# As required maintenance

## Backing up system files

The system software consists of the operating system, data processing software, and user-specific system and data files. Back up the system files to a USB Memory Stick or a formatted CD / CD-RW / DVD disc whenever you make any configuration or parameter changes. The Restoring System Files procedure follows this procedure.

***Materials required:***

USB memory stick or CD-RW disc or DVD-RW disc

Time: 10 minutes
Analyzer mode: READY

1. Use an indelible marker to write **System back up** with the current date on a disc label.
2. If the disc is not formatted, format the disk as follows:
   a. Place a blank CDRW or a blank DVDRW into the CD/DVD drive.
   b. Select the **Drag-to-Disc** icon located to the left of the time display in the lower right corner of the window.
   c. On the Drag-to-Disc popup window, right-select the disc.
   d. Select **Format disc**.
   e. Select **Full format**.
   f. Select **OK**.
   g. When prompted, select **Yes**.
3. At the Startup window, select **Back-up**.
4. At the ADVIA Backup window, select **Make a Backup Copy**.
5. Select the Target Files to be backed up from the following options:
   - **System Files** - Approximately 30 MB of disk space is required.
   - **Data Files** - Disk space required is dependent on the amount of data stored on the C:/ drive. A new CD holds approximately 650 MB.
6. Verify that the backup name is the current date.

   **NOTE**

   The system names the backup automatically, which consists of a yyyymmdd format. Accept the destination folder default for the DVD disk drive letter (usually D:) or select **Browse** to choose a different destination. If a recordable disk is not available, then the backup can be stored on the partitioned storage drive (D:).
7. Select **Execute**.
8. At the Backup window, select **OK** to confirm the copy.

   **NOTE**

   If an error window displays, reformat the disk and try again.
9. When the file copy completes, at the Backup window, select **OK**.

## Restoring system files

1. Insert the CD or the DVD containing the backup files into the CD drive.

   **NOTES**

   - When restoring backed-up data files (in the Data subfolder under the A002 folder), select the **Delete Data Files** checkbox at the ADVIA Backup window. This deletes any current data files on the PC hard drive before the backed up system and data files are restored.
   - If the current data files are needed, perform a backup before restoring previous files. The restore feature restores all files (system and/or data files) that were previously backed up. If this is the case, close the ADVIA Backup window and perform Backing up system files (see above).

2. At the Startup window, select **Back-up**.
3. At the ADVIA Backup window, select **Restore a Backup Copy**, then browse to the source folder that contains the backup files to restore and select **Execute**.
4. At the Restore confirmation window, select **OK**.

   If the disk contains all the backed up files required for the restore procedure, the copy function begins.

5. If the backed up files are on more than one disk, select **Continue**.
6. At the ADVIA Backup window, select **Exit**, select **Restore**, then select **OK**.
7. At the ADVIA Backup window, select **Cancel**.
8. Reboot the PC.

## Replacing the SPP, RPP1, and RPP2 probes

***Materials required:***

- Probes:

  **DPP** (without crash detection),
  REF 003975051, PN 073-0223-01

  **DPP** (with crash detection),

  REF 02030495, PN 073-0611-01

  **SPP**-(REF 03975051, PN 073-0223-01)

  **RPP1,2**-(REF 0551684, PN 073-0224-01)
- Phillips screwdriver
- Pliers
- Lint-free towels

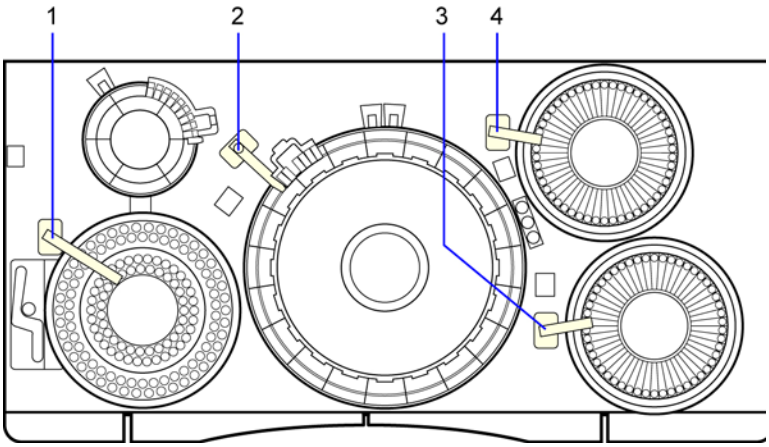
Time: 10 minutes
Analyzer mode: STANDBY

**BIOHAZARD**

Wear personal protective equipment. Use universal precautions.

**NOTE**

Use this procedure to replace SPP and RPP probes **not** equipped with crash detection. For dilution probes (DPP) equipped with crash detection, refer to *Replacing DPP probes - with crash detection*.




**1** Dilution Probe (DPP)
**2** Sample Probe (SPP)
**3** Reagent Probe 1 (RPP1)
**4** Reagent Probe 2 (RPP2)

**Figure 5-28. Probes**

### *Remove the probe*

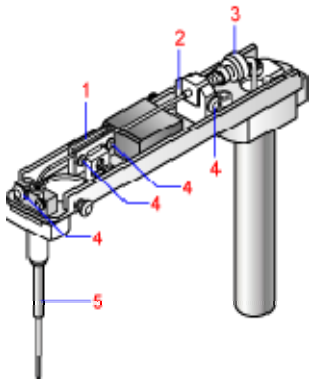
1. Put the system in Standby mode.

   **CAUTION**
   To keep from damaging the probe tip when the power is off, you must manually support the probe and be careful not to strike it against anything on the analyzer.

2. Cover the cuvettes, wash cups, and other analyzer surfaces with lint-free towels to catch any screws that might fall.
3. Lift and manually rotate the probe to an accessible location.

| Probe | Accessible Location |
|---|---|
| Sample probe (SPP) | Over the dilution tray (DTT) |
| Reagent probe 1 (RPP1) | Over reagent tray 1 (RTT1) |
| Reagent probe 2 (RPP2) | Over reagent tray 2 (RTT2) |

4. Loosen but do not remove the setscrews on each side of the probe cover. Lift the cover off the probe.
5. Using pliers or your fingers, loosen the knurled fitting (**3**) counterclockwise, then unfasten and remove it by hand.
6. Loosen but do not remove setscrews (**4**).
7. Lift the old probe and discard.




**1** Terminal 2
**2** Joint Holder
**3** Joint Connector
**4** Philips Screws (4 places)
**5** Probe Tube

**Figure 5-29. Probe without cover**

## *Install a new probe*

1. Slowly insert the new probe (**5)** through the guide hole (**7**) until the flange (**8**) is seated against terminal 1 (**6**).
2. Verify that the probe is correctly positioned in terminal 2 (**1**) and the joint holder (**2**).
3. Tighten the setscrews while maintaining the probe position in terminal 2 and the joint holder.
4. Finger-tighten the joint connector.

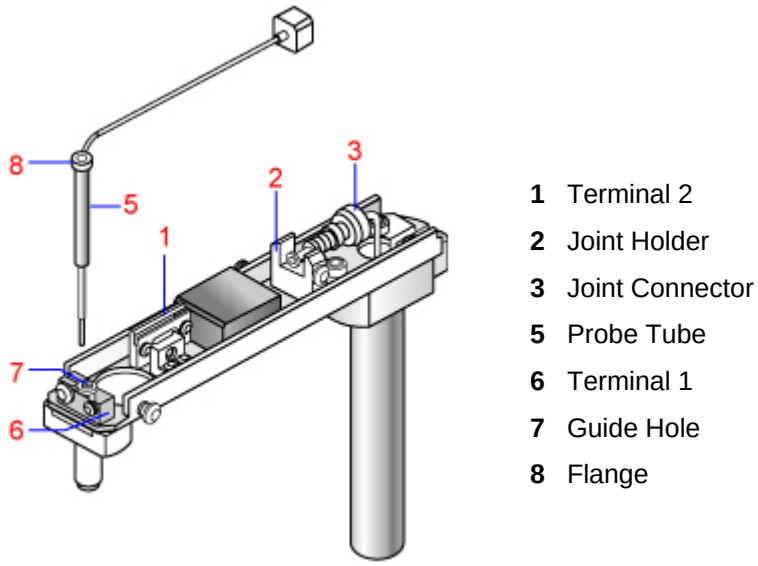



**Figure 5-30. Installing new probe**

**CAUTION**

To avoid damaging the threads or introducing leaks or air bubbles, do not cross thread or force the knurled fitting in too far.

5. Replace the probe-arm cover and tighten the two probe cover screws.
6. Lift up the probe arm to the end of its travel. Manually rotate the probe over the probe wash cup but not within the wash port.
7. Put the system in Operating mode.
8. At the Menu Panel, select **Maint.**, then select **User maint.** In the Probe posi.adjust area, select **Position adjust start**.

   All probes (DPP, SPP, RPP1, and RPP2) move over cuvettes.

9. Ensure that the probe is perpendicular to the arm and centered over the cuvette. If not, call your local technical support provider or distributor.
10. At the Operation Panel, select **Initialize** to return the probes back to home (over the wash cups).

11. At the Operation Panel, select **PRIME**, then select **PRIME 2,** then **Execute** to ensure proper water flow through the probe.

**NOTE**

Make sure that no water is leaking from the knurled fitting.

## Replacing DPP probes equipped with crash detection

***Materials required:***

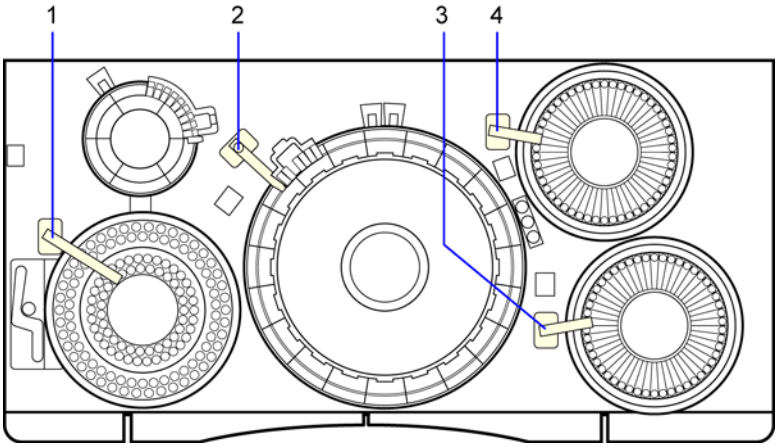
- Probes:

  **DPP**-equipped for crash detection (REF 02030495, PN 073-0611-01)
- Phillips screwdriver
- Pliers
- Lint-free towels

Time: 10 minutes
Analyzer mode: STANDBY

**BIOHAZARD**

Wear personal protective equipment. Use universal precautions.




**1** Dilution Probe (DPP)
**2** Sample Probe (SPP)
**3** Reagent Probe 1 (RPP1)
**4** Reagent Probe 2 (RPP2)

**Figure 5-31. Dilution probe location**

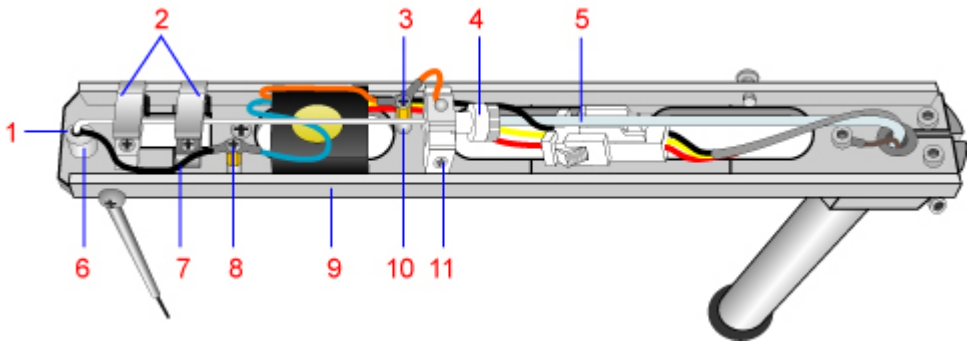
### Removing the DPP probe

1. Put the system in Standby mode.

**CAUTION**

Manually support the probe and be careful not to strike it against anything on the analyzer, to avoid damaging the probe tip when the power is off.

2. Cover the cuvettes, wash cups, and other analyzer surfaces with lint-free towels to catch any screws that may fall.
3. Lift and manually rotate the probe over the sample tray, either over the sample tray or over the ISE.
4. Loosen but do not remove the screws on each side of the probe cover.
5. Lift the cover off the probe arm.




| | | | |
|---|---|---|---|
| **1** | Probe | **7** | Black Wire |
| **2** | Spring Clips | **8** | Wire Lock Screw |
| **3** | Probe Wire Screw | **9** | Probe Arm |
| **4** | Joint Connector | **10** | Probe Wire Post |
| **5** | Probe Tubing | **11** | Joint Holder (and Locking Screw) |
| **6** | Probe Guide | | |

**Figure 5-32. DPP probe without cover**

6. Using pliers, if necessary, gently loosen the probe joint connector (**4**), then slide it back on the tubing (**5**) approximately 1 cm.
7. Gently flex and pull back on the tubing (**5**) to remove it from the end of the probe body.

**CAUTION**

Be careful not to damage the flare end or kink the tube.

8. Loosen but do not remove the locking screw (**11**).
9. Loosen but do not remove the probe wire screw (**3**), then remove the orange probe wire from the post (**10**).

**CAUTION**

Do **not** force the wire or bend excessively, to avoid breaking the wire off of the probe body mount.

10. Securely hold the probe arm (**9**) and open the 2 spring clips (**2**) by grasping each at the side closest to the black wire (**7**) going to the probe (**1**) and gently raising each to an open, locked position.

**CAUTION**

There is some spring resistance when attempting to open the clips. Do not allow the probe arm to swing side to side when opening the clips.

11. Loosen but do not remove the wire lock screw (**8**).
12. Remove the black wire (**7**) from the post coming from the probe (**1**), but leave the other blue wire attached.
13. Gently lift the probe (**1**) up through the probe guide (**6**), then carefully remove it from the probe arm (**9**).

14. Discard the old probe.

## *Install the new probe*

1. Carefully insert the new probe (**1**) into the probe guide (**6**).
2. Lower the probe fully into the guide so that the rear tube fitting rests in the joint holder (**11**).
3. While holding down the rear tube fitting, tighten the locking screw at the joint holder (**11**).
4. Carefully close each spring clip (**2**) over the probe.

**CAUTION**

Do **not** allow the clips to snap on the probe shaft, to avoid damaging the probe.

5. Reconnect the black wire (**7**) under the wire lock screw (**8**) and tighten the screw.

   To prevent damaging the wire, avoid flexing the wire more than necessary.

**CAUTION**

If the screw does not fully tighten, or the standoff spins, tighten the screw on the probe arm base until the standoff no longer spins; otherwise the liquid-level-sensing capability may be adversely affected.

6. Reconnect the orange probe and preamp wires to the post (**10**).
7. Carefully flex the tubing (**5**) and slip the flared end into the probe joint holder (**11**).
8. Slide the knurled nut of the joint connector (**4**) into the joint holder (**11**) and carefully tighten until snug.

**CAUTION**

Do not cross thread or force the joint connector in too far, to avoid damaging the threads or introducing leaks or air bubbles.

9. Replace the probe arm cover and tighten the 2 probe cover screws.
10. Lift up the probe arm (9) to the end of its travel, then manually lift and rotate the probe over the probe wash cup but not within the wash port.
11. Put the system in Operating mode.

## *Priming the system*

1. At the Menu Panel, select **Maint.**, then select **User maint**. (For additional details, refer to Using the User Maintenance window.).
2. At the User Maintenance window, in the Position Probes for Routine Cleaning area, select **Start**, then select **Yes** when prompted.
3. Ensure that the probe is perpendicular to the arm and centered over the cuvette.

4. If not centered, call your local technical support provider or distributor.
5. At the Operation Panel, select **Initialize** to return the probes back to home (over the wash cups).
6. At the Operation Panel, select **Prime**, **PRIME 2**, and then **Execute** to ensure proper water flow through the probe.

**NOTE**

Make sure that no water is leaking from the joint connector (4).

## Replenishing the RRV (reaction) bath oil bottle

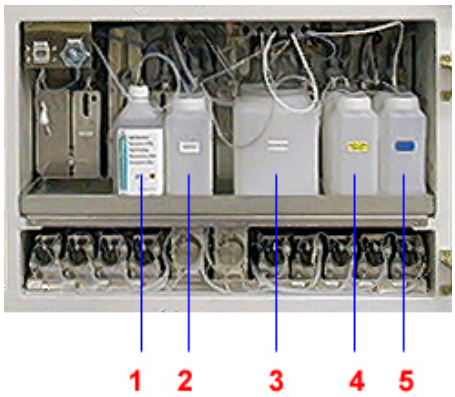
***Materials required:***

- RRV (reaction) bath oil (REF 09323099, PN B01-4180-01)

Time: 10 minutes
Analyzer mode: READY

**BIOHAZARD**

Wear personal protective equipment. Use universal precautions.




**1** ISE buffer bottle
**2** RRV (Reaction) bath oil bottle
**3** Isotonic saline diluent bottle
**4** Cuvette detergent bottle
**5** Cell conditioner bottle

**Figure 5-33. RRV bath oil bottle**

**CAUTION**

**Do not** attempt to clean the RRV bath oil bottle (**1**) with water; RRV bath oil and water do not mix.

1. Unscrew the filter cap (**3**) at the front of the RRV bath oil bottle (**1**), then pull up the tube with the filter.
2. Disconnect the RRV bath oil bottle level sensor connector (**2**), then turn the connector counter-clockwise and pull it out.

**CAUTION**

Make a note of the bottle position on the shelf, to avoid mixing up the fluid bottles.

3. Remove the RRV bath oil bottle (**1**).

**CAUTION**

Ensure that level-sensor connector (**2**) does not get wet, to avoid damaging it.

4. Refill the bottle with RRV (reaction) bath oil.
5. Replace the bottle on the shelf in the cabinet.
6. Connect the RRV bath oil bottle level sensor connector (**2**) by pushing the connector in and turning it clockwise.
7. Insert the filter and tube, then fasten the cap.

   **NOTE**

   Make sure that the filter holder is located at the bottom of the bottle.

## *Preventive cleaning of the wash station lines*

***Materials required:***

- 5 reagent containers, empty, 70-mL (optional)
- Probe Wash 1
- Probe Wash 2
- 10% Cuvette Wash solution
- 5% Probe Wash 3 solution
- 70-mL reagent container (REF 06397121, PN 073-0373-02)
- Wash solution labels (REF 00153468, PN 073-0406-02)
- Deionized water

**BIOHAZARD**

Wear personal protective equipment. Use universal precautions.

Time: 45 minutes
Analyzer mode: READY

If you experience a problem with clogs in the wash station aspiration nozzles and lines, use this procedure to clean the WUD and DWUD wash station aspiration nozzles and lines.

1. Prepare either of the following wash solutions:

**WARNING**

Probe Wash 3 contains 4.5% potassium hydroxide and 2% sodium hypochlorite. Avoid contact with skin and eyes. Probe Wash 3 is a corrosive material that can cause burns. Wear suitable protective clothing, gloves and eye/face protection. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

Household bleach is 5% sodium hypochlorite. When handling bleach, which can be used as a cleaning and antiviral agent, wear protective clothing, gloves, and safety glasses. It is harmful if swallowed and may cause eye or skin irritation.

Use household bleach that is free of heavy metals, such as Clorox.

- **Preferred Solution** – Prepare a 10% solution of Probe Wash 3 by diluting 1 part of Probe Wash 3 with 9 parts of distilled or deionized water. The minimum recommended volume is 100 mL Probe Wash 3 plus 900 mL of distilled or deionized water.
- **Alternate Solution** – Prepare a 20% solution of household bleach by diluting 1 part of bleach with 4 parts of distilled or deionized water. The prepared solution is

stable for one week when stored at room temperature. Minimum recommended volume is 200 mL bleach plus 800 mL of deionized distilled water.

**NOTE**
The remainder of this procedure describes the steps to clean the WUD and DWUD wash stations. Perform the entire procedure for the WUD lines and nozzles, then repeat the entire procedure for the DWUD lines and nozzles. The various parts are described as the "DWUD/WUD," meaning one or the other, depending on which is being cleaned at the time, and does not mean both simultaneously.

2. Prepare the WUD/DWUD for cleaning:
   a. With the system in READY mode, log on as **supervisor**.
   b. Place paper towels on top of the RRV and DTT cuvettes directly under the WUD/DWUD nozzles as a precaution.
   c. Using a 4-mm hex wrench, loosen the captive screw (**1**) that secures the WUD/DWUD wash head to the WUD/DWUD mechanism.

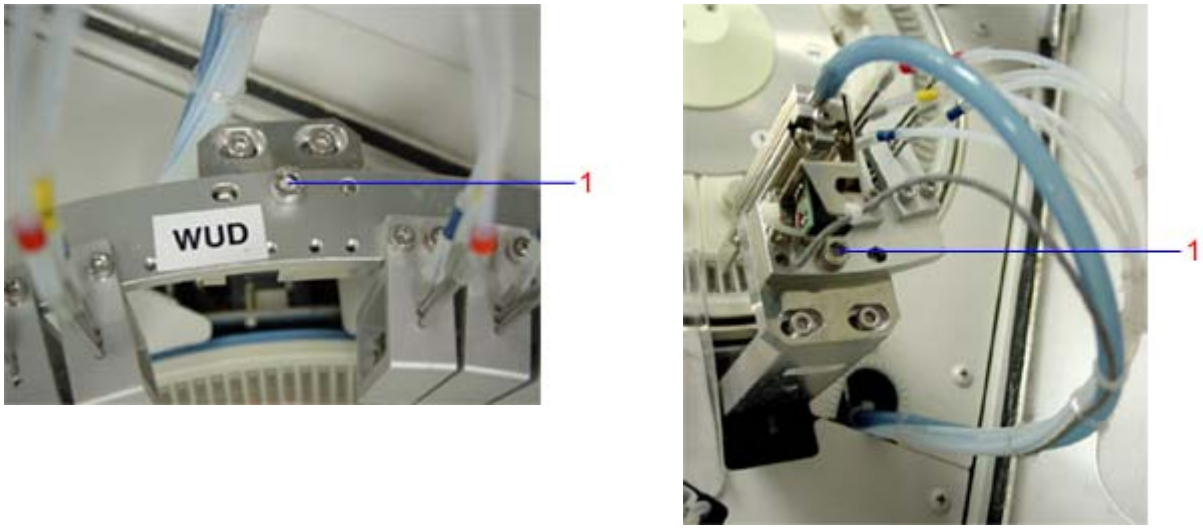



**Figure 5-34. WUD and DWUD captive screw**

   d. Lift up the WUD/DWUD wash head and place it in a shallow plastic tray on top of the paper towels.

      **NOTE**
      Use a shallow tray for washing the nozzles. A tray with a depth of 35 – 40 mm is most suitable. Trays with higher sides may require additional wash solution.

   e. Place the dryer nozzle outside the tray (**1**) and all the other nozzles inside the tray.

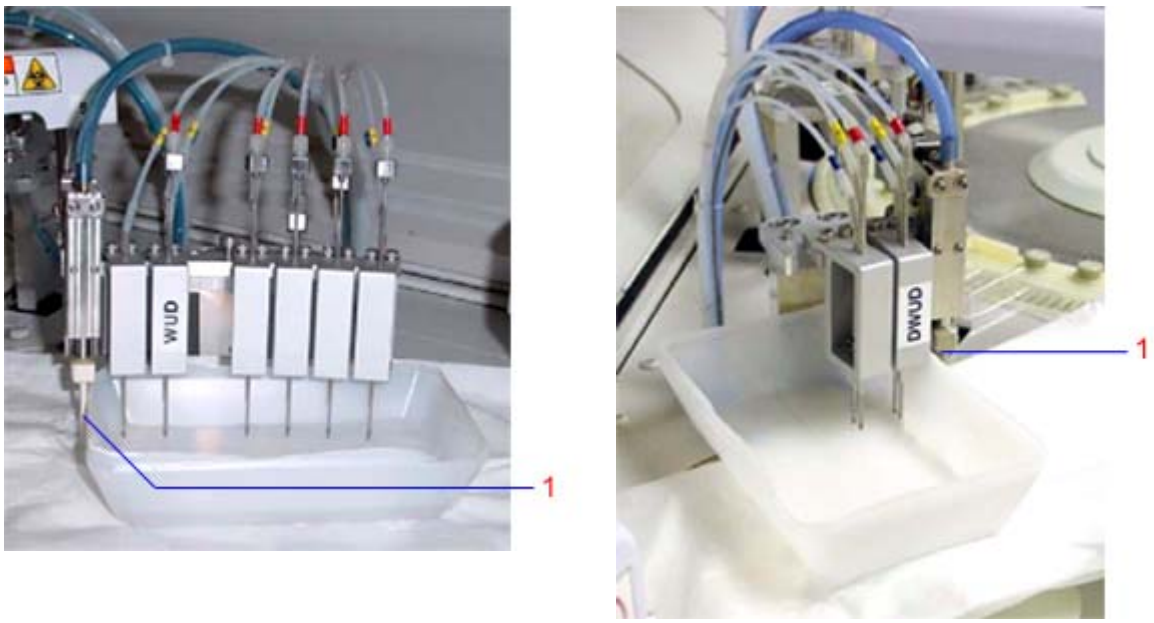



**Figure 5-35. WUD and DWUD dryer nozzle**

f. Fill the tray with deionized water, being careful not to overflow the tray.

g. Pour enough deionized water into the tray so that the center nozzles (yellow-labeled overflow nozzle) are in liquid.

3. At the Menu Panel, select **Maint.**, then select **JEOL Maintenance**.

   **NOTE**

   If the JEOL Maintenance option is not listed on the Maint. menu, call your local support provider for access to this menu option.

4. At the JEOL Maintenance window, in the Univers. sequence start area, type **1** in the Sequence field and **1** in the Number of times field, then select **Start**.

5. Select **Yes** at the confirmation window to start the procedure.
   - UNIVERSAL displays as the operation mode.
   - One sequence takes about 65 – 70 seconds.
   - This sequence activates the appropriate devices so all the WUD/DWUD aspiration nozzles and overflow nozzles are pulling vacuum.
   - The overflow lines (short nozzles) aspirate air after a short while as the liquid in the container lowers. Add more liquid as necessary to flush out the overflow lines.

6. When the operation mode returns to READY, lift the WUD/DWUD wash head out of the tray and temporally place it on top of the WUD/DWUD assembly.

7. Remove and empty the tray, then place it back on paper toweling under the WUD/DWUD nozzles.

8. Place the WUD/DWUD wash head into the tray and fill the tray with 10% Probe Wash 3 solution (preferred) or 20% bleach solution (alternate).

9. Pour enough wash solution into the tray, so the center nozzle (yellow-labeled overflow nozzle) is in liquid, without overflowing the tray.
10. Repeat steps 4 and 5, to clean the WUD/DWUD lines with the 10% Probe Wash 3 or 20% bleach solution.
11. Repeat steps 4 and 5 until the lines are cleaned thoroughly.

    **NOTE**

    As an aid to cleaning the aspiration lines, manually lift the WUD/DWUD wash head in and out of the cleaning solution to introduce air into the lines.
12. When the operation mode returns to READY, lift the WUD/DWUD wash head out of the tray and temporally place it on top of the WUD/DWUD assembly.
13. Using a lint-free cloth, carefully clean the stainless steel nozzles of the WUD/DWUD wash head.
14. Remove, empty, and rinse the tray to remove any residual cleaning solution, then place it back on paper toweling under the WUD/DWUD nozzles.
15. Place the WUD/DWUD wash head into the tray, then fill the tray with deionized water.
16. Repeat steps 4 and 5 to flush out the cleaning solution with deionized water.
17. Repeat this sequence twice as many times as the sequence was run with the cleaning solution, to ensure that no residual cleaning solution is left in the lines.

    **NOTE**

    A colored food dye may be added to the rinse water as a visual aid, to verify the blue and yellow aspiration lines are not clogged and are working properly.
18. When the operation mode returns to READY, move the WUD/DWUD wash head on top of the WUD/DWUD assembly and secure it by tightening the 4-mm captive hex screw.
19. Remove the tray and paper towels from the system.
20. Repeat this procedure from step 2 for the other wash head, if needed, and then proceed to step 21.
21. Exit the JEOL Maintenance window.
22. Run a Startup Wash (WASH3) procedure on the system, then verify proper hydraulic operation and mechanical alignment of the WUD/DWUD assemblies during the Startup Wash.
23. Run your laboratory’s quality control material and verify the results are within acceptable ranges.

## *Washing all the ISE lines*

***Materials required:***

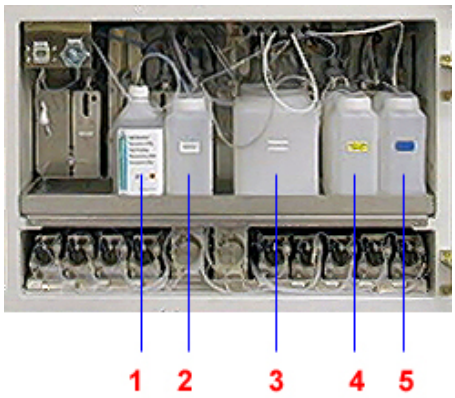
- 2 clean, empty buffer bottles
- Probe Wash 3 solution
- Dummy electrode
- Phillips head screwdriver

Time: 15 minutes
Analyzer mode: Manual operation

**BIOHAZARD**

Wear personal protective equipment.
Use universal precautions.

1. At the Menu Panel, select **Maint.**, then select **ISE Operation**.
2. In the Period.wash area, select **OFF**, then select **Set**.
3. Open the front doors and replace the buffer solution (**1**) with another buffer bottle containing 500 mL of deionized water.




**1** ISE buffer bottle
**2** RRV (Reaction) bath oil bottle
**3** Isotonic saline diluent bottle
**4** Cuvette detergent bottle
**5** Cell conditioner bottle

**Figurer 5-36. Location of ISE Buffer bottle**

4. Loosen the thumb screw and lift the ISE cover.
5. Disconnect the electrode connectors.
6. Remove the thumbscrew (**1**) to release the plate that secures the electrodes and the block containing the electrode.


**Figure 5-37. ISE electrode plate thumbscrew**

7. Remove the electrodes and replace it with the dummy electrode.
8. At the ISE Operation window, in the Bufferprime area, type **50** in the Times field.

9. Select **Execute**
10. When prompted, select **Yes** to execute buffer prime.

### *Washing the lines*

1. Remove the buffer bottle with the deionized water and replace it with a bottle filled with a solution of 475 mL of deionized water and 25 mL probe wash 3 solution.
2. At the ISE Operation window, in the Bufferprime area, enter **50** in the Times field.
3. Select **Execute**.
4. When prompted, select **Yes** to execute the buffer prime.

### *Rinsing the lines*

1. Replace the probe wash 3 solution bottle with a bottle of deionized water.
2. In the Bufferprime area, enter **50** in the Times field, then select **Execute**.
3. Remove the dummy electrode.
4. Reinstall the Na, K, and Cl electrodes.
5. In the Initialize area, select **Execute**.
6. Before reinstalling the buffer-solution bottle, thoroughly rinse the buffer bottle cap, float switch, and tube with deionized water and dry completely.
7. Install the buffer bottle or replace it if the volume is low.

### *Priming and initializing the ISE module*

1. At the ISE Operation window, in the Bufferprime area, enter **15** in the Times field.
2. To prime the line with buffer, select **Execute**, then select **Yes**.
3. When the priming is finished, verify that the electrodes are not leaking.
4. At the ISE Operation window, select **Exit**, then select **Yes**.
5. Run 10 pooled serum samples, or do an ISE CV check.
6. Perform calibration and run controls.

## *Conditioning the ISE Na and K electrodes*

***Materials required:***

- 10 mL of serum pool
- 30 mL of ISE Buffer (REF 03463190, PN B01-4171-51)
- 2-mL or 3-mL plastic, disposable pipette

Time: 5 minutes (preparation)
24 hours (immersion)
Analyzer mode: READY

**BIOHAZARD**

Wear personal protective equipment.
Use universal precautions.

**NOTES**

- The Cl electrode does not require conditioning.
- If the slope of the electrode is in the range of 46 – 49 (Na or K) and the Daily Maintenance Log entries for the electrode shows it is trending down, then perform this procedure.
- If the slope is low and a trend is not observed, verify that all other ISE maintenance is current before performing this procedure.

1. Prepare a 1:4 dilution of pool serum using ISE buffer solution.
2. Remove the new electrode from its case.

   **NOTE**

   The ion electrode contains an inner solution, which can be confirmed by shaking the electrode. This solution decreases little by little with time. If you do not feel any response in your shaking, measure its weight. If the electrode weighs less than 9 g, do not use it.

3. Remove the sponge from the bottom of the electrode case and place the electrode to be conditioned back into the case.
4. Using a dropper or pipette, add 0.5 mL of pool serum into the flow path of the electrode.

   Be sure to apply the serum thoroughly.
5. Add buffer solution, prepared in step 1, to the case. Cover the entire electrode with the solution.

   Allow the electrode to condition overnight.
6. When conditioning is complete, remove the electrode, wash it with deionized water, and dry it thoroughly

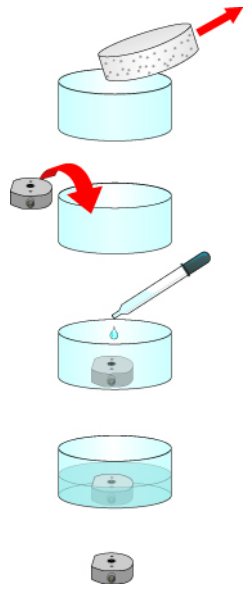


**Figure 5-38. Soaking the electrode**

**WARNING**

To prevent infection, by contacting serum directly, wear suitable protective gloves when you remove the electrode from the solution.

**NOTE**

High-concentrated salt water is used as a preservation solution to maintain electrode performance. When the electrode package is opened, wash the electrode with sufficient water and wipe well before use. Small amounts of salt on the electrode may cause rust on the electrode connector.

**NOTE**

Storing the reference electrode:

a. Remove the reference electrode from the ISE module.

b. Rinse the reference electrode with deionized water.

c. Place it into an appropriate container.

d. Cover the reference electrode with reference electrode filling solution.

e. Cover the container and store at -18 to 4.5 °C (0 to 40 °F).

f. Rinse the reference electrode with deionized water prior to the next use.

7. Replace the electrodes on the instrument with the newly conditioned ones.
8. Calibration is performed as part of the electrode replacement.
9. If the calibration fails, repeat the calibration.
10. If data continues to be unstable after electrode conditioning, perform an electrode wash, then perform calibration.

## *Replacing ISE electrodes*

***Materials required:***

Electrodes

- Cl (REF 07097504, PN 073-0049-01)
- K (REF 06135445, PN 073-0050-01)
- Na (REF 03092699, PN 073-0051-01)
- Reference (REF 00311764, PN 073-0653-01
- O-rings, 3 (REF 09955206, PN 073-0071-01)
- Philips screwdriver

**BIOHAZARD**

Wear personal protective equipment. Use universal precautions.

Time: 5 minutes
Analyzer mode: Manual operation

Replace the Na, K, and the Cl electrodes if the slope is incorrect or calibration continuously fails.

The acceptable ISE slope is between 45.0 and 63.0. Slopes outside of this range are flagged as shown in the table. A flagged slope fails the calibration. The slope limits are defined at the ISE Parameter Settings window.

| Mark | ISE Slope Range |
|---|---|
| H | > 65.0 |
| h | 63.1 to 65.0 |
| l | 38.0 - 44.9 |
| L | < 38.0 |

Replace the reference electrode when the reference electrode value is <500.

*Checking the reference electrode value*

1. At the Menu Panel, select **Maint.**, then select **ISE Monitor**.
2. At the ISE Monitor window, at the bottom of the Calib.monitor: Serum area, check the value of the Ref. electrode field.
3. If the Ref. electrode value is **less than 500.0**, replace the reference electrode.

## *Removing electrodes*

1. At the Menu Panel, select **Maint.**, then select **ISE Operation**.
2. In the Period. wash area, select **OFF**, then select **Set**.
3. Using a Phillips screwdriver, remove the screws (**1**, see Figure 5-1) that secure the DPP shield to the analyzer panel.
4. Push the DPP shield to the right and slowly lift the DPP shield until it reaches approximately a 90° angle, then gently lift the tab of the DPP shield and remove.
5. Loosen the thumb screw and lift the ISE cover.
6. Disconnect the electrode connectors.
7. Remove the thumbscrew (**1**) to release the plate that secures the electrodes and the block containing the electrode. (See Figure 5-37.)
8. Remove the electrode to replace.

## *Installing electrodes*

**NOTE**
Make sure the K and Na electrodes are conditioned. When the Cl and Ref electrodes are taken out of their packaging, they are wet. Wipe the Cl electrode thoroughly, and wash the Ref electrode using water.

**NOTE**
To store the reference electrode, refer to Storing the Reference Electrode on page 169.

1. Assemble the new electrodes in the correct order:
2. Set the electrodes in place, paying careful attention not to leave a space between them.

   Make sure there is an 0-ring between each electrode and that the ridges on the side of each electrode fits into the depressions on the side of the electrode next to it.

3. Tighten the thumbscrew while holding down each electrode with the retaining plate.

4. Insert the electrode connectors.

**CAUTION**

If a space exists between the electrode connections, the plate retaining the electrodes cannot close. If you cannot close it, move each electrode left and right little-by-little. **Do not** force the electrode. Fasten the thumbscrew tightly. If the retaining plate loosens during measurement, liquid could leak, causing a problem with the instrument.

### *Priming the ISEs*

1. At the ISE Operation window, select **Execute** to the right of the word Initialize.
2. Select **Yes** when prompted to execute.
3. In the Bufferprime area, enter **3** into the Times field.
4. Select **Execute**, then select **Yes** when prompted to execute buffer prime.
5. Verify the liquid is discharged smoothly from the dilution bowl during priming.
6. If the liquid is increasing without being discharged, a leak exists, an electrode is incorrectly positioned, or a clog is in the drain system. If the liquid increases, immediately stop the instrument.

   **IMPORTANT**

   If clogging occurs, the most probable cause is that the flow path is clogged inside the electrode. Remove the Na and K electrodes, and check them by transmitted light to see whether the flow path is clogged or not. You cannot do this for the Cl electrode because of its construction. When in doubt, even if you cannot find a problem, try replacing the electrode.
7. Mount the stainless steel cover on the top of the ISE unit by sliding it inside and fasten the screw retaining the cover.

   **NOTE**

   When sliding it, be careful not to scratch the tubes or dilution bowl. When fastening the screw, verify that the cover is not caught in the groove and is not loose.
8. Reinstall the cover and tighten the screws.
9. Replace the DPP shield and secure it in place with the Phillips screw.
10. At the ISE Operation window, in the Initialize area, select **Execute,** then select **Yes**.

    **NOTE**

    The ISE wash is automatically turned on.
11. After initialization is complete, select **Exit,** then select **Yes**.

### *Calibrating the ISEs*

1. At the Operation Panel, select **Initialize**.
2. At the Menu Panel, select **Maint.**, then select **ISE Operation**.
3. At the ISE Operation window, in the Calibration area, select **Execute**.
4. When prompted, select **Yes** to execute calibration.

5. If the calibration fails, repeat calibration again and if data continues to be unstable, perform an electrode wash.

   **NOTE**

   The electrodes may have to stabilize on the system before a successful calibration is achieved.

6. At the ISE Operation window, select the **Electrode Info** button and enter the new electrode information.

### *Storing the reference electrode*

1. Remove the reference electrode from the ISE module.
2. Rinse the electrode with deionized water.
3. Place it into an appropriate container.
4. Cover the reference electrode with reference electrode filling solution.
5. Cover the container and store at 2 - 40°C (35.6 - 104°F).
6. When ready to use, rinse the electrode with deionized water.

   **NOTE**

   If the electrode is stored cold, allow time for it to equilibrate to room temperature before use.

## *Cleaning the dilution bowl and waste-drain nozzle*

***Materials required:***

- Cotton stick
- Deionized water
- Household bleach
- Toothpick
- Philips screwdriver

Time: 45 minutes
Analyzer mode: READY

**BIOHAZARD**

Wear personal protective equipment.
Use universal precautions.

### *Cleaning the dilution bowl*

1. At the Menu Panel, select **Maint.**, then select **ISE Operation**.
2. At the ISE Operation window, in the Period.wash area, select **OFF**, then select **Set**.
3. Using a Phillips screwdriver, remove the screws (**1**, see Figure 5-1) that secure the DPP shield to the analyzer panel.
4. Push the DPP shield to the right and slowly lift the DPP shield until it reaches approximately a 90° angle, then gently lift the tab of the DPP shield and remove.
5. Loosen the thumb screws, then remove the ISE cover.
6. Loosen the screw retaining the stainless steel cover at the top of the ISE unit, and remove that cover by sliding it toward you.
7. At the ISE Operation window, next to Final operation, type **16** in the field next to Pure water position.

8. Select container 1 setting for 10-mL tube.
9. Fill a 10-mL tube with deionized water and place it on the CTT tray in position 16.
10. At the ISE Operation window, in the Final operation area, select **Execute.**

    Water is dispensed into the ISE module.

11. To dissolve the crystals attached to the liquid-supply nozzle, let it stand for about five minutes.
12. At the ISE Operation window, in the Dil Bowl drain area, select **Execute**.

    The water in the dilution bowl drains.

13. Wipe up any water or dirty parts around the liquid-supply nozzle (**1**) using a damp cotton stick or similar material.


**Figure 5-39. Location of the liquid-supply nozzle**

14. At the ISE Operation window, enter **5** in the Bufferprime Times box, then select **Execute**.
15. When prompted, select **Yes** to execute a buffer prime.

### *Cleaning the waste-drain nozzle*

**CAUTION**

Be careful not to scratch the nozzle. Damaging the nozzle may cause inaccurate results.

1. Using a blunt object such as a pipette, carefully scrape the crystals that are attached to the waste-drain nozzle (**1**).


**Figure 5-40. Location of waste-drain nozzle**

2. At the ISE Operation window, enter **5** in the Bufferprime Times box, then select **Execute**.

   **IMPORTANT**
   Verify that no buffer collects in the wash block. Buffer that remains in the wash block may clog the drain.

### *Maintaining the ISE unit after the dilution bowl and waste-drain nozzle are clean*

1. Replace the stainless steel cover of the ISE unit by sliding it into place, then secure it with the retaining screw.

**CAUTION**
When sliding the cover, be careful not to scratch the tubes and dilution bowl. Also, when fastening the screw, verify that the cover is not caught in the groove and is not loose.

2. Reinstall the splash cover and the DPP probe shield.
3. At the ISE Operation window, in the Initialize area, select **Execute**.
4. When prompted, select **Yes** to execute.
5. At the ISE Operation window, in the Period.wash area, select **ON**, then select **Set**.
6. At the ISE Operation window, select **Exit**.
7. Perform calibration and run controls.

## *Recovering from a power failure*

### *Preparing the system for an expected power outage*

If you know in advance of an upcoming power outage:

1. Turn off the workstation and analyzer power by performing the normal shutdown operation.
2. If you expect the power supply to be off for a long period of time, refrigerate the reagents.

3. When the power returns, perform the normal startup operation.

### *Preparing the system for power return (if power was unexpectedly lost while system was on)*

*While the electrical power is still off, do the following:*

1. Turn off the workstation power switch.
2. At the power panel, set the **Operate/Standby switch** to Standby.

*When the electric power returns, do the following:*

1. Turn on the workstation power switch.
2. When the Startup window opens, turn the **Operate/Standby switch** to Operate.
3. Select the **system reset** button on the analyzer unit power supply panel.
4. At the Startup window, enter a password.
5. Select **Re-Start**, then select **OK**.
6. If possible, repeat the task that you were performing prior to the power failure and verify that the data was stored.
7. If reagent was dispensed, you must perform a Weekly WASH2 before resuming operation.

### *Recovering from an unexpected power outage (after power returns, when power was unexpectedly lost while system was on)*

1. If the Startup window is open, select **Shutdown** and perform the normal shutdown operation.
2. Turn off the workstation power and turn the Operate/Standby switch on the analyzer to **Standby**.
3. Wait approximately 20 seconds.
4. Perform the normal startup operation and open the Startup window.
5. At the Startup window, enter a password.
6. Select **Re-Start**, then select **OK**.
7. If possible, repeat the task prior to the power failure and verify that the data was stored.
8. If reagent was dispensed, you must perform a Weekly WASH2 before resuming operation.