



Installing the ICS-2000 Ion Chromatography System

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This document provides instructions for the initial installation of the ICS-2000 Ion Chromatography System.

NOTE The order of the steps is important. It is especially important to install Chromeleon® before connecting the USB cable and turning on the ICS-2000 power.

1 Facility Requirements

- Make sure the ICS-2000 installation site meets the following environmental specifications:
 - Operating Temperature:** 4 °C to 40 °C (40 °F to 104 °F)
 - Humidity:** 5% to 95% relative humidity, noncondensing
- Provide a sturdy workbench for the ICS-2000 of a height that ensures convenient access to the interior.
- Allow at least 15 cm (6 in) behind the ICS-2000 for power connections and ventilation. For optimal performance, install the ICS-2000 in a draft-free location, out of the path of air conditioning and heating vents.
- (Optional) Provide a clean gas source regulated to between 0.55 and 0.83 MPa (80 and 120 psi) for pressurization of the eluent reservoir.
- Use ASTM filtered, Type I (18-megohm) deionized water when preparing eluent and regenerant.

2 Unpacking the ICS-2000 System

1. After removing the ICS-2000 from the shipping box and removing the top layer of foam, remove the next layer of foam (see [Figure 1](#)).

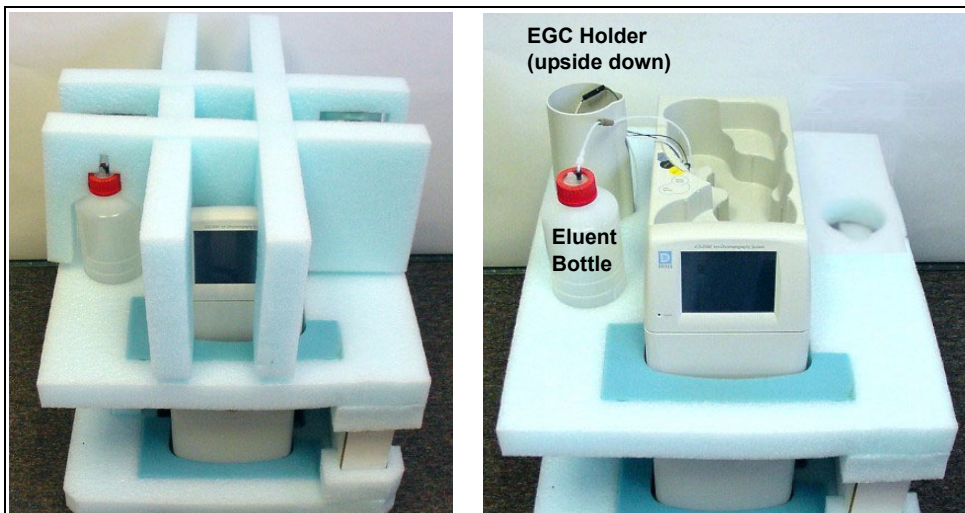


Figure 1. Unpacking the ICS-2000

2. Set the eluent bottle on top of the ICS-2000 (see [Figure 2](#)).
3. **TURN OVER THE EGC HOLDER**, and set it on top of the ICS-2000.



Figure 2. ICS-2000 After Installing Eluent Bottle and EGC Holders

4. Remove the next layer of foam and remove the Ship Kit box (see [Figure 3](#)).

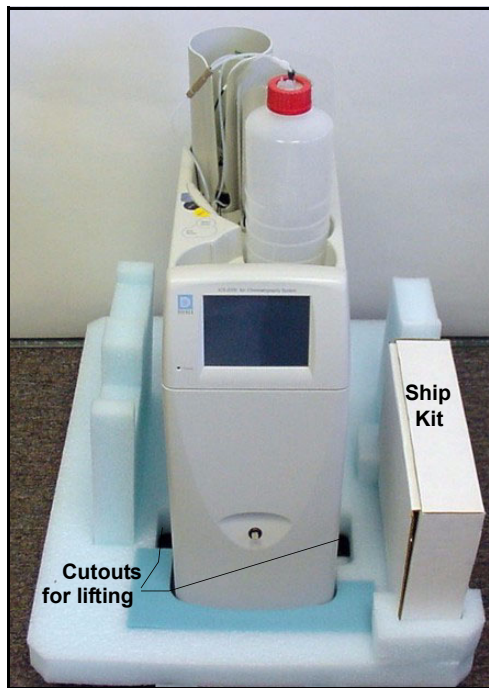


Figure 3. ICS-2000 with Ship Kit

5. The bottom foam layer has two cutouts on either side of the ICS-2000 module; use these as hand holds when lifting the module (see [Figure 3](#)).
6. Lift the ICS-2000 out of the bottom layer of foam and set it on a workbench. Inspect the ICS-2000 for any shipping damage.



Two or more persons should lift the ICS-2000, which weighs 30 kg (66 lb). Lift the ICS-2000 only from each side of the cabinet bottom. Lifting from the front door will damage the door hinges.



Au moins deux personnes peuvent soulever le ICS-2000: il pèse 30 kg (66 lb). Ne soulevez le ICS-2000 que par chaque côté du fond de l'armoire. Son soulèvement par la porte du panneau avant endommagera les charnières de la porte.



Der ICS-2000 wiegt über 20 kg. Daher sollte das Gerät nur von zwei oder mehr Personen angehoben werden. Greifen Sie dazu an beiden Seiten unter das Gerät. Heben Sie den Autosampller nicht an der Vordertür an, da dadurch die Türangeln beschädigt werden könnten.

2.1 Unpacking the Computer (North America only)

NOTE These instructions assume that Chromeleon® software and the software license were installed on the computer before shipping.

1. Remove the central processing unit (CPU), keyboard, mouse, and all documentation from the computer box and place these items on a workbench.
2. Remove the monitor from its box and place it on the workbench.
3. Follow the instructions in the computer installation guide to hook up the monitor, mouse, keyboard, and CPU.
4. Go on to [Section 4](#), “Installing the Chromeleon Software License.”.

2.2 Unpacking the Computer (outside North America)

1. Refer to *Installing the Chromeleon IC System* (Document No. 031883) to verify that the computer being used meets Chromeleon specifications. The manual is on the Dionex Reference Library CD-ROM (P/N 053891).
2. Remove the central processing unit (CPU), keyboard, mouse, and all documentation from the computer box and place these items on a workbench.
3. Remove the monitor from its box and place it on the workbench.
4. Follow the instructions in the computer installation guide to hook up the monitor, mouse, keyboard, and CPU.
5. If Chromeleon is not installed on the computer, go on to [Section 3](#), “Installing Chromeleon.”
6. If Chromeleon is already installed on the computer, go on to [Section 4](#), “Installing the Chromeleon Software License.”

3 Installing Chromeleon

NOTES

- **Windows® 2000 or Windows XP is required for controlling the ICS-2000 with Chromeleon. Chromeleon version 6.5 SP2 or later is required.**
 - **To install Chromeleon, you must log onto Windows 2000 or XP with administrator privileges. Administrator privileges are not required to run Chromeleon.**
1. Turn on the computer power.
 2. Follow the Windows setup steps as they appear on the screen.
 3. Verify that the monitor display is set to a minimum of 1024 x 768 with 16 bit color.
 4. Insert the Chromeleon CD-ROM into the CD-ROM drive.
 5. The Chromeleon Setup menu appears.
 6. If the Setup menu does not appear automatically, go to the Autorun folder on the Chromeleon CD-ROM and double-click **autorun.exe**.
 7. Select **Launch Chromeleon Setup**.
 8. Setup now guides you through the installation procedure; follow the on-screen instructions as they appear.
 9. When prompted, select whether to add the Chromeleon Server Monitor to the Startup group. If you select yes, the Server Monitor starts automatically when the computer is started, and the program icon appears in the taskbar.
 10. When complete, go on to [Section 4](#), “Installing the Chromeleon Software License.”

IMPORTANT

Installing DX-LAN Devices

If you will also be installing a module that requires a DX-LAN interface connection, verify that the following steps are completed before continuing:

1. If it is not already installed, install the DX-LAN card in the module. Refer to the operator's manual for the module for installation instructions.
2. Install the DX-LAN card in the computer.
3. Connect the module to the DX-LAN.
4. Install the DX-LAN card driver.

Instructions for Steps 2 through 4 are in *Installing the Chromeleon IC System* (Document No. 031883).

4 Installing the Chromeleon Software License

For the Chromeleon computer to control the ICS-2000, a valid software license must be installed. To install the license, you first install a dongle on the computer and then enter a license "Key Code" in Chromeleon. (A dongle is an adapter that is connected to the parallel PC interface or USB port. The dongle stores the serial number of a Chromeleon computer.)

NOTE If the software license is managed via a License Server, a dongle is not required.

1. Plug the dongle into the appropriate port on the computer (either the parallel or USB port, depending on the type of dongle). Tighten the connector screws on a parallel port dongle.
2. If it is not already running, start the Chromeleon Server Monitor (select **Start>Programs>Chromeleon>Server Monitor**). The Server Monitor window opens.

3. Check the server status:
 - If “Chromeleon Server is running idle” is displayed, the license Key Code was entered before shipping the computer, and you can omit the remaining steps in this section. Click **Close** and go on to [Section 5](#).
 - If “Chromeleon Server is running idle (Evaluation Mode)” is displayed (see [Figure 4](#)), the license Key Code has not yet been entered. If this is the case, go on to Step 4.

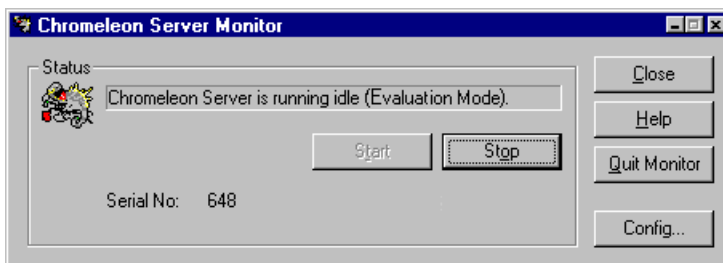


Figure 4. Server Evaluation Mode

4. Open Chromeleon (select **Start>Programs>Chromeleon>Chromeleon**).

5. Select **File>Preferences** to open the Preferences dialog box (see [Figure 5](#)). Select the **License** tab and click **Dongle**. Enter the **Key Code** exactly as it appears on the Chromeleon Software License key code sheet. Click **OK**.

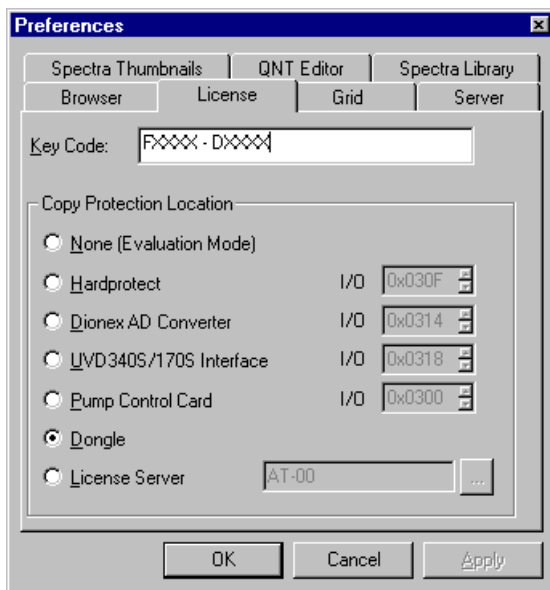


Figure 5. Preferences: License Page

6. Check the Server Monitor status. It should now display “Chromeleon Server is running idle.” (see [Figure 6](#)).

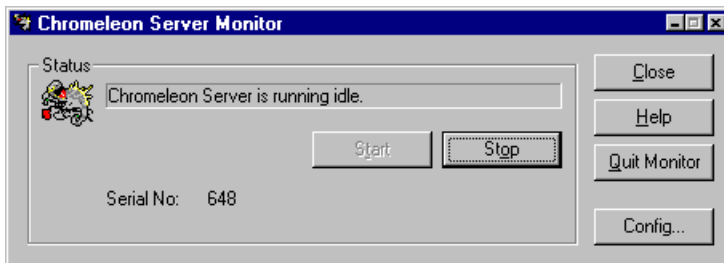


Figure 6. Server Running

7. Click **Close** to close the Server Monitor window.
8. Go on to [Section 5](#).

5 Connecting the ICS-2000 to the Chromeleon PC

The ICS-2000 rear panel provides a USB receptacle for connecting the ICS-2000 to a USB port on the Chromeleon PC. The rear panel also provides two USB ports for connecting other Dionex USB-compliant modules to the system.

IMPORTANT

Do not turn on the power to the ICS-2000 or other USB module(s) until after you connect the USB cable.

Before connecting the USB cable, verify that Chromeleon is installed. If not, Windows will be unable to identify the new USB device when the power is turned on. See [Section 3](#) to install Chromeleon.

5.1 Connecting the ICS-2000 to the PC

1. Locate the USB cable (P/N 960779) in the ICS-2000 Ship Kit (P/N 057905).
2. Plug the cable's "A" connector into a USB port on the Chromeleon PC and plug the cable's "B" connector into the USB receptacle (labeled **FROM PC**) on the ICS-2000 rear panel (see [Figure 7](#)).

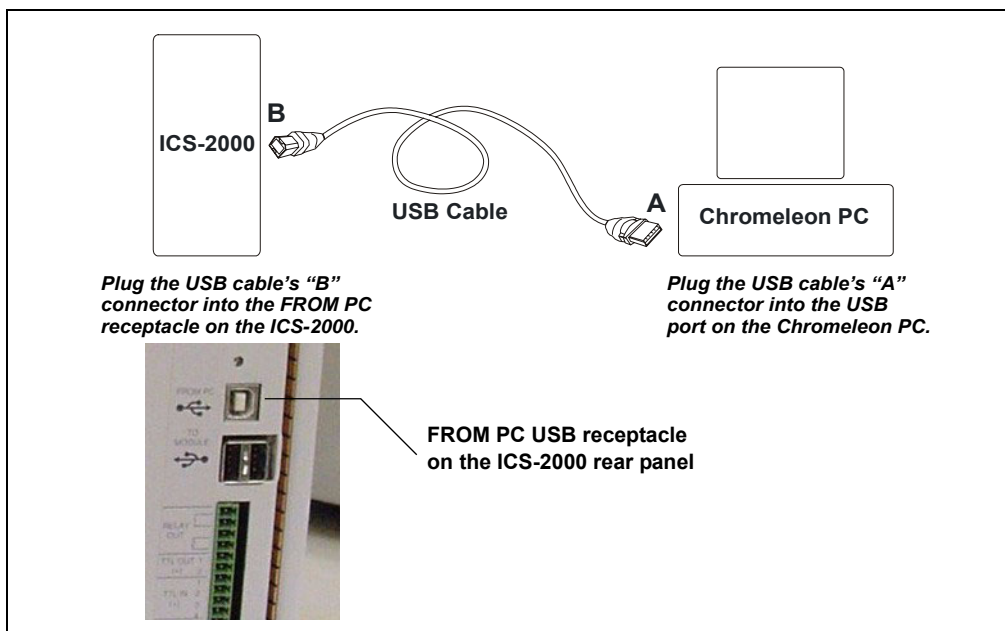


Figure 7. Example Connections: One ICS-2000 Connected to the Computer

5.2 Connecting Additional USB Devices

The ICS-2000 provides two USB ports for connecting additional Dionex USB-compliant modules to the system.

To connect an additional USB module, plug the “A” connector on a USB cable into an “A” port (labeled **TO MODULE**) on the ICS-2000 rear panel and plug the cable’s “B” connector into the USB receptacle on the USB module (see [Figure 8](#)).

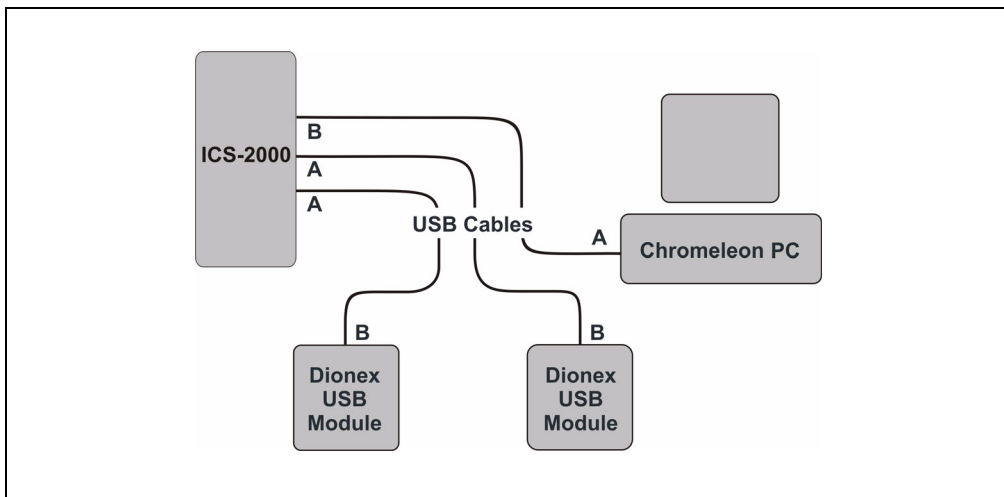


Figure 8. Example Connections: Two Dionex USB Modules Connected to the ICS-2000

NOTE If the number of USB devices in the system exceeds the number of available USB ports, connect the devices to the system with a USB-compliant, full-speed external hub. One or more hubs is also required if the ICS-2000 or other USB device is more than 5 meters (16 ft) from the PC. Refer to the manual provided by the hub vendor for complete installation instructions.

IMPORTANT

The USB standard limits the USB cable length to 5 meters (16 ft). Each USB device can be separated from the PC by no more than five hubs. Thus, each USB device can be located no more than 30 meters (32 yds) from the PC.

6 Connecting the Power Cord

Connect the power cord (IEC 320 C13) (ordered separately) from the main power receptacle on the rear panel to a grounded power source. The ICS-2000 power supply is auto-sensing, so no adjustment is required to select the line voltage.



SHOCK HAZARD—To avoid electrical shock, use a grounded receptacle. Do not operate the ICS-2000 or connect it to AC power mains without an earthed ground connection.



The power supply cord is used as the main disconnect device. Make sure the socket-outlet is located near the ICS-2000 and is easily accessible.



Operation at AC input levels outside of the specified operating voltage range may damage the ICS-2000.



DANGER D'ÉLECTROCUTION—Pour éviter toute électrocution, il faut utiliser une prise de courant avec prise de terre. Ne l'utilisez pas et ne le branchez pas au secteur C.A. sans utiliser de branchement mis à la terre.



Le cordon d'alimentation principal est utilisé comme dispositif principal de débranchement. Veillez à ce que la prise de base soit située/installée près du module et facilement accessible.



STROMSCHLAGGEFAHR—Zur Vermeidung von elektrischen Schlägen ist eine geerdete Steckdose zu verwenden. Das Gerät darf nicht ohne Erdung betrieben bzw. an Wechselstrom angeschlossen werden.



Das Netzkabel ist das wichtigste Mittel zur Stromunterbrechung. Stellen Sie sicher, daß sich die Steckdose nahe am Gerät befindet und leicht zugänglich ist.

7 Turning On the ICS-2000 Power

IMPORTANT

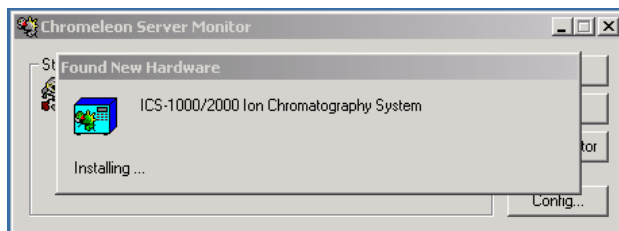
Before turning on the ICS-2000 power, verify that Chromeleon software is installed. See [Section 3](#) for installation instructions. If Chromeleon is not installed first, Windows will be unable to identify the new USB device.

1. If it is not already on, turn on the computer power and log onto Windows 2000 or Windows XP as an administrator.
2. Press the power switch on the ICS-2000 rear panel (see [Figure 9](#)) to turn on the power.



Figure 9. ICS-2000 Rear Panel

3. Windows automatically detects the new USB device. A message flashes on the screen to inform you that new hardware was found.





4. Go on to [Section 8](#).

8 Setting Up Chromeleon

NOTE This section provides brief instructions for setting up Chromeleon. For details about any of these steps, refer to the Chromeleon user's guide or online Help.

8.1 Assigning the ICS-2000 to a Timebase

1. If the Chromeleon Server is not running (the icon on the taskbar is crossed out in red ) , start the Server by right-clicking the icon and selecting **Start Server**. When the server starts, the icon changes to gray  .
2. Open the Server Configuration program (select **Start>Programs>Chromeleon>Server Configuration**).
3. The Unassigned USB Devices dialog box appears (see [Figure 10](#)).

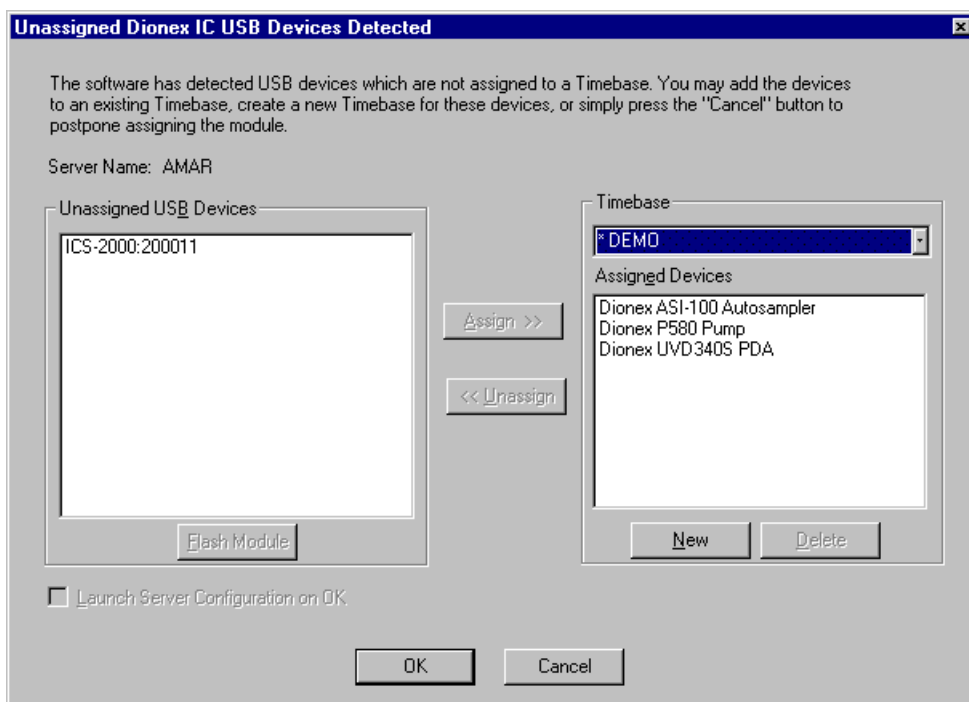


Figure 10. ICS-2000 Unassigned to Timebase

4. Click the **New** button.
5. The Timebase box displays a default name (the Server Configuration name). You can use the provided name or type a new one (for example, **ICS-2000**).
6. Press the **Enter** key.
7. In the Unassigned USB Devices box, select the ICS-2000 and then click the **Assign** button. The ICS-2000 is now assigned to the timebase (see [Figure 11](#)). If you are installing more than one ICS-2000, you can verify the serial numbers for each by checking the label on the component panel. The serial number is also shown on the **INFORMATION** touch screen page.
8. Repeat [Step 7](#) if you are adding additional USB devices to this timebase.

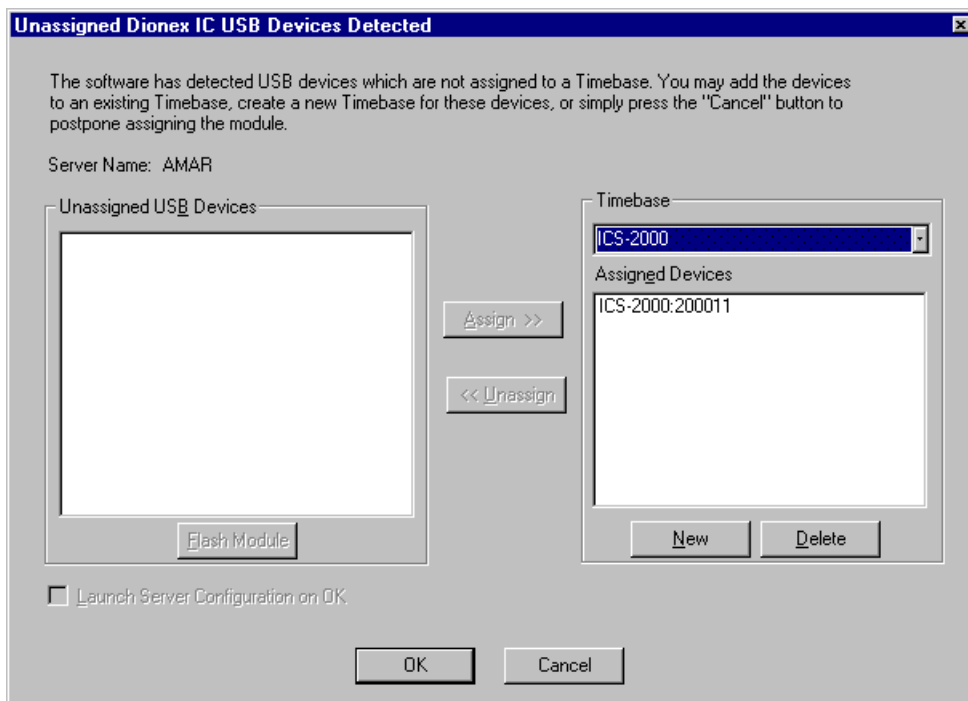


Figure 11. ICS-2000 Assigned to a Timebase

- Click **OK** to close the dialog box. The Server Configuration program window appears.
- Click the + icon next to the server name to expand the folder. The timebase you created is displayed (see [Figure 12](#)).

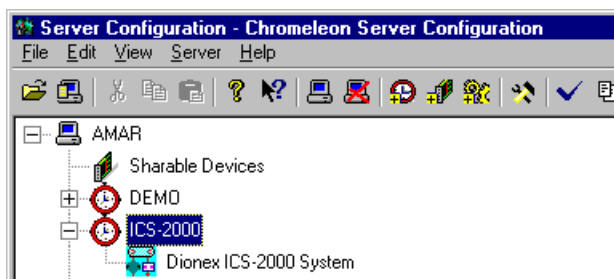


Figure 12. Server Configuration with ICS-2000 Timebase

- To verify that the ICS-2000 is correctly connected to the timebase, double-click its name under the timebase. Click **Yes** if the following message appears: “Communication to the device will be stopped...Do you want to continue?”

- The ICS-2000 System dialog box opens (see [Figure 13](#)). The **General** page shows the Device Name (**Pump_ECD**), the Mode (**Live**), and the Module Serial No.

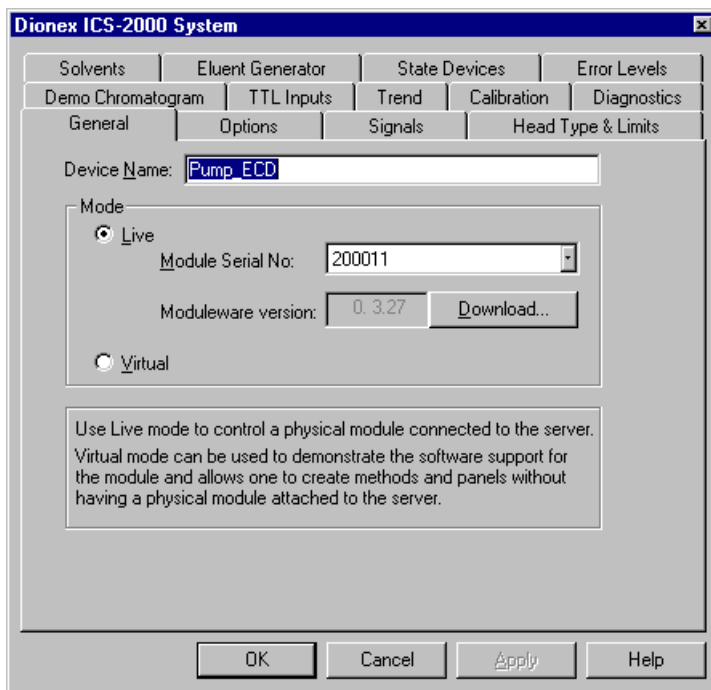



Figure 13. ICS-2000 System Properties

- Close the dialog box and then save the configuration (select **File>Save Installation**).
- If you are going to add one or more DX-LAN devices to the timebase, go on to [Section 8.2](#). Otherwise, exit the Server Configuration program and then go on to [Section 9](#).

8.2 Assigning DX-LAN Devices to the Timebase (Optional)

Follow the instructions in this section if you are adding one or more devices to the timebase that are connected to the PC through a DX-LAN interface (not through USB connections).

1. Follow the instructions in *Installing the Chromeleon IC System* (Document No. 031883) to add the DX-LAN card to the server configuration as a sharable device.
2. Select the timebase that was created for the ICS-2000 (see [Figure 14](#)); then, click the **Add device** icon  on the toolbar (or select **Edit>Add Device**).

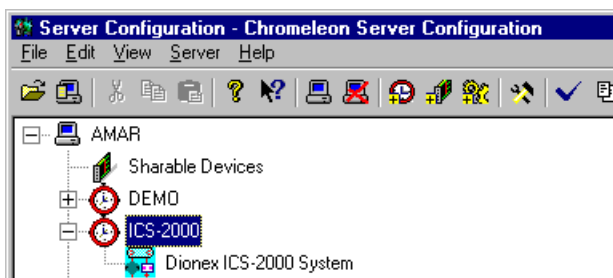


Figure 14. Example: ICS-2000 Timebase

The Add device to timebase dialog box appears.

3. If it is not already selected, select **Dionex** under Manufacturers and then select the device from the Devices list.

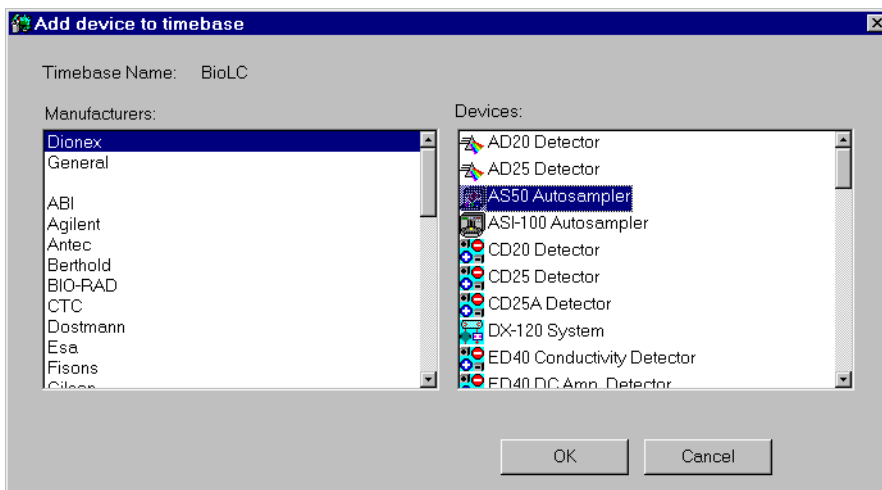


Figure 15. Add Device to Timebase Dialog Box

- Click **OK**. A configuration properties dialog box for the device appears. [Figure 16](#) shows an example of the properties for an AS50 Autosampler.

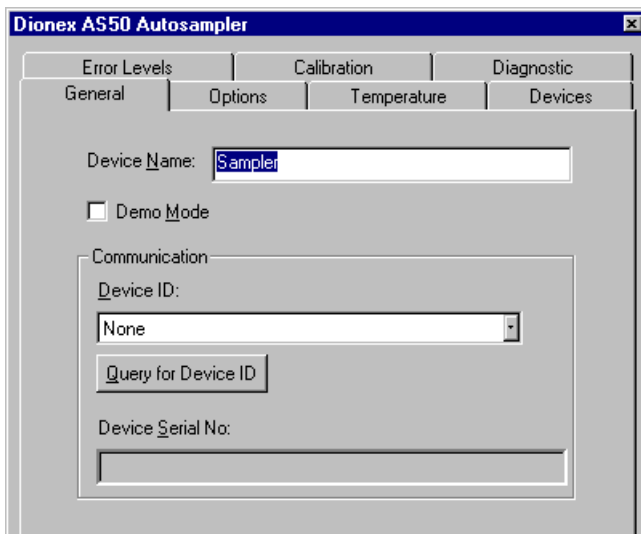


Figure 16. AS50 Configuration Properties

- On the **General** tab page, clear the Demo Mode check box if it is currently selected, and then select the DX-LAN Device ID number. **Note:** Devices display their DX-LAN ID numbers when their power is turned on.
- Click **OK** to close the dialog box.
- Save the configuration (select **File>Save Installation**).
- Exit the Server Configuration program.
- Go on to [Section 9](#)

9 Installing and Plumbing the Columns and Suppressor

NOTE This section provides brief installation and plumbing instructions for the columns and suppressor. Before beginning the installation, refer to the column and suppressor manuals for detailed start-up and installation instructions. The manuals are provided on the Dionex Reference Library CD-ROM (P/N 053891), which is located in the ICS-2000 Ship Kit (P/N 057905).

Before beginning:

- Remove the guard column, separator column, and suppressor from their boxes.
- Remove the fitting plugs from the ends of each column and from all ports on the suppressor.
- Discard any tubing temporarily connecting the suppressor ports.

9.1 Column Heater Setup

1. Cut off the two shipping ties from the column heater and remove them (see [Figure 17](#)).
2. Loosen the two thumbscrews on the heater cover (they remain attached to the cover).
3. Pull the heater cover straight out to remove it.

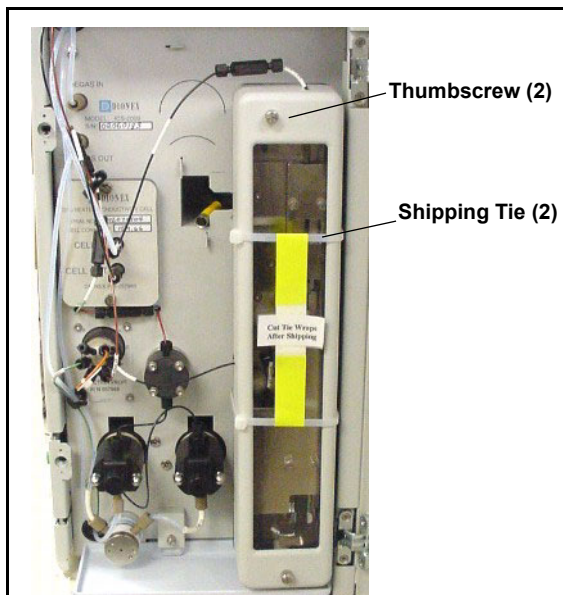


Figure 17. ICS-2000 Column Heater Setup

4. Unscrew the six thumbscrews on the top metal plate (see [Figure 18](#)) and remove the plate.
5. Go on to [Section 9.2](#).

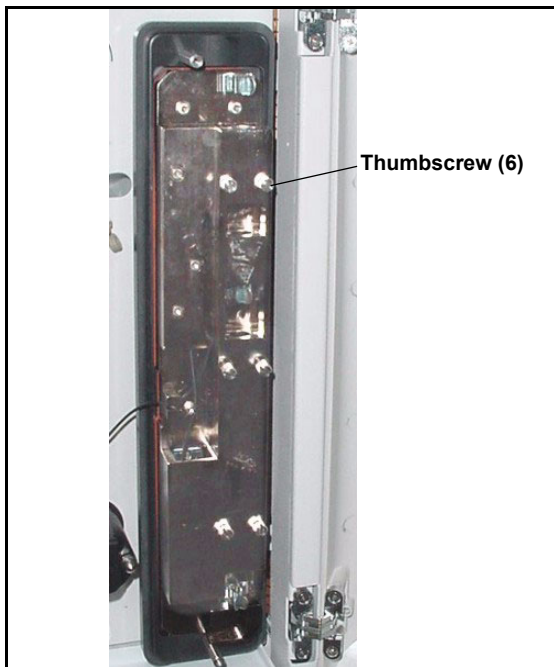


Figure 18. ICS-2000 Column Heater Cover Removed

9.2 Installing the Columns

1. Remove the union connecting **GUARD IN** and **GUARD OUT**.
2. Connect **GUARD IN** to the guard column inlet. Check the arrow on the column label; it should point down (flow away from the injection valve).
3. Connect **GUARD OUT** to the guard column outlet.
4. Push the guard column onto the back column clip.
5. Remove the union connecting **COL IN** and **COL OUT** and
6. Connect **COL IN** to the separator column inlet. Connect **COL OUT** to the separator column outlet. Check the arrow on the column label. It should point up (flow toward the cell).
7. Push the separator column onto the front column clips.
8. Replace the top metal plate on the column heater.

9.3 Installing the Suppressor

1. Locate the suppressor mounting tabs on the component panel (see [Figure 19](#)). Reach into the opening between the tabs and pull the yellow connector and attached cable slightly out of the opening.
2. Connect this cable to the cable from the suppressor (align the pins on the two connectors and push them together).

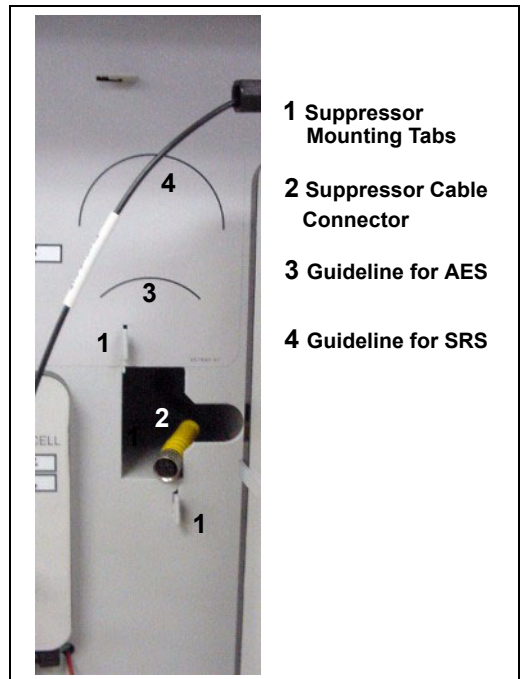


Figure 19. Suppressor Mounting Tabs and Guidelines

3. Orient the suppressor with the **REGEN OUT** fitting on top and the cable to the right.
4. Feed the cable into the opening in the component panel.
5. Align the top of the suppressor with the guideline printed on the component panel (see [Figure 19](#)) and align the slots on the rear of the suppressor with the tabs on the panel.

6. Press the suppressor onto the tabs and then slide it down to lock it in place. Pull slightly on the center of the suppressor to verify that it is securely fastened. [Figure 20](#) shows an SRS suppressor installed on the component panel.
7. Remove the union connecting **ELUENT IN** and **ELUENT OUT** and connect these lines to the corresponding ports on the suppressor.



*Figure 20. Suppressor Installed
(SRS Shown)*

8. Remove the fitting plug from **REGEN IN** and connect it to the **REGEN IN** port on the suppressor. **Do not connect the REGEN OUT port until after completing the eluent generator setup** ([Section 13](#)).
9. Replace the cover on the column heater, making sure the **GUARD IN** line is aligned with the slot on the side of the heater cover.
10. Go on to [Section 10](#).

10 Connecting the Waste Lines

The ICS-2000 has the following waste lines:

- **PUMP WASTE** carries prime waste from the pump.
- **TO WASTE OUT** carries sample overflow from the injection valve.
- **WASTE, GAS SEPARATOR** carries system waste from the suppressor.

Untape the coiled waste lines from the rear panel. Place the ends of the **PUMP WASTE** and **TO WASTE OUT** lines into a waste container.

Direct the **WASTE, GAS SEPARATOR** line from the top of the ICS-2000 to the rear panel. Snap the line onto one of the tubing clips on the rear panel. Connect the line to the gas separator waste tube (see [Section 10.1](#)).

NOTE To prevent waste from siphoning back into the system, check the lines periodically to be sure they are not bent, pinched, or elevated at any point.

10.1 Installing the Gas Separator Waste Tube

1. Locate the gas separator waste tube assembly (see [Figure 21](#)) in the ICS-2000 Ship Kit (P/N 057905).
2. Connect the **WASTE, GAS SEPARATOR** line to the 3-mm (1/8-in) ID white Teflon tubing on the gas separator waste tube assembly.



Figure 21. Gas Separator Waste Tube Assembly

3. Place the gas separator waste tube assembly into the waste container. Make sure the tubing junction (where the white Teflon tubing meets the black polyethylene tubing) is above the top of the container and

that the gas separator waste tube and the waste container are open to the atmosphere (see [Figure 22](#)).

4. Go on to [Section 11](#).

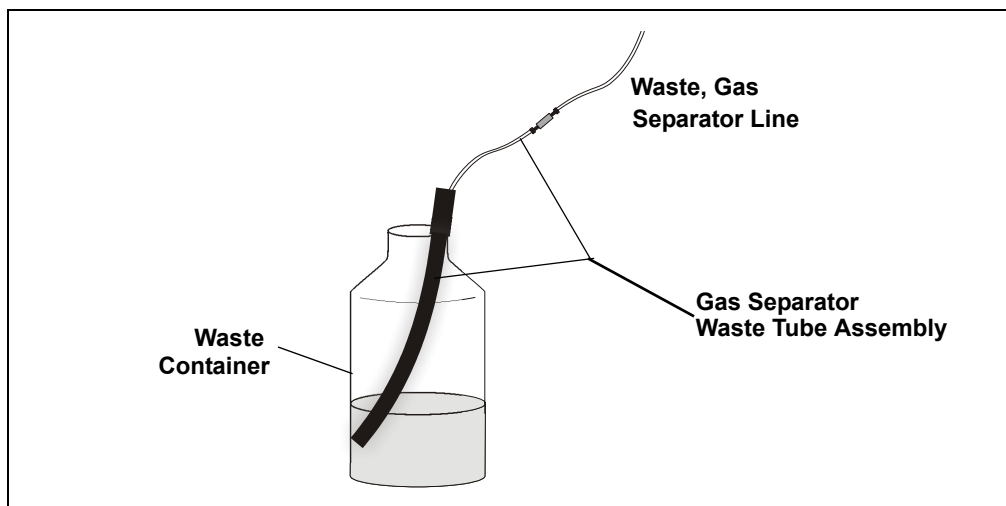


Figure 22. Gas Separator Waste Tube Installation



CAUTION

DO NOT CAP THE WASTE CONTAINER: The ICS-2000 uses an electrolytic process that results in the production of small amounts of oxygen or hydrogen gas. To ensure that the gas is not trapped in a closed container and allowed to concentrate, install a 1.3-cm (0.52-in) ID black gas separator waste tube (P/N 045460) in an uncapped waste container. Connect the Waste, Gas Separator line to the waste tube (see [Figure 22](#)).



MISE EN GARDE

NE FERMEZ PAS LE CONTENEUR DE GAZ RÉSIDUEL L : Le ICS-2000 travaille avec un proces d'électrolyse, qui produit des petites quantités de gaz d'oxygène ou d'hydrogène. Afin de garantir que le gaz ne soit pas enfermé dans un conteneur fermé et puisse s'y concentrer, connectez un tube noir à gaz résiduel (diamètre intérieur = 1,3 cm ; n° de commande 045460) à un conteneur ouvert (non fermé). Connectez le conteneur résiduel au tube résiduel/gaz séparateur (désigné : « Waste, Gas Separator »).



VERSCHLIESSEN SIE DEN ABFALLBEHÄLTER NICHT: Der ICS-2000 verwendet einen Elektrolyseprozess, wodurch kleine Mengen an Sauerstoff und Wasserstoff entstehen. Führen Sie einen schwarzen Gasabscheiderschlauch (ID = 1,3 cm; Bestell-Nr. 045460) in einen offenen (unverschlossenen) Abfallbehälter, damit sich das Gas nicht in einem geschlossenen Behälter sammelt und aufkonzentriert. Verbinden Sie die mit Waste, Gas Separator bezeichnete Leitung mit dem Abfallschlauch.

11 Setting Up the Eluent Reservoir

1. Rinse the eluent reservoir.
2. Fill the reservoir with deionized water.
3. Place the reservoir on top of the ICS-2000.
4. Install the cap and hand tighten.

NOTE The ICS-2000 does not require pressurized reservoirs. However, if eluent is manually degassed or is sensitive to contamination, Dionex recommends pressurizing the reservoir with helium or nitrogen. See [Section 21](#) for instructions.

5. Go on to [Section 14](#).

12 Priming the Pump

1. Verify that the eluent reservoir is filled, the reservoir cap is installed and hand tightened, and the liquid line from the ICS-2000 to the reservoir cap is connected (see [Section 11](#)).
2. Verify that the waste lines are directed to a waste container.
3. The priming procedure consists of two parts:
 - Priming the eluent lines with a syringe. Perform this procedure at initial installation, after changing eluents, or when eluent lines are empty.
 - Priming the pump heads with the **Prime** button. Perform this procedure after the eluent lines are primed.

12.1 Priming the Eluent Lines with a Syringe

NOTE Prime the eluent lines after initial installation, after changing eluents, or when eluent lines are empty.

1. Verify that the pump is turned off.
2. Connect a 10 mL syringe (P/N 054578) to the port in the priming valve on the primary pump head (see [Figure 23](#)).

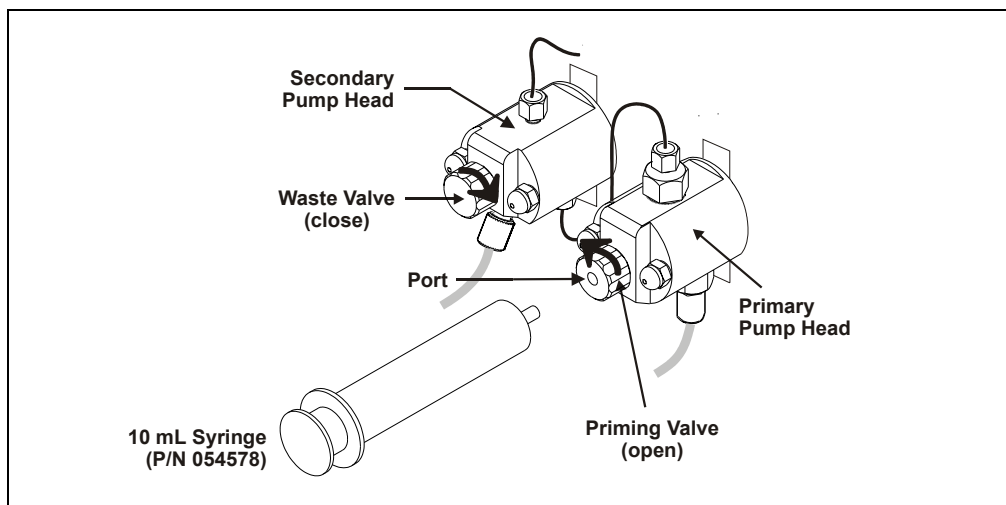



Figure 23. Priming the Eluent Lines

3. Open the priming valve by turning it one-quarter to one-half turn counterclockwise.
4. On the ICS-2000 touch screen, touch the page name (for example, ) on the bottom right corner to open a menu of pages.
5. Touch **PUMP** to open the touch screen **PUMP** page (see [Figure 24](#)). Under **Eluent Valve**, touch the **Open** button.

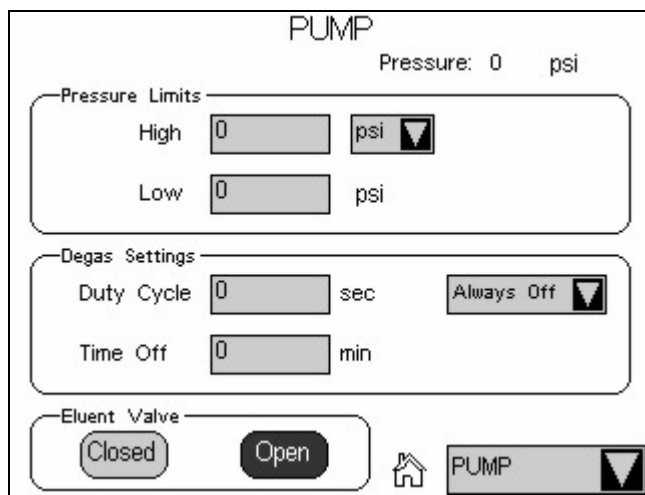


Figure 24. Pump Page: Eluent Valve Open

6. Draw the syringe back to begin pulling eluent through the flow path. It may take several syringe draws to remove all air or previous eluent from the tubing. Draw out a minimum of 20 mL of eluent to ensure that the vacuum degas assembly is primed.
7. After priming the lines thoroughly, close the priming valve. **Do not overtighten the priming valve.**
8. Touch **Eluent Valve Closed** on the touch screen **PUMP** page.

12.2 Priming with the Prime Button

NOTE Perform this procedure after priming the eluent lines (see [Section 12.1](#)).

1. Check that the priming valve on the primary pump head is closed (see [Figure 25](#)).

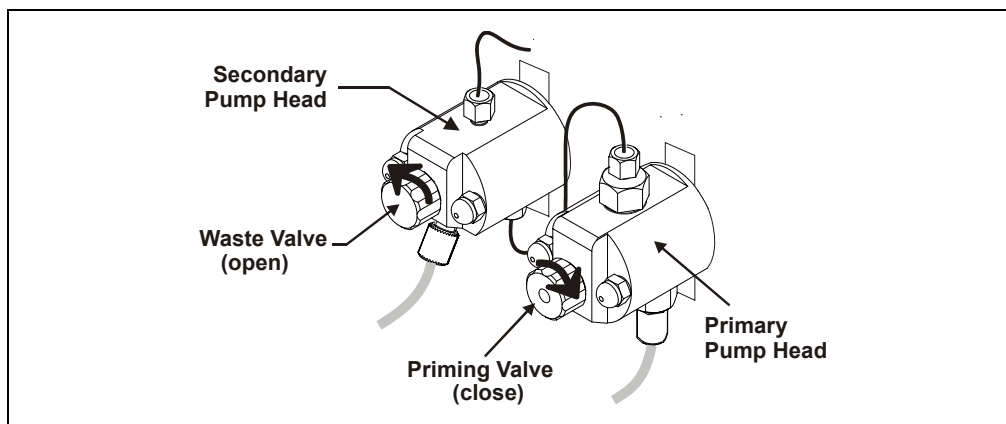


Figure 25. Priming the Pump

2. Open the waste valve on the secondary pump head by turning the knob one-quarter to one-half turn counterclockwise (see [Figure 25](#)). Opening the valve directs the eluent flow path to waste and eliminates backpressure.
3. Touch **Prime** on the ICS-2000 touch screen **HOME** page. Confirm that the waste valve is open by pressing **OK** when the reminder message appears. The pump will begin pumping at approximately 3.0 mL/min.
4. Continue priming the ICS-2000 until no air bubbles are exiting the pump waste line.
5. Press **Pump Off**.
6. Close the waste valve. **Do not overtighten**. The pump is now ready for operation.

NOTE If the two standard priming procedures described above are unsuccessful, prime the pump with isopropyl alcohol. See “Chapter 5, Troubleshooting,” in the ICS-2000 operator’s manual for instructions.

13 Setting Up the Eluent Generator

Before beginning:

Remove the EluGen cartridge (EGC) and the CR-TC from their shipping boxes.

[Figure 26](#) illustrates the ICS-2000 after the EGC is installed.

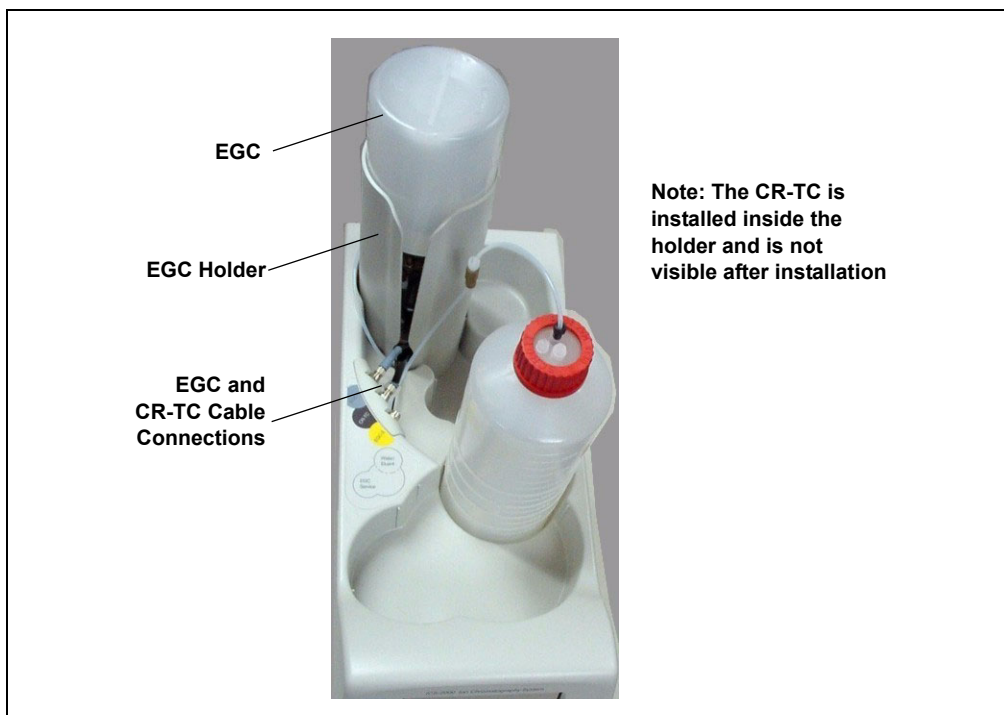


Figure 26. ICS-2000 with an EGC Installed (Top View)

[Figure 27](#) illustrates the liquid flow path through the eluent generator components after all plumbing connections are complete. The EGC and CR-TC are shipped in separate boxes. The EGC degas assembly is installed inside the EGC holder at the factory. When installation is complete, all components fit inside the EGC holder.

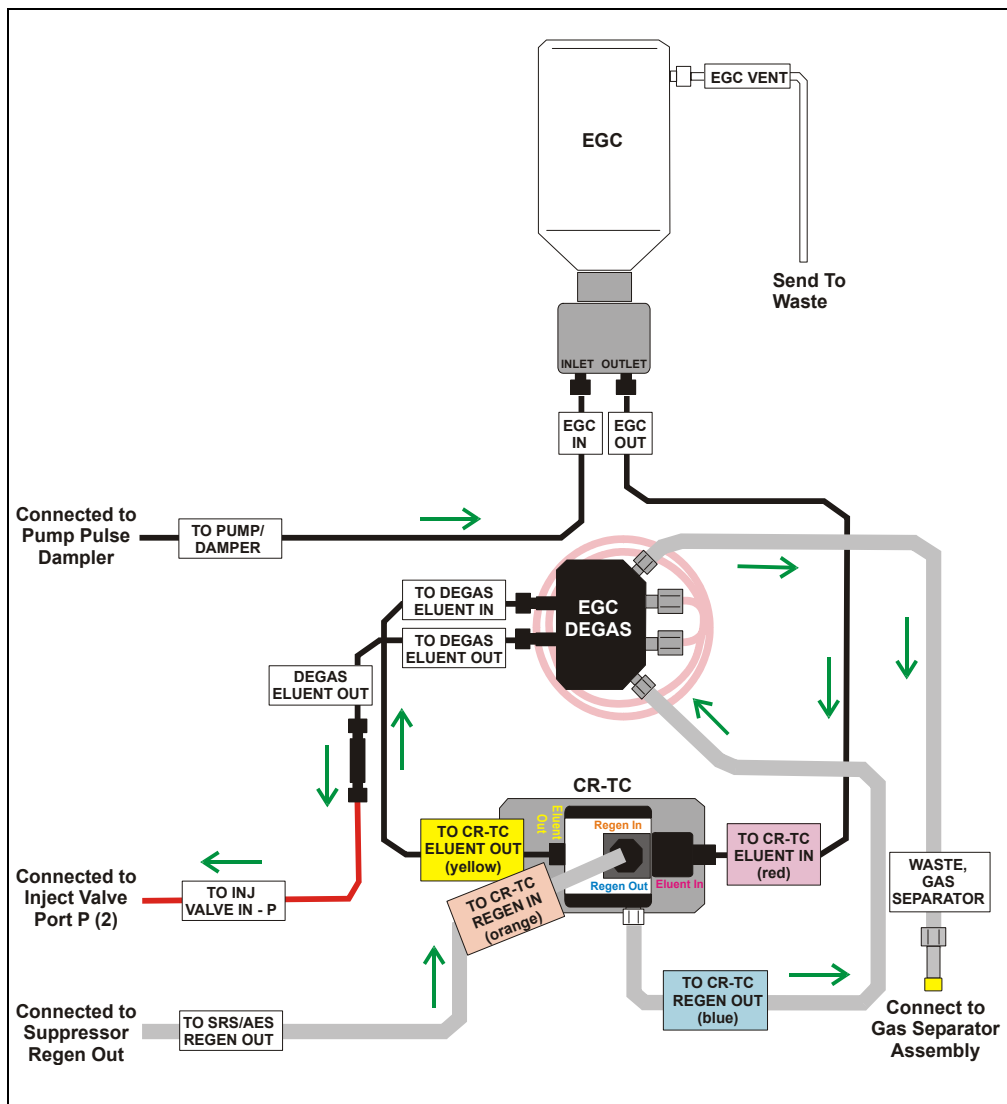


Figure 27. Eluent Generator Flow Schematic

13.1 Installing the CR-TC

1. Tilt the cartridge holder to view the bottom of the holder and brace the holder against the back corner of the ICS-2000 (see [Figure 28](#)).

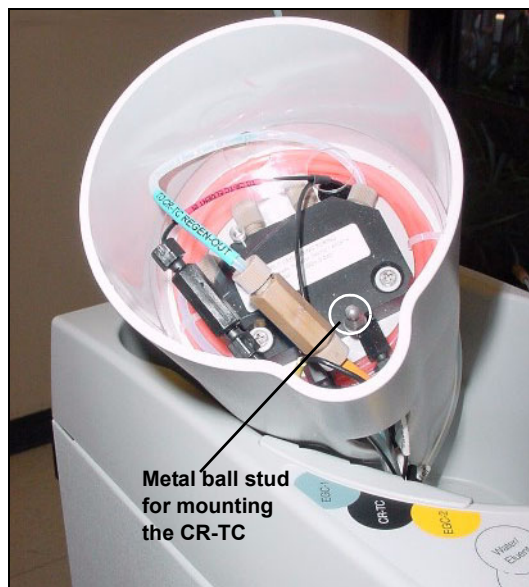


Figure 28. Cartridge Holder (tilted to view the bottom)

2. Before installing the CR-TC, note the metal ball stud inside the bottom of the cartridge holder (see [Figure 28](#)) and the bracket on the CR-TC mounting plate (see [Figure 29](#)). These are used to mount the CR-TC inside the holder after it is plumbed.

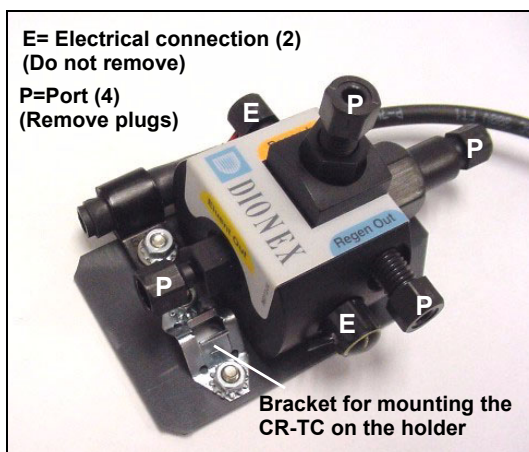


Figure 29. CR-TC

3. Remove the plugs from the four ports, labeled “P” on [Figure 29](#). **Do not remove the two electrical connections, labeled “E” on the figure.**

4. With the CR-TC oriented as shown in [Figure 30](#), connect the lines to the corresponding ports on the CR-TC. Match the color coded labels on the EGC holder lines to the color coded labels for the CR-TC ports.

NOTE To help retain the fittings and ferrules on the lines, remove the union from each line just before connecting the line to a port.

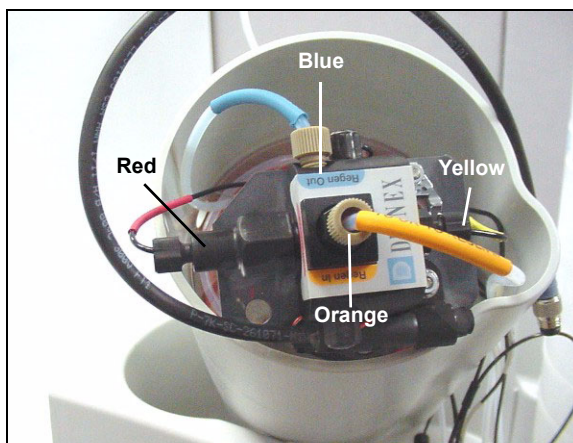


Figure 30. Plumbed CR-TC

5. Check that none of the lines are caught under the CR-TC and then push the CR-TC onto the metal stud inside the EGC holder (see [Figure 31](#)). Push down until the CR-TC snaps into place.

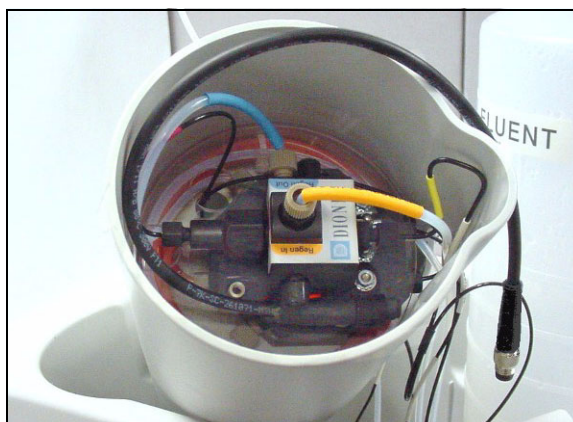


Figure 31. CR-TC Installed in Holder

6. Feed the CR-TC cable through the slot on the side of the EGC holder (see [Figure 32](#)).

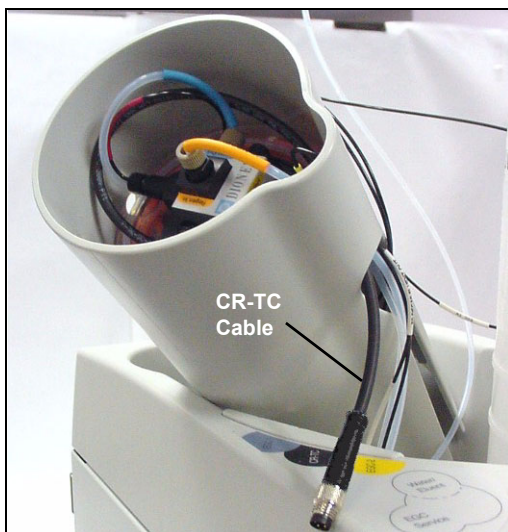


Figure 32. Installing the CR-TC

7. Turn the EGC holder right-side up and set it back into position.

13.2 Installing the EGC

1. Orient the EGC with the fittings facing up (see [Figure 33](#)) and remove the plugs from the EGC **INLET** and **OUTLET** fittings.

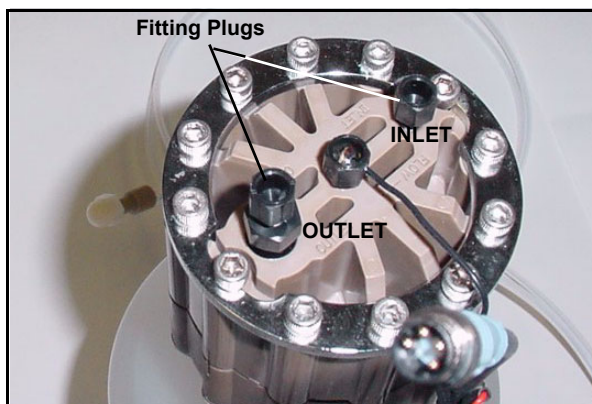


Figure 33. EGC Fitting Plugs

ICS-2000 Ion Chromatography System

2. Set the EGC in the service position on top of the ICS-2000 (see [Figure 34](#) and [Figure 35](#)).



Figure 34. EGC Service Position



Figure 35. EGC in Service Position

3. Orient the EGC with the cable toward the cartridge holder (see [Figure 36](#)).

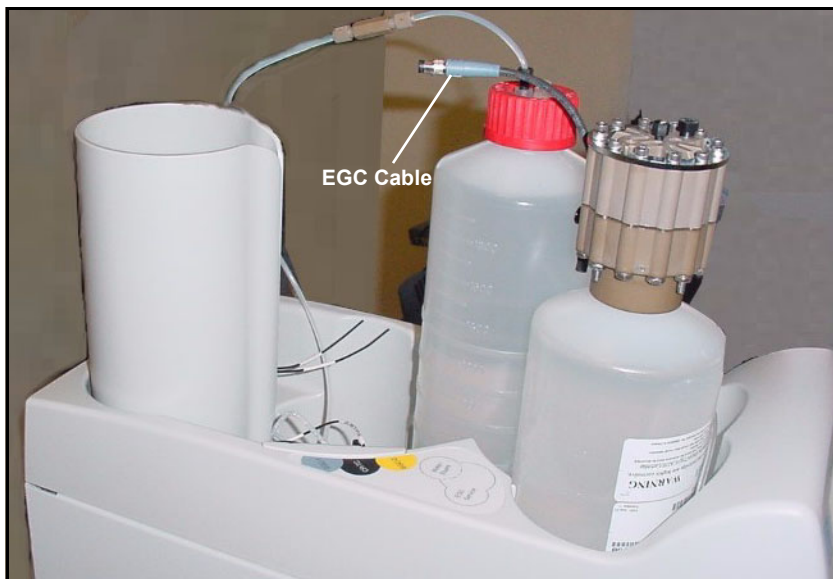


Figure 36. EGC Cable Orientation

4. Pull the coiled black **EGC IN** and **EGC OUT** lines out slightly from the cartridge holder. Disconnect the **EGC IN** line from the union that connects it to the **EGC OUT** line. Connect **EGC IN** to the EGC **INLET** port (see [Figure 37](#)).

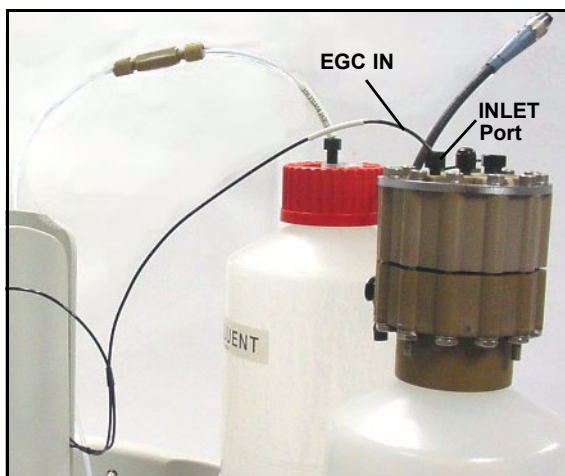


Figure 37. Connecting the EGC Inlet Port

5. Locate the yellow 0.5 mL/min, 1000 psi (7 MPa) pressure restrictor coil (P/N 053765) in the ICS-2000 Ship Kit (P/N 057905). Connect one end of this coil to the EGC **OUTLET** port (see [Figure 38](#)). Leave the other end of the coil unconnected.

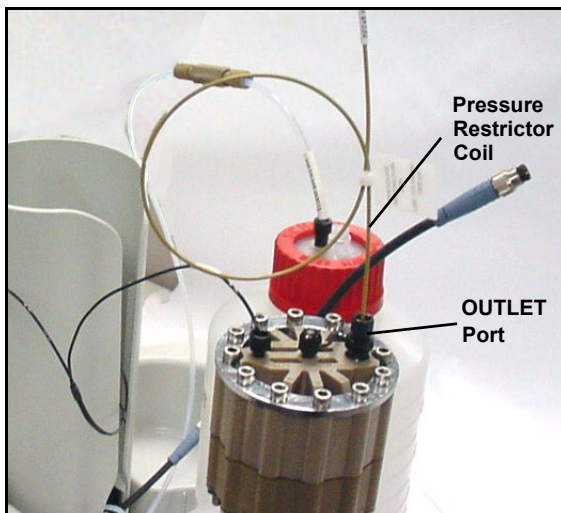


Figure 38. EGC Outlet Connection for Conditioning the EGC

NOTE The pressure restrictor connection is temporary; it is used only during the EGC conditioning procedure describe in [Section 13.3](#).

6. Turn the EGC cartridge over (with the fittings facing down). **Shake the EGC vigorously, and tap it with the palm of your hand 10 to 15 times. Check that all trapped bubbles are dislodged.**



The EGC contains either KOH, a corrosive base, or MSA, a corrosive acid. Wear eye protection and gloves when handling the EGC.



L'EGC contient soit du KOH, une base corrosive, soit du méthanesulfonique (AMS), un acide corrosive. Portez donc des lunettes protectrices et des gants en travaillant avec l'EGC.



Der EGC ist mit KOH, einer ätzenden Lauge, oder MSA, einer ätzenden Säure befüllt. Tragen Sie daher eine Schutzbrille und Handschuhe.

- Slide the EGC down into the holder until it stops. Make sure the cable and restrictor coil remain out of the holder (see [Figure 39](#)).

NOTE To avoid crimping the lines inside the holder, do not twist the cartridge when you slide it into the holder. The lines are designed to coil inside the holder.



Figure 39. Installing the EGC in the Holder

- Remove the plug from the **EGC-1** connector on top of the ICS-2000.

NOTE The **EGC-2** connector is reserved for future use.

- Orient the cartridge's blue 4-pin electrical cable connector as shown in [Figure 40](#). Push it onto the **EGC-1** connector on the ICS-2000. Twist the ring on the cable connector fingertight to secure it.



Figure 40. Connecting the EGC Cable

13.3 Conditioning the EGC

The EGC must be conditioned before initial use. This requires directing the pressure restrictor coil (connected to the EGC outlet) to waste, and then generating 50 mM of eluent (either KOH or MSA) at 1.0 mL/min for 10 minutes. Follow the steps below:

1. Locate the EGC vent line tubing, label, and barbed luer lock, in the Ship Kit (P/N 057905). Locate the luer adapter and cap, supplied with the EGC. Slide the label onto one end of the tubing and then push the barbed luer lock onto the tubing.



The EGC contains either KOH, a corrosive base, or MSA, a corrosive acid. Wear protective eye wear and gloves when handling the EGC.



L'EGC contient soit du KOH, une base corrosive, soit du méthanesulfonique (AMS), un acide corrosive. Portez donc des lunettes protectrices et des gants en travaillant avec l'EGC.



Der EGC ist mit KOH, einer ätzenden Lauge, oder MSA, einer ätzenden Säure befüllt. Tragen Sie daher eine Schutzbrille und Handschuhe.

2. Unscrew and remove the plug from the vent opening on the side of the EGC (see [Figure 41](#)).



Figure 41. EGC Vent Plug

3. Screw the luer adapter onto the vent opening. Remove the cap on the luer adapter by twisting. **Save the cap.**
4. Twist the luer lock and EGC vent line into the luer adapter (see [Figure 42](#)).

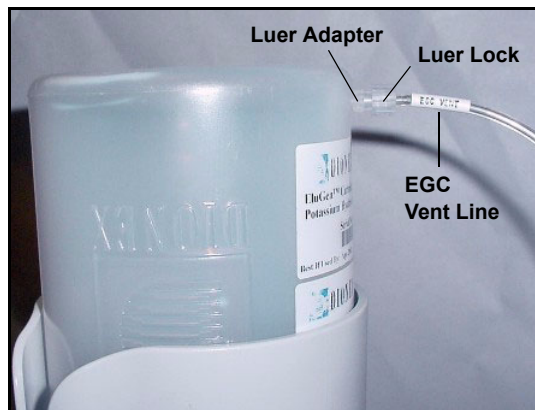


Figure 42. Installing the EGC Vent Line

NOTE To prevent leaks from the EGC, always replace the luer adapter cap before moving the EGC.

5. Direct the EGC vent line to the rear of the ICS-2000 and snap it onto one of the tubing clips on the rear panel. Direct the vent line to the waste container and insert it down into the gas separator waste tube about 4 to 6 inches.
6. Set a temporary waste container, such as a beaker, on top of the ICS-2000 and direct the yellow backpressure coil from the EGC **OUTLET** port to the container.
7. From the Chromeleon Control Panel or the ICS-2000 touch screen **HOME** page, set the pump flow rate to **1.00 mL/min** and set the EGC concentration to **50 mM**.
8. Verify that the suppressor and CR-TC are off.

IMPORTANT

To avoid damaging the suppressor and CR-TC, always turn off the suppressor and CR-TC before conditioning the EGC. The pump flow is on during conditioning, however, no flow reaches the suppressor or CR-TC.

9. Turn on the pump.
10. Run at the selected settings (1.0 mL/min at 50 mM) for 30 minutes.
11. Turn off the pump.

12. Disconnect the EGC cable
13. Remove the backpressure tubing from the waste container and remove the waste container.
14. Lift the EGC out of the holder, turn it over, and set it in the service position.
15. Disconnect the pressure restrictor coil from the EGC **OUTLET** port.
16. Connect the **EGC OUT** line from the holder to the **OUTLET** port (see [Figure 43](#)).

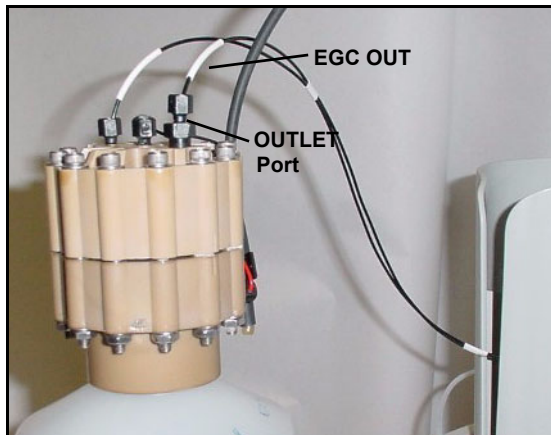


Figure 43. EGC Outlet Connection

17. Turn over the EGC. Check for bubbles; if necessary, shake and tap the EGC to remove bubbles
18. Reinstall the EGC in the holder.
19. Do not reconnect the EGC cable until after hydrating the CR-TC.

13.4 Hydrating the CR-TC

The CR-TC must be hydrated before initial. This requires running deionized water through it for 10 minutes, while bypassing the columns and suppressor.

1. Locate the 10-32 to 1/4-28 coupler (P/N 042806) in the Ship Kit (P/N 057905).
2. Temporarily disconnect the **TO INJ VALVE IN - P** line from port **P** on the injection valve.
3. Connect the coupler between the **TO INJ VALVE IN - P** line and the **SRS/AES REGEN OUT** line.

4. Verify that the suppressor is off.

IMPORTANT

To avoid damaging the suppressor, always turn off the suppressor before hydrating the CR-TC. The pump flow is on during conditioning, however, no flow reaches the suppressor.

5. Turn on the pump and set the flow to the rate recommended for your application. Pump deionized water through the CR-TC for at least 10 minutes.
6. Turn off the pump and disconnect the coupler.
7. Connect the **TO SRS/AES REGEN OUT** line to the **REGEN OUT** port on the suppressor.
8. Reconnect the **TO INJ VALVE IN - P** line to port **P** on the injection valve.
9. Reconnect the EGC cable.

13.5 Completing the EGC Installation

1. Remove the plug from the **CR-TC** connector on top of the ICS-2000
2. Orient the CR-TC's black 3-pin electrical cable connector as shown in [Figure 40](#). Push it onto the **CR-TC** connector on the ICS-2000. Twist the ring on the cable connector and fingertighten to secure it.

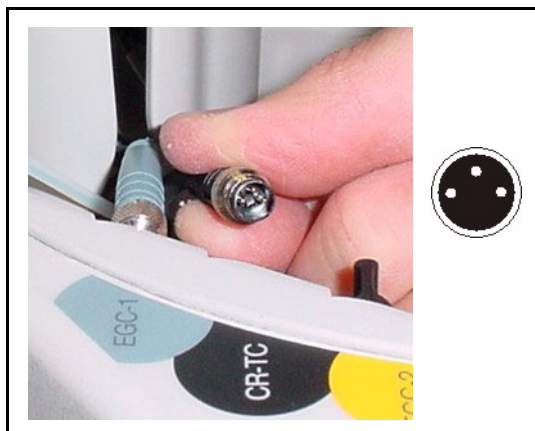


Figure 44. Connecting the CR-TC Cable

3. Record the serial number of the new cartridge in Chromeleon. The number is printed on a label on the cartridge.
 - a. Open the Server Configuration program (select **Start>Programs>Chromeleon>Server Configuration**).

- b. Double-click the ICS-2000 system icon. The properties dialog box for the ICS-2000 appears.
- c. Click the **Eluent Generator** tab.
- d. Select the **Installed** check box.
- e. Enter the cartridge serial number and click **OK**.

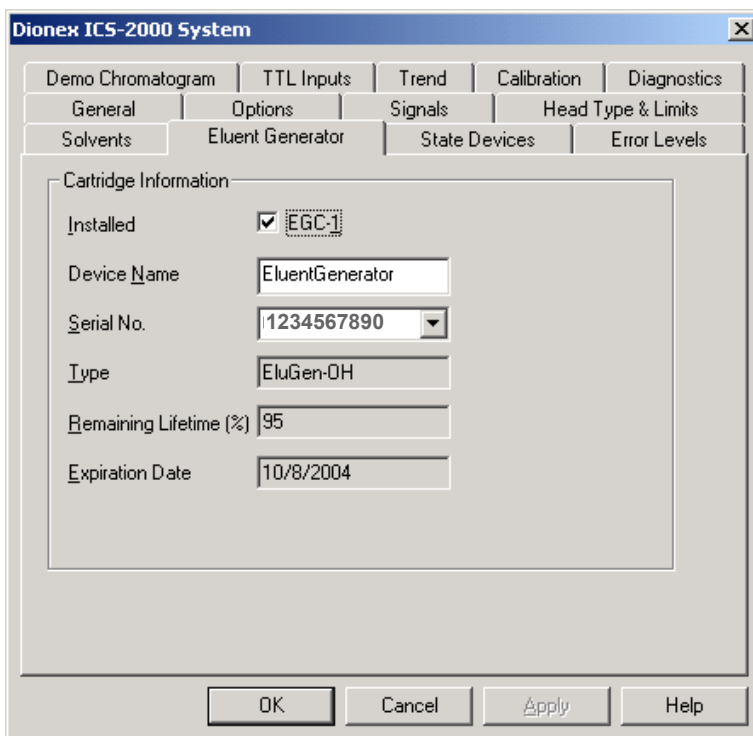


Figure 45. Eluent Generator Configuration Properties Example

13.6 EGC Backpressure Requirements

The EGC requires at least 14 MPa (2,000 psi) of backpressure for optimal removal of electrolysis gas from the eluent produced by the cartridge. During system equilibration (see [Section 16](#)), monitor the system pressure and verify that it is between 14 and 20 MPa (2000 and 3000 psi). A system backpressure of 16 MPa (2,300 psi) is ideal.

If necessary, install backpressure restrictor tubing between the injection valve and the **ELUENT OUT** port on the EGC. The pressure restrictor coils listed in [Table 2-1](#) are included in the ICS-2000 Ship Kit (P/N 057905). Connect the backpressure coil to Port P (2) on the injection valve and connect the other end to the **TO INJ VALVE IN - P** line.

Part Number	Description	Flow Rate	Approximate Back-pressure Added
053763	4-mm Pressure Restrictor	2.0 mL/min	7 MPa (1,000 psi)
		1.0 mL/min	3.5 MPa (500 psi)
053762	4-mm Pressure Restrictor	2.0 mL/min	3.5 MPa (500 psi)
		1.0 mL/min	1.75 MPa (250 psi)
053765	2-mm Pressure Restrictor	0.50 mL/min	7 MPa (1,000 psi)
		0.25 mL/min	3.5 MPa (500 psi)
053764	2-mm Pressure Restrictor	0.50 mL/min	3.5 MPa (500 psi)
		0.25 mL/min	1.75 MPa (250 psi)

Table 2-1. Pressure Restrictor Coils

14 Setting Up a Chromeleon Application

Chromeleon provides application templates, which you can use to quickly get started running. To use the application templates, you need to know the type of column and suppressor you will be using. This section shows how to create a list of samples to be processed (a sequence) and how to use an application template.

1. Identify the type of column and suppressor installed in the ICS-2000.
2. Start Chromeleon (select **Start>Programs>Chromeleon>Chromeleon**).
The Chromeleon main window and Browser appear (see [Figure 46](#)).

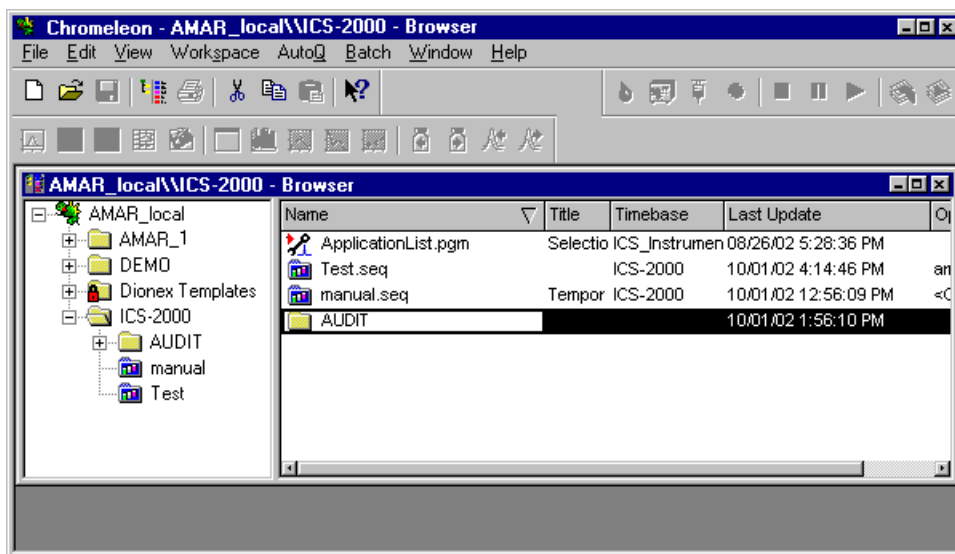


Figure 46. Chromeleon Main Window and Browser

3. In the Browser, select **File>New** and select **Sequence (using Wizard)** (see [Figure 47](#)).

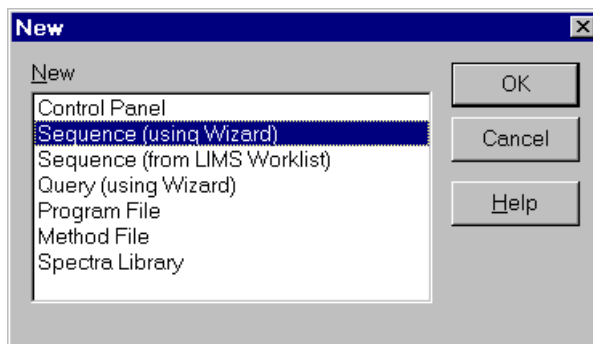


Figure 47. Creating a New Sequence

The Sequence Wizard Welcome page appears (see [Figure 48](#)).



Figure 48. Sequence Wizard Welcome Page

NOTE For details about a Sequence Wizard step, click the **Help** button on the Sequence Wizard page.

4. Click **Next>**.

The Sequence Wizard Timebase page appears (see [Figure 49](#)).

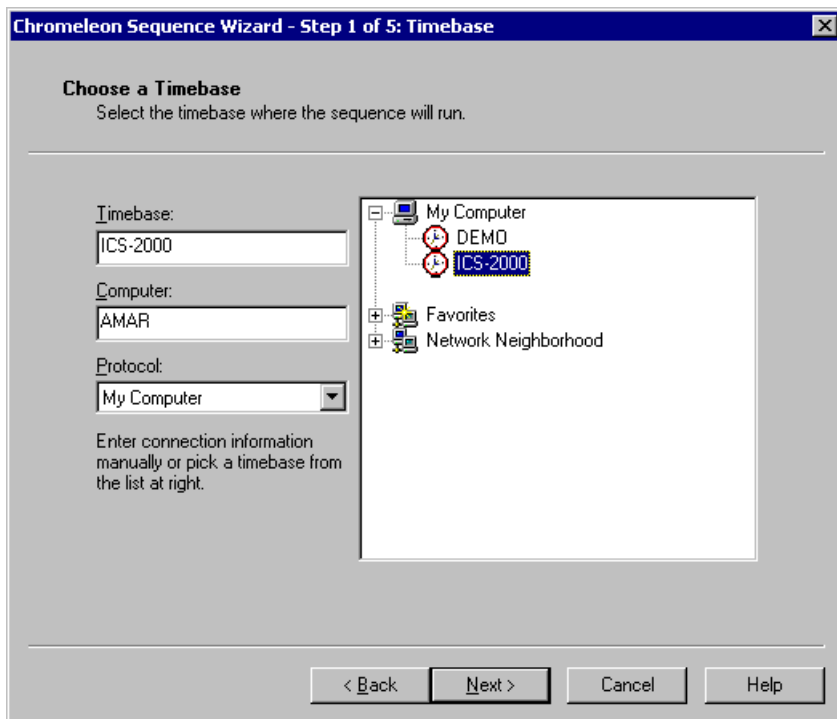


Figure 49. Example: Sequence Wizard Step 1

5. Select the ICS-2000 timebase and click **Next>**.

The Unknown Samples page appears (see [Figure 50](#)).

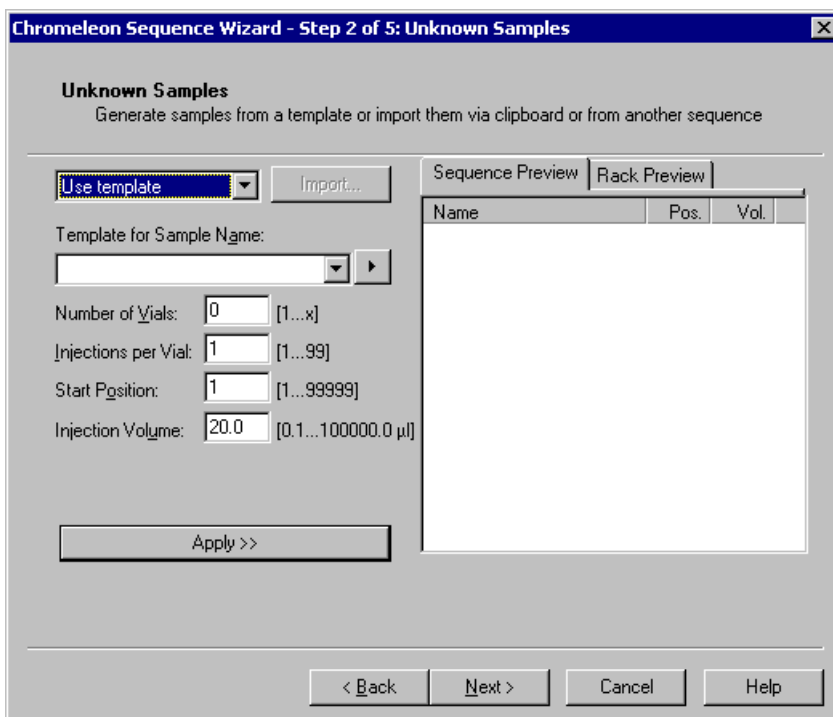


Figure 50. Example: Sequence Wizard Step 2

6. Select **Use Template** from the drop-down list.
7. In the **Template for Sample Name** field, type **Sample**, click the right arrow, and select **Sample Number #n**.
8. In the **Number of Vials** field, type **1**.
9. Use default settings for the remaining parameters on the page.

NOTE You can edit the sequence later, to add more samples and select the injection parameters appropriate for your application.

10. Click **Apply**.

[Figure 51](#) shows Sequence Wizard Step 2 after a sample is defined.

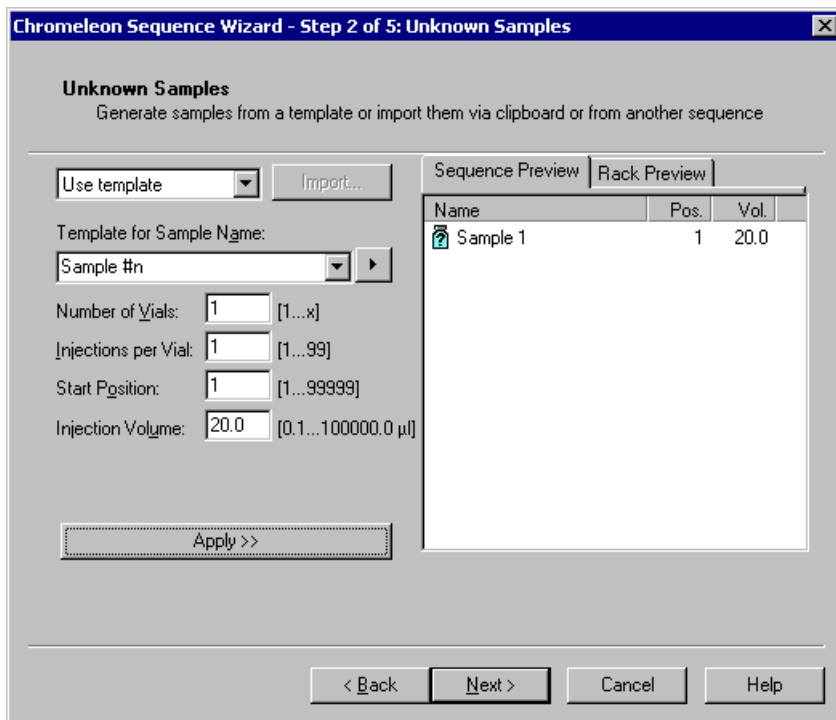


Figure 51. Example: Sequence Wizard Step 2 with Sample Defined

11. Click **Next>**.

The Standard Samples page appears (see [Figure 52](#)).

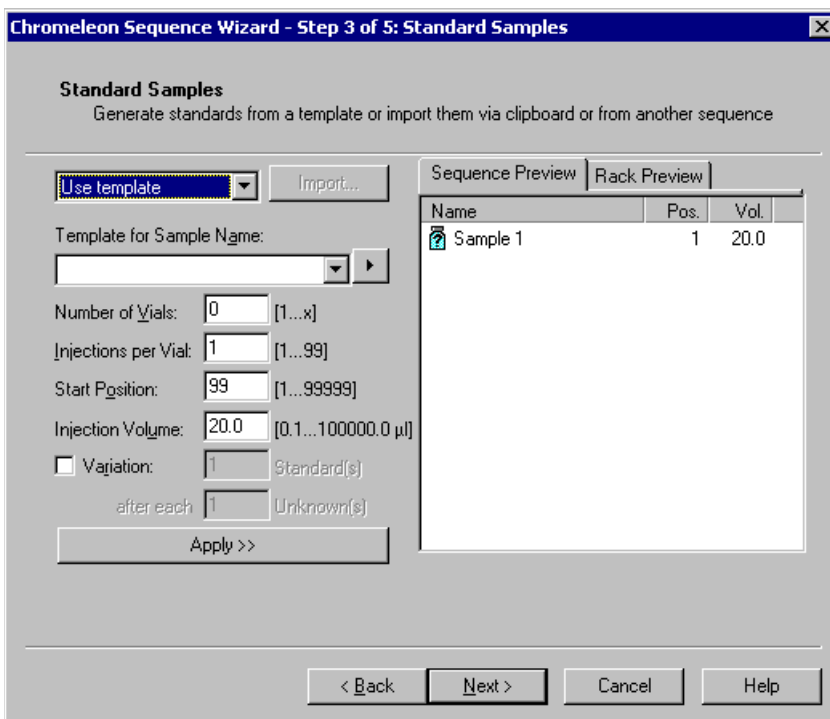


Figure 52. Example Sequence Wizard Step 3

12. Click **Next>** to omit this step and define standard injections later. Or, define one or more standard injections, and then click **Next>**.

The Methods & Reporting page appears

13. Select the **Use Application Template** check box.
14. From the drop-down lists, select the type of suppressor to be installed and then select the column.

In the example in [Figure 53](#), the 4-mm ASRS suppressor and AS17 column are selected.

The screenshot shows the 'Chromeleon Sequence Wizard - Step 4 of 5: Methods & Reporting' dialog box. The title bar is blue with a close button. The main area is titled 'Methods & Reporting' and contains the instruction: 'Specify a method or select a pre-defined template, and indicate reporting preferences.' The dialog is divided into three sections: 'Applications (includes method)', 'Method Files', and 'Preferred Reporting Options'. In the 'Applications' section, the 'Use Application Template' checkbox is checked, and the 'Suppressor Type' dropdown is set to 'ASRS_4mm'. The 'Method Files' section has 'Program:' and 'Quantification Method:' dropdowns both set to 'AS17 Production Test Chromatogram', each with a 'Browse...' button. The 'Preferred Reporting Options' section has 'Preferred Report:' set to 'T_local\Dionex Templates\Reports\default' and 'Preferred Channel:' empty, both with 'Browse...' buttons. At the bottom are buttons for '< Back', 'Next >', 'Cancel', and 'Help'.

Figure 53. Example: Sequence Wizard Step 4

15. To select a report template, click the **Browse** button, go to the Dionex Templates/Reports folder, and select a template (for example, **default_letter**).
16. Click **Next>**.

The Saving the Sequence page appears.

17. Enter a name for the sequence and a location (see the example in [Figure 54](#)).

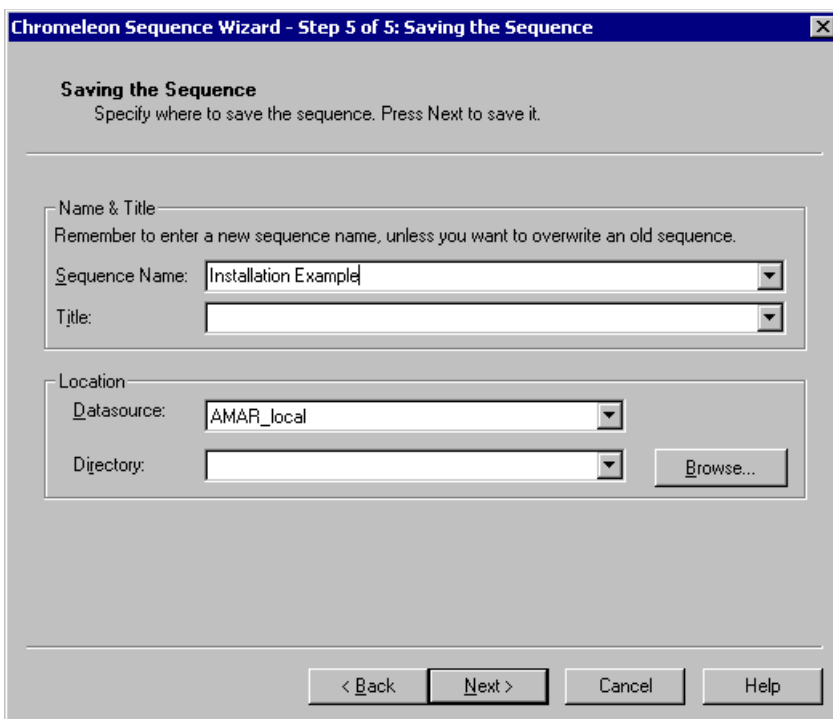


Figure 54. Example: Sequence Wizard Step 5

18. Click **Next>** and then click **Done** on the last page of the Sequence Wizard. The Browser appears, displaying the sequence you created (see [Figure 55](#)). Notice the three files in the top pane of the Browser window.

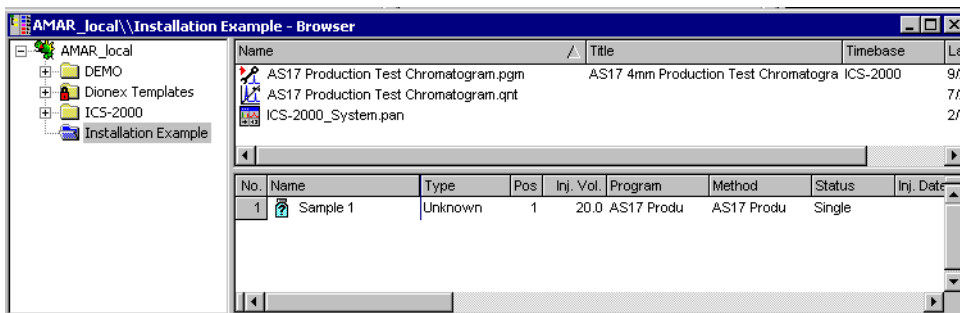


Figure 55. Example Browser with Open Sequence

- The .pgm file (program) contains commands and parameters for controlling the ICS-2000, controlling the autosampler (if used), and acquiring sample data.
- The .qnt file (quantification method) contains peak identification and area determination parameters.
- The .pan file (Control Panel) lets you control and/or monitor the ICS-2000 and other modules that are connected to the timebase.

NOTE The sequence that you create here is intended as a starting point only. You can add additional samples to the sequence, change injection parameters, and edit the .pgm and .qnt files. Refer to the Chromeleon online Help for details.

NOTE After completing the installation, see Chapter 3 in the ICS-2000 operator's manual (Document No. 031857) for how to process the samples and standards in the sequence. The manual is on the Dionex Reference Library CD-ROM (P/N 053891).

- Double-click the .pan file to open the Control Panel for your system (see the example in [Figure 56](#)).

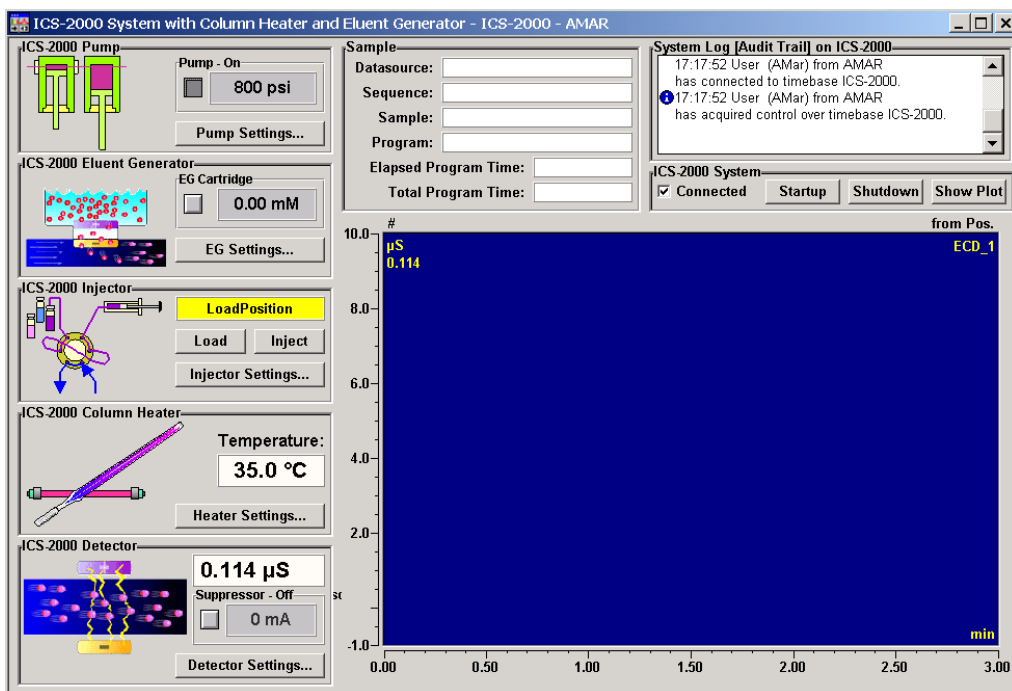


Figure 56. ICS-2000 System Control Panel Example

NOTE If the Connected check box is not selected, click the box to connect the ICS-2000 to the Control Panel.

14.1 Verifying Chromeleon Communication

Verify that Chromeleon is communicating with the ICS-2000 by clicking the **Inject** and then the **Load** button on the Control Panel. If communication is occurring, you will hear the valve actuate as it changes position.

Go on to [Section 15](#).

15 Setting the Eluent Level

After filling the reservoir, open the **HOME** page and enter the volume of liquid in the reservoir in the **Eluent Level** field (see [Figure 57](#)), or enter the volume in the **Eluent Bottle** field on the Chromeleon Control Panel (see [Figure 58](#)). The ICS-2000 determines the eluent usage, by monitoring the flow rate and the length of time the pump is on, and updates the field as the eluent is used up. A warning is displayed if the level falls below 200 mL. The warning is repeated at 100 mL and at 0 mL.

IMPORTANT

In order for the eluent level displayed on the screen to be accurate, the level must be entered by the user when the reservoir is filled. The ICS-2000 does not automatically detect when the reservoir is filled, nor when it is empty.

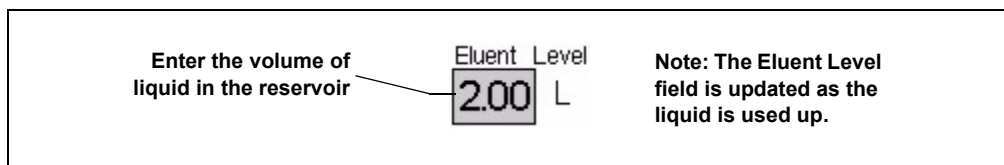


Figure 57. Home Page: Setting the Eluent Level

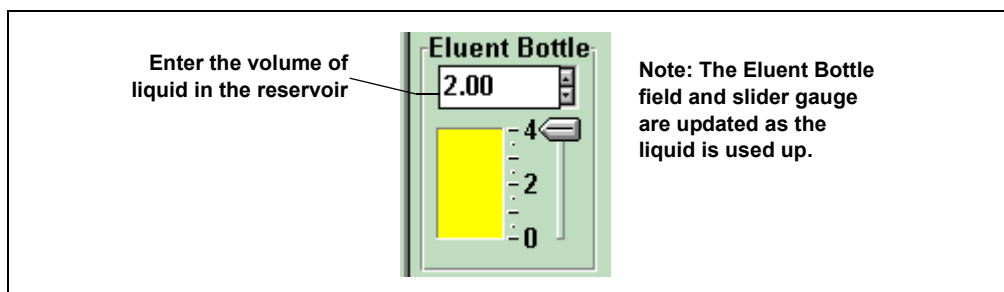


Figure 58. Chromeleon Control Panel: Setting the Eluent Level

16 Equilibrating the System

1. After priming the pump, turn on the pump and set the flow to the operating rate.
2. Flush the system for about 5 minutes to equilibrate.

3. Monitor the system pressure from the Control Panel to make sure it is at the expected pressure for the installed column (refer to the column manual for details) and is stable. If the pressure is less than the expected amount, gas may be trapped in the system. Release the gas by removing the pump fitting on the injection valve. The fitting is labeled **P (2)**. Allow the air to escape and then reconnect the fitting.
4. Check that liquid is flowing out of the suppressor **REGEN OUT** waste line and that the pressure is stable.
5. Monitor the baseline conductivity. In general, it should be $<30 \mu\text{S}$ for a system set up for anion analyses, and $<2 \mu\text{S}$ for a system set up for cation analyses. Equilibration time varies and it can take some time to reach these expected values.

17 Verifying Operational Status

After the system has equilibrated, verify the actual pump pressure and stability by monitoring the pump pressure reading on the Chromeleon Control Panel (or the touch screen **HOME** page). Write down the short-term pressure fluctuations; they should be less than 0.13 MPa (20 psi).

18 Connecting an AS50 Autosampler (Optional)

18.1 AS50 Configuration Requirements

To use an AS50 autosampler with the ICS-2000, the AS50 must meet the following requirements:

- An injection valve cannot be installed in the AS50
- The AS50 must have Moduleware version 1.11 or later installed
- Control of the ICS-2000 injection valve must be enabled in the AS50

The following AS50 models are configured at the factory to meet the above requirements:

- AS50 without injection valve (P/N 061309)
- AS50 without injection valve; with sample preparation (P/N 061310)
- AS50 without injection valve; with sample preparation and sample tray cooling (P/N 061311)
- AS50 without injection valve; with sample tray cooling (P/N 061312)

Notes

- To identify the version of Moduleware currently installed in the AS50, go to the AS50 **POWER UP** screen (press **Menu**, **8**, and **1**). If a Moduleware update is required, contact Dionex.
- In order to use an AS50 that has an injection valve installed, the valve must be disconnected from the AS50 electronics. Contact Dionex for assistance. The AS50 electronics components cannot be serviced by the user.
- If the AS50 is currently running with a Thermal Compartment (TC) or Chromatography Compartment (CC) and you are now going to use it with an ICS-2000, the injection valve is typically installed in the TC or CC, not in the AS50. If this is the case, verify that the correct Moduleware version is installed, and enable control of the ICS-2000 injection valve (see [Section 18.3](#)).

After the AS50 is configured for use with the ICS-2000, all AS50 modes of injection (full-loop, partial-loop, and partial-loop limited-sample) are supported. In addition, all AS50 injection valve commands (whether

issued from the AS50 front panel or from Chromeleon) will control the ICS-2000 injection valve. For Chromeleon control, the AS50 must be added to the ICS-2000 timebase (see [Section 8](#)). For front panel control, the AS50 and ICS-2000 can be set up for stand-alone operation. This requires a TTL cable connection between the AS50 and the ICS-2000. See the TTL appendix in the ICS-2000 operator's manual for stand-alone setup instructions.

18.2 AS50 Connections

1. Place the AS50 to the left of the ICS-2000 on the workbench.
2. Open the ICS-2000 and AS50 doors.
3. The needle seal line that extends from the inject port in the autosampler is coiled inside the AS50 door, on the right side. Route this line through the AS50 right side slot (see [Figure 59](#)) and the ICS-2000 left side slot to the ICS-2000 injection valve.

IMPORTANT

The needle seal line from the AS50 inject port to the ICS-2000 injection valve is calibrated for use with the ICS-2000. To ensure injection precision, do not shorten (by cutting) or lengthen this line, or replace it with a different (uncalibrated) line.

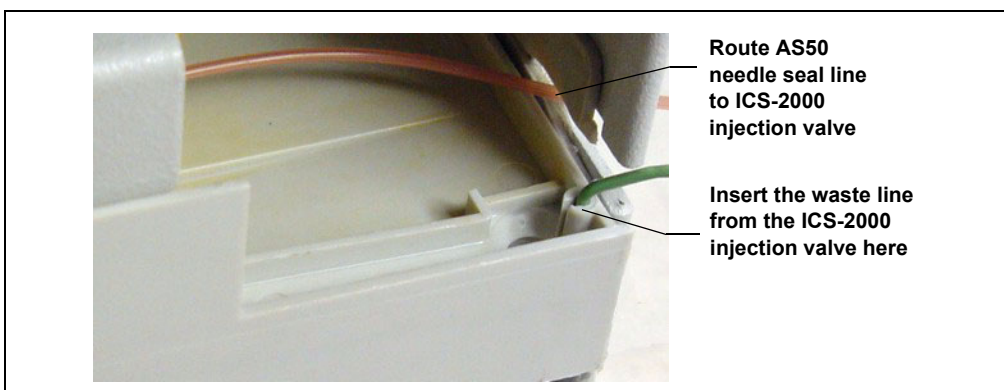


Figure 59. AS50 Drip Tray

4. Connect the needle seal line from the AS50 to port **S (5)** on the injection valve (see [Figure 60](#)).

The green waste line that is connected to port **W (6)** on the injection valve (see [Figure 60](#)) is connected with a union to a Teflon waste line (see [Figure 61](#)) and routed through the tubing chase to the ICS-2000 rear panel.

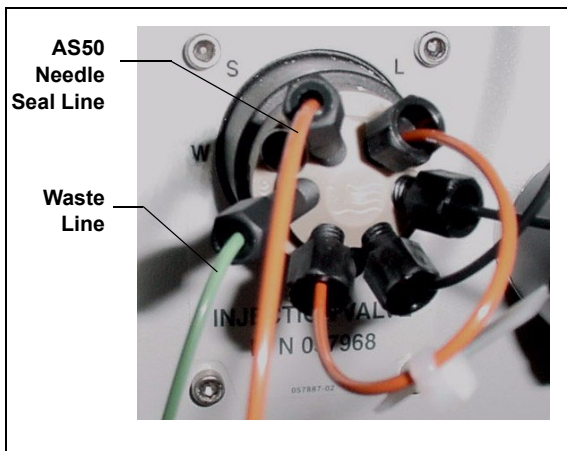


Figure 60. ICS-2000 Injection Valve

5. Disconnect the green waste line (labeled **AS50 TRAY**) from the union and route the line to the drip tray in the autosampler compartment.

You can either leave the disconnected Teflon waste line and union in the tubing chase, or pull the line out from the front.

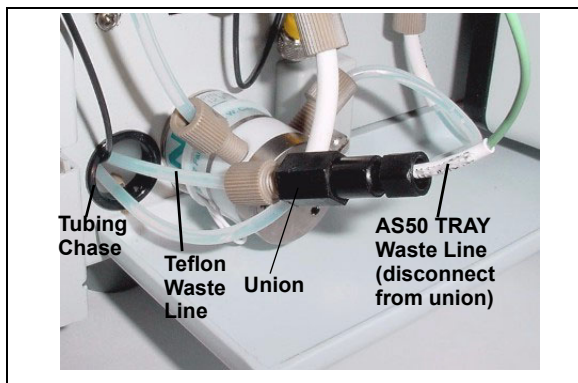


Figure 61. Injection Valve Waste Line Union

6. Push the end of the green **AS50 TRAY** line into the small round opening on the right side of the AS50 tray (see [Figure 59](#)).

IMPORTANT

Make sure the injection valve waste line is not elevated above the injection valve at any point between the valve and the AS50 drip tray.

NOTE For PEEK waste lines, sharply bend the waste line tubing about 5-mm from the end to ensure it stays in place in the opening in the drip tray. When bending the tubing, be sure not to restrict the inner diameter.

7. If you have not already done so, add the AS50 to the Chromeleon timebase (see [Section 8](#)).

18.3 Enable AS50 Control of the Injection Valve

Follow the steps below if you are connecting an AS50 that was not configured at the factory for ICS-2000 support. Injection valve control is already enabled in pre-configured AS50 models (see the list in [Section 18.1](#)).

1. On the AS50 front panel, press **Menu** and **0** to go to the **TIME FUNCTION OUT** screen (see [Figure 62](#)). In the **LOAD/INJECT VALVE:** **TTL 1** field, select **ENABLED**.

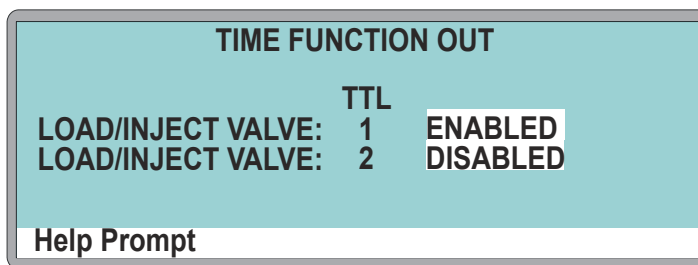


Figure 62. AS50 Time Function Out Screen

2. Turn the AS50 power off and then back on.
All AS50 injection valve commands (whether issued from the AS50 front panel or from Chromeleon) will now control the ICS-2000 injection valve.

19 Connecting an AS40 Automated Sampler (Optional)

1. Place the AS40 to the left of the ICS-2000 on the workbench.
2. Open the front door of the ICS-2000 and thread the outlet line from the AS40 through the left side slot at the front of the ICS-2000.
3. Connect the outlet line from the AS40 to port **S (5)** of the injection valve (see [Figure 63](#)).

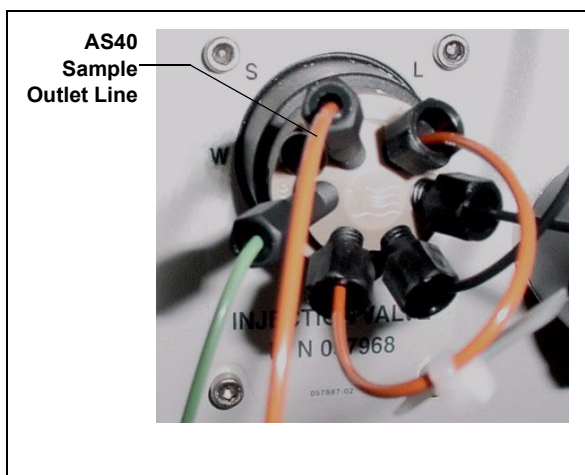


Figure 63. ICS-2000 Injection Valve

4. Locate the relay control cable (P/N 047946) supplied with the AS40.
5. Remove the 2-position connector plug from the pair of wires labeled **LOAD** on the relay control cable.
6. Locate the 12-position connector plug (P/N 923686) in the ICS-2000 Ship Kit (P/N 057905) (see [Figure 64](#)).
7. Attach the red wire from the relay control cable to position 1 on the plug, and attach the green wire to position 2. This will be used to connect the AS40 **LOAD** relay to **RELAY OUT 1** on the ICS-2000.

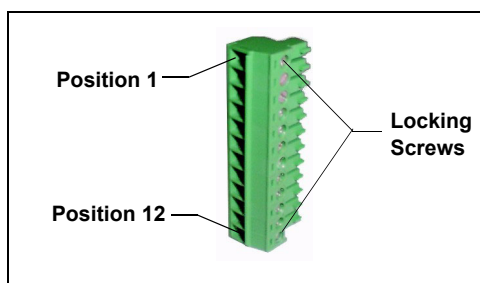


Figure 64. 12-Position Connector Plug

To attach a wire to the plug, strip the end of the wire, insert it into the plug, and use a screwdriver to tighten the locking screw.



When attaching wires to the connector plug, be careful not to allow stray strands of wire to short to the adjoining position on the connector.

Connecting an AS40 Automated Sampler (Optional)

NOTE If **RELAY OUT 1** is not available, you can connect to **RELAY OUT 2** or to one of the **TTL outputs**. For **RELAY OUT 2**, connect the red wire to position 3 and the green wire to position 4. For **TTL OUT 1**, connect the red wire to position 5 and the green wire to position 11. For **TTL OUT 2**, connect the red wire to position 6 and the green wire to position 12.

8. Connect the relay control cable's 10-position connector plug to the **RELAY CONTROL** connector on the AS40 rear panel (see [Figure 65](#)).
9. Plug the 12-position connector plug into the TTL and relay connector on the ICS-2000 rear panel (see [Figure 65](#)). Make sure the red wire connects to position 1 and the green wire connects to position 2.

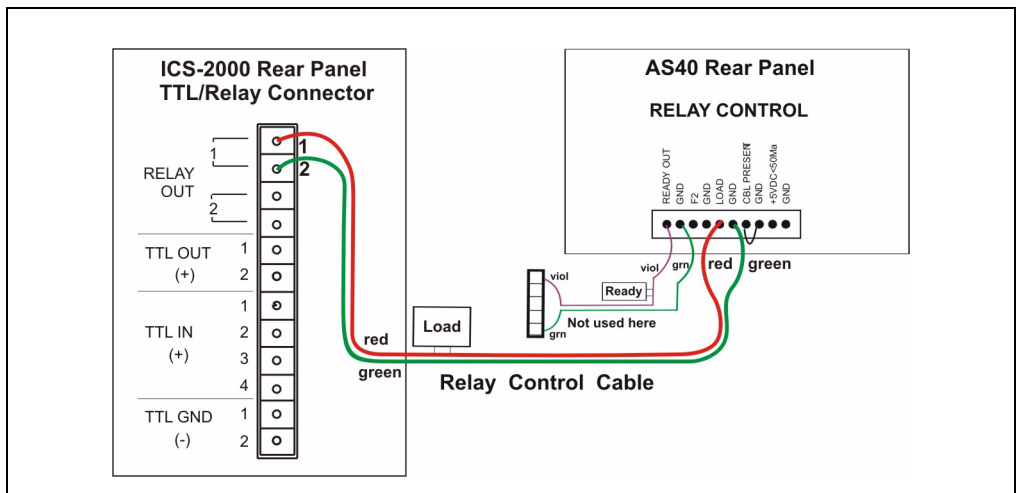


Figure 65. Example AS40 Autosampler Connection

The AS40 Load relay is now dedicated to the ICS-2000 **RELAY OUT 1**. Use this relay for running with Chromeleon. When you set up the ICS-2000 application (see [Section 14](#)), commands for controlling the AS40 Load relay and switching the ICS-2000 injection valve are included by default in the program file (see [Figure 66](#)).

```
S12A Production Test Chromatogram - Commands
m Production Test Chromatogram
Suppressor_Current = 2.9
Flow = 1.50
-2.300 Pump_ECD_Relay_1.Closed Duration=138.00 ; For AS40 injection
0.000 Pump_ECD.Autozero
      ECD_1.AcqOn
      Pump_InjectValve.InjectPosition Duration=30.00
15.000 ECD_1.AcqOff
      End
```

The screenshot shows a command file for an AS40 injection. Key events are annotated with callouts:

- At -2.300, `Pump_ECD_Relay_1.Closed` is executed for a duration of 138.00 seconds. A callout states: "Relay 1 turned on to start the AS40 Load cycle and load the sample loop".
- At 0.000, `Pump_ECD.Autozero`, `ECD_1.AcqOn`, and `Pump_InjectValve.InjectPosition` (Duration=30.00) are executed. A callout states: "Relay 1 turned off after 138 seconds".
- At 15.000, `ECD_1.AcqOff` is executed. A callout states: "Injection valve switched to Inject".
- At the end of the file, a callout states: "Injection valve switched back to Load".

Figure 66. Example Program for AS40 Control

20 Analog Output Connection (Optional)

The analog output connector on the ICS-2000 rear panel outputs an analog voltage signal proportional to the conductivity measured by the cell. The output is filtered using the selected data rise time. The analog output can be connected to an analog-to-digital converter such as an integrator or other recording device. Refer to the documentation for the device for connection instructions.

Analog output is 0 to 1V, scaled to the selected range.

For an example setup for ICS-2000 stand-alone operation with an AS50 autosampler, see the TTL appendix in the ICS-2000 operator's manual.

ICS-2000 installation is complete. For routine operation, refer to *ICS-2000 Ion Chromatography System Operator's Manual* (Document No. 031857). The manual is on the Dionex Reference Library CD-ROM (P/N 053891).

21 Pressurizing the Eluent Reservoir (Optional)

The ICS-2000 does not require pressurized reservoirs. However, if eluent is manually degassed or is sensitive to contamination, Dionex recommends pressurizing the reservoir with helium or nitrogen. The air regulator accessory bracket and other items needed for pressurizing the eluent reservoir must be ordered separately (P/N 060054).

21.1 Connecting the Gas Source (Optional)

1. Locate the barbed fitting (P/N 030071), pipe thread reducer (P/N 030087), 3-mm (1/8-in) ID tubing (P/N 040793), and ICS-2000 air regulator accessory (P/N 060054). These parts must be ordered separately.
2. Use the barbed fitting and pipe thread reducer to connect the 3-mm (1/8-in) ID tubing to a clean gas source, regulated to between 0.55 and 0.83 MPa (80 and 120 psi).
3. Push the other end of the tubing onto the inlet of the air regulator (see [Figure 67](#)).
4. Remove the eluent reservoir cap.
5. Connect the gas line from the eluent reservoir cap to the gas line on the air regulator outlet.
6. Slip the air regulator accessory bracket over the neck of the eluent reservoir (see [Figure 67](#)).

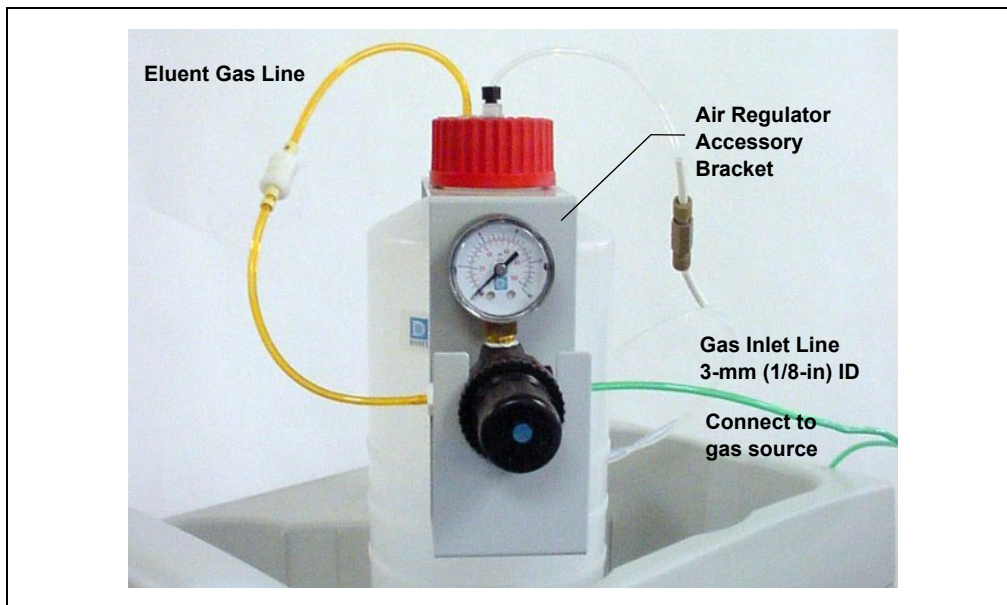


Figure 67. ICS-2000 Pressurized Eluent Reservoir Connections (Optional)

21.2 Pressurizing the Eluent Reservoir (Optional)

NOTE Do not pressurize the ICS-2000 until after the reservoir is plumbed.

1. Pull out the air regulator knob and turn it fully counterclockwise to ensure there is no pressure to the reservoir when the gas source is turned on.
2. Turn on the gas source.
3. Pull out the air regulator knob and turn it clockwise to pressurize the eluent reservoir.
4. Adjust the pressure to between 30 and 40 kPa (5 and 6 psi). Push the regulator knob back in.



Do not pressurize the eluent reservoir above 70 kPa (10 psi).



Ne mettez jamais les réservoirs d'éluants sous une pression supérieure à 0,07 MPa (10 lb/po²).



Setzen Sie den Eluentbehälter auf keinen Fall einem Druck über 0,07 MPa aus.

22 Pump Continuous Seal Wash Connections (Optional)

The pump includes a seal wash assembly that can be set up to continuously rinse the back of the piston seals to remove salt crystals and prolong the life of the seals. Follow the steps below to set up this feature.

1. Fill a flush bottle with either deionized water or a combination of deionized water and 10% or 20% isopropyl alcohol. (Isopropyl alcohol will inhibit bacterial growth in the water.)
2. Place the flush bottle on top of the ICS-2000. During operation, gravity maintains flow through the pump heads.
3. The flush solution is carried to the piston seal wash assembly and out to waste via 1.5-mm (0.06-in) ID tubing (P/N 055847). Locate this tubing in the ICS-2000 Ship Kit and cut the tubing into three unequal pieces in the following lengths:
 - 117 cm (46 in)
 - 152 cm (60 in)
 - 15 cm (6 in)
4. Install the tubing as follows (see [Figure 68](#) and [Figure 69](#)):
 - a. Push the 117-cm (46-in) piece of clear tubing onto the drain tube on the bottom of the *secondary* pump head. Place the free end of this tubing in the flush bottle. Make sure the end of the tubing is near the bottom of the bottle.

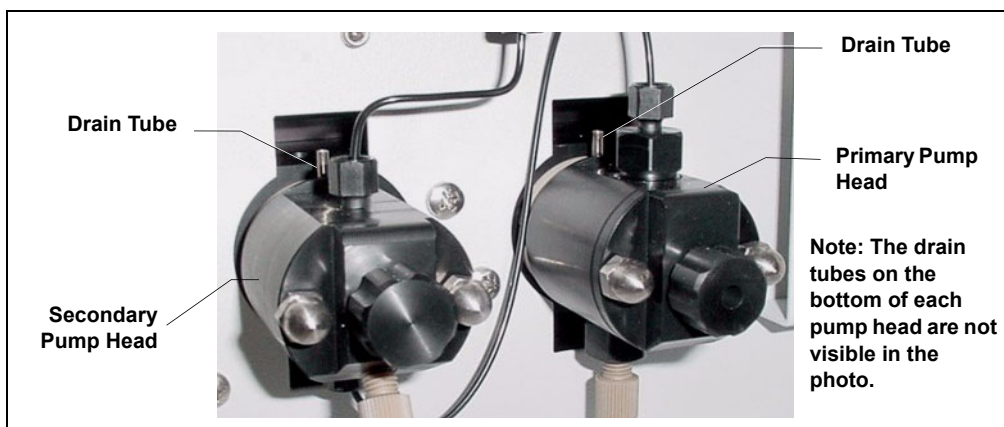


Figure 68. Primary and Secondary Pump Heads with Drain Tubes

- b. Push the 152-cm (60-in) piece of clear tubing onto the drain tube on the top of the *primary* pump head. This is the waste line. Route this waste line through the lower tubing chase and out the back of the ICS-2000.
- c. Push the 15-cm (6-in) piece of clear tubing over the drain tube on the top the *secondary* pump head. Push the other end of the tubing over the drain tube on the bottom of the *primary* pump head.
- d. Place a 10 mL syringe (P/N 054578) at the end of the waste line, press the syringe against the line to form a seal, and draw out all of the air.
- e. Push approximately 5 cm (2 in) of black 0.25-mm (0.01-in) ID tubing (P/N 057057) into the end of the waste line.

NOTE The black tubing creates a flow restriction. Assuming a height difference of about 76 cm (30 in) between the flush bottle and the waste container, this setup provides a flow of one drop of flush solution every 5 to 30 seconds.

- f. Place the end of the waste line in a waste container.
- g. This completes the piston seal wash installation. Periodically refill the flush bottle and empty the waste container as required.

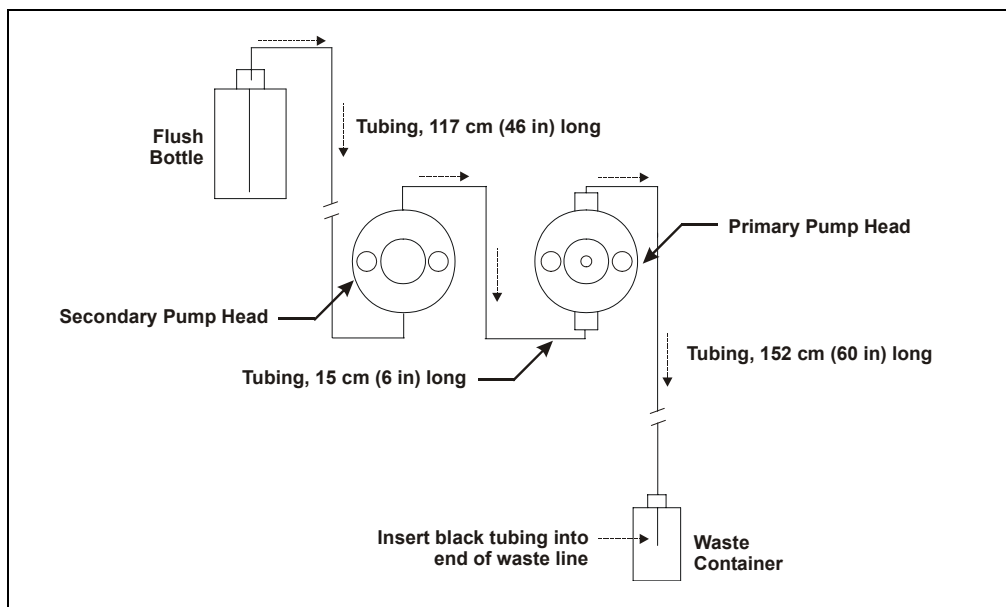


Figure 69. Piston Seal Wash Flow Schematic

23 Manually Connecting to a Control Panel

This section describes how to manually connect the ICS-2000 to a Control Panel if you do not use the application templates described in [Section 14](#).

1. In the Browser, expand the **Dionex Templates\Panels\Dionex_IC\ICS-2000** folder. Several System Control Panels, corresponding to various system configurations, are provided.
2. Open the panel for your system configuration by double-clicking its name in the list. For example, if your system includes an ICS-2000 and an AS50 autosampler, double-click either **ICS-2000_System_AS50.pan** or **ICS-2000_Traditional_System_AS50.pan**.

NOTE The two types of panels (system and traditional system) are similar in function, but have different “looks.” You can select either style, depending on your personal preference.

When the Control Panel opens, the controls on the panel are not enabled (see [Figure 70](#)).

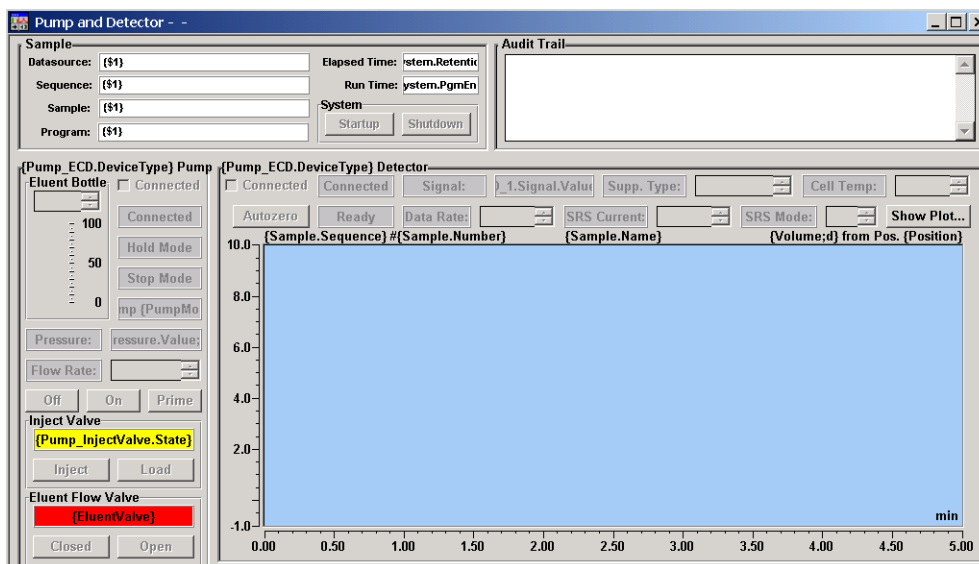


Figure 70. ICS-2000 Traditional System Control Panel (Unconnected)

ICS-2000 Ion Chromatography System

3. To connect the Control Panel to the ICS-2000, open the **Control** menu and click the name of the ICS-2000 timebase at the bottom of the menu.

The Control Panel is now connected to the ICS-2000 and the controls are enabled (see [Figure 71](#)).

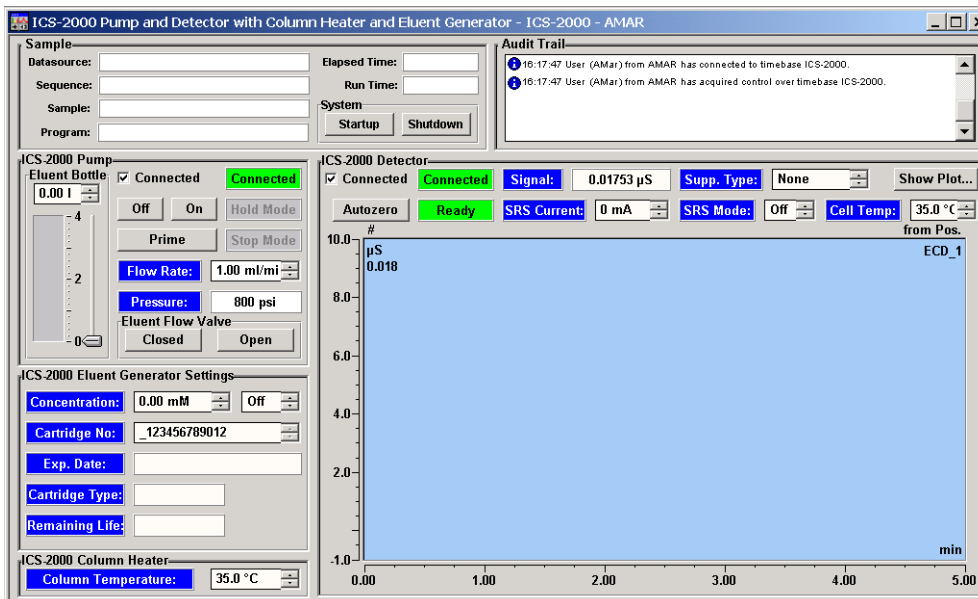


Figure 71. ICS-2000 Traditional System Control Panel (Connected to the ICS-2000)

24 Installation Troubleshooting

Problem: When the ICS-2000 power is turned on for the first time, a Windows message box appears asking for a USB configuration file (cmwdmusb.inf).

Possible Cause: The USB cable was connected and the power turned on before Chromeleon was installed.

Solutions:

Use one of the methods below to resolve the problem:

- Click the **Cancel** button on the Windows message box. Turn off the ICS-2000 power and unplug the USB cable. Then, install Chromeleon, reconnect the USB cable and turn on the ICS-2000 power. Windows will now automatically recognize the new USB device.
- Leave the message box open and insert the Chromeleon CD into the CD-ROM drive. Click the **Browse** button on the message dialog box. The cmwdmusb.inf file is located in the **Drivers** folder on the CD.

