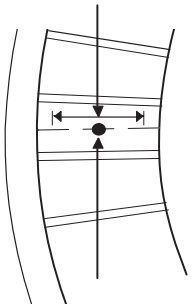
IF THE DIFFERENCE BETWEEN ANY TWO CUVETTE POSITIONS IS GREATER THAN TWO VERTICAL STEPS, CONTACT THE CUSTOMER SUPPORT CENTER.

10. The least positive vertical step position is the highest physical bottom position on the cuvette carrier. Record this highest cuvette carrier position on the Probe Positioning Summary provided in this section.
11. Touch CUVETTE [redacted] and type in the determined highest cuvette carrier position number and press the ENTER key. After the rotation completes, touch CUVETTE BOTTOM. Touch UP twice to properly position the mix arm tip two steps above the highest position vertical step value. Record this trained vertical step value on the Probe Positioning Summary provided in this section. Proceed with Mix Arm Robotic Training, Step 2 of Wash Station.

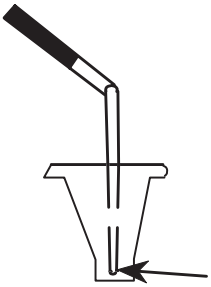
NOTE

IF FURTHER ROBOTIC TRAINING IS NOT REQUIRED, TOUCH **HOME ROBOTICS** BEFORE EXITING THE MIX ARM SCREEN.

PATH OF STROKE IS = ½ OF CUVETTE LENGTH OR $^{3}/_{16}$ INCH WIDE



PROBE IS CENTERED WHEN STATIONARY



2 STEPS HIGHER THAN THE VERTICAL STEP VALUE RECORDED FOR THE HIGHEST CUVETTE BOTTOM POSITION

Positioning Verification

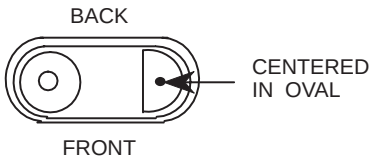
If the validation of the current highest physical bottom position is required as a verification or as troubleshooting, utilize the following protocol.

1. Repeat steps 1-6 of the Cuvette Carrier procedure in this section.
2. Touch CUVETTE [redacted] and type in the current highest cuvette carrier position indicated on the Probe Positioning Summary provided in this section. Press the ENTER Key. After the rotation completes, touch CUVETTE BOTTOM. The vertical step value should match the trained step value on the current Probe Positioning Summary. If step value does not agree, investigate by referring to the Maintenance Log and the Probe Positioning Summary for information on possible component replacement(s). Redetermination of the highest physical bottom for the cuvette carrier would be required if discrepancy occurs.

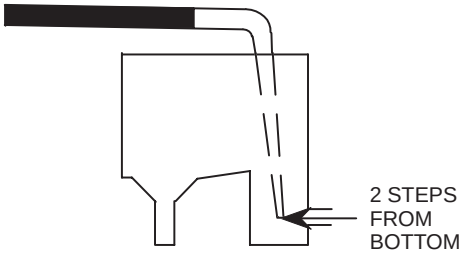
NOTE

IF FURTHER ROBOTIC TRAINING IS NOT REQUIRED, TOUCH **HOME ROBOTICS** BEFORE EXITING THE MIX ARM SCREEN.

Wash Station



1. From the Main menu, touch SPECIAL PROCEDURES, SELECT. Touch ROBOTICS, SELECT. Touch MIX ARM, SELECT.
2. From the Mix Arm screen, touch HOME ROBOTICS. Ensure that the mixer tip clears the wash station cover and the cuvette cover. If an adjustment is needed, touch UP or DOWN, until adjustment is correct.
3. Touch CUVETTE TOP and remove the wash station cover.
4. Touch WASH CUP TOP. Utilizing the mirror included in the accessory kit, visually verify whether the mix arm tip is centered. Center the mixer tip in the wash station oval by touching LEFT or RIGHT. Touch WASH CUP BOTTOM. Fine tune the adjustment by touching LEFT or RIGHT.



NOTE

IF THE MIX ARM TIP IS NOT CENTERED FRONT TO BACK IN THE WASH CUP OVAL, CONTACT THE CUSTOMER SUPPORT CENTER.

5. The mixer tip should be two steps from the physical bottom of the wash station. To determine the physical bottom, touch UP five steps, then touch MIXER OFF to display MIXER ON. Step the mixer down until the pitch of the mix arm tip changes. This is the physical bottom. Touch UP two steps to properly position the mix arm tip above the wash station physical bottom. Touch MIXER ON to display MIXER OFF.
6. Touch CUVETTE TOP. Replace the wash station cover.
7. Proceed to Sample Arm Robotic Training, Cuvette Cell Positioning Step 2 by touching SAMPLE ARM on this screen.

NOTE

IF FURTHER ROBOTIC TRAINING IS NOT REQUIRED, TOUCH **HOME ROBOTICS** BEFORE EXITING THE MIX ARM SCREEN.

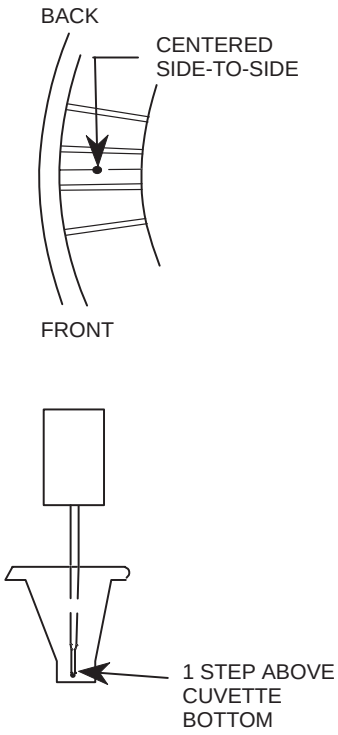
Introduction

The following protocols are utilized to determine the sample arm probe assembly positioning, the wash station positioning, and the highest physical bottom position for the sample carousel using the sample probe. This position, once determined, is recorded and utilized in setting the fluid sensitivity to ensure accurate sample aspiration and dispense.

Items needed are:

- 0.9% NaCl
- Mechanism to dispense 50 µl of 0.9% NaCl
- Clean sample cup
- Pen light (provided in system accessory kit)

◆ Cuvette Cell Positioning



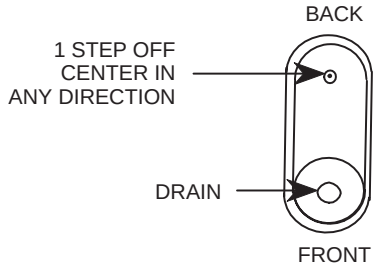
1. From the Main menu, touch SPECIAL PROCEDURES, SELECT. Touch ROBOTICS, SELECT. Touch SAMPLE ARM, SELECT.
2. From the Sample Arm screen, touch HOME ROBOTICS.
3. Touch the CUVETTE field and type in the highest cuvette carrier position as recorded on the current Probe Positioning Summary provided in this section. Touch CUVETTE TOP. Center the sample arm probe above the cuvette by touching LEFT or RIGHT.

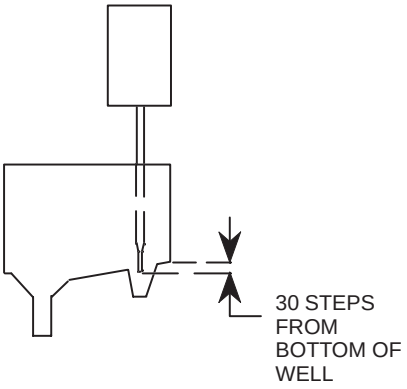
CAUTION

THE MAXIMUM WIDTH THAT THE SAMPLE PROBE ASSEMBLY SHOULD BE AWAY FROM THE SAMPLE ARM IS $^{1}/_{8}$ INCH. IF THE POSITIONING IS NOT CORRECT, CONTACT THE CUSTOMER SUPPORT CENTER.

4. Touch OTHER DEVICES. Touch SHUTTER OPEN and ensure shutter is open by looking into the cuvette cell under the sample probe. Touch SAMPLE ARM.
5. Touch CUVETTE BOTTOM. Fine tune the left to right adjustment by touching LEFT or RIGHT. Touch DOWN until the probe is touching the physical cuvette bottom, then touch UP once to properly position the sample arm probe one step above the cuvette highest carrier position.
6. Verify the sample probe assembly centering in the Cuvette Cell by loosening the knurled knob underneath the assembly and then gently pulling or pushing the entire assembly in or out.
7. Touch WASH CUP TOP. Touch OTHER DEVICES. Touch SHUTTER CLOSE. Visually ensure shutter is closed.
8. Proceed to the Wash Station Step 2, if appropriate.

◆ Wash Station



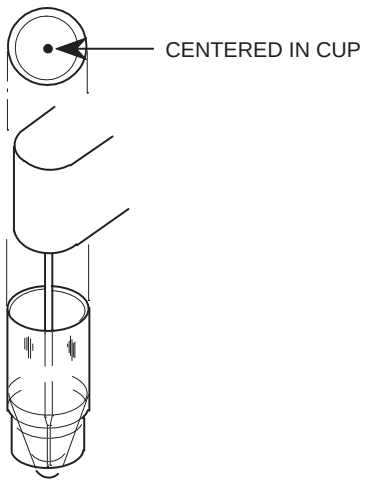


1. From the Main menu, touch SPECIAL PROCEDURES, SELECT. Touch ROBOTICS, SELECT. Touch SAMPLE ARM, SELECT.
2. From the Sample Arm screen, touch HOME ROBOTICS. Ensure that the sample probe clears the wash station cover, sample carousel and cuvette covers. If an adjustment is needed, touch UP or DOWN, until adjustment is correct.
3. Touch CUVETTE TOP. Remove the wash station cover.
4. Touch WASH CUP TOP. Center the sample arm probe over the wash station. Touch LEFT or RIGHT until adjustment is correct.
5. Touch WASH CUP BOTTOM. The probe should be one step off-center. Touch LEFT or RIGHT until adjustment is correct.
6. Touch DOWN until the probe is physically touching the bottom of the wash station well (utilize pen light to visually verify positioning). Touch UP thirty times to properly position the sample arm probe above the physical bottom of the wash station well.
7. Touch CUVETTE TOP. Replace the wash station cover.
8. Touch WASH CUP TOP.
9. Proceed to the Sample Carousel procedure beginning with Step 2.

NOTE

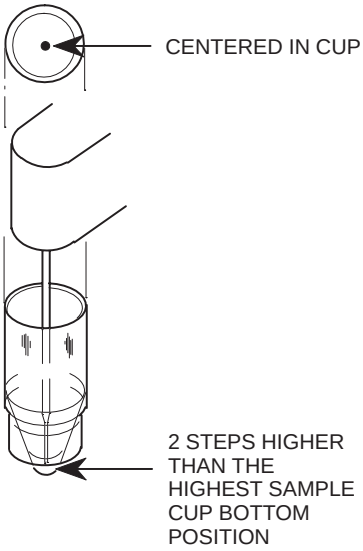
IF FURTHER ROBOTIC TRAINING IS NOT REQUIRED, TOUCH **HOME ROBOTICS** BEFORE EXITING THE SAMPLE ARM SCREEN.

◆ Sample Carousel



1. From the Main menu, touch SPECIAL PROCEDURES, SELECT. Touch ROBOTICS, SELECT. Touch SAMPLE ARM, SELECT.
2. Place an empty sample cup in position 1 on the sample carousel. Touch HOME ROBOTICS.
3. Touch OUTER CUP TOP. Verify the sample probe is centered over the sample cup.
4. Touch OUTER CUP BOTTOM. Verify the sample arm probe positioning by lifting up on the sample cup. Touch UP or DOWN as is required to position the sample probe on the physical bottom of the sample cup.

Sample Carousel (continued)



5. Record the vertical step for position 1 on the Probe Positioning Summary provided in this section. To avoid damaging the sample probe, touch UP ten times before proceeding.
6. Touch WASH CUP TOP.
7. Move the same sample cup to sample carousel position13. Touch SAMPLE CAROUSEL field and type 13. Press the ENTER key. After the sample carousel rotation completes, repeat Steps 3-7 for sample carousel positions 13, 25, 37, 49 and 61. (For positions 49 and 61, touch INNER CUP TOP in Step 3 and INNER CUP BOTTOM in Step 4.)

CAUTION

IF THE DIFFERENCE BETWEEN ANY TWO SAMPLE CUPS IS GREATER THAN FIVE VERTICAL STEPS, NOTIFY THE CUSTOMER SUPPORT CENTER.

8. The least negative position is the highest physical bottom position on the sample carousel. Record this highest sample carousel position on the Probe Positioning Summary provided in this section.
9. Place the same sample cup in the highest sample carousel position and touch OUTER CUP TOP or INNER CUP TOP, whichever is appropriate for the highest sample carousel position. Touch SAMPLE CAROUSEL field, type in the highest sample carousel position and press the ENTER key. Touch BOTTOM. Touch UP twice to properly position the sample probe two steps above the highest position vertical step value. Record this trained vertical step value on the Probe Positioning Summary provided in this section.
10. Proceed to Fluid Sensitivity procedure beginning with Step 2.

NOTE

IF FURTHER ROBOTIC TRAINING IS NOT REQUIRED, TOUCH **HOME ROBOTICS** BEFORE EXITING THE SAMPLE ARM SCREEN.

◆ **Fluid Sensitivity Adjustment** (Top Mounted Fluid Sense Status LED)

The following procedure is for use only with sample arms which have the Fluid Sense Status LED mounted on the top. Refer to Fluid Sensitivity Check on the following pages if the LED is on the side of the sample arm.

1. From the Main menu, touch, SPECIAL PROCEDURES, SELECT. Touch ROBOTICS, SELECT. Touch SAMPLE ARM, SELECT.
2. From the Sample Arm screen, touch HOME ROBOTICS to ensure fluid is in the sample arm probe. Place an empty sample cup in the recorded highest sample carousel position (refer to the current Probe Positioning Summary). Place the sample carousel cover on the sample carousel.
3. Touch the SAMPLE CAROUSEL field, and type in the highest sample carousel position number. Press the ENTER key.
4. Touch OUTER CUP FLUID or INNER CUP FLUID, whichever is appropriate for the highest position number.

Fluid Sensitivity Adjustment (continued)

CAUTION

IF THE SAMPLE ARM TOUCHES THE SAMPLE CAROUSEL COVER, CONTACT THE CUSTOMER SUPPORT CENTER.

The LED on top of the sample arm should be illuminated to indicate that fluid is not being sensed by the dielectric sample probe. The VERTICAL field should display CLEAR and OUTER CUP or INNER CUP BOTTOM will be highlighted.

If the LED is not illuminated and/or the VERTICAL field displays FLUID, the dielectric sample arm probe is too sensitive. Utilize the potentiometer adjustment tool and adjust the potentiometer on top of the sample arm one-quarter turn counter-clockwise and repeat this step until the dielectric sample probe is adjusted correctly.

5. Once the adjustment is complete, touch WASH CUP TOP. Remove the sample carousel cover and place 50 µl of 0.9% NaCl into the same sample cup. Replace the sample carousel cover.
6. Touch OUTER CUP FLUID or INNER CUP FLUID, whichever is appropriate for the highest position number. The LED on top of the sample arm should NOT be illuminated to indicate that fluid is sensed by the dielectric sample probe. The VERTICAL field should display FLUID.

   If the LED is still illuminated and the VERTICAL field displays CLEAR, the dielectric sample probe is not sensitive enough. Again, utilize the plastic potentiometer adjustment tool and turn the potentiometer $^{1}/_{16}$ turn clockwise. Repeat until the adjustment is complete.
7. Touch WASH CUP TOP. Verify the LED is illuminated and not flickering. If the LED is not illuminated or is flickering, repeat Step 4.
8. Proceed to Reagent Arm Robotic Training, Reagent Tray, Step 2 by touching REAGENT ARM on this screen.

NOTE

IF FURTHER ROBOTIC TRAINING IS NOT REQUIRED, TOUCH **HOME ROBOTICS** BEFORE EXITING THE SAMPLE ARM SCREEN.

◆ **Fluid Sensitivity Check**
(Side Mounted
Fluid Sense Status LED)

The following procedure is for use only with sample arms which have the Fluid Sense Status LED mounted on the side. Refer to Fluid Sensitivity Adjustment on the preceding pages if the LED is on the top of the sample arm.

1. From the Main menu, touch, SPECIAL PROCEDURES, SELECT. Touch ROBOTICS, SELECT. Touch SAMPLE ARM, SELECT.
2. From the Sample Arm screen, touch HOME ROBOTICS to ensure fluid is in the sample arm probe. Place an empty sample cup in the recorded highest sample carousel position (refer to the current Probe Positioning Summary). Place the sample carousel cover on the sample carousel.
3. Touch the SAMPLE CAROUSEL field, and type in the highest sample carousel position number. Press the ENTER key.
4. Touch OUTER CUP FLUID or INNER CUP FLUID, whichever is appropriate for the highest position number.

CAUTION

IF THE SAMPLE ARM TOUCHES THE SAMPLE CAROUSEL COVER, CONTACT THE CUSTOMER SUPPORT CENTER.

The LED on the side of the sample arm should be illuminated to indicate that fluid is not being sensed by the dielectric sample probe. The VERTICAL field should display CLEAR and OUTER CUP or INNER CUP BOTTOM will be highlighted.

CAUTION

DO NOT ALTER THE SETTING OF THE SELECTOR SWITCH LOCATED DIRECTLY BELOW THE FLUID SENSE LED. IT IS FOR FIELD SERVICE ONLY.

5. Touch WASH CUP TOP. Remove the sample carousel cover and place 50 µl of 0.9% NaCl into the same sample cup. Replace the sample carousel cover.
6. Touch OUTER CUP FLUID or INNER CUP FLUID, whichever is appropriate for the highest position number. The LED on the side of the sample arm should NOT be illuminated to indicate that fluid is sensed by the dielectric sample probe. The VERTICAL field should display FLUID.

CAUTION

IF THE LED IS STILL ILLUMINATED AND THE **VERTICAL** FIELD DISPLAYS **CLEAR**, THE FLUID SENSE ELECTRONICS ARE MALFUNCTIONING. CONTACT THE CUSTOMER SUPPORT CENTER.

7. Touch WASH CUP TOP. Verify the LED is illuminated and not flickering. If that the LED is not illuminated or is flickering, contact the Customer Support Center.
8. Proceed to Reagent Arm Robotic Training, Reagent Tray, Step 2 by touching REAGENT ARM on this screen.

NOTE

IF FURTHER ROBOTIC TRAINING IS NOT REQUIRED, TOUCH **HOME ROBOTICS** BEFORE EXITING THE SAMPLE ARM SCREEN.

REAGENT ARM ROBOTIC TRAINING

Introduction

The following protocols are utilized to determine the reagent probe center positioning for the core positions, the highest physical bottom position for the reagent tray (utilizing for the core positions), and the reagent probe center positioning for the perimeter positions. The highest physical position, once determined, is recorded and utilized in the fluid sensitivity procedure to ensure accurate reagent aspiration and dispense.

Items required:

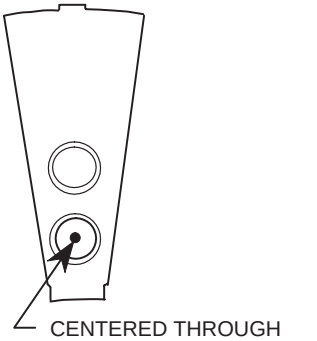
- 0.9% NaCl
- Mechanism to dispense up to 2 ml of 0.9% NaCl
- Five empty cartridges with clean septum caps (23 ml application cartridges are recommended)
- Potentiometer adjustment tool
- Pen light

NOTE

REPLACE REAGENT ARM TIP AFTER THE REAGENT ARM ROBOTIC TRAINING PROCEDURE. REFER TO COMPONENT REPLACEMENT IN THIS MANUAL.

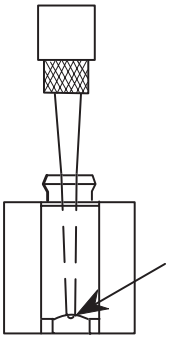
◆ Reagent Tray

Core Positions



1. From the Main menu, touch SPECIAL PROCEDURES, SELECT. Touch ROBOTICS, SELECT. Touch REAGENT ARM, SELECT.
2. From the Reagent Arm screen, touch HOME ROBOTICS. Beginning with quadrant 1, place five empty cartridges (application 23 ml cartridges are recommended) with clean septums on board. (This will ensure that the quadrant tray has equal pressure during the robotic training and proper fluid sense setting.) Place the reagent tray cover on the reagent tray. Ensure the arrow indicator on the reagent cover is facing the front of the system.
3. Touch REAGENT 1 TOP field. Verify that the reagent arm tip is centered over the opening in the reagent tray cover of core position 1. Touch the adjust position field (INNER RIGHT or LEFT; OUTER RIGHT or LEFT) to center the reagent arm tip properly. Touch REAGENT 1 BOTTOM. Fine tune the centering adjustment. Repeat this step for each of the twenty core positions utilizing the five empty cartridges in each quadrant. (If the next position to be trained is in a different quadrant, touch WASH CUP TOP. Remove the reagent tray cover. Move all five cartridges to the appropriate quadrant and proceed.)

Core Positions
(continued)



NOTE

IF THE REAGENT ARM TOUCHES THE REAGENT TRAY COVER, CONTACT THE CUSTOMER SUPPORT CENTER.

4. Touch REAGENT 1 **TOP**. Touch REAGENT 1 **BOTTOM**. Touch **DOWN** until the physical bottom of the empty cartridge is verified.

   (Verification is accomplished by lightly pressing down on the top of the reagent tip assembly. When resistance is felt and no vertical deflection of the reagent arm tip is detected, the physical bottom of the cartridge has been reached.)

5. Record the vertical step for reagent quadrant 1, position 1 on the Probe Positioning Summary provided in this section.

6. To avoid damaging the reagent arm tip, touch **UP** ten times before proceeding. (If the next position to be trained is in a different quadrant, touch WASH CUP **TOP**. Remove the reagent tray cover. Move all five cartridges to the appropriate quadrant and proceed.)

7. Touch REAGENT [redacted] field, type **3** and press the **ENTER** key. Touch REAGENT 3 **TOP**. After the reagent arm accesses core position 3, repeat Steps 4-7 for each of the following:

Quadrant	Core Position
1	1, 3
2	6, 9
3a	12, 15
4a	17, 19

CAUTION

IF THE DIFFERENCE BETWEEN ANY TWO CORE POSITIONS IS GREATER THAN 15 VERTICAL STEPS, CONTACT THE CUSTOMER SUPPORT CENTER.

8. The least negative vertical step position is the highest physical bottom position on the reagent tray. Record this highest reagent tray position on the Probe Positioning Summary provided in this section.

9. Place the five empty cartridges in the highest determined position quadrant and replace the reagent tray cover.

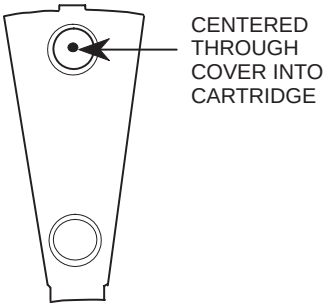
10. Touch REAGENT [redacted] field, type in the highest reagent tray position and press the **ENTER** key. Touch **BOTTOM**. Touch **UP** ten times to properly train the reagent arm tip ten steps above the highest position vertical step value. Record this trained vertical step on the Probe Positioning Summary provided in this section.

11. Proceed to the Perimeter Position procedure.

NOTE

IF FURTHER ROBOTIC TRAINING IS NOT REQUIRED, TOUCH **HOME ROBOTICS** BEFORE EXITING THE REAGENT ARM SCREEN.

Perimeter Positions
P1–P8



NOTE

ROBOTIC HIGHEST POSITION TRAINING FOR THE PERIMETER POSITIONS (P1–8) IS NOT NECESSARY. THE SOFTWARE AUTOMATICALLY DETERMINES THE PHYSICAL BOTTOM FOR THESE POSITIONS. CENTERING THE REAGENT ARM OVER THE PERIMETER POSITIONS IS REQUIRED.

1. Touch HOME ROBOTICS. Touch REAGENT [redacted] field, type in P1 and press the ENTER key.
2. Verify that the reagent arm tip is centered over the opening in the reagent tray cover of Perimeter Position 1.
3. Touch REAGENT P1 field, type in P2 and press the ENTER key. Repeat steps 2-3 for each Perimeter Position utilizing P1-P8.
4. Proceed with the Reagent Arm Robotic Training, Fluid Sensitivity, Step 2.

NOTE

IF FURTHER ROBOTIC TRAINING IS NOT REQUIRED, TOUCH **HOME ROBOTICS** BEFORE EXITING THE REAGENT ARM SCREEN.

◆ Fluid Sensitivity

CAUTION

IF FLUID SENSITIVITY IS PERFORMED AS A VERIFICATION OR AS TROUBLESHOOTING, CUVETTE FLUID SENSITIVITY AND WASH STATION FLUID SETTING **MUST** BE VERIFIED AND/OR PERFORMED.

1. From the Main menu, touch SPECIAL PROCEDURES, SELECT. Touch ROBOTICS, SELECT. Touch REAGENT ARM, SELECT.
2. Position the reagent tray cover to ensure the arrow indicator is facing the front of the system. From the Reagent Arm screen touch HOME ROBOTICS. Place the five empty cartridges with clean septums in the highest position quadrant as recorded on the current Probe Positioning Summary provided in this section.
3. Touch REAGENT [redacted] field, type in the highest quadrant position number and press the ENTER key. Touch REAGENT [redacted] FLUID.

   The LED on top of the reagent arm should be illuminated to indicate that fluid is not being sensed by the reagent arm tip. The VERTICAL field should display CLEAR, and the REAGENT [redacted] BOTTOM will be highlighted.

   If the LED is not illuminated and/or the VERTICAL field displays FLUID, the reagent arm tip is too sensitive. Utilize the potentiometer adjustment tool and adjust the potentiometer on top of the reagent arm one-quarter turn counterclockwise and repeat this step until the reagent arm tip is adjusted correctly.

Fluid Sensitivity
(continued)

4. Once the adjustment is complete, touch WASH CUP TOP. Remove the reagent tray cover and pipette 2.0 ml of 0.9% NaCl into the empty cartridge that is in the actual highest quadrant position. Replace the reagent tray cover.
5. Ensure the REAGENT field indicates the highest quadrant position and touch FLUID. The LED on top of the reagent arm should not be illuminated to indicate that fluid is sensed by the reagent arm tip. The VERTICAL field should display FLUID.

   If the LED is illuminated and the VERTICAL field displays CLEAR, the reagent arm tip is not sensitive enough. Again, utilize the potentiometer adjustment tool and turn the potentiometer $^{1}/_{16}$ turn clockwise. Repeat until the adjustment is complete.
6. Touch WASH CUP TOP. Lightly wipe the reagent arm tip with a dry lint-free tissue. Verify the LED is illuminated and not flickering. If the LED is not illuminated or is flickering, repeat Step 3.
7. Proceed to the Cuvette Cell Positioning procedure, beginning with Step 2.

◆ Cuvette Cell Positioning

NOTE

VERIFY ALL CUVETTES ARE CLEAN AND SECURE BEFORE PERFORMING THIS PROCEDURE.

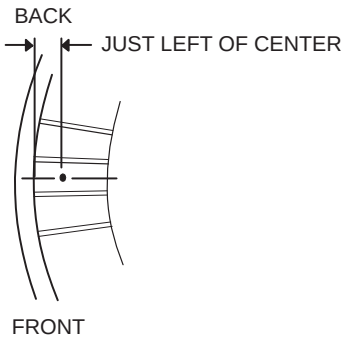
1. From the Main menu, touch SPECIAL PROCEDURES, SELECT. Touch ROBOTICS, SELECT. Touch REAGENT ARM, select.
2. Place cuvette carrier cover on the cuvette carrier. Ensure correct positioning of the cuvette carrier cover by verifying that the extensions on the left side of the cuvette carrier cover fit snuggly around the wash station cover of the sample arm wash station. From the Reagent Arm screen, touch HOME ROBOTICS. Once the homing sequence completes, remove the cuvette carrier cover.

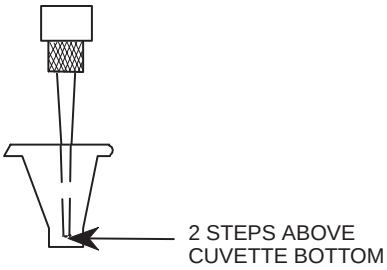
CAUTION

IF THE REAGENT ARM TOUCHES THE CUVETTE CARRIER COVER, CONTACT THE CUSTOMER SUPPORT CENTER.

3. Touch the CUVETTE field. In the Reagent Arm screen, the cuvette position is keyed off the light path position rather than the reagent dispense position. Subtract 3 from the highest cuvette position recorded on the current Probe Positioning Summary and type this number in the CUVETTE field. Press the ENTER key.
4. Touch OTHER DEVICES. Touch SHUTTER OPEN and ensure shutter is open by looking into the cuvette cell under the reagent arm tip. Touch REAGENT ARM.

Cuvette Cell Positioning (continued)





5. Touch DISPENSE [redacted] TOP (This will position the reagent arm tip over the cuvette cell entered in Step 3). Touch BOTTOM. Center the reagent arm tip in the cuvette front to back and left of center by touch ing the adjust position fields (OUTER RIGHT or LEFT; INNER RIGHT or LEFT).

   Verify that the LED on top of the reagent arm is illuminated to indicate that fluid is not being sensed by the reagent arm tip. If the LED is not illuminated and/or the VERTICAL field displays FLUID, refer back to Steps 4-6 of the Fluid Sensitivity procedure for the reagent arm.

6. Touch UP or DOWN until the reagent arm tip is physically touching the cuvette cell bottom. Verify positioning by lightly pressing down on the top of the reagent tip assembly. When resistance is felt and no vertical deflection of the reagent arm tip is detected, the physical bottom of the cuvette cell has been reached. Once bottom is determined, touch UP twice to properly adjust the vertical step value. Touch WASH CUP TOP.

7. Replace the cuvette cover. Touch DISPENSE [redacted] TOP. Loosen the two Phillips head screws that secure the aperture plate on the cuvette carrier. Position the aperture plate to center the opening around the reagent arm tip. Once centered, touch DISPENSE [redacted] BOTTOM. Fine tune the aperture plate adjustment.

8. Touch WASH CUP TOP. Carefully tighten the aperture plate screws.

9. For AUX Dispense training, touch HOME ROBOTICS, then touch DISPENSE [redacted] TOP field and type 102. Press the ENTER key. Center the reagent probe above cuvette 95 front to back and left of center by touching the adjust position (INNER RIGHT or LEFT; OUTER RIGHT or LEFT).

10. Proceed to Wash Station procedure beginning with Step 2.

NOTE

IF NO FURTHER ROBOTIC TRAINING IS REQUIRED, TOUCH **HOME ROBOTICS** BEFORE EXITING THE REAGENT ARM SCREEN.

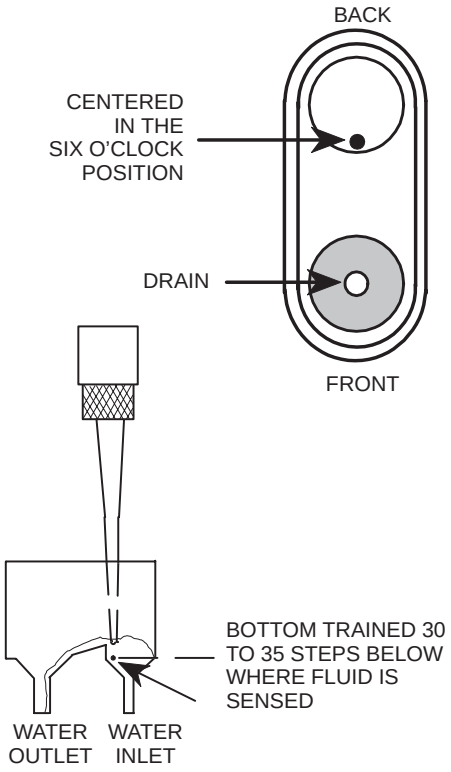
◆ Wash Station

CAUTION

IF PERFORMING THIS PROCEDURE AS A STAND ALONE PROTOCOL, BE SURE THE FLUID SENSITIVITY IS APPROPRIATELY SET PRIOR TO BEGINNING THIS PROCEDURE BY REFERRING TO THE FLUID SENSITIVITY PROCEDURE FOR THE REAGENT ARM.

1. From the Main menu, touch SPECIAL PROCEDURES, SELECT. Touch ROBOTICS, SELECT. Touch REAGENT ARM, SELECT.

Wash Station
(continued)



2. From the Reagent Arm screen, touch HOME ROBOTICS.

CAUTION

VERIFY THE WATER QUALITY STATION INCOMING PSI TO ENSURE APPROPRIATE 5–7 PSI.

Touch REAGENT [redacted] TOP and remove the wash station cover. Touch WASH CUP TOP. Verify that the reagent arm tip is centered over the inlet well in the wash station. Touch WASH CUP BOTTOM. Touch the Adjust Position field (INNER RIGHT or LEFT; OUTER RIGHT or LEFT) to position the reagent arm tip in the six o'clock position of the wash station inlet.

3. Touch WASH OFF to display WASH ON. Touch WASH CUP FLUID. Record the vertical step value where fluid is being sensed by the reagent arm tip. (This value is not to be recorded in the Probe Positioning Summary. This is for the user's information.) Repeat this procedure five times and average the vertical step values at which fluid was sensed.
4. Touch WASH CUP BOTTOM. There is to be a 30-35 vertical step difference between the average recorded in Step 4 and the displayed vertical step value for WASH CUP BOTTOM. Touch UP or DOWN as required to obtain a vertical step value between the 30-35 range.
5. Touch WASH ON to display WASH OFF. Touch REAGENT [redacted] TOP and replace the wash station cover.

NOTE

IF NO FURTHER ROBOTIC TRAINING IS REQUIRED, TOUCH **HOME ROBOTICS** BEFORE EXITING THE REAGENT ARM SCREEN.

Introduction

To ensure accurate aspiration of sample, the ISE sample probe must be trained appropriately. This will result in precise and accurate ISE results and appropriate utilization of the available sample volume.

NOTE

THE ISE STATUS SCREEN IS THE ONLY SCREEN THAT THE ISE TOP OF CUP POSITION MAY BE ADJUSTED AND SAVED. THE INSTRUMENT STATUS SCREEN ONLY DISPLAYS THE CURRENT TOP OF CUP SETTING.

◆ ISE Probe Top of Cup Positioning

1. From the Main menu, touch CALIBRATION, SELECT. Touch ISE STATUS, SELECT.
2. Place an empty cup in the highest sample carousel position recorded on the current Probe Positioning Summary.
3. Touch MOVE CAROUSEL and type in the highest sample carousel position number. Press the ENTER key.
4. Touch MOVE TO OUTER or MOVE TO INNER to access the highest sample carousel position.
5. Touch TOP OF CUP. The ISE sample probe should be centered over the sample cup. If adjustment is required, perform the ISE Module Positioning procedure in this section before proceeding.
6. Touch STEP UP or STEP DOWN until the ISE sample probe is even with the top of the sample cup. Touch SAVE POSITION.
7. Touch BOTTOM OF CUP to determine that the ISE sample probe is approximately $^1/_8$ inch from the bottom of the sample cup. If adjustment is required, repeat Steps 5 and 6.
8. Touch EXIT.

◇ 9. Remove and dispose of the sample cup in accordance with local, state, and federal regulations governing the treatment of regulated medical waste.

◆ ISE Module Positioning

1. Open the upper left access door. Remove the ISE Pack and place on the top deck area without removing any of the tubing from the pack.
2. Remove the two Phillips head screws from the ISE shroud. Remove the two remaining bolts.
3. Place an empty cup in the highest sample carousel position recorded on the current Probe Positioning Summary provided in this section.
4. From the main menu, touch CALIBRATION, SELECT. Touch ISE STATUS, SELECT. Touch MOVE CAROUSEL. Type in the sample carousel position and press the ENTER key. After the carousel rotation stops, touch MOVE TO OUTER or MOVE TO INNER to access sample cup. Touch TOP OF CUP.
5. Loosen the two flat-head screws on top of the metal flag plate. Turn the adjustment screw under the flag plate clockwise one quarter turn to adjust the ISE module forward. Turn the adjustment screw counterclockwise one quarter turn to adjust the ISE module backward.

NOTE

- THE FORWARD OR BACKWARD MOVEMENT CANNOT BE DETECTED VISUALLY. CONTINUE PROCEDURE TO VERIFY POSITIONING.
- THIS ADJUSTMENT AFFECTS BOTH INNER AND OUTER POSITIONS.

6. Touch PROBE UP. Touch HOME. Touch MOVE TO OUTER or MOVE TO INNER to again access the sample cup and verify positioning.
7. Repeat Steps 5 and 6 as required to correctly position the ISE module.
8. Tighten the flat-head screws on top of the flag plate and replace the ISE shroud.
9. Touch EXIT on the ISE Status screen.

CAUTION

- IF PROPER POSITIONING CANNOT BE ACCOMPLISHED WITH THIS PROCEDURE, THE ISE MODULE CAN BE FURTHER POSITIONED BY ADJUSTING THE FOUR SCREWS SECURING THE ISE MODULE TO THE TOP BRACKET.
- CONTACT THE CUSTOMER SUPPORT CENTER IF THIS PROCEDURE DOES NOT CORRECTLY POSITION THE ISE MODULE.

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OBSERVED CONCERNS

Introduction

This section provides information necessary to define, isolate and resolve operational and component concerns.

For each observed concern that can occur during operation, this section includes a description of the probable cause and likely resolution.

OBSERVED CONCERNS

Observed Concern **BARCODE READER NOT READING THE REAGENT CARTRIDGES**

Probable Cause The reader window requires cleaning, the reagent cartridge barcode label is defective or not aligned properly, or the barcode reader requires attention from a Field Service Engineer.

◆ Corrective Action

1. Clean the window with lens paper.
2. If the concern is specific to one cartridge, clean the cartridge label. Verify the horizontal positioning of the label. Be sure vertical lines and letters are not corrupted.
3. If the concern persists, contact the Customer Support Center. Override the barcode reader, utilizing one of the two options listed below, until attention can be provided by a Field Service Engineer.

OPTION 1

- From the Main menu, touch SYSTEM FILES, SELECT. Touch INSTRUMENT OPTIONS, SELECT. Touch ON in the Barcode Reader field to display OFF. Touch STORE RESULTS. CODE 00166 FILE SAVED will display.
- From the Reagent Loadlist screen, place the reagent cartridge in the designated positions and touch LOAD NOW to display ASSIGNED.

OPTION 2

It is possible to type in the desired reagent cartridge positions instead of placing the reagents as indicated by positions. Refer to Reagent Loadlist Typed Entry Procedure in the Operation manual.

Observed Concern **BUBBLES IN THE SAMPLE DILUENT SYSTEM**

Probable Cause Sample diluent reservoir became empty during run, or the sample diluent system was not purged appropriately.

◆ Corrective Action

1. Ensure the reservoir is full before initiating a run. Fill it if necessary.
2. Verify that the Status field is not highlighted. If highlighted, refer to the displayed STATUS CODE. If not, proceed to Step 3.
3. From the Main menu, touch SPECIAL PROCEDURES, SELECT. Touch ROBOTICS, SELECT.
4. Touch PUMPS & VALVES, SELECT. Disconnect the sample syringe from its holding bracket by loosening the silver knurled knob at the bottom.
5. Touch DILUENT VALVE CLOSED to cycle to DILUENT VALVE OPENED. Touch SINGLE STROKE to cycle to PURGE # PURGES 1. Touch DILUENT PUMP.
6. While the sample diluent system is purging, move the sample syringe barrel up and down. This will force the residual air out. Repeat as needed.
7. When the air is purged, reseat the syringe by placing the syringe barrel against the groove in the drive block and tighten the silver knurled knob.

OBSERVED CONCERNS

Observed Concern	**CUVETTES TOO TIGHT/TOO LOOSE IN THE CARRIER**
Probable Cause	Incubator clamp worn or not adjusted correctly.
Corrective Action	Loosen the screw holding the incubator clamp. Move the incubator clamp forward or backward until the cuvette is held firmly. Tighten the screw then make sure that the cuvette can be removed easily. If necessary, replace the incubator clamp. Refer to Component Replacement in this manual.

Observed Concern	**POWER-DOWN ON THE ABBOTT SPECTRUM SERIES II SYSTEM**
Corrective Action	Reenter the BI-HOST INTERFACE screen to re-establish proper communication between the ABBOTT SPECTRUM® SERIES II™ System and the host computer. Wait for the host computer to return the system to the Main menu. Continue normal activity.

Observed Concern	**THE MAIN MENU IMMEDIATELY RETURNS FROM THE BI-HOST INTERFACE SCREEN WHEN TRYING TO DOWNLOAD INFORMATION FROM THE HOST.**
Probable Cause	The host computer has no information to download to the ABBOTT SPECTRUM® SERIES II™ System.
Corrective Action	Verify the host computer for information to be downloaded.

Observed Concern	**A COMMUNICATION FAILURE OCCURRED BETWEEN THE ANALYZER AND THE HOST COMPUTER.**
Probable Cause	STATUS CODE 00018 Host Interface Timeout was generated.
Corrective Action	1. To activate BREAK, touch BREAK from the BI-HOST INTERFACE screen. 2. When CODE 00281 PROCEED WITH BREAK? Y/N displays, type Y (YES) or N (NO) and press the ENTER key. 3. Proceed with error resolution as indicated by STATUS CODE 00018, and restart transmission from the BI-HOST INTERFACE screen.

NOTE

ACTIVATION OF THE BREAK FUNCTION SHOULD NOT BE USED TO ROUTINELY EXIT THE BI-HOST INTERFACE SCREEN SINCE ANY TRANSMISSION IN PROCESS WILL BE LOST.

OBSERVED CONCERNS

Observed Concern	**DROPS FROM MIX ARM TIP**
Probable Cause	The mix arm tip is not being washed properly. Improper washing can cause reagent to cling to the mix arm tip as it is drawn from the cuvette.
Corrective Action	To ensure the mix arm tip is being washed adequately, verify that water is flowing in the mix wash station and that the mix arm tip is positioned correctly. Refer to the Probe Positioning section in this manual.

Observed Concern	**DROPS FROM REAGENT PROBE** Large reagent drops falling on the instrument top deck after aspirating from the cartridge or dispensing into the cuvette.
Probable Cause	• Reagent probe damage caused by crashing into any surface: reagent cartridge caps, cuvettes, carousel covers, or the top deck. • Burrs on the reagent probe which can cause reagent cross contamination. • Leak in the reagent dispensing system: the tubing, two quad ring seals in the reagent syringe, or the O-ring in the Reagent adapter assembly.
◆ Corrective Action	1. Lightly wipe the Reagent Probe with an alcohol pad. 2. Lightly wipe the Reagent Probe with a moist, lint-free tissue. 3. Inspect the Reagent Probe and replace it if burrs, abrasions, or damage are found. Refer to Component Replacement in this manual. 4. Inspect the TEFLON® tubing for proper seating, presence of crimps or bulges at the Reagent Syringe and probe port junction. If in doubt, replace the tubing. Refer to Component Replacement in this manual. 5. Inspect the Reagent Syringe for any signs of wear. If replacement is necessary, refer to Component Replacement section in this manual.

OBSERVED CONCERNS

Observed Concern	**DROPS CLING TO THE SAMPLE PROBE WHEN DRAWN FROM THE WASH STATION.**
	A drop of water clings to the sample arm probe as it leaves the wash station but does not increase in size while the sample arm probe pauses over the wash station.
Probable Cause	• Dirty or damaged probe. • The probe is not properly positioned in the wash station.
◆ Corrective Action	1. Verify the step tables in the system with the printed step tables in the Probe Positioning section of this manual for proper positioning of the sample arm probe in the wash station. If the concern persists, refer to Probe Positioning in this manual to verify robotic training. 2. Carefully wipe the outside of the sample arm probe with a gauze moistened with Type II water. Inspect for burrs or irregularities that could trap droplets. Remove the sample arm probe, use a probe wire (provided in the accessory kit) to clean the inside. Backflush the sample arm probe with Type II water and replace it on the Sample Arm. 3. Replace the sample arm probe if necessary. Refer to Component Replacement in this manual. Verify the position of the new sample arm probe by referring to Probe positioning in this manual.

Observed Concern	**DROPS FALLING FROM THE SAMPLE PROBE OVER THE WASH STATION**
Probable Cause	• The tubing on the sample system: – is not the correct type, and/or bore size. – has a leak. • The sample diluent valve is obstructed or not functioning properly. • The sample diluent valve 35-micron filter needs to be replaced.
◆ Corrective Action	1. The tubing from the probe to the syringe and from the syringe to the valve must be hard-walled TEFLON®. Soft tubing expands and contracts causing drops to form. If the tubing is not TEFLON®, replace it. Refer to Component Replacement in this manual. 2. Verify all tubing/port connections from the sample arm probe to the sample diluent valve and to the sample diluent valve filter. The tubing should be seated about $^{1}/_{4}$ inch over the port. Look for crimps and bulges that could be a source of pin holes. Refer to the Component Replacement in this manual for instructions in reseating the tubing. 3. If a drop persists, replace the sample syringe seals or replace the sample syringe. Refer to Component Replacement in this manual. 4. If a drop persists, replace the sample diluent valve filter. Refer to Component Replacement this manual. 5. Flush the sample diluent valve both backward and forward with Type II water. If this fails to correct the problem, replace the valve.

Observed Concern

IMPRECISE RESULTS

Probable Cause

Imprecise results could be caused by any of the following concerns.

Corrective Action

For precision concerns:

- Verify if the Status field is highlighted. If highlighted, verify Status Codes displayed and refer to STATUS CODES section in this manual.
- Verify the mix arm tip stroke, cuvette position left, right and bottom, and wash station position left, right, and bottom. Refer to Probe Positioning in this manual.
- Verify the cuvettes are firmly in position. Tighten or replace the incubator clamp if the cuvettes are loose. Refer to Component Replacement in this manual.
- Verify the incubator is clear of bubbles or floating debris. Bubbles are caused by air in the pressurized water. If this problem persists, it may be necessary to install a degassifier to the water system. Contact the Customer Support Center for information. Floating debris can be resolved by cleaning the incubator. Refer to Specific Procedures in this manual. If the concern is severe, it may be necessary to clean the incubator more frequently than on a weekly basis.
- Verify that the Cuvette Change panel reflects the actual cuvette usage. Replace all cuvettes if necessary.
- Refer to the following conditions described in this section:
  - Drops falling from the reagent arm tip
  - Drops falling from the sample arm probe
  - Samples having very low results
- Verify sample arm probe fluid sensitivity adjustment. Refer to Probe Positioning section in this manual.
- If problem persists, contact the Abbott Customer Support Center.

Observed Concern	**KINETIC ASSAY RESULTS TOO HIGH/LOW**
Probable Cause	Elevated kinetic blank values, sample delivery system contamination, reagent contamination.
◆ Corrective Action	If the problem is isolated to one assay:

1. From the Main menu, touch CALIBRATION, SELECT. Touch CALIBRATION, SELECT. From the Calibrator Status screen, touch the specific assay, then SELECT.
2. The ACCEPTED BLANK and the NEW BLANK (ABSORB/MIN) field display an A_d value that represents reagent activity that is subtracted from the Sample A_d before the result is calculated. (Refer to the Theory of Measurement section of the Operation Manual for more information.)
3. Verify that the kinetic blank range has fallen within the established kinetic blank tolerance range. If no kinetic blank tolerance has been established, refer to the Operation Manual for information on establishing the kinetic blank tolerance range.

   Comparable to the Cal Factor on endpoint or calibrated rate tests, there are variations in blank values between labs; these can be traced to causes such as the water source. Fresh Type II water should be used for a kinetic blank.
4. Contamination of the water used for kinetic blank or the sample delivery system will cause this to occur. Recalibrate the assay with a fresh Type II water blank.
   - To recalibrate an assay from the Calibrator Status screen, highlight the desired assay name, then SELECT. To recalibrate, touch KINETIC BLANK, which will change to BLANK STATUS: REBLK.
   - Request a sample for the assay, or use the Rerun function to change the status from COM to ENT on a previously run sample.
   - Enter Review & Run.
   - Load any necessary reagent, sample, and fresh Type II water calibrator according to the loadlists.
   - Touch RUN.
5. If the blank is still too high but no IA flags accompany the result, the sample delivery system may be contaminated. Clean the sample diluent system. Refer to Monthly Maintenance. Recalibrate the kinetic blank, as in Step 4.

   If the blank is too high and the results are flagged IA, a reagent contamination concern should be suspected.
   - Check the reconstitution date to be sure the reagent is not outdated.
   - Verify the reagent A_d using the Reagents Flagged IA or MA procedure in this section.

(continued)

Corrective Action (continued)

6. If the Reagent A_d exceeds the specifications, be sure the reagent was reconstituted properly. If water is used, be sure it or the measuring device for the water has not been contaminated. To isolate this concern when water is used as the diluent, use Type II water and a new pipette to reconstitute the reagent.
7. Recalibrate the kinetic blank as in Step 4.

If the concern occurs with several assays:

1. Verify the mix arm tip positioning in the wash station and cuvette. Verify mix arm tip stroke. (Refer to the Probe Positioning procedure in this manual.)
2. Verify water is flowing in the mix arm tip wash station. Touch WASH OFF to display WASH ON in the Mix Arm Robotic screen.
3. Be sure no contamination has occurred in the sample delivery or reagent reconstitution system.
4. Verify the reagent probe condition. If required, refer to Component Replacement procedures.
5. Verify incubator maintenance date in the Maintenance Log. If required, clean the incubator. Refer to Weekly Maintenance.
6. Verify lamp voltage in the A_d Read screen. Refer to Weekly Maintenance.

Observed Concern: **MOISTURE IN REAGENT TUBING**

Probable Cause: Changing temperature and humidity in the lab causes condensation.

Corrective Action: Replace tubing. Refer to Component Replacement procedures in this manual.

Observed Concern: **NEGATIVE (–) OR BLANK END POINT RESULTS WITH LL FLAG**

Probable Cause: The sample probe did not aspirate sample.

Corrective Action: Verify the sample probe fluid sensitivity and adjust correctly. Refer to Probe Positioning, Sample Arm Robotic Training. Be sure all sample tubing is seated correctly and there are no bubbles in the lines. If required, refer to Component Replacement procedures to replace tubing. Rerun the assays. Refer to Specific Procedures in the Operation Manual.

OBSERVED CONCERNS

Observed Concern	**NEGATIVE (–) RESULTS WITH LL AND IA FLAGS**
Probable Cause	Initial reagent absorbance out of range defined in the Test Parameter Files.
Corrective Action	Verify the reconstituted reagent stability date. If allowable date has been exceeded, reconstitute new reagent. If within date, verify the isolation steps described under Kinetic Assay Results Too Low in this section. When the concern is resolved, rerun the assays. Refer to the Specific Procedures section of the Operation Manual.

Observed Concern	**PRINTER PAPER JAMS**
Probable Cause	If the printer paper jams or printing is interrupted, STATUS CODE 00026 PRINTER TIME OUT ERROR will be generated.
Corrective Action	1. Turn the printer OFF. 2. Verify the correct paper is being used (not thicker than 0.28 mm and carbonless), and that the paper is aligned with the paper feed properly. 3. If paper is feeding through the bottom of the printer, verify that no paper is dragging on the instrument tray slot. 4. Turn printer ON and resume printing. 5. If concern persists, refer to the Okidata printer manual.

Observed Concern	**SAMPLE WAS NOT RUN**
Probable Cause	The sample was requested on a carousel that was not the carousel being processed by the System. Also, the Review and Run screen may have been exited twice after touching RUN.
Corrective Action	Verify the carousel number of the sample. Avoid exiting from Review and Run screen once RUN has been requested.

Observed Concern	**SAMPLES NEVER CALCULATED OR COMPLETED; OVERRIDE IS OFF IN THE INSTRUMENT OPTIONS SCREEN; ASSAY CAL STATUS DISPLAYS CALIBRATION FAIL IN THE CALIBRATION STATUS SCREEN.**
Probable Cause	• Calibration failed for those assays not completed. • RECALIBRATE was touched after samples were dispensed. This indicates that accepted calibration data should not be used.
Corrective Action	Resolve the concern that caused calibration to fail and recalibrate. Verify Status Codes that may have been generated.

Observed Concern	**REAGENTS FLAGGED IA OR MA**
Probable Cause	Reagent degradation
Corrective Action	Perform the following Reagent A_d Read procedure.

1. From the Main menu, touch SPECIAL PROCEDURES, SELECT. Touch AD READ, SELECT.
2. Obtain the following assay information from the reagent package insert of the suspect reagent:
   - Wavelength pair
   - Initial A_d
   - Reaction direction
3. Use the cursor control key to access the top wavelength pair and type the appropriate wavelengths.
4. Edit the following parameters. Use the CYCLE key to set MODE and SCALE FACTOR.

CELL	1 TO 2
REPEAT	1
INTERVAL (SEC)	1
MODE	DELTA
SCALE FACTOR	AD HI RES

5. Pipet 300 µl of fresh Type II water into cuvette cell 1 and 300 µl of suspect reagent into cuvette cell 2.

NOTE

ADDITIONAL REAGENTS MAY BE DISPENSED INTO CONSECUTIVE CELL POSITIONS, BEGINNING WITH CELL 3. THE WAVELENGTH AND THE CELL BEING EVALUATED MUST BE APPROPRIATE FOR THE REAGENT. THEREFORE, THE WAVELENGTH PAIR AND CELL FIELDS MUST BE REPEATED FOR EACH DISPENSED REAGENT. THE INTERVAL, MODE, AND SCALE FACTOR WILL REMAIN CONSTANT. CELL 1 WILL REMAIN TYPE II WATER FOR ANY ADDITIONAL REAGENTS DISPENSED FOR EVALUATION.

6. Touch START. The reagent A_d reading displays to the right of the top wavelength pair.
7. The reagent is within specification when the A_d displayed is:
   a. Lower than the Initial A_d in the Test Parameter File for an UP reaction.
   b. Higher than the Initial A_d in the Test Parameter File for a DOWN reaction.
8. Reconstitute new reagent(s) if required.
9. Remove and dispose of the used cuvettes in accordance with local, state, and federal regulations governing the treatment of regulated medical waste.

OBSERVED CONCERNS

Observed Concern	**SAMPLE ARM PROBE IS NOT SENSING FLUID WHEN FLUID IS PRESENT**
Probable Cause	The fluid sensitivity is not adjusted properly, the fluid sense cable is broken or disconnected, or the fluid sense electronics have failed.
Corrective Action	• Verify that at least 50 µl of fluid are present in the sample cup. • Refer to Probe Positioning in this manual to verify the fluid sensitivity of the sample arm probe.

Observed Concern	**ISE SAMPLES NOT BEING RUN**
Probable Cause	ISE channels turned OFF in the ISE Status screen.
Corrective Action	1. From the Main menu, touch CALIBRATION, SELECT. Touch ISE STATUS, SELECT. 2. Touch OFF next to the channel to display ON. 3. Touch EXIT. 4. From the Main menu, touch REVIEW & RUN. Continue with routine operation.

Observed Concern	**SYSTEM DISPLAYS RUNNING MOMENTARILY; DOES NOT BEGIN OPERATION. NO STATUS CODE IS GENERATED.**
Probable Cause	Carousel displayed in Review & Run has all requests complete or was not appropriately entered in Review & Run.
Corrective Action	Review the carousel number when the Review & Run screen is entered and verify that the carousel is appropriate.

Observed Concern	**WASH STATION (SAMPLE, REAGENT OR MIX) NEAR OVERFLOW**
Probable Cause	• Length of travel from wash station to waste line is too long. • Wash station drain tube obstructed by microbial growth, crimping, or an air pocket.
Corrective Action	1. Be sure the drain tubing travels no longer than 15 feet and is sloped downward along its entire length. 2. Use the incubator syringe bulb to force air down the wash station tubing. This will dislodge an air pocket if present. Remove the top deck cover using the protocol in Component Replacement procedures. 3. Prepare 100 ml of 5% benzalkonium chloride solution by mixing 10 ml of 50% benzalkonium chloride in 90 ml of Type II water. 4. Pour one quarter of the 5% benzalkonium chloride solution into the wash station.

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Corrective Action (continued)	5. From the Main menu, touch SPECIAL PROCEDURES, SELECT. Touch ROBOTICS, SELECT and then touch the appropriate screen (Mix, Sample or Reagent) and SELECT. Touch WASH OFF to display WASH ON. While the water is flowing, pour more 5% benzalkonium chloride solution into the wash station. Be sure not to overflow the waste line. Depending on the severity of the obstruction, you may have to add more benzalkonium chloride solution and allow it to remain in the wash station. 6. HOME ROBOTICS five times to purge all benzalkonium chloride from the wash station.

Observed Concern	**WATER PRESSURE LOW AND CANNOT BE ADJUSTED**
Probable Cause	The water quality station filter requires replacement.
Corrective Action	Clean the Inlet Water System. Refer to Quarterly Maintenance.

Observed Concern	**SAMPLE CAROUSEL READER NOT READING**
Probable Cause	• The binary label on the sample carousel is not properly aligned or requires replacement. • Carousel reader is dirty.
Corrective Action	1. Align or replace the binary label with a new label from the accessory kit. 2. Use lens paper to clean the carousel reader. 3. Remove the sample carousel. From the Main menu, touch REVIEW & RUN, SELECT. The carousel read will display 0. Touch EXIT twice. Place the mixer adjustment gauge inside the carousel reader to block the photodiodes. From the Main menu, touch REVIEW & RUN, SELECT. The carousel read should display 7. If this does not occur, the carousel reader may need to be adjusted. Contact the Customer Support Center. The carousel number may be manually entered. From the Main menu, touch REVIEW & RUN, SELECT. Highlight the field to the right of IF DESIRED, ENTER SAMPLE CAROUSEL NUMBER (1-6): . Type the desired carousel number and press the ENTER key.

GLOSSARY

% C.V.	Calculation used to measure reproducibility/precision.
absorbance	Measurement of the optical density of a liquid determined by spectrophotometric analysis.
absorbance difference	Difference between the primary and secondary wavelengths.
A_d	Absorbance difference.
AFT	Aspirate flow time.
alarm	Audible tone sounded when the instrument requires operator action.
alphanumeric	Character set containing letters, digits, and punctuation marks.
analyte	Substance measured by chemical analysis.
arrow keys	Keys used to move the cursor.
aspirate	Physical action of drawing or removing liquid by suction.
aspirate flow time	Time required for the beginning of the sample fluid to reach the air detector.
assay	Analytical process or test to determine the presence or concentration of an analyte in an unknown specimen.
assay type	Defines when reagents are dispensed, when readings are taken, and the equation used to calculate results.
autoclave	Strong, pressurized, steam-heated vessel, for sterilization.
aux assay	Assay that requires more than one reagent dispense at different time intervals.
aux dispense	Second or third reagent dispense that is required by a given test.
auxiliary	Indicates a second system.
AUX PENDING	Status, displayed in the ACTIVITY field, that indicates the System is waiting for the second or third reagent to be dispensed.
aux reagent	Assay with two or three reagents.
balance points	Zero absorbance levels electronically generated for any given bichromatic pair of wavelengths.
barcode	Special code designed to be read by a scanner.
barcode labels	Labels that contain a code that can be read by a scanner.
barcode reader	Device used to read barcode labels.
Batch mode	Processing mode that allows all same type assays to be processed together in sequential order, based on carousel position number.
baud	Unit for measuring the speed of data transmission.
baud rate	Rate of speed in data transmission.
bichromatic measurement	Spectrophotometry that subtracts a secondary wavelength absorbance reading from a primary wavelength absorbance reading to obtain a delta absorbance reading.
bi-directional interface	Communications medium that allows two-way communication between a host device and a peripheral device.
bi-host interface	Hardware or software communications medium that allows two-way communications between a host device and a peripheral device.

GLOSSARY

biohazardous	Pertaining to materials that are a threat to human health or to the well-being of the environment.
bit	Binary digit.
blank	Method used for correcting interferences.
C of C	Coefficient of correlation.
calibration	Result of calibrating an instrument or assay.
calibration curve	Curve stored in memory of known values and rates that is referenced for unknown samples.
calibration interval	Time period during which the calibration curve is good.
calibration type	Defines the mathematical relationship applied to calculate the coefficients used to determine analyte concentration and specifies the constraints on the value of these coefficients.
calibration wheel	Wheel, containing lenses and filters, that resides in the light path between the cuvette cell and the detector.
calibrator	Solution with an assigned value.
Cal On Command	Procedure for manually selecting and running assay calibrations.
cartridge	Component used to store reagent.
cartridge type	Defines the size of the reagent container by specifying the volume of the container.
coefficient	Numerical measure of a physical or chemical property that is constant for a system.
coefficient of correlation	Indicator of goodness of fit of the data set being measured.
coefficient of variation	Calculation of standard deviation divided by mean.
collection tube	Glass tube for collecting and storing blood samples.
COM	Status that indicates the assay is complete.
component assay	Assay that, with other assays, comprises a ratio.
concentration	Amount of a substance contained per unit volume.
contaminate	Make impure by contact.
control	Standard of known reactivity used to monitor the performance and efficacy of the assay.
core vial	Vial located in the inside position of a dual reagent cartridge.
cumulative total	Running tally of all counts or values used for statistical purposes.
cursor	Location indicator on the touch screen.
cuvette	High-quality glass or plastic container.
cuvette carousel	Ring or carousel used to hold cuvettes.
cuvette status panel	Panel that displays the number of used and unused cuvettes loaded on the System.
dark current	Measurement of electrical noise in the optics.
data entry field	Portion of display where data is entered and displayed.

dead volume	Residual amount of reagent or sample that is necessary to ensure that proper dispense occurs.
decontaminate	Remove contamination or chemicals.
default value	Value used if no other is input.
delta A_d	Difference between two A_d measurements. The delta absorbance is used in conjunction with calibration data to calculate concentration or activity.
diagnostics	Utilities designed to test the electronics, optics, detection capacity, and dispense functions within the System.
digit	Number symbol, 0 through 9.
diluent	Solution used to dilute a sample.
diluent purge	Action of circulating diluent through the sample tubing.
diluent valve	Device that switches the fluid flow on and off.
dilution protocol	Procedure for performing a particular dilution ratio.
dilution ratio	Ratio of total volume to sample volume.
dispense	Delivery of a volume of reagent, sample, or diluent.
DP	Dilution protocol.
dual reagent assay	Assay that requires two reagent dispenses at different time intervals.
dual reagent cartridge	Reagent container comprised of a core vial and a perimeter vial.
E.F.	Extinction factor.
electrode	Ion selective component that measures the voltage activity of sodium, potassium, and chloride.
electrode carrier	Housing that holds electrodes.
electrode train	All electrodes connected in a series.
end point assay	Assay that reaches equilibrium in a short period of time.
ENT	Status that indicates the assay has been entered but not currently scheduled by the System.
extinction factor	Bichromatic absorbance change per unit of concentration change of chromophore. This factor is specifically determined for a wavelength pair and derived from linearity tests performed during the manufacture of the instrument.
FFT	Fill flow time.
fibrin	Protein that gives the semisolid character to a blood clot.
first read time	Time that the first reading takes place in a System test.
flag	Symbol appended to a sample result that draws attention to a particular characteristic of the result.
Flex-B	Flexible batch.
Flexible Batch mode	Instrument processing order that schedules assays for optimum throughput.
flush	Function that circulates fluid through a system.

flush valve	Valve used to remove fluid from a system.
function key	Key assigned to perform special functions within a program.
HALT key	Key used as an emergency stop for the System. Activation of Halt aborts System activities immediately.
hazardous waste	Waste material presenting danger to the environment or to humans.
header	Text that appears in the top margin of printed pages (e.g., hospital name and address).
holographic grating	Optical grating that splits the light beam coming from the cuvette cell into specific wavelength beams, that are then focused on the diode array.
home position	Position of the robotics arm when the cycle is complete and the System is in the ready state.
host computer	Central computer in a timesharing or distributed processing environment.
IA	Initial absorbance.
incubator	Unit maintaining a specific level of heat.
infrared	Indicates electromagnetic radiation visible by light.
initial absorbance	First reading taken on reagent when no sample has been dispensed.
interconnects	Components that connect two or more assemblies together.
interface setup	Parameter entered to make a computer interface match the operating requirements of the computer and the system to which it is to be connected.
ion selective electrode technology	Method, using an ion-specific membrane, to develop an electrical potential according to the Nernst equation.
ISE	Ion selective electrode.
ISE maintenance mode	Troubleshooting mode for the ISE module that gives real-time readouts of each electrode, in millivolts.
ISE module	System component that draws samples directly from the carousel to perform sodium, potassium, and chloride measurements, using ion selective electrode technology.
ISE septum	Component of the ISE module that allows separate ports of entry for Standards A and B, while allowing the ISE sample probe to aspirate sample or standard as needed.
kinetic blank	Blank cell used in calibration.
LE	Low energy or spectral correction.
LH	Linear high.
LL	Linear low.
linear high	Value above the stated linearity claim.
linear low	Value below the stated linearity claim.
linear regression	Analytical technique.
linearity	Range over which absorbance versus concentration approximates a straight line.

loadlist	Calibrator—List of available or needed calibrators/standards on the System. Reagent—List of available or needed reagents on the System. Sample—List of specific SIDs loaded on the sample carousel.
low energy	Flag that indicates insufficient light is entering the photometer.
MA	Maximum absorbance or Rate C. of C. flag.
MAINTENANCE	Status, displayed in the ACTIVITY field, that indicates a maintenance routine is being performed.
manual entry	Use of the keyboard to enter data, such as a sample ID.
math model	Mathematical formula used in a test file to determine or measure reactions.
matrix	Information in row and column form.
maximum absorbance	Highest allowable optical density value.
mean	Calculated average for a set of numbers.
membrane	Thin layer of tissue.
minimum absorbance	Lowest acceptable optical density reading.
mixer	Robotic component that agitates the sample and the reagent in the cuvette cell.
NCCLS	National Committee for Clinical Laboratory Standards; an organization that has created documentation to standardize the way tasks are performed in the laboratory.
numeric key	Key, labeled from 0 to 9, used to enter numeric data.
O-ring	Rubber washer or ring used to seal a connection.
offline	Refers to test results manually entered into a system but not run on that system.
optics	Subsystem comprised of the lamp, light path, lenses, calibration wheel, mirrors, holographic grating, and the photodiode array.
panel	Group of tests.
parameter	Variable appearing in a mathematical expression.
parity	Method of checking if binary numbers or characters are correct by counting the ONE bits.
partial ISE	Selectable option that allows use of one or two channels of the ISE, rather than all three channels.
password	Special code provided at login time to identify a user.
patient identification number	Number assigned to the patient for tracking purposes.
PAUSE key	Key used to interrupt reagent and sample dispense procedures; optical readings of assays in progress continue.
percentage	Proportion in relationship to a whole.
perimeter vial	Vial located in the outer position of a dual reagent cartridge.
photodiode	Component that detects light.

photodiode array	Multiple photodiodes electrically attached and functioning together.
PID	Patient identification number.
primary wavelength	Chosen wavelength where the chromophore has a maximum, or near maximum, absorbance. *See also* bichromatic measurement.
print order	Order in which tests are printed, as defined in the Print Order screen.
probe	Instrument component used for dispensing or aspirating.
probe wash	Number of cycles a probe is washed between dispenses.
processing order	Order in which tests are run, as defined in the Processing Order screen.
purge	To rid the System or tubing of excess air or fluid.
QC	Quality control.
quad rings	Ring seal.
quality control	Method of evaluating products by comparing them to a predetermined range.
Random mode	Processing mode in which tests are run by patient order.
range	Area between known limits.
rate reaction	Chemistry reaction that measures the amount of change over a specified time.
ratio	Comparison of two measurements.
reaction cell	Container where a chemical reaction takes place.
READING	Status, displayed in the ACTIVITY field, that indicates the sample carousel has been accessed and is no longer required for processing.
reagent	Substance used to produce a chemical reaction in order to direct, measure, or produce other substances.
reagent barcode reader	Electronic device used to read barcode labels on reagent cartridges.
reagent blank	Optical reading that determines the absorbance due to the reagent.
reagent cartridge	Container used to store reagent.
reagent lot number	Specific lot number given to a reagent cartridge at the time of manufacture.
reagent probe	Probe used for dispensing reagent by the reagent arm.
reagent syringe	Syringe used by the reagent assembly for dispensing reagent.
reagent tray	Component that houses reagent cartridges.
reference cal factor	Parameter used to convert absorbance to concentration.
resolution	Measurement of the sensitivity of an instrument to determine small changes in absorbance.
RUNNING	Status, displayed in the ACTIVITY field, that indicates the sample, reagent, or mix arms are in operation.
safety glasses	Shatter-resistant eye protection worn in the laboratory.
safety procedure	Course of action for the safety of persons and equipment.

sample	Specimen, or one of a group.
sample carousel	Carousel that holds patient samples, controls, and calibrators.
sample carousel ID kit	Kit containing labels to identify a carousel.
sample cup	Small, disposable plastic cup that holds sample, calibrators, or controls.
sample diluent	Solution used to dilute sample.
sample diluent 35-micron filter	Filter used to remove particulate matter from the tubing.
sample diluent pump	Pump that forces diluent to the sample syringe and probe for dispensing and washing.
sample diluent reservoir	Container that holds the necessary amount of diluent for System operation.
sample diluent valve	Valve that opens and closes the diluent tubing in the sample dispense system.
sample identification number	Number used to identify patient specimen.
sample probe	Probe used for dispensing patient samples or controls.
sample syringe	Syringe used to aspirate and dispense samples or patient specimens.
sample tube	Glass tube closed at one end used to collect and hold patient samples.
sample tubing	Tubing that connects the sample syringe to the sample probe.
sample volume	Volume of sample dispensed.
SCH	Status that indicates the assay has been scheduled for processing.
SD	Standard deviation.
secondary wavelength	Second wavelength in a bichromatic measurement. *See also* bichromatic measurement.
segment	One cuvette segment is comprised of a group of 12 reaction cells.
serum	Clear yellowish fluid obtained upon separating whole blood into its solid and liquid components.
serum blank	Baseline optical measurement of the serum and reagent mixture used to compensate for interfering substances in final results.
SID	Sample identification number.
software	Instructions programmed into a computer to control System operation.
source lamp	Light source directed through the reaction mixture.
spectrophotometer	Instrument to determine intensities of various wavelengths of light.
spoke	Support position on the cuvette carousel.
standard	Solution of known concentrations against which unknowns may be run.
standard deviation	Calculation used to determine variance from the mean.
STAT	Assay requiring immediate results.
status code	Code that indicates a given condition.

stepper motor	Type of electrical motor used to drive all robotics subassemblies.
step table	Table that lists trained positions of the robotics.
stop bit	Bit transmitted after a specified string of characters.
stray light	Light from any source other than the light directed at the photometer.
supernatant	Liquid floating on top of another liquid or a solid sediment or precipitate.
syringe	Device used to supply a liquid.
Tandem mode	Processing order that prioritizes sample processing based on the number of assays ordered for each sample.
temperature calibration	Procedure used to adjust the incubator to a specific temperature.
test parameter file	File containing the settings used to perform an assay.
tolerance	Allowed difference from a specified value or standard.
touch screen	Screen that allows the user to make a selection by touching the screen.
tubing	Component within an instrument used to transport substances.
Type II water	Water with a resistivity of 1 megohm or greater, a microbiological content of 1000 or less colony-forming units/mL, carbon filtered, and free of particles as defined by NCCLS.
uni-directional interface	Communications medium that allows data to be sent to a host device.
value	Assigned or calculated numerical quantity.
volume	Amount or content.
volume correction of blanks	Calculation that volume corrects all blank readings.
wash cup	Well in which the sample probe, reagent probe, or mixer arm tip is rinsed.
waste decontamination	Procedure used to disinfect waste.
water quality station	Component that regulates and filters water from deionization tanks; source of water for the incubator, mixer arm tip wash station, and reagent probe wash station.
wavelength	Length, in nanometers, of one cycle of a sine wave.
Y-intercept	Parameter determined from a calibration curve and used in the calculation of result concentrations.

Symbols

Numbers

A

B

C

D

E

F

G

H

I

K

L

M

N

O

P

Q

R

S

T

U

V

W

Z

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