

Installation Instructions for the Dionex ICS-2100 Ion Chromatography System

Document No. 065294
Revision 03
October 2012

©2012 Thermo Fisher Scientific Inc. All rights reserved.

AES, Atlas, Chromeleon, and SRS are registered trademarks of Thermo Fisher Scientific Inc. in the United States. Microsoft, Windows, and Windows Vista are registered trademarks of Microsoft Corporation in the United States and other countries.

PEEK is a trademark of Victrex PLC.

All other trademarks are the property of Thermo Fisher Scientific and its subsidiaries.

Thermo Fisher Scientific Inc. provides this document to its customers with a product purchase to use in the product operation. This document is copyright protected and any reproduction of the whole or any part of this document is strictly prohibited, except with the written authorization of Thermo Fisher Scientific Inc.

The contents of this document are subject to change without notice. All technical information in this document is for reference purposes only. System configurations and specifications in this document supersede all previous information received by the purchaser.

Thermo Fisher Scientific Inc. makes no representations that this document is complete, accurate or error-free and assumes no responsibility and will not be liable for any errors, omissions, damage or loss that might result from any use of this document, even if the information in the document is followed properly.

This document is not part of any sales contract between Thermo Fisher Scientific Inc. and a purchaser. This document shall in no way govern or modify any Terms and Conditions of Sale, which Terms and Conditions of Sale shall govern all conflicting information between the two documents.

Revision history: Revision 01 released March 2009; initial release of system
Revision 02 released December 2011; Thermo Fisher Scientific transition
Revision 03 released October 2012; new part numbers assigned

For Research Use Only. Not for use in diagnostic procedures.

Contents

1.	Facility Requirements	1
2.	Unpacking the IC System	2
3.	Connecting an Autosampler (Optional)	4
3.1	Connecting a Dionex AS-DV Autosampler	4
3.2	Connecting a Dionex AS Autosampler	5
4.	Unpacking the PC	8
5.	Installing Chromeleon	8
6.	Installing the Chromeleon Software License Dongle	10
7.	Installing the Software License	11
8.	Starting the Chromeleon Server	12
9.	Connecting to the Chromeleon PC	13
9.1	Connecting the IC System to the PC	13
9.2	Connecting Additional USB Devices	14
10.	Connecting the Power Cord	16
11.	Installing the Dionex ICS-2100 Device Driver	17
12.	Setting Up Chromeleon	18
12.1	Creating a Timebase	18
12.2	Configuring the Device Properties	21
12.3	Connecting to the Panel Tabset	24
12.4	Verifying Chromeleon Communication	25
13.	Installing and Plumbing the Columns and Suppressor	26
13.1	Unpacking the Columns and Suppressor	27
13.2	Setting Up the Column Heater	27

13.3	Plumbing the Columns	29
13.4	Installing the Suppressor	30
14.	Connecting the Waste Lines	31
14.1	Installing the Waste, Gas Separator Tube	32
15.	Setting Up the Eluent Reservoir	33
16.	Entering the Eluent Level	34
17.	Priming the Pump	35
17.1	Priming the Eluent Lines with a Syringe	35
17.2	Priming the Pump Heads with the Prime Button	37
18.	Setting Up the Eluent Generator	38
18.1	Eluent Generator Setup for KOH, LiOH, MSA, and NaOH Eluents	38
18.2	Eluent Generator Setup for Carbonate/Bicarbonate Eluent	55
18.3	Eluent Generator Setup for Carbonate Eluent	83
19.	Equilibrating the System	100
19.1	Dionex EluGen Cartridge Backpressure Requirements	100
20.	Verifying Operational Status	101
21.	Connecting the Analog Output (Optional)	103
22.	Pressurizing the Eluent Reservoir (Optional)	104
22.1	Connecting the Gas Source	105
22.2	Applying the Pressure	106
23.	Connecting the Pump Continuous Seal Wash (Optional)	107
24.	Sample Processing Overview	109
25.	Troubleshooting the USB Configuration Error	110

This document provides instructions for the initial installation of the Thermo Scientific Dionex ICS-2100 Ion Chromatography System.

NOTE The order of the steps is important. It is especially important to install the Thermo Scientific Dionex™ Chromeleon™ Chromatography Data System before connecting the USB cable and turning on the system power.

1. Facility Requirements

- Make sure the installation site meets these environmental specifications:
 - Main Power:** 100 to 240 Vac, 50 to 60 Hz (Auto-sensing power supply; no manual voltage or frequency adjustment required)
 - Operating Temperature:** 4 to 40 °C (40 to 104 °F)
 - Humidity:** 5% to 95% relative humidity, noncondensing
- Provide a sturdy workbench for the system of a height that ensures convenient access to the interior of the Dionex ICS-2100.
- Allow at least 15 cm (6 in) behind the system for power connections and ventilation. For optimal performance, install the system in a draft-free location, out of the path of air conditioning and heating vents.
- Use ASTM filtered, Type I (18-megohm) deionized water when preparing eluent and regenerant.
- (Optional) For pressurization of the eluent reservoir, provide a clean gas source regulated to between 0.55 and 0.83 MPa (80 and 120 psi). An air regulator accessory (P/N 060054) is required to regulate the pressure to between 0.03 and 0.04 MPa (5 and 6 psi).



Do not pressurize the eluent reservoir above 0.07 MPa (10 psi).



Ne mettez jamais les réservoirs d'éluants sous une pression supérieure à 0,07 MPa (10 lb/pc²).



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

2. Unpacking the IC System

1. Open the shipping box (see [Figure 1](#)) and remove the top layer of foam.



Figure 1. Unpacking the Dionex ICS-2100

2. Open the plastic bag that covers the IC system (see [Figure 2](#)).

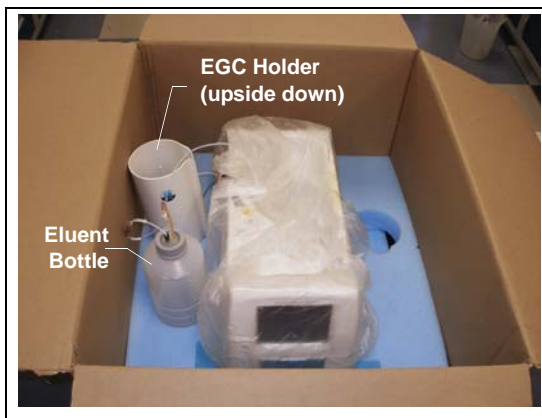


Figure 2. IC System Enclosed in Bag

3. Set the eluent bottle on top of the Dionex ICS-2100 (see [Figure 3](#)).
4. **TURN OVER THE DIONEX EGC HOLDER,** and set it on top of the Dionex ICS-2100.



Figure 3. Dionex ICS-2100 after Installing Eluent Bottle and Dionex EGC Holder

5. Remove the next layer of foam and remove the Ship Kit (P/N 064375) (see [Figure 4](#)).
6. The bottom layer of foam has two cutouts on either side of the module; use these as handholds when lifting the IC system.



Figure 4. IC System with Ship Kit

7. Lift the IC system off the bottom layer of foam and out of the box. Set it on a workbench.



Two or more persons should lift the IC system, which weighs 30 kg (66 lb). Lift the IC system 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 chromatograph ionique: il pèse 30 kg (66 lb). Ne soulevez le chromatograph ionique que par chaque côté du fond de l'armoire. Son soulèvement par la porte du panneau avant endommagera les charnières de la porte.



Das IC system wiegt über 30 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 Ionenchromatographen nicht an der Vordertür an, da dadurch die Türangeln beschädigt werden könnten.

8. Inspect the system for any shipping damage. Remember to save the shipping container and all packing material. You will need them in future if the IC system is shipped.

3. Connecting an Autosampler (Optional)

To connect a Thermo Scientific Dionex AS-DV Autosampler or Dionex AS Autosampler to the injection valve in the IC system, follow the instructions in the appropriate section below.

Notes:

- If an optional auxiliary valve is installed in the Dionex ICS-2100, it can be used as the injection valve, instead of the standard valve configured with each system. After connecting the autosampler to the auxiliary valve (as described in the appropriate section below), configure the valve as the injection valve in Chromeleon. For instructions, refer to *Installing the Thermo Scientific Dionex ICS-1100/1600/2100 Auxiliary Valve* (Document No. 065288). The document is provided with the valve.
- To connect a Thermo Scientific Dionex AS-HV Autosampler, refer to the instructions in *Thermo Scientific Dionex AS-HV Operator's Manual* (Document No. 065125). The manual is provided on the Thermo Scientific Reference Library DVD (P/N 053891).

3.1 Connecting a Dionex AS-DV Autosampler

1. Place the Dionex AS-DV to the left of the IC system on the workbench.
2. Open the IC system and the autosampler doors.

3. Route the sample outlet line from the Dionex AS-DV through the left side slot, at the front of the IC system.
4. Connect the outlet sample line from the Dionex AS-DV to port **S (5)** on the injection valve (see [Figure 5](#)).

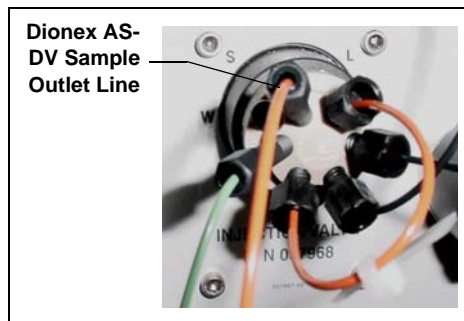


Figure 5. IC System Injection Valve

3.2 Connecting a Dionex AS Autosampler

NOTE Thermo Scientific recommends using AS models that do not have injection valves. If a valve is installed in the autosampler, it is switched at the same time as the valve in the IC system. This causes unnecessary wear on the autosampler valve. If your AS has an injection valve, contact Thermo Scientific for assistance.

1. Place the autosampler to the left of the IC system on the workbench.
2. Open the IC system and the autosampler doors.
3. Route the needle seal line that extends from the autosampler inject port through the autosampler right side slot (see [Figure 6](#)) and then through the IC system left side slot to the injection valve.

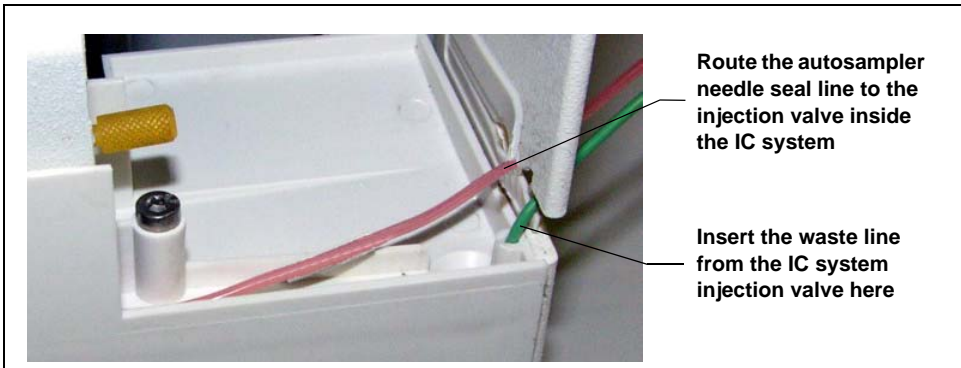


Figure 6. AS Drip Tray and Right Side Slot

IMPORTANT

The needle seal line from the AS inject port to the IC system injection valve is specially constructed. It consists of two tubes (one inside the other) that are sealed at the end. This seal must be maintained.

In addition, the line is calibrated for use with the IC system. To ensure correct autosampler function, this line **MUST NOT BE CUT!** If replacement is required, refer to the AS operator's manual for the required part number and replacement instructions.

4. Connect the needle seal line to port **S** (5) on the injection valve (see [Figure 7](#)).

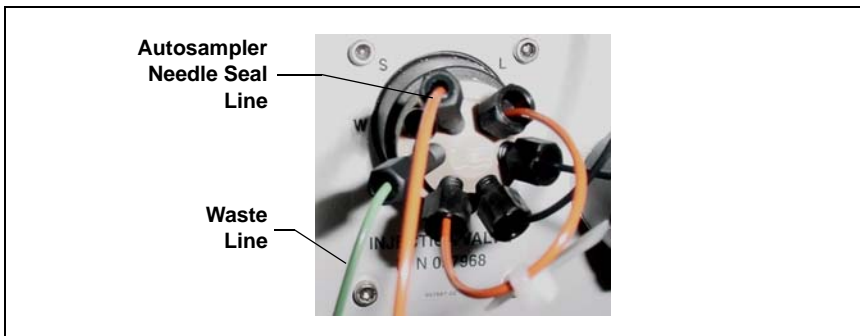


Figure 7. Injection Valve

A coupler (see [Figure 8](#)) connects the green waste line from port **W** (6) to a 3-mm (1/8-in) ID PTFE waste line. The waste line is routed through the tubing chase to the IC system rear panel.

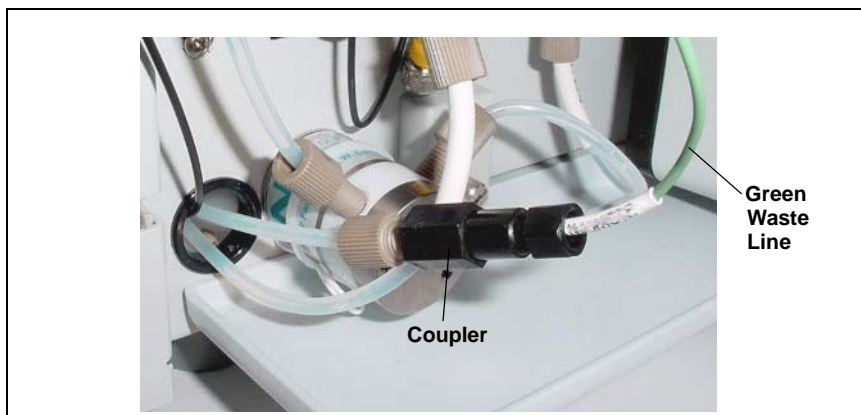


Figure 8. Injection Valve Waste Line Coupler

5. If the coupler is not visible, grasp the green waste line where it exits the tubing chase and pull it toward the front of the system until the coupler is outside the chase.
6. Disconnect the green waste line (labeled **TO AS50 TRAY**) from the coupler and route the line to the drip tray in the autosampler compartment.
You can either leave the disconnected PTFE waste line and coupler in the tubing chase, or pull the line out from the front.
7. Bend the green waste line about 5 mm (0.2 in) from the end (to ensure it stays in the AS drip tray). When bending the tubing, be sure not to restrict the inner diameter.
8. Push the end of the green waste line into the small round opening on the right side of the AS tray (see [Figure 6](#)).

IMPORTANT

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

NOTE After the AS is configured for use with the Dionex ICS-2100 (see [Section 12.2](#)), all AS injection types are supported. In addition, all injection valve commands (whether issued from Chromeleon or the AS front panel) can control the injection valve.

4. Unpacking the PC

1. Remove the PC and all documentation from the PC box and place them on a workbench.
2. Follow the instructions in the PC installation guide to connect the PC components.

5. Installing Chromeleon

NOTE If you purchased Chromeleon and a PC from Thermo Scientific, omit this section and go directly to [“Starting the Chromeleon Server” on page 12.](#)

1. To verify that the PC meets current system specifications, go to <http://www.thermoscientific.com/dionex>, select **Software** under **Products**, and click the **Specifications** link.
2. Verify that the Chromeleon disk contains Chromeleon version 6.80 SR6a (or later).
3. For a local PC: Log onto Windows[®] XP or Windows[®] Vista[®] as an **administrator**.

For a network PC: Log on as a user with local PC administrator privileges.

4. Verify that at least 250 MB of free disk space is available on the drive on which you plan to install Chromeleon.

More than 250 MB may be needed to store the large amounts of data that Chromeleon can generate. Data can also be stored at a different location (for example, on a network).

5. Insert the Chromeleon disk into the PC drive.

The Chromeleon Setup screen appears.

6. If you are installing Chromeleon on a PC that has an earlier release of Chromeleon 6.80 already installed, click **Update Chromeleon** and follow the on-screen instructions.

7. If you are installing Chromeleon on a PC that does not have an earlier release of Chromeleon 6.80 installed, follow these steps to install Chromeleon:
 - a. On the Chromeleon Setup screen, click **Exit**.
 - b. Go to the following folder on the Chromeleon disk: CM680SRx (where x is the service release number). For example, if you are installing Chromeleon 6.80 SR6a, go to the CM680SR6a folder on the disk.
 - c. Double-click **setup.exe** and follow the on-screen instructions.
8. When asked whether to add the Server Monitor program to the Startup group, select **Yes** if the PC will be physically connected to devices or **No** if the PC will never be connected to devices.
9. After installing the software, restart the PC.

6. Installing the Chromeleon Software License Dongle

NOTE If your software license is provided through a Chromeleon License Server, omit this section. Instead, follow the instructions in the Chromeleon Help to install the software license. Then, go on to [“Connecting to the Chromeleon PC” on page 13.](#)

1. If your software license is issued with a USB dongle, plug the dongle into a USB port on the PC. **Always connect the USB dongle to the PC, not to a Dionex module.**

Microsoft® Windows automatically detects the USB dongle and launches the Found New Hardware Wizard (see [Figure 9](#)).

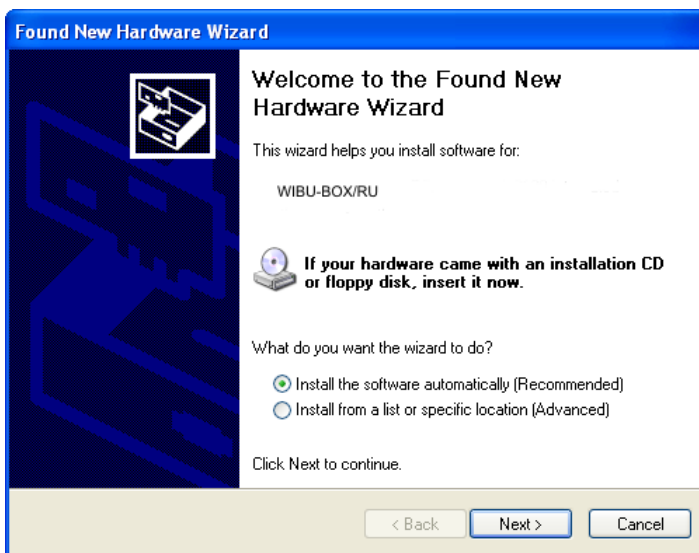


Figure 9. Windows Found New Hardware Wizard

2. Complete the wizard by selecting the following options:
 - If asked whether Windows can connect to Windows Update to search for software, select **No, not this time.**
 - Accept the default option (**Install the software automatically (Recommended)**) option and click **Next >**. It is not necessary to insert a

hardware installation disk. When the wizard has completed installing the software, click **Finish**.

3. Store the Chromeleon disk in a safe place, away from heat and moisture.

7. Installing the Software License

To activate the licensed features in Chromeleon, enter the license key code (an alphanumeric series) provided on the Software License key code sheet. **Store the key code sheet in a safe place.**

1. Click **Start** on the Windows taskbar and select **All Programs > Chromeleon > Chromeleon** to start the Chromeleon client.
2. Select **Help > About Chromeleon**.
3. Click the **Preferences** button and select the **License** tab (see [Figure 10](#)).

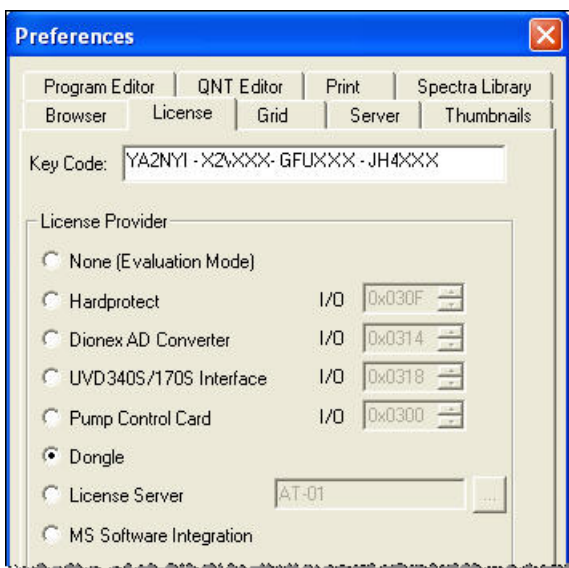




Figure 10. Chromeleon License

4. Under **Copy Protection Location**, select **Dongle** and then enter the key code, exactly as it appears on the key code sheet. Click **OK**.

5. The About Chromeleon Client screen should now display the serial number of the dongle, and all purchased license features (devices controlled, number of timebases, and software options) should be labeled **On**.
6. Click **OK** to close the screen.

8. Starting the Chromeleon Server

Check the Chromeleon Server icon on the Windows taskbar to determine if the server is already running:

- If the icon is crossed out in red , the server is not running. Right-click the icon and select **Start Server**.
- If the icon is gray , the server is already running.

If the Server Monitor icon is not on the Windows taskbar, follow these steps to start the Chromeleon server:

1. Click **Start** on the Windows taskbar and select **All Programs > Chromeleon > Server Monitor**.

The Server Monitor window appears.

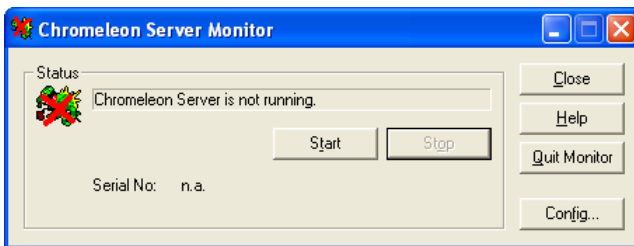


Figure 11. Server Not Running

2. Click **Start** to start the server.
3. Click **Close** to close the Server Monitor window.

The Server Monitor icon appears on the taskbar.

NOTE Clicking the **Quit Monitor** button quits (or exits) the **Server Monitor** program, but does not stop the server. To stop the server, click the **Stop** button.

9. Connecting to the Chromeleon PC

The IC system rear panel provides a USB receptacle for connecting 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 Dionex ICS-2100 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. To install Chromeleon, see [Section 5](#).

9.1 Connecting the IC System to the PC

1. Locate the USB cable (P/N 960779) in the IC system Ship Kit.
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 IC system rear panel (see [Figure 12](#)).

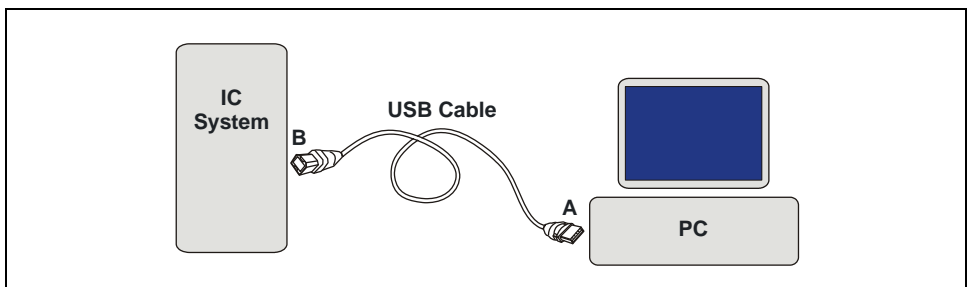


Figure 12. Example USB Connections: One IC System Connected to the PC

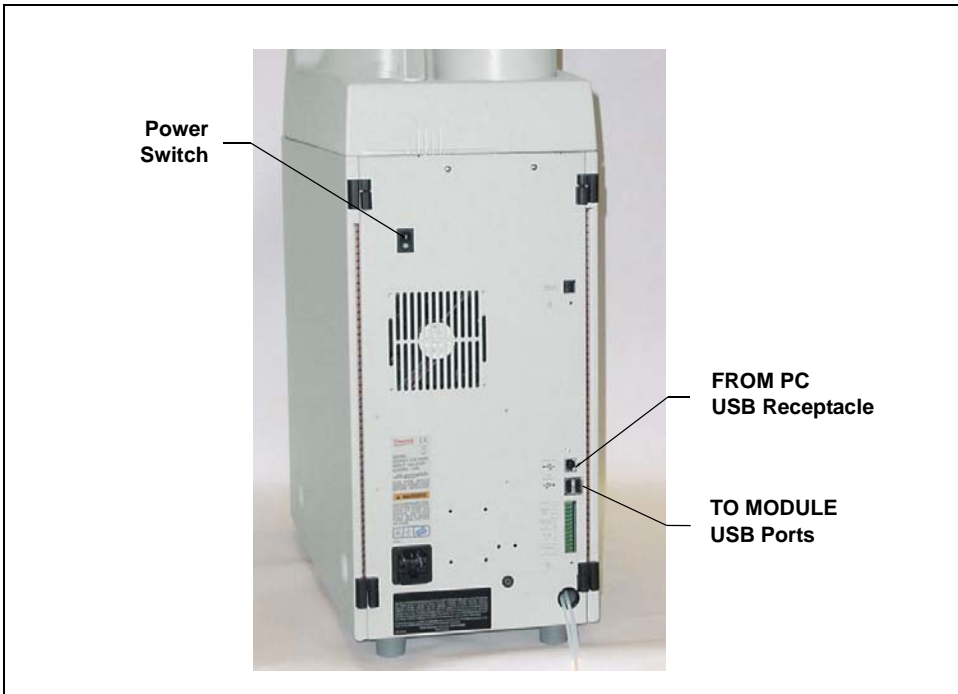


Figure 13. IC System Rear Panel

9.2 Connecting Additional USB Devices

Two USB ports on the IC system rear panel are provided for connecting additional Dionex USB-compliant modules (for example, an autosampler) 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 Dionex ICS-2100 rear

panel (see [Figure 13](#)) and plug the cable's "B" connector into the USB receptacle on the other USB module (see [Figure 14](#)).

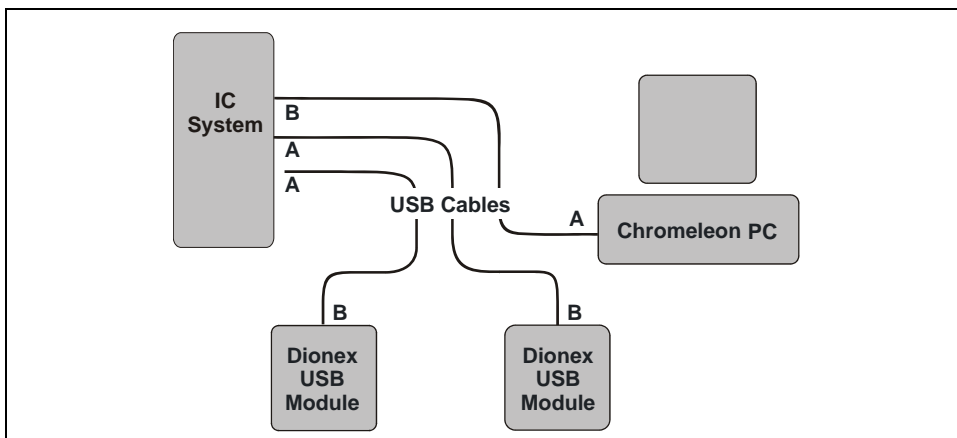


Figure 14. Example USB Connections: Two Dionex USB Modules Connected to the IC System

A USB 2.0 external hub can be used to connect the modules to the PC. Refer to the manual provided by the hub vendor for complete installation instructions. One or more hubs is required in the following situations:

- Use a hub if the number of USB devices in the system exceeds the number of available USB ports.
- Use a hub if the IC system or other USB device is more than 5 meters (16 ft) from the PC.

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.

10. Connecting the Power Cord

1. Verify that the main power switch on the rear panel of the Dionex ICS-2100 (see [Figure 13](#)) is turned off. (The main power switch may be turned on accidentally when the module is unpacked.)
2. Connect the power cord (IEC 320 C13) (ordered separately) from the main power receptacle on the rear panel to a grounded power source. The IC system 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 IC system 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 IC system and is easily accessible.



Operation at AC input levels outside of the specified operating voltage range may damage the IC system.



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.

11. Installing the Dionex ICS-2100 Device Driver

IMPORTANT

Before turning on the system power, verify that Chromeleon software is installed. If Chromeleon is not installed first, Windows will be unable to identify the new USB device. For Chromeleon installation instructions, see [Section 5](#).

1. If you have not already done so, turn on the PC power.
2. For a local PC: Log onto Windows XP or Windows Vista as an **administrator**.
For a network PC: Log on as a user with local PC administrator privileges.
3. If the Chromeleon Server is not running, start the server (see [Section 8](#)).
4. Press the power switch on the Dionex ICS-2100 rear panel (see [Figure 13](#)) to turn on the power.
5. Turn on the power to the autosampler (if installed).
6. Windows automatically detects the new USB devices. A message flashes on the screen to inform you that new hardware was found.

The Found New Hardware Wizard appears (see [Figure 15](#)). This wizard installs the new hardware into the Windows Device Manager.



Figure 15. Windows Found New Hardware Wizard: IC System Device

7. Complete the wizard for each new device by selecting the following options:
 - If asked whether Windows can connect to Windows Update to search for software, select **No, not this time**.
 - Accept the default option (**Install the software automatically**) and click **Next >**. It is not necessary to insert a hardware installation disk.
8. If any additional devices were found (for example, an autosampler), complete the wizard for the device.

12. Setting Up Chromeleon

NOTE This section provides brief instructions for setting up Chromeleon. For details about any of these steps, refer to the **Chromeleon Help**.

12.1 Creating a Timebase

1. Click **Start** on the Windows taskbar and click **All Programs > Chromeleon > Server Configuration** to start the Chromeleon Server Configuration program.
2. Select **Edit > Add Timebase**.
The New Timebase dialog box appears.
3. Type a name for the timebase (for example, **ICS-1100**) (see [Figure 16](#)).

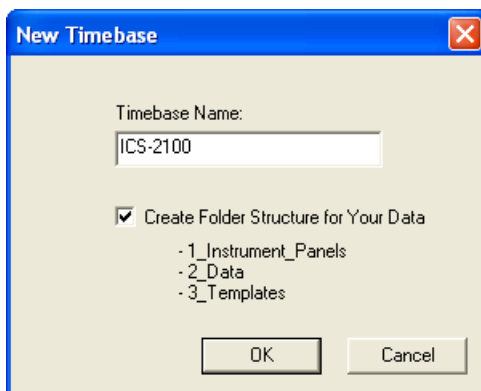


Figure 16. Example New Timebase Dialog Box

- (Optional) Select the **Create Folder Structure for Your Data** check box. This creates a standardized folder structure in the Chromeleon Browser for the data related to your timebase.
- Click **OK**.

The new timebase appears under the server name.

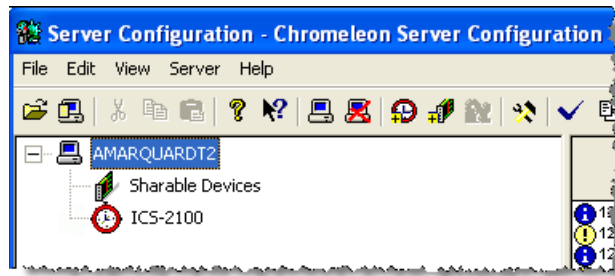


Figure 17. Example Server Configuration with New Timebase

- Right-click the new timebase and select **Add Device**.
The Add device to timebase dialog box appears.
- Under **Manufacturers**, select **Dionex IC: Integrated Systems**.
- Under **Devices**, select **ICS-1100** and click **OK**.

The Properties dialog box for the IC system appears. The **General** tab page shows the Device Name (**Pump_ECD**) and the Mode (**Live**).

9. Click the arrow next to **Module Serial No.** In the list, select the serial number of the system you are configuring (see [Figure 18](#)).

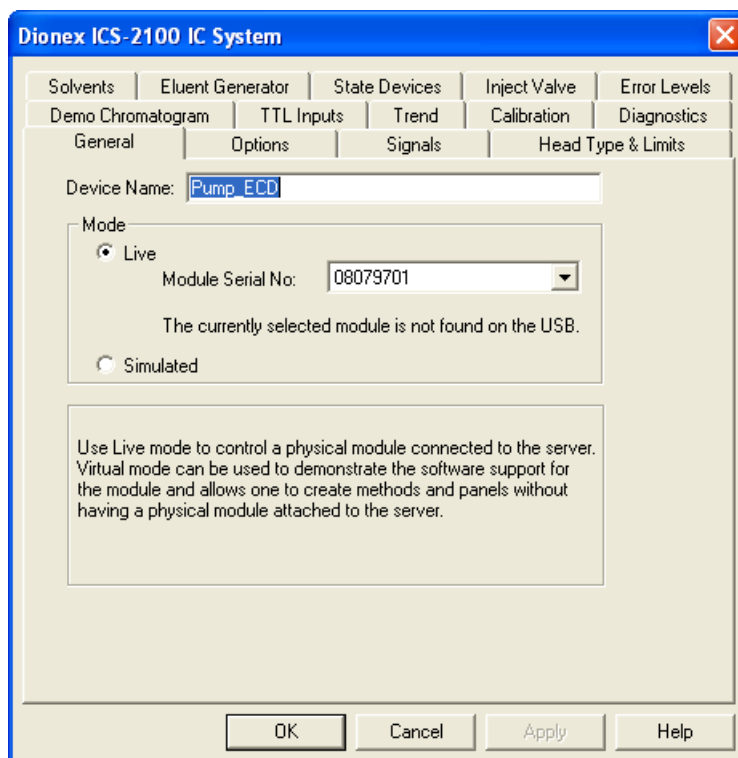


Figure 18. Example Properties Dialog Box: General Tab Page)

12.2 Configuring the Device Properties

NOTE For details about the settings on any of the Properties tab pages, click the Help button.

1. Click the **Options** tab and verify that the options installed in your IC system are enabled.

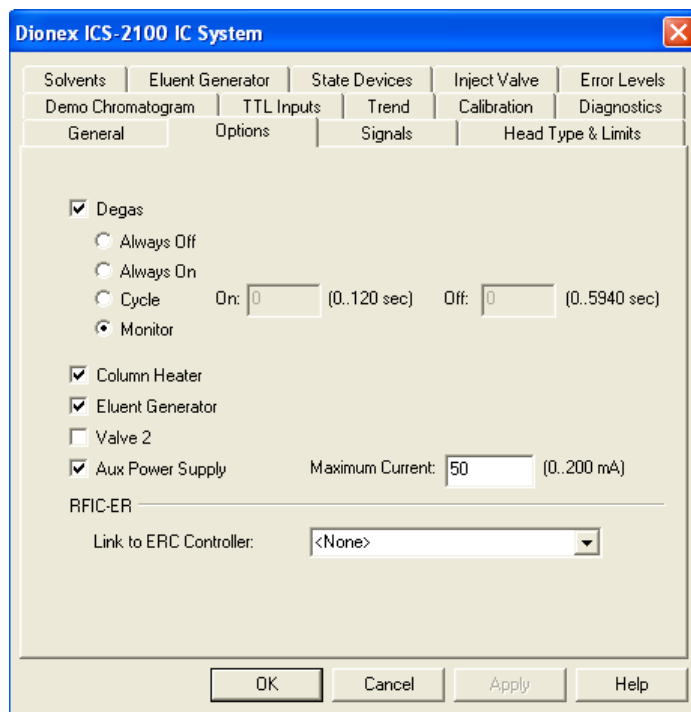


Figure 19. Example Properties Dialog Box: Options Tab Page

To configure an auxiliary power supply (optional):

To operate an electrolytic device such as a water polisher, you can configure the Dionex EGC-2 power supply as an auxiliary power supply. The power supply operates in constant current mode and can be configured from 0 to 200 mA, with a maximum voltage of 35 V.

- On the Options tab page, select the **AuxPower Supply** check box (see [Figure 19](#)) and enter the **Maximum Current** allowed for the

electrolytic device (refer to the documentation provided with the device).

- Connect the device to the **EGC-2** connector on top of the Dionex ICS-2100.

After the auxiliary power supply is configured, information about the power supply (current, on, off, etc.) is displayed in Chromeleon and on the front panel touch screens.

2. Click the **Inject Valve** tab and verify that the correct device is assigned to control the injection valve in the Dionex ICS-2100.
 - If the timebase will include a AS or Dionex AS-DV, the **Controlled By** setting for **Pump_InjectValve** must be **AS** (see [Figure 20](#)).

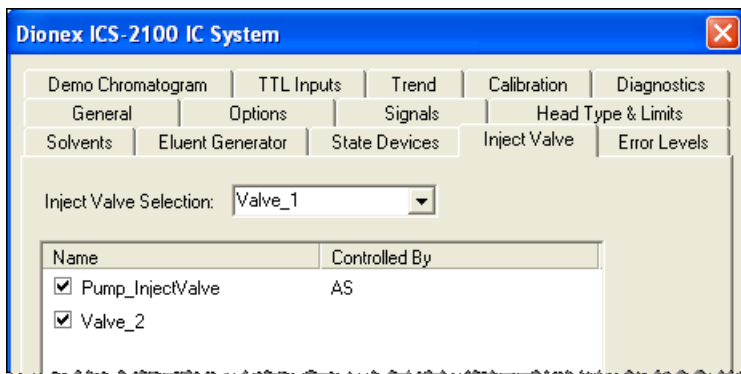


Figure 20. Inject Valve Properties: Inject Valve Controlled by the AS

- If the timebase will include another model of autosampler (or no autosampler), the **Controlled By** setting must be **ICS-1100** (see [Figure 21](#)).

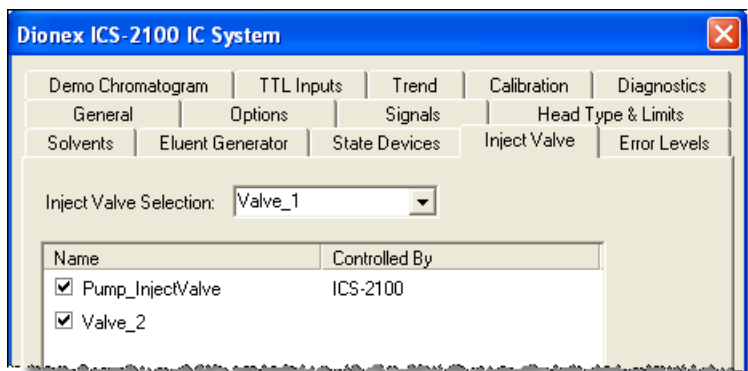


Figure 21. Inject Valve Properties: Inject Valve Controlled by the IC System

To change a **Controlled By** setting, select the **Pump_InjectValve** name, press **F2**, and select the device.

3. After selecting the device properties, click **OK** to close the dialog box. The IC system is added to the timebase (see [Figure 22](#)).

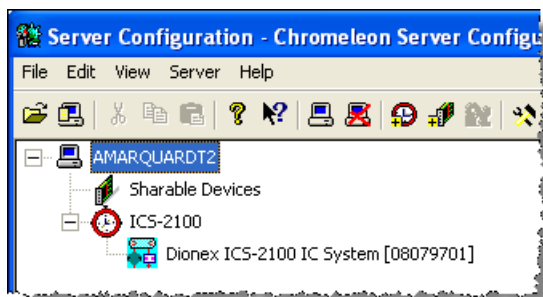


Figure 22. Example Server Configuration with IC System Added to the Timebase

4. If you are configuring an autosampler, add the autosampler to the timebase as described for the IC system.
5. When the timebase is complete, select **File > Save Installation**.

6. You can ignore the “no inject device installed” warning, if it appears. This simply means that the timebase does not include an autosampler. This message appears if you are using manual injections. Close the Server Configuration Check dialog box.
7. Exit the Server Configuration program.

12.3 Connecting to the Panel Tabset

1. Click **Start** on the Windows taskbar and select **All Programs > Chromeleon > Chromeleon** to start the Chromeleon client.

The Chromeleon main window and Browser appear (see [Figure 23](#)).

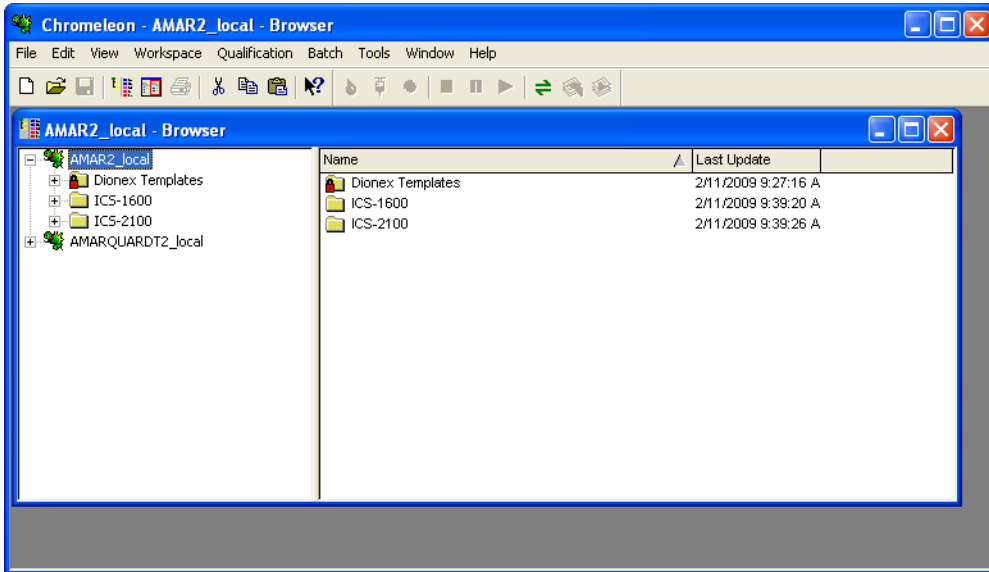


Figure 23. Chromeleon Main Window and Browser

2. Select **View > Default Panel Tabset** to display the panel tabset.

3. Click the **ICS-2100** tab on the panel tabset to view the IC system panel (see [Figure 24](#)).

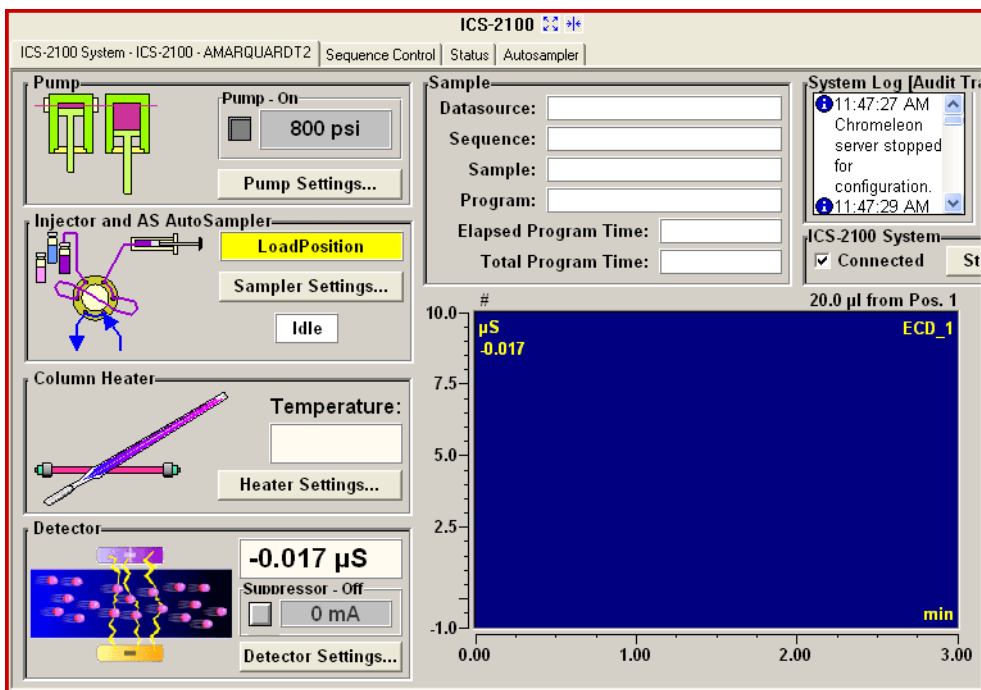


Figure 24. IC System Panel on the Chromeleon Panel Tabset

NOTE If an autosampler is installed, a separate Control panel for the autosampler is included in the panel tabset.

12.4 Verifying Chromeleon Communication

Verify that Chromeleon is communicating with the IC system by clicking the **Inject** and then the **Load** button on the panel. If communication is occurring, you will hear the valve actuate as it changes position.

13. Installing and Plumbing the Columns and Suppressor

This section provides brief installation and plumbing instructions for the columns and suppressor. For detailed start-up and installation instructions, refer to the column and suppressor manuals. The manuals are provided on the Thermo Scientific Reference Library DVD (P/N 053891).

For reference, [Figure 25](#) shows the system flow schematic after all plumbing is completed.

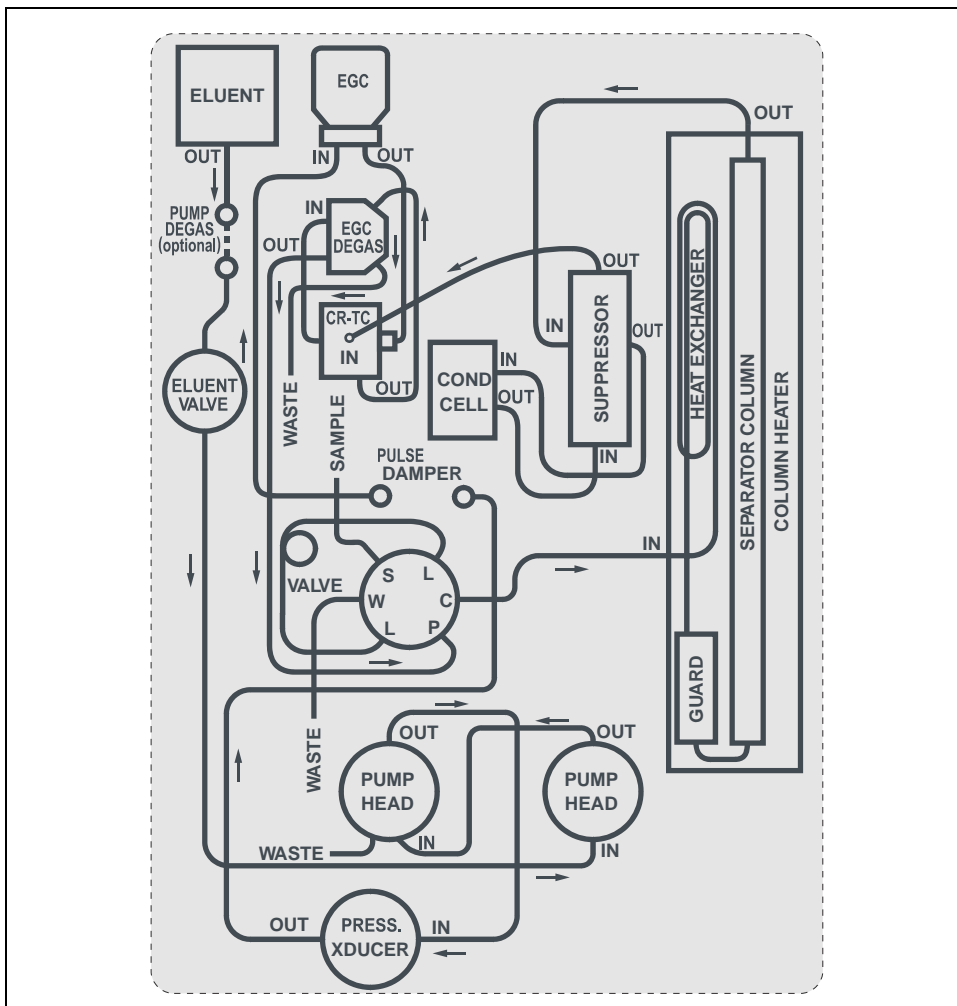


Figure 25. IC System Plumbing Schematic

13.1 Unpacking the Columns and Suppressor

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

13.2 Setting Up the Column Heater

Note for 2-mm columns:

For best results with 2-mm columns, install a microbore heat exchanger (P/N 060943) in the column heater. In addition, use red 0.125-mm (0.005-in) ID PEEK™ tubing (P/N 044221), rather than the standard black PEEK tubing, for tubing connections between the following components:

- Injection valve and column heater heat exchanger
- Guard column and separator column
- Separator column and detector cell

To set up the column heater

1. Cut off the two shipping ties from the column heater and remove them (see [Figure 26](#)).

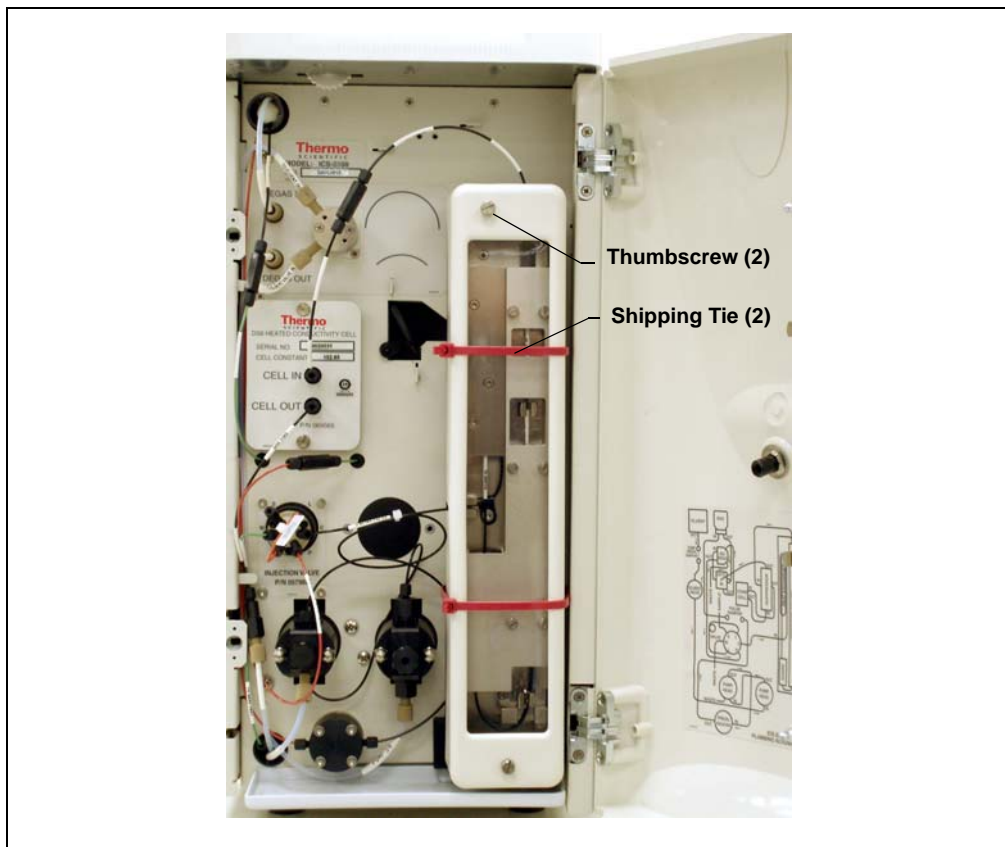


Figure 26. Column Heater with Shipping Ties

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.

4. Unscrew the six thumbscrews on the top metal plate (see [Figure 27](#)) and remove the plate.



Figure 27. Column Heater with Cover Removed

13.3 Plumbing the Columns

1. Remove the coupler connecting the lines labeled **GUARD IN** and **GUARD OUT**.
2. Connect the **GUARD IN** line to the guard column inlet. Check the arrow on the guard column label; it should point down (flow away from the injection valve).
3. Connect the **GUARD OUT** line to the guard column outlet.
4. Push the guard column onto the back column clip.
5. Remove the coupler connecting the **COL IN** and **COL OUT** lines.
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.

13.4 Installing the Suppressor

1. Before installing the suppressor, hydrate it as instructed in the suppressor manual. Suppressor manuals are provided on the Thermo Scientific Reference Library DVD (P/N 053891).

2. Locate the suppressor mounting tabs on the component panel (see [Figure 28](#)). Reach into the opening between the tabs and pull the yellow connector and attached cable slightly out of the opening.

Connect this cable to the cable from the suppressor (align the pins on the two connectors and push them together).

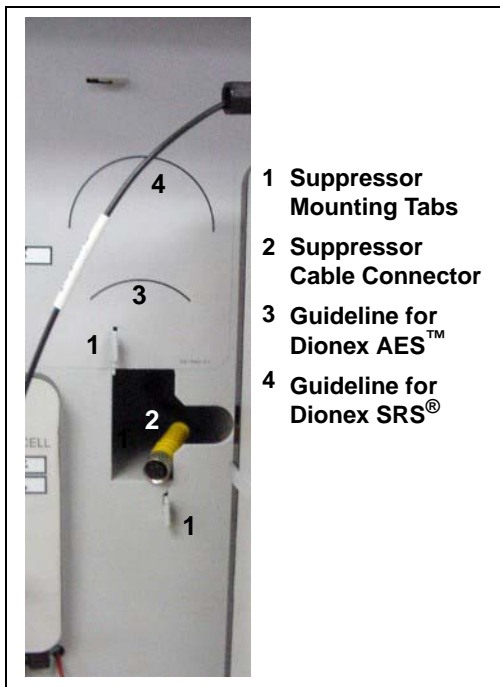


Figure 28. Suppressor Mounting Tabs and Guidelines

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 28](#)) 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 29](#) shows a Thermo Scientific Dionex SRS Suppressor installed on the component panel.
7. Remove the coupler connecting the **ELUENT IN** and **ELUENT OUT** lines and connect these lines to the corresponding ports on the suppressor.

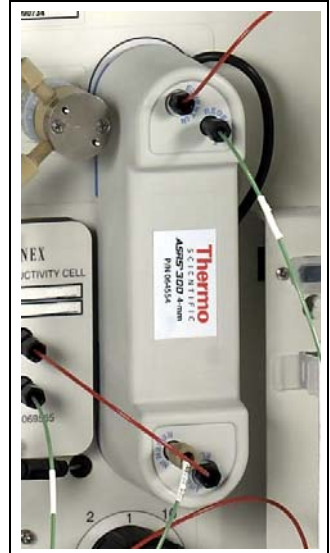


Figure 29. Suppressor Installed (Dionex SRS Shown)

8. Remove the fitting plug from the **REGEN IN** line and connect it to the **REGEN IN** port on the suppressor.
9. **Do not connect the REGEN OUT port until after completing the eluent generator setup ([Section 18](#)).**
10. 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.

14. Connecting the Waste Lines

1. 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.
2. Direct the **WASTE, GAS SEPARATOR** line from the top of the IC system to the rear panel. Snap the line onto one of the tubing clips on the rear panel. Connect the line to the waste, gas separator tube (see [Section 14.1](#)).

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.

14.1 Installing the Waste, Gas Separator Tube

1. Locate the waste, gas separator tube assembly in the IC system Ship Kit.
2. Connect the **WASTE, GAS SEPARATOR** line from the suppressor to one of the 3-mm (1/8-in) ID white PTFE lines on the waste, gas separator tube assembly (see [Figure 30](#)).

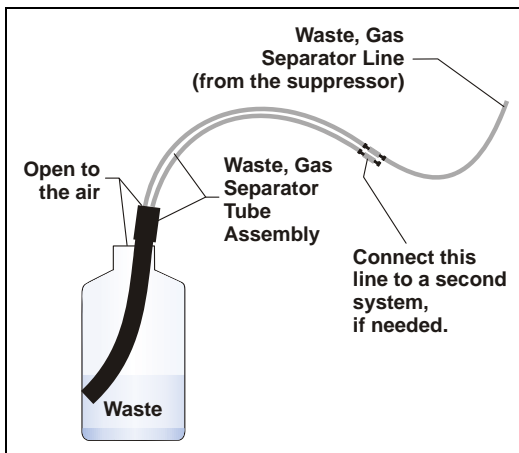


Figure 30. Waste, Gas Separator Tube Installation

3. Place the waste, gas separator tube assembly into the waste container. Make sure the tubing junction (where the white PTFE tubing meets the black polyethylene tubing) is above the top of the container and that the waste, gas separator tube and the waste container are open to the atmosphere.



DO NOT CAP THE WASTE CONTAINER: In the Dionex ICS-2100, the Thermo Scientific Dionex Atlas® Electrolytic Suppressor and Thermo Scientific Dionex Self-Regenerating Suppressor (Dionex SRS) use 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 waste, gas separator tube (P/N 045460) in an uncapped waste container. Connect the Waste, Gas Separator line to the waste tube (see [Figure 30](#)).



NE FERMEZ PAS LE CONTENEUR DE GAZ RÉSIDUEL: Le Dionex ICS-2100, le Thermo Scientific Dionex Atlas Electrolytic Suppressor, et le Thermo Scientific Dionex Self-Regenerating Suppressor (Dionex SRS) travaillent 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 Dionex ICS-2100, Thermo Scientific Dionex Atlas Electrolytic Suppressor und Thermo Scientific Dionex Self-Regenerating Suppressor (Dionex SRS) verwenden 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.

15. Setting Up the Eluent Reservoir

1. Rinse the eluent reservoir with ASTM filtered, Type I (18-megohm) deionized water.
2. Fill the reservoir with ASTM filtered, Type I (18-megohm) deionized water.
3. Place the reservoir on top of the IC system.
4. Install the cap and handtighten.
5. Connect the liquid lines from the IC system to the corresponding lines exiting the eluent bottle.

NOTE The IC system does not require pressurized reservoirs. However, if eluent is manually degassed or is sensitive to contamination, Thermo Scientific recommends pressurizing the reservoir with helium or nitrogen. See [Section 22](#) for instructions.

16. Entering the Eluent Level

After filling the reservoir, enter the volume of liquid in the reservoir.

1. On the IC system panel on the Chromeleon panel tabset, click the **Pump Settings** button.

The **Pump Settings** window appears (see [Figure 31](#)).

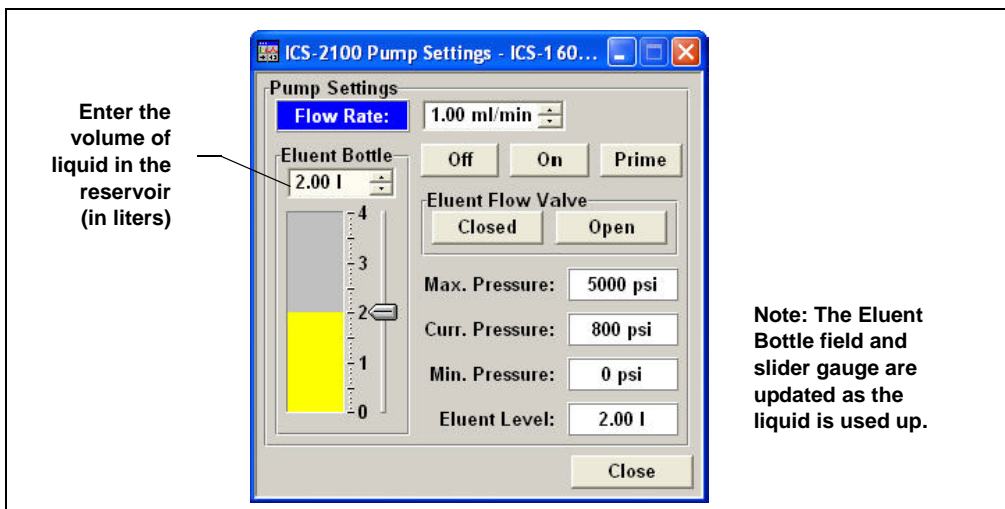


Figure 31. Pump Settings Window: Setting the Eluent Level

2. Use the slider to enter the volume (in liters), or enter the volume directly into the **Eluent Bottle** box.

The IC system determines the eluent usage by monitoring the flow rate and the length of time the pump is on, and updates the **Eluent Bottle** volume as the eluent is used up. A warning appears if the level falls below 200 mL. Warnings are repeated at 100 mL and 0 mL.

IMPORTANT

In order for the level displayed in the **Eluent Bottle** box and gauge to be accurate, you must enter the level when the reservoir is filled. The IC system does not automatically detect when the reservoir is filled, nor when it is empty.

If preferred, you can enter the eluent bottle level on the touch screen **HOME** page, instead of on the Chromeleon Control panel.

17. Priming the Pump

1. Verify that the eluent reservoir is filled, the reservoir cap is installed and handtightened, and the liquid line from the IC system to the reservoir cap is connected (see [Section 15](#)).
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 (see [Section 17.1](#)). Perform this procedure at initial installation, after changing eluents, or when eluent lines are empty.
 - Priming the pump heads with the **Prime** button (see [Section 17.2](#)). Perform this procedure after the eluent lines are primed.

17.1 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 079803) to the priming valve port on the primary pump head (see [Figure 32](#)).

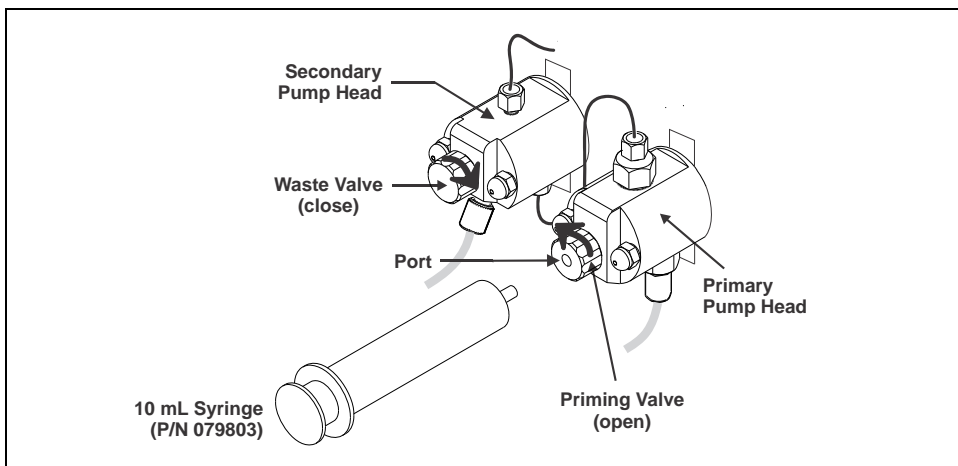


Figure 32. Pump Head Valve Settings for Priming the Eluent Lines

3. Open the priming valve by turning it one-quarter to one-half turn counterclockwise.
4. On the IC system panel on the Chromeleon panel tabset, click the **Pump Settings** button.

The **Pump Settings** window appears (see [Figure 33](#)).

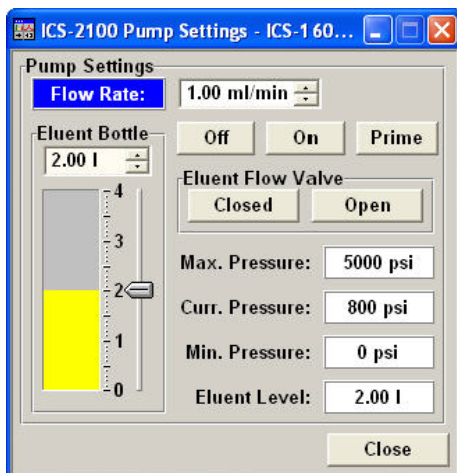


Figure 33. Pump Settings Window

5. Under **Eluent Flow Valve**, click **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 (if installed) is primed.
7. After priming the lines thoroughly, close the priming valve. **Do not overtighten the priming valve.**
8. Under **Eluent Flow Valve**, click **Closed**.

17.2 Priming the Pump Heads with the Prime Button

NOTE Perform this procedure after priming the eluent lines (see [Section 17.1](#)).

1. Close the priming valve on the primary pump head (see [Figure 34](#)).

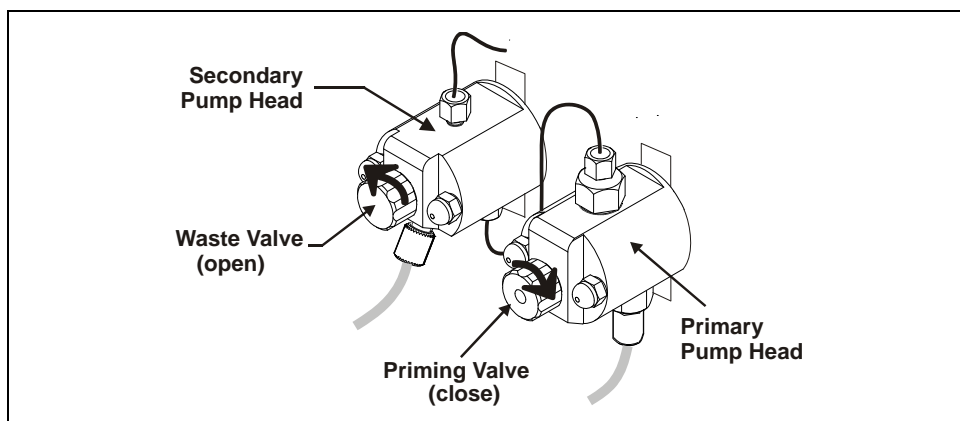


Figure 34. Pump Head Valve Settings for Priming the Pump Heads

2. Open the waste valve on the secondary pump head by turning the knob one-quarter to one-half turn counterclockwise (see [Figure 34](#)). Opening the valve directs the eluent flow path to waste and eliminates backpressure.
3. On the **Pump Settings** window, click the **Prime** button. Confirm that the waste valve is open by clicking **OK** when the reminder message appears. The pump will begin pumping at approximately 3 mL/min.
4. Continue priming the IC system until no air bubbles are exiting the pump waste line.
5. On the **Pump Settings** window, click **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 in the IC system operator's manual for instructions.

18. Setting Up the Eluent Generator

Before Beginning

Remove the Dionex EluGen cartridge (Dionex EGC) and the other items to be installed from their shipping containers. Depending on the type of eluent to be generated, the other items may include a Dionex Continuously Regenerated Trap Column (Dionex CR-TC), a Dionex EPM Electrolytic pH Modifier, and/or a Dionex EGC CO₃ Mixer.

NOTE The Dionex EGC degas assembly is installed inside the Dionex EGC holder at the factory.



The Dionex EluGen cartridge contains one of the following: a corrosive base (KOH, LiOH, or NaOH), a corrosive acid (MSA), or a concentrated K₂CO₃ solution. Wear protective eyewear and gloves when handling the cartridge.



La cartouche d'Dionex EluGen contient un de ce qui suit: une base corrosive (KOH, LiOH, ou NaOH), un acide corrosif (MSA), ou une solution concentrée de K₂CO₃. Porter des lunettes et des gants protectives en manipulant la cartouche.



Die Dionex EluGen-Kartusche enthält eine korrosive Base (KOH, LiOH oder NaOH), oder eine korrosive Säure (MSA). Tragen Sie daher beim Umgang mit der Kartusche eine Schutzbrille und Handschuhe.

Refer to the Dionex EluGen cartridge, Dionex CR-TC, and Dionex EPM manuals for the optimal operating conditions for your application. The manuals are provided on the Dionex Reference Library CD-ROM (P/N 053891).

18.1 Eluent Generator Setup for KOH, LiOH, MSA, and NaOH Eluents

Follow the instructions in this section if you are installing a Dionex KOH, LiOH, MSA, or NaOH EluGen cartridge and a Dionex CR-TC.

- If you are installing a K₂CO₃ cartridge, a Dionex EPM, and a Dionex EGC CO₃ Mixer (for generating carbonate/bicarbonate eluent), go to [Section 18.2](#).
- If you are installing a K₂CO₃ cartridge and a Dionex EGC CO₃ Mixer (for generating carbonate eluent), go to [Section 18.3](#).

Overview

The eluent generator setup procedure for KOH, LiOH, MSA, or NaOH eluents consists of the following main steps:

- Installing the Dionex CR-TC.
- Installing the Dionex EluGen cartridge.
- Connecting the Dionex EluGen cartridge vent line.
- Recording the Dionex EluGen cartridge serial number in Chromeleon.
- Conditioning the Dionex EluGen cartridge.
- Hydrating the Dionex CR-TC.
- Completing the eluent generator setup.

Items Required to Complete the Setup Procedure

In addition to the Dionex EluGen cartridge and the Dionex CR-TC, you will need the following items to complete the eluent generator setup.

Item	P/N	Use To
Yellow 0.5 mL/min, 7 MPa (1000 psi) backpressure coil (supplied in the Dionex ICS-2100 Ship Kit (P/N 064375))	053765	Provide backpressure during setup procedures.
Dionex EluGen Cartridge Vent Line Tubing Kit (supplied with the cartridge)	063092	Vent the cartridge during operation.
10-32 to 1/4-28 coupler (supplied in the Dionex ICS-2100 Ship Kit)	042806	Provide a temporary connection during setup procedures.
Temporary waste container (beaker, bottle, etc.) (not supplied)	n/a	Collect waste during setup procedures.
10-32 fittings 10-32 ferrules	043275 043276	Complete the connections.
1/8-in fittings 1/8-in ferrules	052267 048949	Complete the connections.

Dionex ICS-2100 Installation Instructions

[Figure 35](#) illustrates the Dionex ICS-2100 after the Dionex EluGen cartridge is installed.

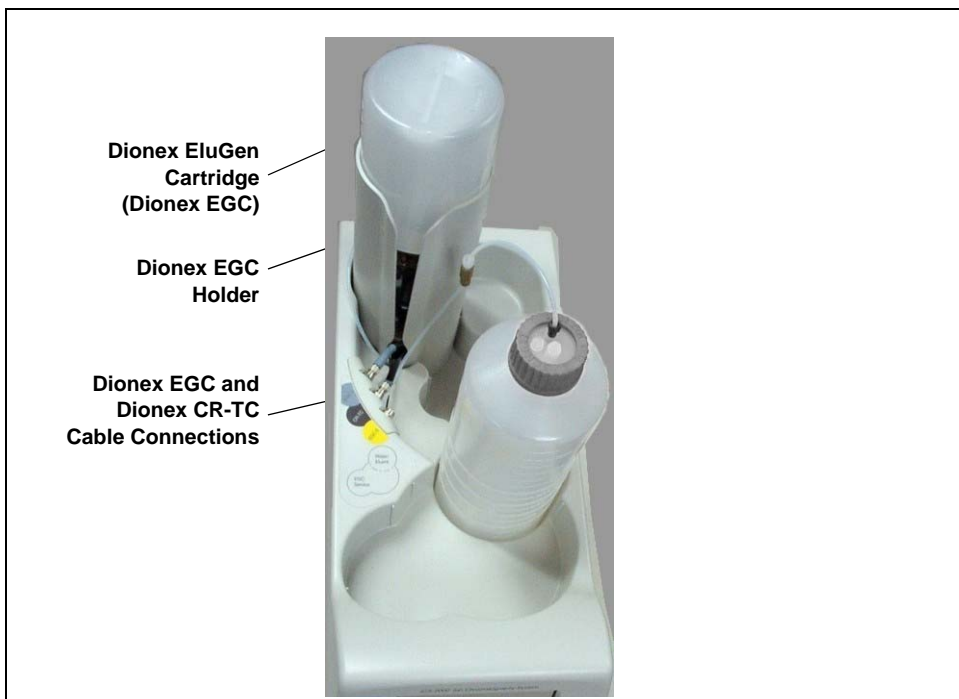


Figure 35. Dionex ICS-2100 with a Dionex EluGen Cartridge Installed (Top View)

Figure 36 illustrates the liquid flow path through the eluent generator components after all setup steps are complete and the eluent generator is ready for operation.

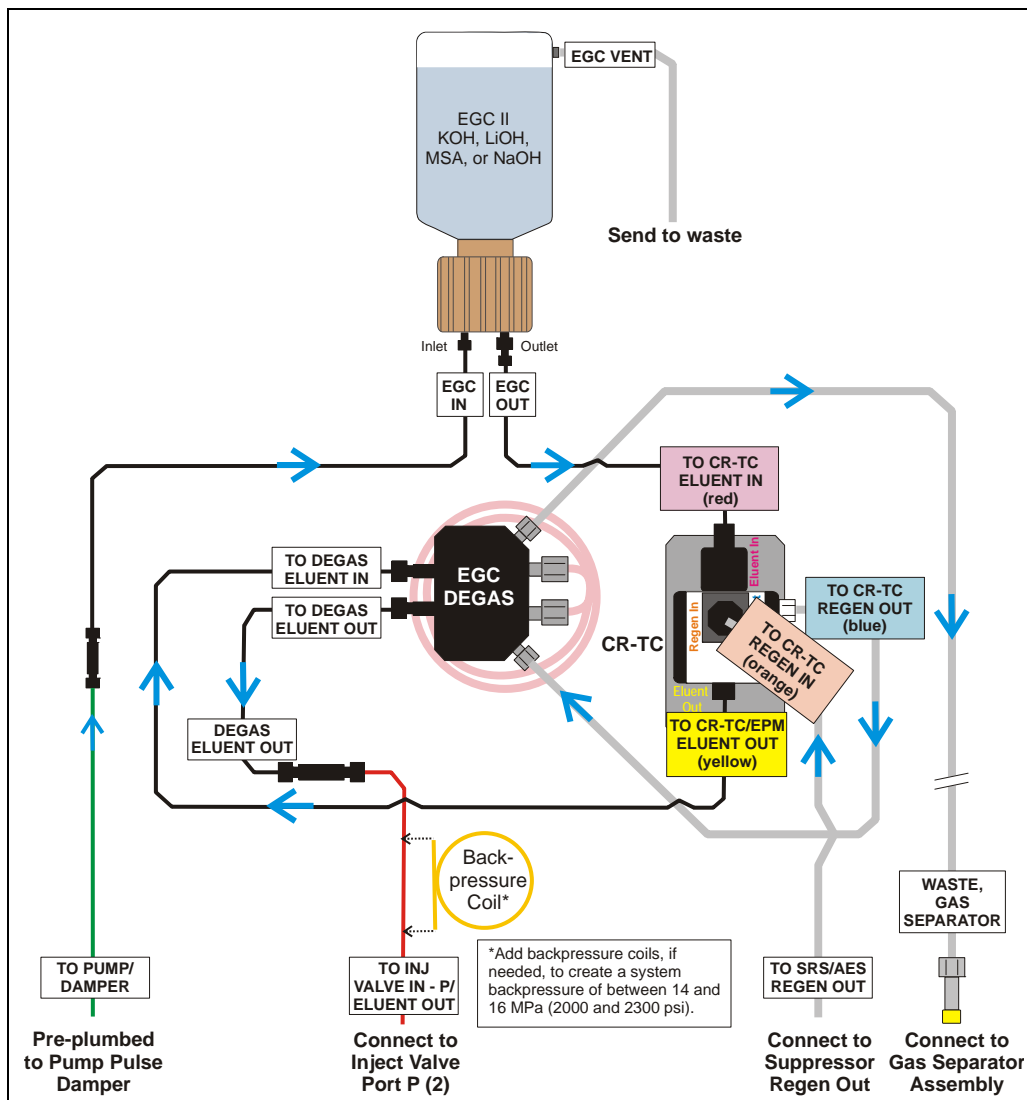


Figure 36. Eluent Generator Flow Schematic with Dionex CR-TC:
Use for Generating KOH, LiOH, MSA, or NaOH Eluent

Installing the Dionex CR-TC

1. Tilt the cartridge holder to view the bottom of the holder and brace the holder against the back corner of the Dionex ICS-2100 (see [Figure 37](#)).



Figure 37. Cartridge Holder (Tilted to View the Bottom)

2. Before installing the Dionex CR-TC, note the metal ball stud inside the bottom of the cartridge holder (see [Figure 37](#)) and the bracket on the Dionex CR-TC mounting plate (see [Figure 38](#)). These are used to mount the Dionex CR-TC inside the holder after it is plumbed.

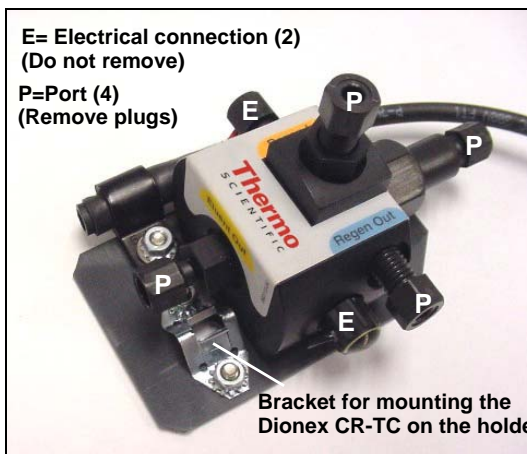


Figure 38. Dionex CR-TC

3. Remove the plugs from the four ports, labeled “P” in [Figure 38](#). Do not remove the two electrical connections, labeled “E” in the figure.

4. With the Dionex CR-TC oriented as shown in [Figure 39](#), connect each line to the corresponding port on the Dionex CR-TC.

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

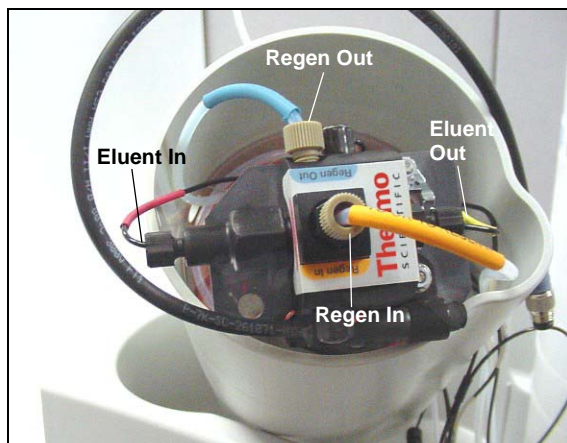


Figure 39. Plumbed Dionex CR-TC

5. Check that none of the lines are caught under the Dionex CR-TC and then push the CR-TC onto the metal stud inside the Dionex EGC holder (see [Figure 40](#)). Push down until the Dionex CR-TC snaps into place.

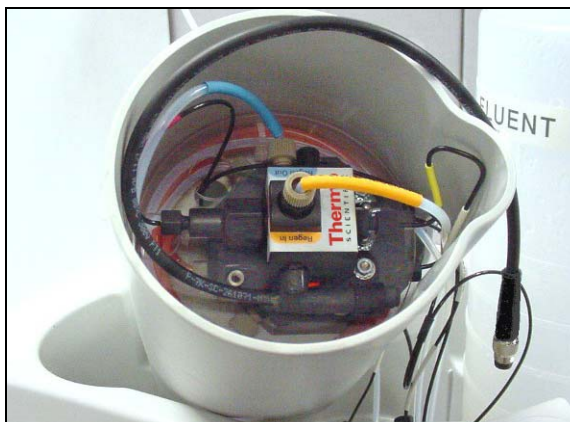


Figure 40. Dionex CR-TC Installed in Holder

6. Feed the Dionex CR-TC cable through the slot on the side of the Dionex EGC holder (see [Figure 41](#)).



Figure 41. Installing the Dionex CR-TC

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

Installing the Dionex EluGen Cartridge

1. Orient the Dionex EluGen cartridge with the fittings facing up and remove the plugs from the Dionex EluGen cartridge **INLET** and **OUTLET** ports (see [Figure 42](#)).

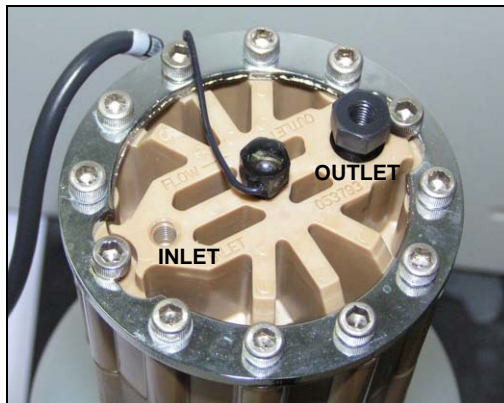


Figure 42. Dionex EluGen Cartridge Inlet and Outlet Ports

2. Set the Dionex EluGen cartridge in the service area on top of the Dionex ICS-2100 and orient it with the cable toward the Dionex EGC holder (see [Figure 43](#)).



Figure 43. Dionex EluGen Cartridge in Service Area

3. Pull the coiled black **EGC IN** and **EGC OUT** lines out slightly from the cartridge holder.
4. Disconnect the **EGC IN** line from the union that connects it to the **EGC OUT** line.
5. Connect **EGC IN** to the **EGC INLET** port (see [Figure 44](#)).

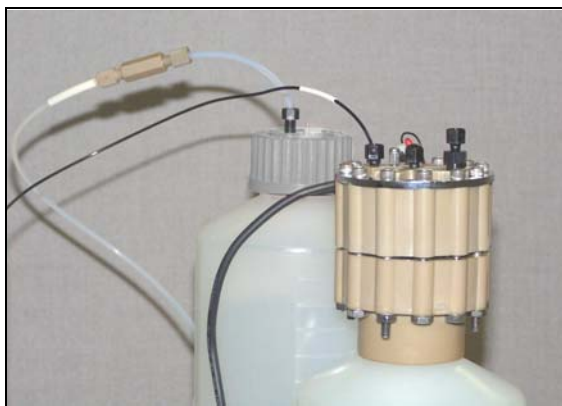


Figure 44. Dionex EGC Inlet Port Connections

6. Locate the yellow 0.5 mL/min, 7 MPa (1000 psi) backpressure coil (P/N 053765) in the Dionex ICS-2100 Ship Kit (P/N 064375).
7. Connect one end of this coil to the Dionex EGC **OUTLET** port (see [Figure 45](#)). Leave the other end of the coil unconnected.

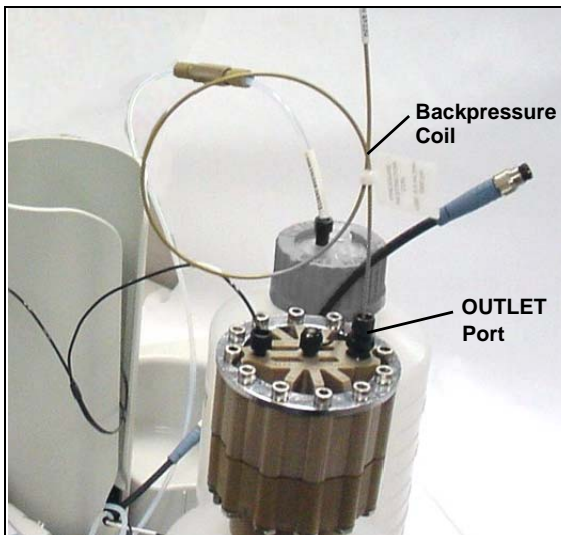


Figure 45. Dionex EGC Outlet Connection for Conditioning the Dionex EGC

NOTE The backpressure coil connection is temporary; it is required only during the Dionex EluGen cartridge conditioning procedure described in [“Conditioning the Dionex EluGen Cartridge”](#) on page 50.

8. Turn the Dionex EluGen cartridge over (with the fittings facing down). **Shake the Dionex EluGen cartridge vigorously, and tap it with the palm of your hand 10 to 15 times. Check that all bubbles trapped in the eluent generation chamber are dislodged.**



CAUTION



MISE EN GARDE

The Dionex EluGen cartridge contains one of the following: a corrosive base (KOH, LiOH, or NaOH), a corrosive acid (MSA), or a concentrated K_2CO_3 solution. Wear protective eyewear and gloves when handling the cartridge.

La cartouche du Dionex EluGen contient un de ce qui suit: une base corrosive (KOH, LiOH, ou NaOH), un acide corrosif (MSA), ou une solution concentrée de K_2CO_3 . Porter des lunettes et des gants protectives en manipulant la cartouche.



Die Dionex EluGen-Kassette enthält eine korrodierende Base (KOH, LiOH oder NaOH), eine korrodierende Säure (MSA) oder eine konzentrierte K_2CO_3 -Lösung. Tragen Sie daher beim Umgang mit Kassette eine Schutzbrille und Handschuhe.

- Slide the Dionex EluGen cartridge down into the holder until it stops. Make sure the cable and backpressure coil remain out of the holder (see [Figure 46](#)).

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 46. Installing the Dionex EluGen Cartridge in the Holder

10. Remove the plug from the **EGC-1** connector on top of the Dionex ICS-2100.
11. Orient the cartridge's blue 4-pin electrical cable connector as shown in [Figure 47](#). Push it onto the **EGC-1** connector on the Dionex ICS-2100. Twist the ring on the cable connector fingertight to secure it.



Figure 47. Connecting the Dionex EluGen Cartridge Cable

Connecting the Vent Line

1. Locate the vent line tubing kit (P/N 063092) supplied with the Dionex EluGen cartridge. Slide the label onto one end of the tubing and then push the barbed luer lock onto the tubing.
2. Unscrew and remove the plug from the vent opening on the side of the Dionex EluGen cartridge (see [Figure 48](#)).



Figure 48. Dionex EluGen Cartridge 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 Dionex EluGen cartridge vent line into the luer adapter (see [Figure 49](#)).

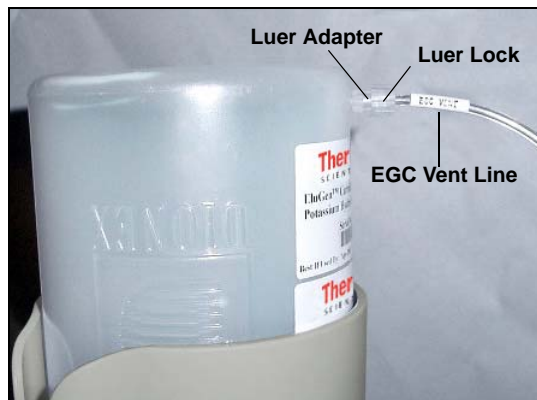


Figure 49. Installing the Dionex EluGen Cartridge Vent Line

NOTE To prevent leaks from the Dionex EluGen cartridge, always replace the luer adapter cap before moving the cartridge.

5. Direct the Dionex EluGen cartridge vent line to the rear of the Dionex ICS-2100 and snap it onto one of the tubing clips on the rear panel.
6. Direct the vent line to the waste container and insert it down into the waste, gas separator tube about 10 to 15 cm (4 to 6 in).

Recording the Dionex EluGen Cartridge Serial Number in Chromeleon

The serial number is printed on the Dionex EluGen cartridge label.

1. Open the Chromeleon Server Configuration program (select **Start > Programs > Chromeleon > Server Configuration**).
2. Double-click the Dionex ICS-2100 system icon. The properties dialog box for the Dionex ICS-2100 appears.
3. Click the **Eluent Generator** tab (see [Figure 50](#)).
4. Select the **EGC-1** check box and enter the Dionex EluGen cartridge serial number.

5. Click **OK**.

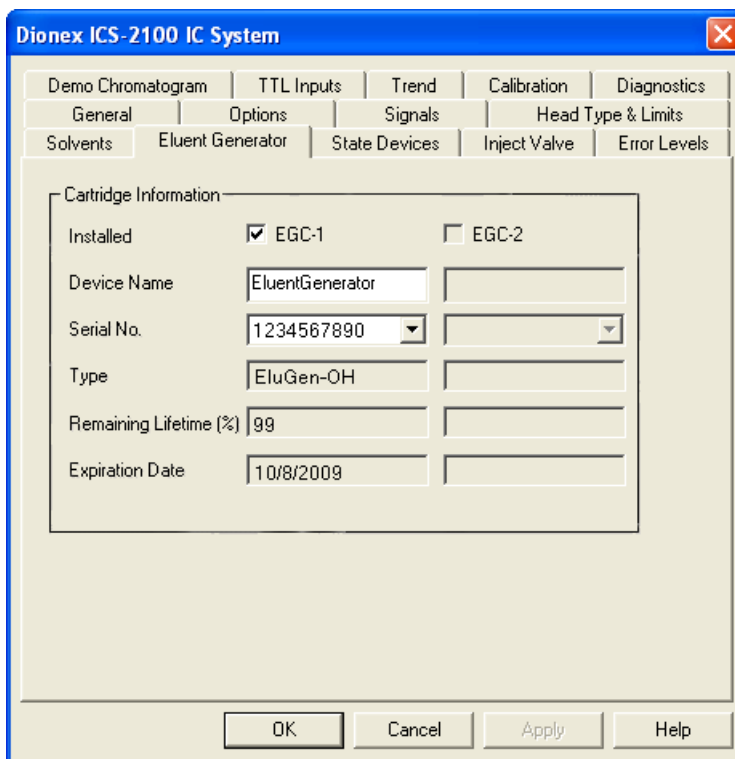


Figure 50. Eluent Generator Configuration Properties: OH Example

Conditioning the Dionex EluGen Cartridge

After completing the installation steps described in the previous sections, condition the Dionex EluGen cartridge for 30 minutes.

1. Set a temporary waste container, such as a beaker, on top of the Dionex ICS-2100 and direct the yellow backpressure coil from the Dionex EluGen cartridge **OUTLET** port to the container.
2. On the Dionex ICS-2100 touch screen **HOME** page, set the pump flow rate to **1.00 mL/min**.
3. Touch the **EGC** button on the **HOME** page to open the **ELUENT GENERATOR** page. Set the Dionex EGC concentration to **50 mM**.
4. Verify that the suppressor and Dionex CR-TC are off.

IMPORTANT

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

5. Verify that the **Automatically turn on with pump** options are not selected on the Dionex ICS-2100 touch screen **SUPPRESSOR** page and **ELUENT GENERATOR** page. Disabling these options lets you turn on the pump, without automatically turning on the suppressor and Dionex CR-TC.
6. Verify that the eluent reservoir is filled with ASTM filtered, Type 1 (18 megohm-cm) deionized water (see [Section 15](#)).
7. Turn on the pump.
8. Turn on the Dionex EluGen cartridge.
9. Run at the selected settings (1.00 mL/min at 50 mM) for 30 minutes.
10. Turn off the Dionex EluGen cartridge.
11. Turn off the pump.
12. Disconnect the Dionex EluGen cartridge cable.
13. Remove the backpressure tubing from the waste container and remove the waste container.
14. Lift the Dionex EluGen cartridge out of the holder, turn it over, and set it in the service area.

15. Disconnect the backpressure coil from the Dionex EluGen cartridge **OUTLET** port.
16. Connect the **EGC OUT** line to the **OUTLET** port (see [Figure 51](#)).

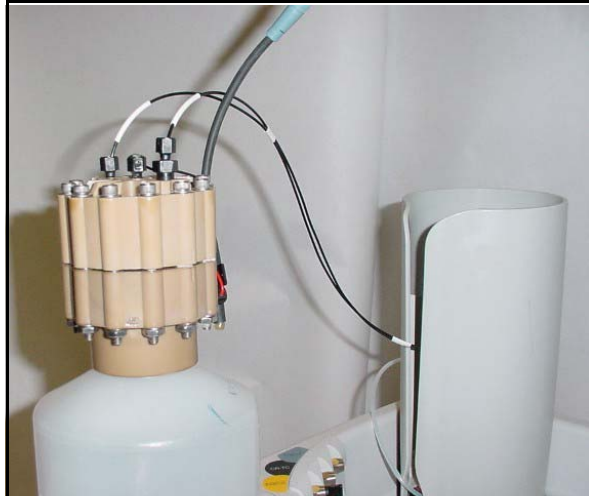


Figure 51. Dionex EGC Inlet and Outlet Connections

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

Hydrating the Dionex CR-TC

Always hydrate the Dionex CR-TC before initial operation. This requires running ASTM filtered, Type 1 (18 megohm-cm) deionized water through the Dionex CR-TC for 10 minutes, while bypassing the columns and suppressor.

[Figure 52](#) illustrates the liquid flow path through the Dionex CR-TC during the hydration procedure.

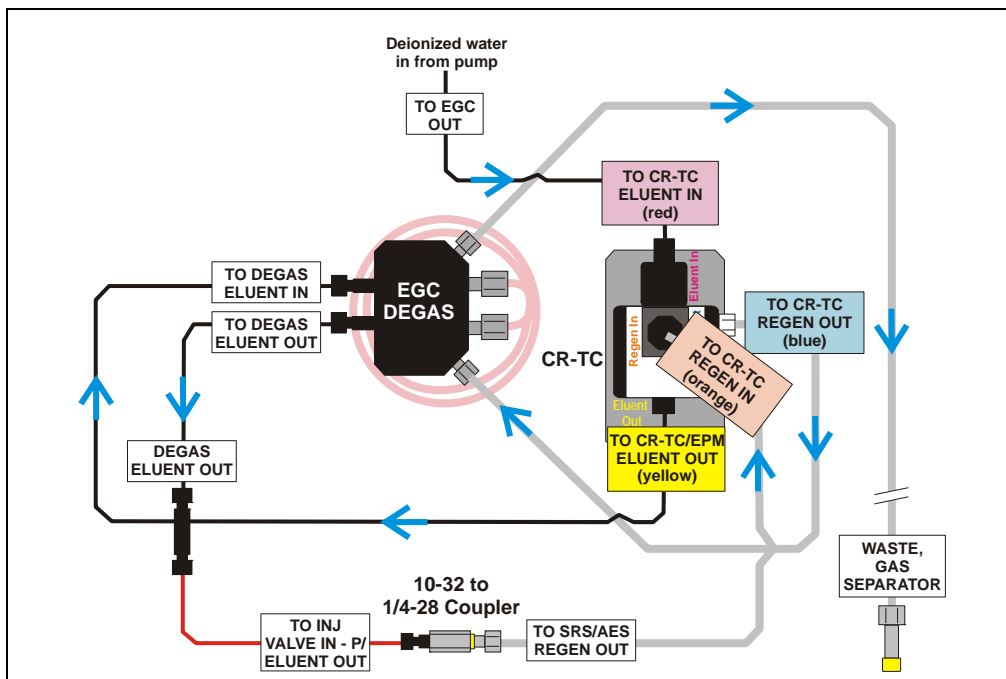


Figure 52. Dionex CR-TC Plumbing for Hydration

1. Disconnect the **TO INJ VALVE IN - P/ELUENT OUT** line from port **P** (2) on the injection valve.
2. Disconnect the **TO SRS/AES REGEN OUT** line from the suppressor.
3. Use a 10-32 to 1/4-28 coupler (P/N 042806) to connect the **TO INJ VALVE IN - P/ELUENT OUT** line to 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 Dionex CR-TC. The pump flow is on during conditioning, however, no flow reaches the suppressor.

5. Verify that the **Automatically turn on with pump** option is not selected on the Dionex ICS-2100 touch screen **SUPPRESSOR** page.

Disabling this option lets you turn on the pump, without automatically turning on the suppressor.

6. Turn on the pump and set the flow to the rate recommended for your application.
7. Pump deionized water through the Dionex CR-TC for at least 10 minutes.
8. Turn off the pump and remove the coupler.

Completing the Eluent Generator Setup

1. Reconnect the **TO SRS/AES REGEN OUT** line to the **REGEN OUT** port on the suppressor.
2. Reconnect the **TO INJ VALVE IN - P/ELUENT OUT** line to port **P (2)** on the injection valve.
3. Reconnect the Dionex EluGen cartridge cable.
4. Remove the plug from the **Dionex CR-TC** connector on top of the Dionex ICS-2100
5. Orient the Dionex CR-TC's black 3-pin electrical cable connector as shown in [Figure 47](#). Push it onto the **Dionex CR-TC** connector on the Dionex ICS-2100. Twist the ring on the cable connector and fingertighten to secure it.



Figure 53. Connecting the Dionex CR-TC Cable

NOTE Backpressure tubing may be required between the injection valve and the Dionex EGC degas eluent outlet. The Dionex EluGen cartridge requires 14 to 16 MPa (2000 to 2300 psi) of system backpressure

for removal of electrolysis gas from the eluent produced by the cartridge. See [Section 19.1](#) for details.

6. Go on to [Section 19](#), “Equilibrating the System.”

18.2 Eluent Generator Setup for Carbonate/Bicarbonate Eluent

Follow the instructions in this section if you are installing a Dionex K_2CO_3 cartridge, a Dionex EPM, and a Dionex EGC CO_3 Mixer (for generating carbonate/bicarbonate eluent).

- If you are installing a Dionex K_2CO_3 cartridge and a Dionex EGC CO_3 Mixer (for generating carbonate eluent), go to [Section 18.3](#).
- If you are installing a Dionex KOH, LiOH, MSA, or NaOH EluGen cartridge and a Dionex CR-TC, go to [Section 18.1](#).

Overview

The eluent generator setup procedure for carbonate/bicarbonate eluent consists of the following main steps:

- Installing the Dionex EluGen cartridge.
- Connecting the Dionex EluGen cartridge vent line.
- Installing the Dionex EPM.
- Plumbing the Dionex EPM for conditioning.
- Recording the Dionex EluGen cartridge and the Dionex EPM serial numbers in Chromeleon.
- Conditioning the Dionex EluGen cartridge and the Dionex EPM.
- Installing the Dionex EGC CO_3 Mixer.
- Temporarily filling the Dionex EGC CO_3 Mixer with deionized water.
- Filling the Dionex EGC CO_3 Mixer with eluent of the required concentration.
- Completing the eluent generator setup.

Dionex ICS-2100 Installation Instructions

Items Required to Complete the Setup Procedure

The following items are required to set up the Dionex EluGen cartridge, Dionex EPM, and Dionex EGC CO₃ Mixer. Except as noted, all items are supplied in the Dionex ICS-2100 Ship Kit (P/N 064375).

Item	P/N	Used To
Dionex EPM mounting bracket	063624	Mount the Dionex EPM on the Dionex EGC holder.
35 cm (14 in) of black 0.25-mm (0.010-in) ID PEEK tubing	064340	Lengthen the line between the Dionex EGC degas eluent inlet and the Dionex EPM ELUENT OUT port.
30 cm (12 in) of black 0.25-mm (0.010-in) ID PEEK tubing	064334	Lengthen the line between the Dionex EluGen cartridge outlet and the Dionex EPM ELUENT IN port.
28 cm (11 in) of clear 1.58-mm (0.062-in) ID PTFE tubing	064337	Lengthen the line between the Dionex EGC degas regenerant inlet and the Dionex EPM REGEN OUT port.
Dionex EluGen Cartridge Vent Line Tubing Kit (supplied with the cartridge)	063092	Vent the cartridge during operation.
Yellow 0.5 mL/min, 7 MPa (1000 psi) backpressure coil	053765	Provide backpressure during setup procedures.
Dionex EGC CO ₃ Mixer mounting clips	063642	Install the mixer.
Phillips head screwdriver (not supplied)	n/a	Install the Dionex EGC CO ₃ Mixer mounting clips.
35 cm (14 in) of black 0.25-mm (0.010-in) ID PEEK tubing	064346	Connect the Dionex EGC degas eluent outlet and the Dionex EGC CO ₃ Mixer inlet.
60 cm (24 in) of black 0.25-mm (0.010-in) ID PEEK tubing	064343	Connect the Dionex EGC CO ₃ Mixer outlet to port P (2) on the injection valve.
Temporary waste container (beaker, bottle, etc.) (not supplied)	n/a	Collect waste during setup procedures.
10-32 to 10-32 coupler	042627	Complete the connections.
10-32 to 1/4-28 coupler	042806	

Setting Up the Eluent Generator

Item	P/N	Used To
10-32 fittings 10-32 ferrules	043275 043276	Complete the connections.
1/8-in fittings 1/8-in ferrules	052267 048949	Complete the connections.

[Figure 54](#) illustrates the Dionex EluGen cartridge and Dionex EPM after installation.

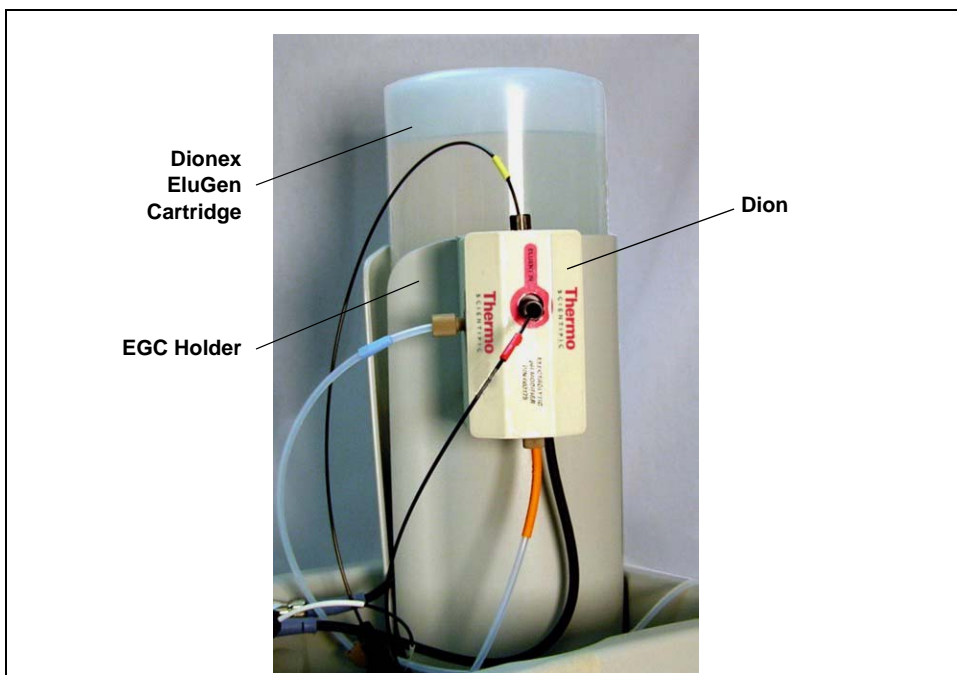


Figure 54. Dionex ICS-2100 with a Dionex EluGenCartridge and Dionex EPM Installed

Figure 55 illustrates the liquid flow path through the eluent generator components after all setup steps are complete and the eluent generator is ready for operation.

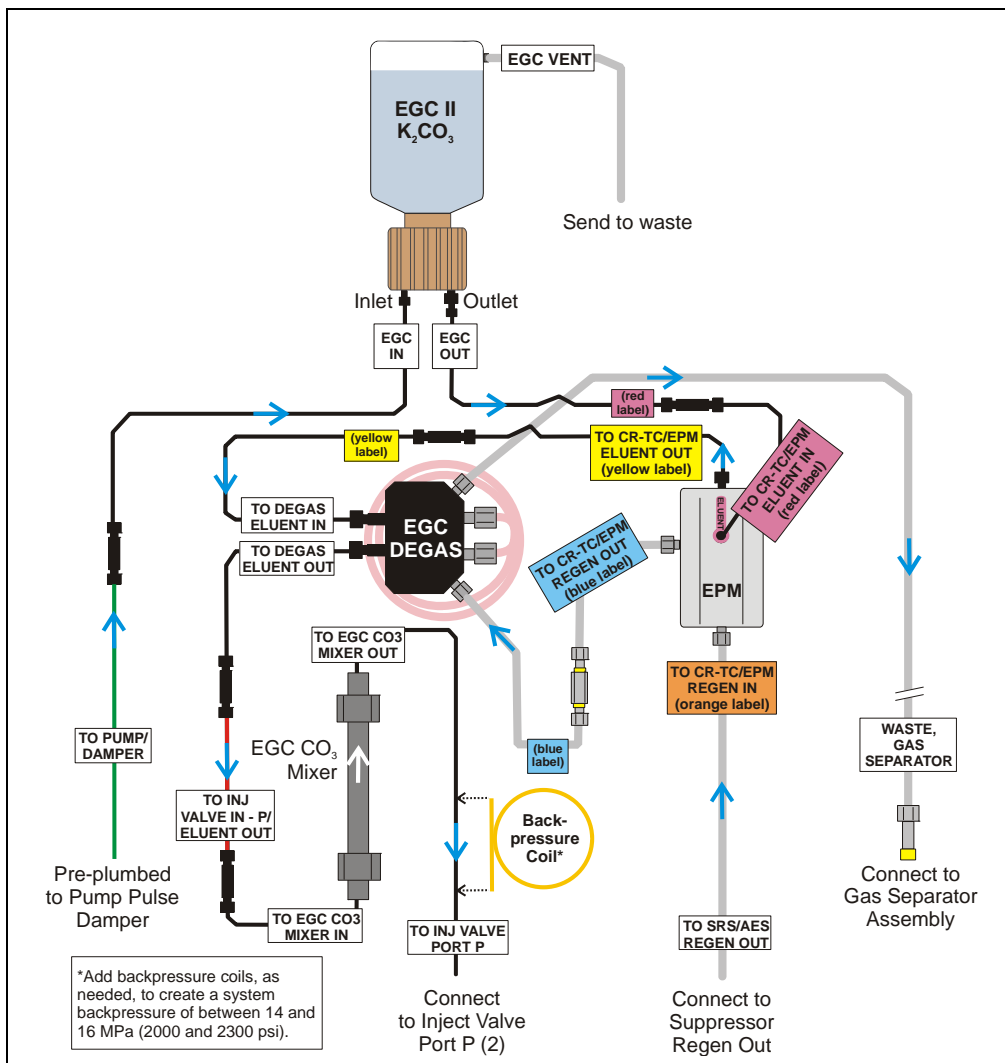


Figure 55. Eluent Generator Flow Schematic with a Dionex EPM and Dionex EGC CO₃ Mixer: Use for Generating Carbonate/Bicarbonate Eluent

Installing the Dionex EluGen Cartridge

1. Tilt the cartridge holder to view the bottom and brace the holder against the back corner of the Dionex ICS-2100 (see [Figure 56](#)).



Figure 56. Cartridge Holder (Tilted to View the Bottom)

2. Use the precut tubing assemblies included in the Dionex ICS-2100 Ship Kit to extend the length of three lines as described below:
 - a. Disconnect the **TO CR-TC ELUENT IN** line (red label) from the coupler that connects it to the **TO CR-TC ELUENT OUT** line (yellow label). Connect a 32 to 10-32 coupler to the end of the **TO CR-TC ELUENT IN** line and connect the 30 cm (12 in) length of black PEEK tubing (red labels) (P/N 064334) to the coupler (see [Figure 57](#)).
 - b. Connect the 35 cm (14 in) length of black PEEK tubing (yellow labels) (P/N 064340) to the coupler on the **TO CR-TC ELUENT OUT** line (yellow label).
 - c. Disconnect the **TO CR-TC REGEN IN** line (orange label) from the coupler that connects it to the **TO CR-TC REGEN OUT** line (blue label). Connect the 28 cm (11 in) length of clear PTFE tubing (blue labels) (P/N 064337) to the coupler on the **TO CR-TC REGEN OUT** line (blue label).

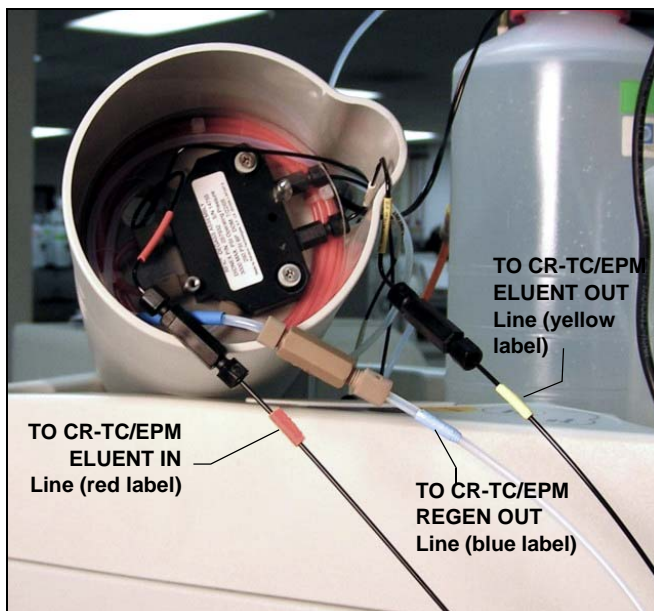


Figure 57. Dionex EPM Eluent and Regen Line Extensions

3. Pull the **TO CR-TC REGEN IN** line (orange label) out of the opening on the side of the holder.
4. Thread the three extended lines (red, yellow, and blue labels) through the opening on the side of the holder (see [Figure 58](#)).

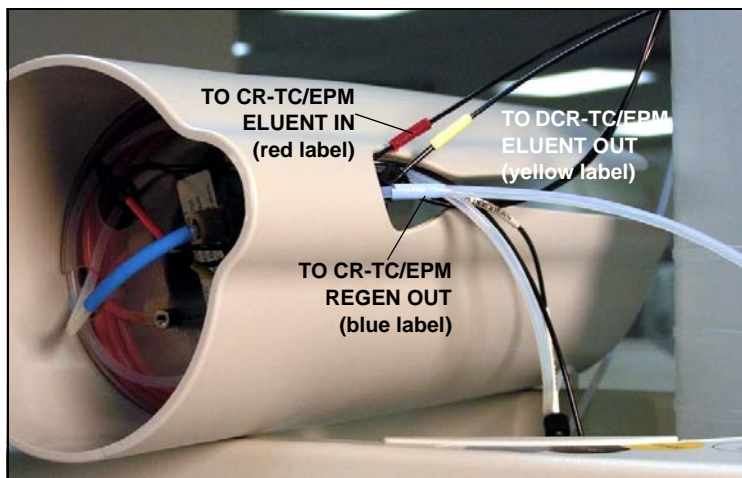


Figure 58. TO CR-TC/EPM Lines Outside of Holder

5. Turn the Dionex EGC holder right-side up and set it back into position.
6. Orient the Dionex EluGen cartridge with the fittings facing up and remove the plugs from the cartridge **INLET** and **OUTLET** fittings (see [Figure 59](#)).

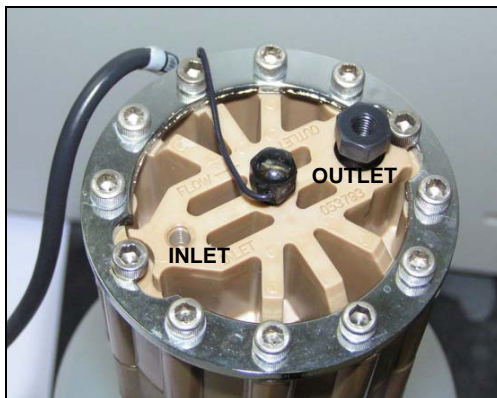


Figure 59. Dionex EluGen Cartridge Fitting Plugs

Dionex ICS-2100 Installation Instructions

7. Set the Dionex EluGen cartridge in the service area on top of the Dionex ICS-2100 and orient it with the cable toward the Dionex EGC holder (see [Figure 60](#)).



Figure 60. Dionex EluGen Cartridge in Service Area

8. Pull the coiled black **EGC IN** and **EGC OUT** lines out from inside the Dionex EGC holder. Disconnect the **EGC IN** line from the coupler that connects it to the **EGC OUT** line.
9. Connect the **EGC IN** line to the Dionex EluGen cartridge **INLET** port (see [Figure 61](#)).
10. Remove the coupler and connect the **EGC OUT** line to the Dionex EluGen cartridge **OUTLET** port.

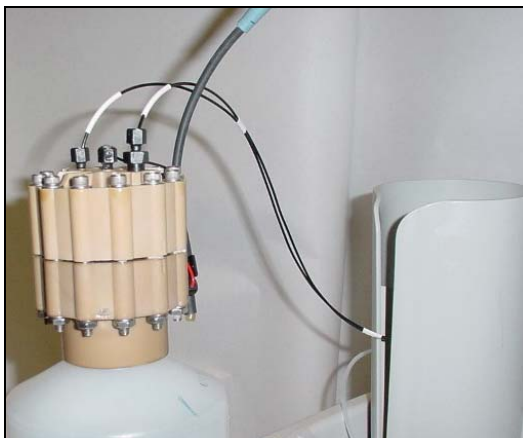


Figure 61. Dionex EluGen Cartridge Inlet and Outlet Port Connections

- Turn the Dionex EluGen cartridge over (with the fittings facing down). **Shake the Dionex EluGen cartridge vigorously, and tap it with the palm of your hand 10 to 15 times. Check that all bubbles trapped in the eluent generation chamber are dislodged.**



The Dionex EluGen cartridge contains one of the following: a corrosive base (KOH, LiOH, or NaOH), a corrosive acid (MSA), or a concentrated K_2CO_3 solution. Wear protective eyewear and gloves when handling the cartridge.



La cartouche du Dionex EluGen contient un de ce qui suit: une base corrosive (KOH, LiOH, ou NaOH), un acide corrosif (MSA), ou une solution concentrée de K_2CO_3 . Porter des lunettes et des gants protectives en manipulant la cartouche.



Die Dionex EluGen-Kassette enthält eine korrodierende Base (KOH, LiOH oder NaOH), eine korrodierende Säure (MSA) oder eine konzentrierte K_2CO_3 -Lösung. Tragen Sie daher beim Umgang mit Kassette eine Schutzbrille und Handschuhe.

- Slide the Dionex EluGen cartridge down into the holder until it stops (see [Figure 62](#)). Make sure the cable remains out of the holder.

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



Figure 62. Dionex EluGen Cartridge Installed in the Holder

13. Remove the plug from the **EGC-1** connector on top of the Dionex ICS-2100.
14. Orient the cartridge's blue 4-pin electrical cable connector as shown in [Figure 63](#). Push it onto the **EGC-1** connector on the Dionex ICS-2100. Twist the ring on the cable connector fingertight to secure it.



Figure 63. Connecting the Dionex EluGen Cartridge Cable

Connecting the Dionex EluGen Cartridge Vent Line

1. Locate the Dionex EluGen Cartridge Vent Line Tubing Kit supplied with the cartridge.
2. Slide the label onto one end of the tubing and then push the barbed luer lock onto the tubing.
3. Unscrew and remove the plug from the vent opening on the side of the Dionex EluGen cartridge (see [Figure 64](#)).



Figure 64. Dionex EluGen Cartridge Vent Plug

4. Screw the luer adapter onto the vent opening. Remove the cap on the luer adapter by twisting. **Save the cap.**
5. Twist the luer lock and Dionex EluGen cartridge vent line into the luer adapter (see [Figure 65](#)).

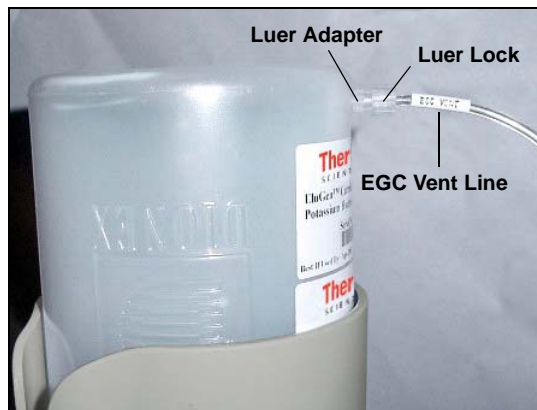


Figure 65. Installing the Dionex EluGen Cartridge Vent Line

NOTE To prevent leaks from the Dionex EluGen cartridge, always replace the luer adapter cap before moving the cartridge.

6. Direct the vent line to the waste container and insert it down into the waste, gas separator tube about 10 to 15 cm (4 to 6 in).

Installing the Dionex EPM

1. Remove the plugs from the Dionex EPM eluent and regen liquid ports.
2. Push the Dionex EPM onto the ball studs on the mounting bracket (see [Figure 66](#)).

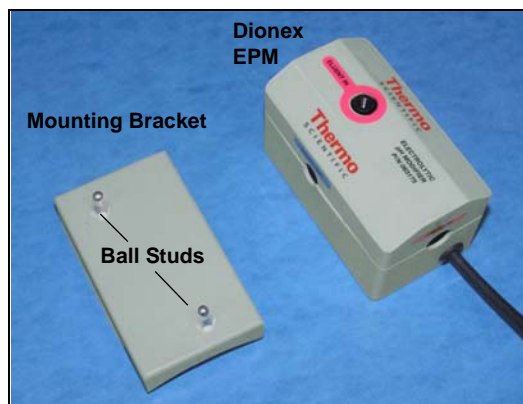


Figure 66. Dionex EPM and Mounting Bracket

Dionex ICS-2100 Installation Instructions

3. Lift the Dionex EluGen cartridge up slightly from the Dionex EGC holder and slide the Dionex EPM bracket onto the side of the holder (see [Figure 67](#)).



Figure 67. Dionex EPM and Mounting Bracket Installed on Dionex EGC Holder

4. Connect the following lines to the Dionex EPM:
 - Connect the **TO CR-TC/EPM ELUENT OUT** line (yellow label) to the **ELUENT OUT** port on the Dionex EPM (see [Figure 68](#)).
 - Connect the **TO CR-TC/EPM ELUENT IN** line (red label) to the **ELUENT IN** port on the Dionex EPM.
 - Connect the **TO CR-TC/EPM REGEN IN** line (orange label) to the **REGEN IN** port on the Dionex EPM.
 - Connect the **TO CR-TC/EPM REGEN OUT** line (blue label) to the **REGEN OUT** port on the Dionex EPM.

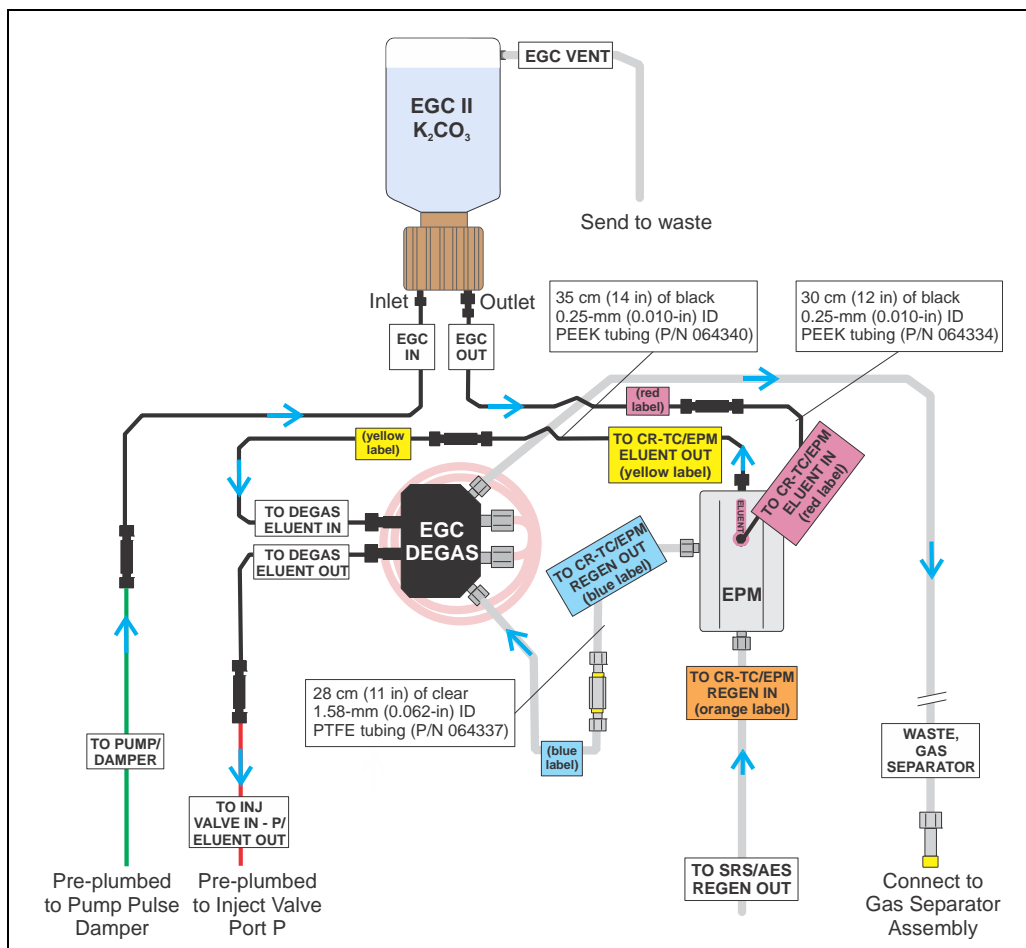


Figure 68. Dionex EluGen Cartridge and Dionex EPM Plumbing with Tubing Extensions

5. Remove the plug from the **EGC-2** connector on top of the Dionex ICS-2100.
6. Connect the Dionex EPM electrical cable to the **EGC-2** connector.

Recording the Dionex EluGen Cartridge and Dionex EPM Serial Numbers in Chromeleon

The serial numbers are printed on labels on the Dionex EluGen cartridge and Dionex EPM.

1. Open the Server Configuration program (select **Start > Programs > Chromeleon > Server Configuration**).
2. Double-click the Dionex ICS-2100 system icon. The properties dialog box for the Dionex ICS-2100 appears.
3. Click the **Eluent Generator** tab (see [Figure 69](#)).
4. Select the **EGC-1** check box and enter the Dionex EluGen cartridge serial number.
5. Select the **EGC-2** check box and enter the serial number of the Dionex EPM.

- Click **OK**.

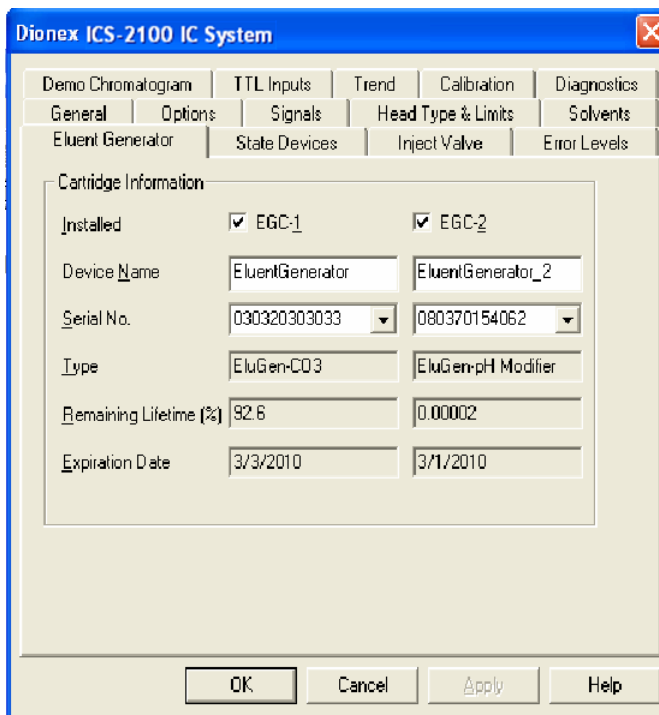


Figure 69. Eluent Generator Configuration Properties: CO₃/Dionex EPM Example

Plumbing the Dionex EluGen Cartridge and Dionex EPM for Conditioning

Figure 70 illustrates the liquid flow path through the Dionex EluGen cartridge and Dionex EPM during the conditioning procedure.

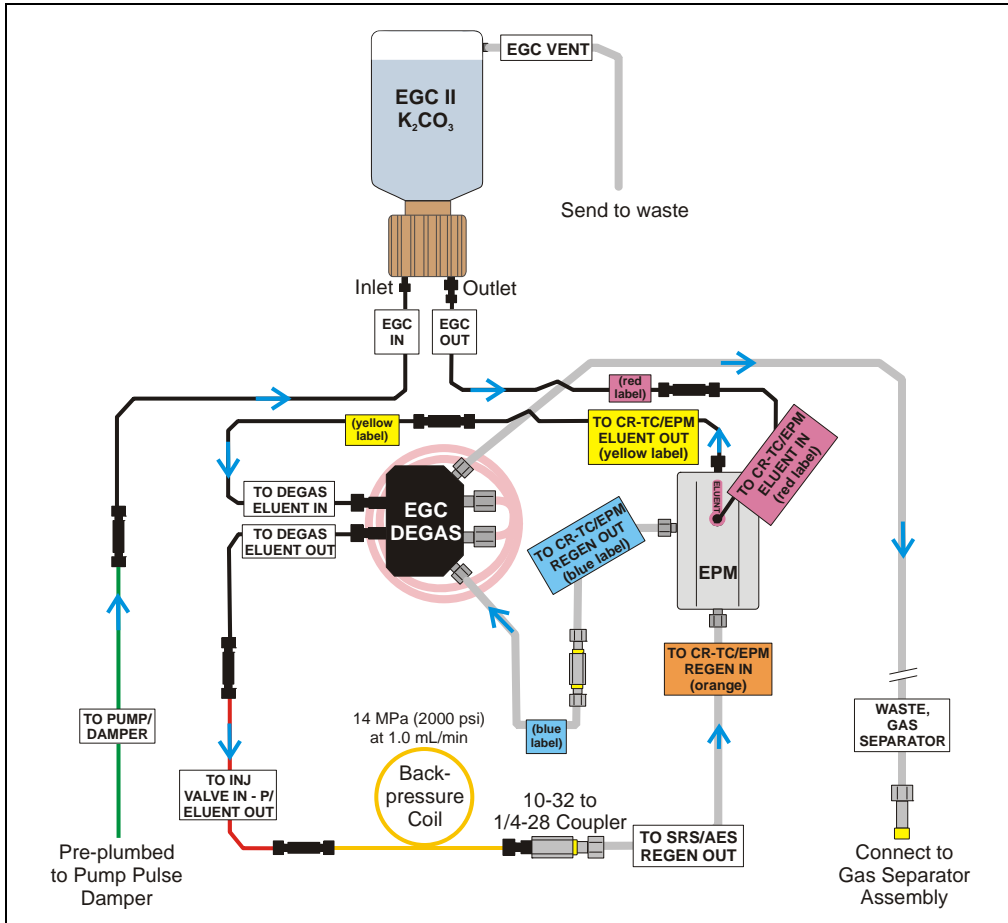


Figure 70. Dionex EluGen Cartridge and Dionex EPM Plumbing for Conditioning with Carbonate/Bicarbonate Eluent

1. Disconnect the **TO INJ VALVE IN - P/ELUENT OUT** line from port **P (2)** on the injection valve.
2. Use a 10-32 to 10-32 coupler (P/N 042627) to connect the yellow 0.5 mL/min, 7 MPa (1000 psi) backpressure coil (P/N 053765) to the **TO INJ VALVE IN - P/ELUENT OUT** line.
3. Connect a 10-32 to 1/4-28 coupler (P/N 042806) to the free end of the backpressure coil.
4. Disconnect the **TO SRS/AES REGEN OUT** line from the suppressor **REGEN OUT** port.
5. Connect the **TO SRS/AES REGEN OUT** line to the 10-32 to 1/4-28 coupler (see [Figure 71](#)).

NOTE The backpressure coil connection in [Figure 71](#) is temporary; it is required only during the Dionex EPM and Dionex EluGen cartridge conditioning procedure described in the next section.

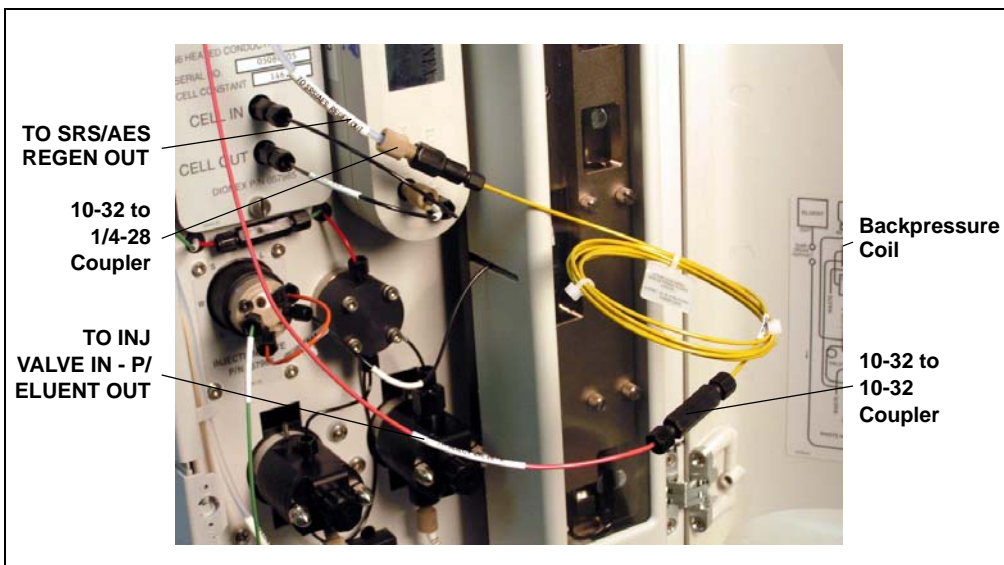


Figure 71. Backpressure Coil Connections for Conditioning the Dionex EluGen Cartridge and Dionex EPM with Carbonate/Bicarbonate Eluent

Conditioning the Dionex EPM and Dionex EluGen Cartridge

After completing the plumbing connections described in the previous sections, follow the steps below to hydrate the Dionex EPM for 5 minutes and then condition the Dionex EPM and Dionex EluGen cartridge for 30 minutes.

1. Make sure the eluent reservoir is filled with ASTM filtered, Type I (18-megohm) deionized water.
2. Verify that the suppressor is off.

IMPORTANT

To avoid damaging the suppressor, always turn off the suppressor before conditioning the Dionex EPM and Dionex EluGen cartridge. The pump flow is on during conditioning, however, no flow reaches the suppressor.

3. Verify that the **Automatically turn on with pump** option is not selected on the Dionex ICS-2100 touch screen **SUPPRESSOR** page. Disabling this option lets you turn on the pump, without automatically turning on the suppressor.
4. On the Dionex ICS-2100 touch screen **HOME** page, set the pump flow rate to **1.00 mL/min**.
5. Turn on the pump.
6. Run the pump for 5 minutes to hydrate the Dionex EPM.
7. Touch the **EGC** button on the **HOME** page to open the **ELUENT GENERATOR** page.
8. Verify that the cartridge type for **EGC-1** is **Carb** and the type for **EGC-2** is **pH Mod**.

If the cartridge types are wrong, make sure the cartridge serial numbers were entered correctly in the Chromeleon Server Configuration program (see [“Recording the Dionex EluGen Cartridge and Dionex EPM Serial Numbers in Chromeleon”](#) on page 68).

9. Select the following settings:
 - Set the **EGC-1** concentration to **9 mM**.
 - Set the **EGC-2** concentration to **1 mM**.
10. Turn on the EGC-1 and EGC-2 currents.

11. Run the Dionex EluGen cartridge and Dionex EPM at these settings for 30 minutes.
12. Turn off the EGC-1 and EGC-2 current.
13. Turn off the pump.

Installing the Dionex EGC CO₃ Mixer

[Figure 72](#) illustrates the Dionex EGC CO₃ Mixer after installation.



Figure 72. Dionex ICS-2100 with a Dionex EGC CO₃ Mixer Installed

Dionex ICS-2100 Installation Instructions

1. Use a Phillips head screwdriver to remove the existing small diameter mounting clips from the inside of the Dionex ICS-2100 door.
2. Install the larger diameter clips (P/N 063642) (see [Figure 73](#)).



Figure 73. Location of Mounting Clips for the Dionex EGC CO₃ Mixer

3. Orient the mixer with the outlet pointing upward and push it onto the clips (see [Figure 74](#)). The mixer outlet must point upward to ensure thorough mixing of the eluent.
4. Locate the 35 cm (14 in) length of black PEEK tubing (white labels) (P/N 064346). Connect the end labeled **TO EGC CO3 MIXER IN** to the mixer inlet.
5. Locate the 60 cm (24 in) length of black PEEK tubing (white labels) (P/N 064343). Connect the end labeled **TO EGC CO3 MIXER OUT** to the mixer outlet.



Figure 74. Dionex EGC CO₃ Mixer Installed on the Dionex ICS-2100 Door

Filling the Dionex EGC CO₃ Mixer with Deionized Water

1. Verify that the EGC-1 and EGC-2 currents are off.
2. Disconnect the Dionex EluGen cartridge inlet line (labeled **TO PUMP/DAMPER**) from the coupler that connects it to the green pump outlet line (see [Figure 75](#)).

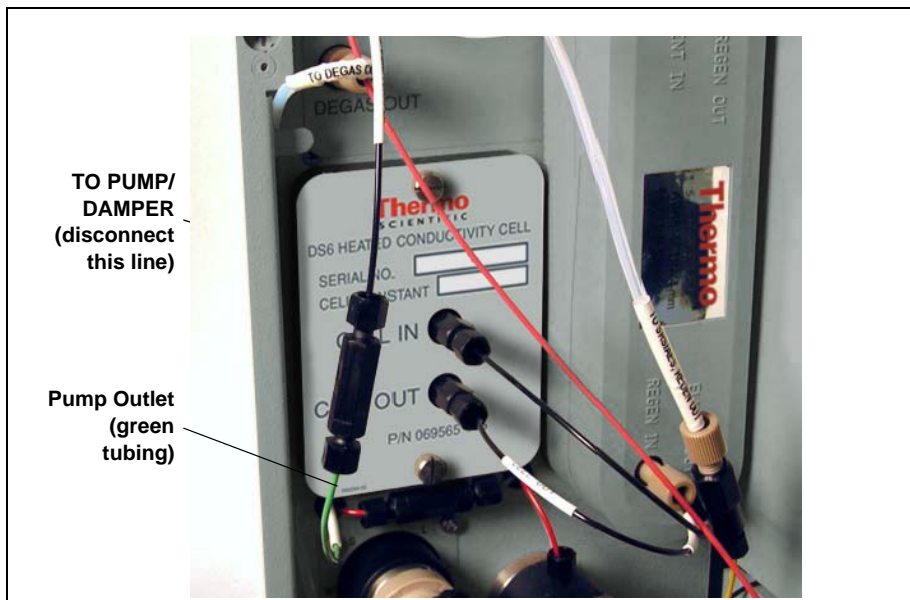


Figure 75. Dionex EluGen Cartridge Inlet and Pump Outlet

3. Connect the pump outlet to the mixer inlet (see [Figure 76](#)).

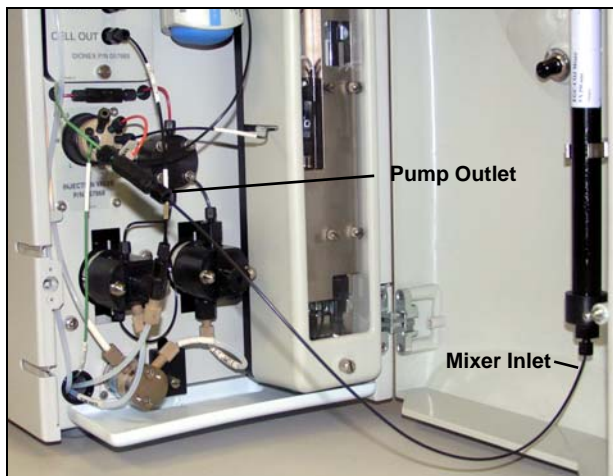


Figure 76. Pump Outlet Connected to Mixer Inlet for Mixer Hydration

4. Direct the mixer outlet line to a temporary waste container, such as a beaker.
5. Verify that the suppressor is off.

IMPORTANT

To avoid damaging the suppressor, always turn off the suppressor before filling the mixer. The pump flow is on during filling, however, no flow reaches the suppressor.

6. Verify that the **Automatically turn on with pump** option is not selected on the Dionex ICS-2100 touch screen **SUPPRESSOR** page. Disabling this option lets you turn on the pump, without automatically turning on the suppressor.
7. Set the pump flow rate to **5.00 mL/min**.
8. Turn on the pump.
9. Run the pump until the mixer is filled and there is a consistent flow of water exiting the mixer outlet.

It takes about 5 minutes to fill a 4-mm mixer and about 2 minutes to fill a 2-mm mixer.

10. Turn off the pump.

Filling the Dionex EGC CO₃ Mixer with the Carbonate/Bicarbonate Eluent

Before initial use, follow the steps in this section to fill the Dionex EGC CO₃ Mixer with the carbonate/bicarbonate eluent concentration required for the application to be run.

Figure 77 illustrates the liquid flow path through the eluent generator components during initial filling of the Dionex EGC CO₃ Mixer with carbonate/bicarbonate eluent.

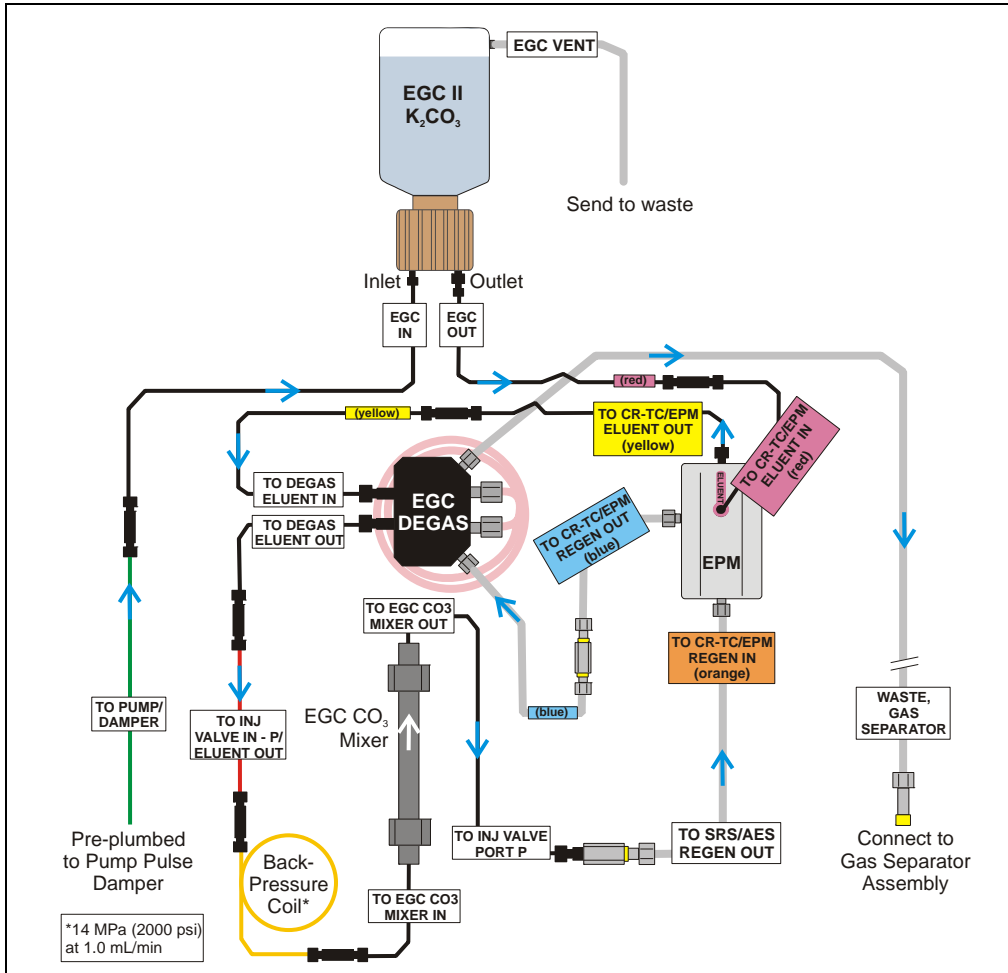


Figure 77. Dionex EluGen Cartridge and Dionex EPM Plumbing for Initial Filling of the Dionex EGC CO₃ Mixer with Carbonate/Bicarbonate Eluent

1. Disconnect the pump outlet from the mixer inlet.
2. Reconnect the pump outlet and the Dionex EluGen cartridge inlet.
3. Connect a 10-32 to 10-32 coupler to the mixer inlet.

4. Disconnect the outlet of the yellow PEEK backpressure coil from the **TO SRS/AES REGEN OUT** line and then connect the backpressure coil to the mixer inlet (see [Figure 78](#)).
5. Connect the mixer outlet to the **TO SRS/AES REGEN OUT** line.

NOTE The backpressure coil connection is temporary; it is required only during initial filling of the mixer.

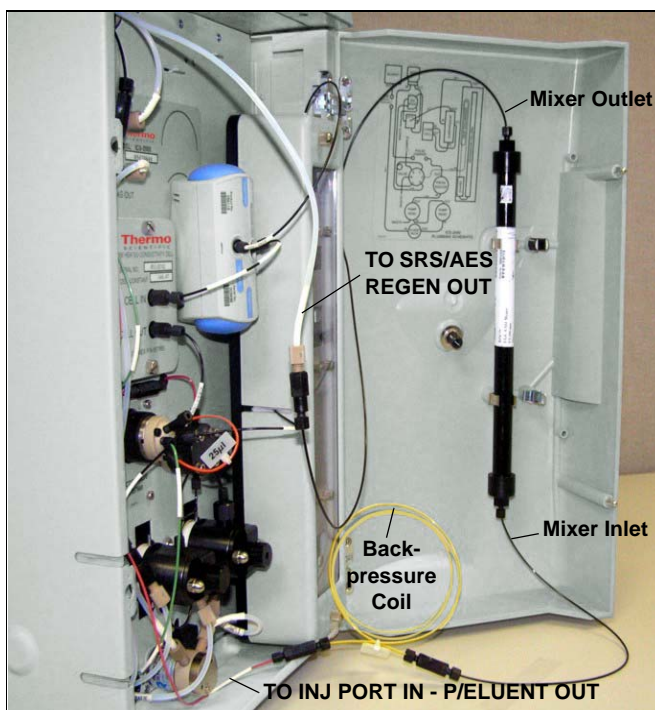


Figure 78. Mixer Connected Directly to Eluent Generator Outlet for Initial Filling

6. Verify that the suppressor is off.

IMPORTANT

To avoid damaging the suppressor, always turn off the suppressor before filling the mixer. The pump flow is on during filling, however, no flow reaches the suppressor.

7. Verify that the **Automatically turn on with pump** option is not selected on the Dionex ICS-2100 touch screen **SUPPRESSOR** page. Disabling this option lets you turn on the pump, without automatically turning on the suppressor.
8. Set the pump flow rate to the rate required for the application.
9. Turn on the pump.
10. Verify that the system backpressure is between 14 and 16 MPa (2000 and 2300 psi). If necessary, adjust the pressure by adding or removing backpressure tubing.
11. Set the **EGC-1** and **EGC-2** concentrations to the values required for your application. For example, for a 3.5 mM K_2CO_3 /1.0 mM $KHCO_3$ mixture, set the **EGC-1** concentration to 3.5 mM and the **EGC-2** concentration to 1.0 mM.
12. Turn on the **EGC-1** and **EGC-2** currents.
13. Run at the selected settings until the mixer is filled with the eluent mixture. At a flow rate of 1 mL/min it will take about 45 minutes to fill the 4-mm mixer and about 15 minutes to fill the 2-mm mixer.

NOTE The void volume of the 4-mm mixer is about 16 mL. The void volume of the 2-mm mixer is about 5 mL.

14. Turn off the **EGC-1** and **EGC-2** currents.
15. Turn off the pump.
16. Remove the yellow PEEK backpressure coil from the **TO INJ VALVE IN - P/ELUENT OUT** line and the mixer inlet.
17. Disconnect the mixer outlet from the **TO SRS/AES REGEN OUT** line and remove the 10-32 to 1/4-28 coupler.
18. Reconnect the **TO SRS/AES REGEN OUT** line to the suppressor **REGEN OUT** port.

Completing the Eluent Generator Setup for Carbonate/Bicarbonate Eluent

Figure 79 illustrates the liquid flow path through the system after all setup steps are complete and the eluent generator is ready for operation.

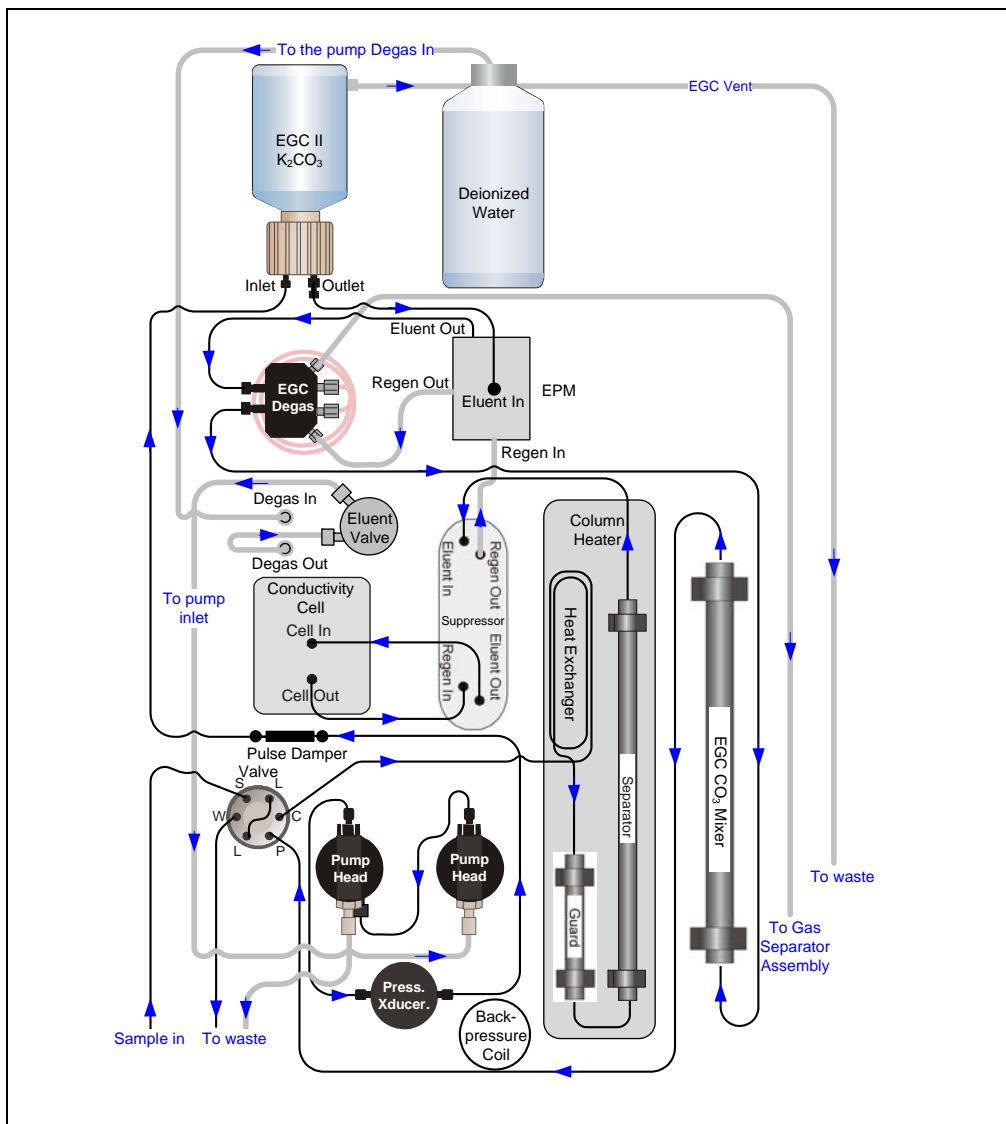


Figure 79. Dionex ICS-2100 Flow Schematic: Carbonate/Bicarbonate Eluent Generation

Dionex ICS-2100 Installation Instructions

1. Connect the **TO INJ VALVE IN - P/ELUENT OUT** line to the coupler attached to the mixer inlet line. Route this line along the back of the drip tray to prevent it from being pinched when the Dionex ICS-2100 door is opened and closed
2. Route the mixer outlet line to the back of the component panel (see [Figure 80](#)).
3. Connect the mixer outlet line to port **P (2)** on the injection valve.



Figure 80. Mixer Outlet Routed to the Back of the Component Panel

NOTE Backpressure tubing may be required between the injection valve and the Dionex EGC CO₃ Mixer outlet. The Dionex EluGen cartridge requires 14 to 16 MPa (2000 to 2300 psi) of system backpressure for removal of electrolysis gas from the eluent produced by the cartridge. See [Section 19.1](#) for details.

4. Go on to [Section 19](#), “Equilibrating the System.”

18.3 Eluent Generator Setup for Carbonate Eluent

Follow the instructions in this section if you are installing a Dionex K_2CO_3 cartridge and a Dionex EGC CO_3 Mixer (for generating carbonate eluent).

- If you are installing a Dionex KOH, LiOH, MSA, or NaOH EluGen cartridge and a Dionex CR-TC, go to [Section 18.1](#).
- If you are installing a Dionex K_2CO_3 cartridge, a Dionex EPM, and a Dionex EGC CO_3 Mixer (for generating carbonate/bicarbonate eluent), go to [Section 18.2](#).

Overview

The eluent generator setup procedure for carbonate eluent consists of the following main steps:

- Installing the Dionex EluGen cartridge and preparing for conditioning.
- Conditioning the Dionex EluGen cartridge.
- Installing the Dionex EGC CO_3 Mixer.
- Filling the Dionex EGC CO_3 Mixer with the eluent concentration required for the application.
- Completing the eluent generator setup.

Dionex ICS-2100 Installation Instructions

Items Required to Complete the Setup Procedure

In addition to the Dionex EluGen cartridge and the Dionex EGC CO₃ Mixer, you will need the following items to complete the eluent generator setup. Except as noted, all items are supplied in the Dionex ICS-2100 Ship Kit (P/N 064375).

Item	P/N	Use To
Yellow 0.5 mL/min, 7 MPa (1000 psi) backpressure coil	053765	Provide backpressure during setup procedures.
Dionex EluGen Cartridge Vent Line Tubing Kit (supplied with the cartridge)	063092	Vent the cartridge during operation.
Dionex EGC CO ₃ Mixer mounting clips	063642	Install the mixer.
Phillips head screwdriver (not supplied)	n/a	Install the Dionex EGC CO ₃ Mixer mounting clips.
35 cm (14 in) of black 0.25-mm (0.010-in) ID PEEK tubing	064346	Connect the Dionex EGC degas eluent outlet and the Dionex EGC CO ₃ Mixer inlet.
60 cm (24 in) of black 0.25-mm (0.010-in) ID PEEK tubing	064343	Connect the Dionex EGC CO ₃ Mixer outlet to port P (2) on the injection valve.
Temporary waste container (beaker, bottle, etc.) (not supplied)	n/a	Collect waste during setup procedures.
10-32 fittings 10-32 ferrules	043275 043276	Complete the plumbing connections.
1/8-in fittings 1/8-in ferrules	052267 048949	Complete the plumbing connections.
10-32 to 10-32 couplers	042627	Complete the plumbing connections.

[Figure 81](#) illustrates the liquid flow path through the eluent generator components after all setup steps are complete and the eluent generator is ready for operation.

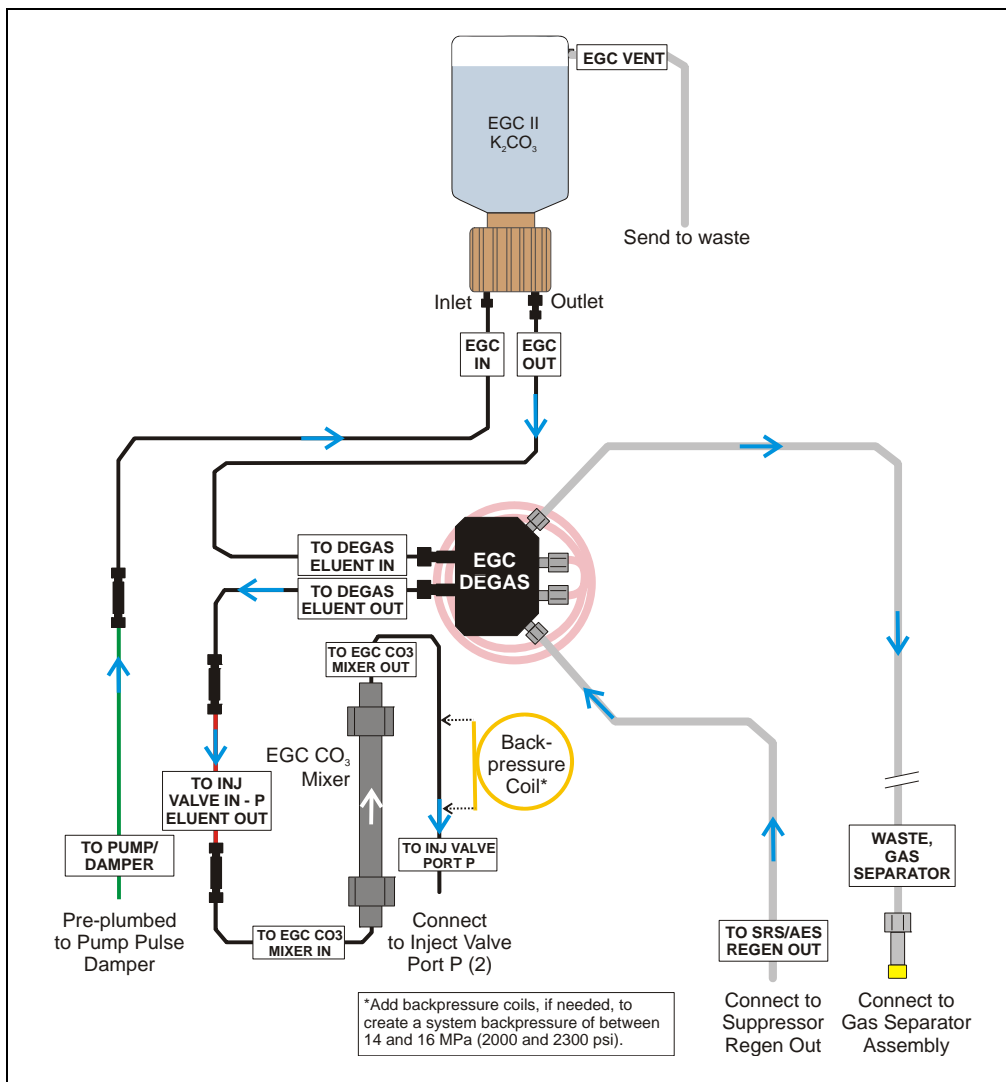


Figure 81. Eluent Generator Flow Schematic with a Dionex EGC CO_3 Mixer: Use for Generating Carbonate Eluent

Installing the Dionex EluGen Cartridge and Preparing for Conditioning

Follow the steps in this section to install the Dionex EluGen cartridge and prepare it for conditioning before initial use.

[Figure 82](#) illustrates the liquid flow path during the conditioning procedure.

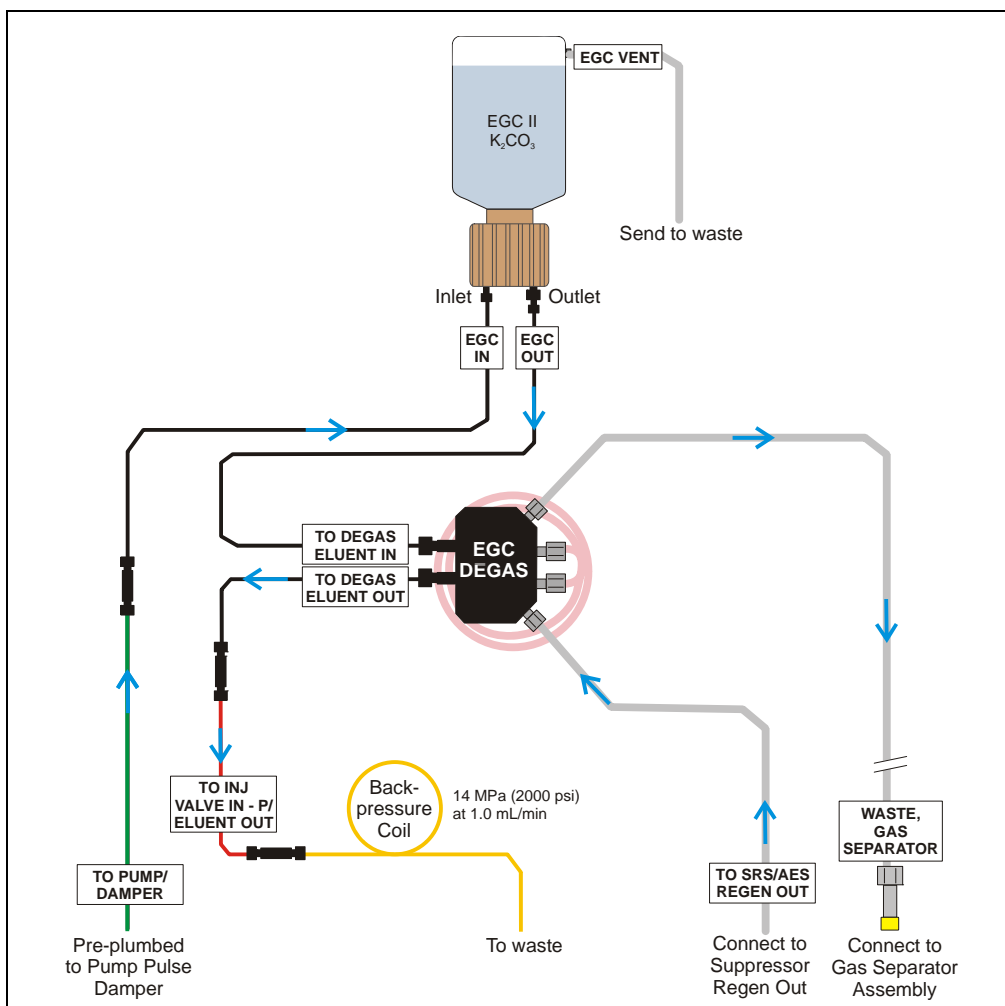


Figure 82. Dionex EluGen Cartridge Plumbing for Conditioning with Carbonate Eluent

1. Orient the Dionex EluGen cartridge with the fittings facing up and remove the plugs from the cartridge **INLET** and **OUTLET** fittings (see [Figure 84](#)).

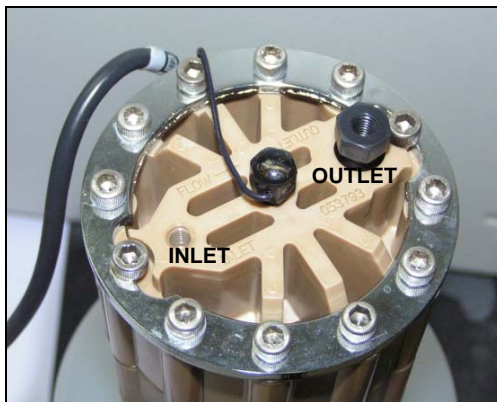


Figure 83. Dionex EluGen Cartridge Fitting Plugs

2. Set the Dionex EluGen cartridge in the service area on top of the Dionex ICS-2100 and orient it with the cable toward the Dionex EGC holder (see [Figure 84](#)).



Figure 84. Dionex EluGen Cartridge in Service Area

Dionex ICS-2100 Installation Instructions

3. Pull the coiled black **EGC IN** and **EGC OUT** lines out from inside the Dionex EGC holder. Disconnect the **EGC IN** line from the coupler that connects it to the **EGC OUT** line.
4. Connect the **EGC IN** line to the Dionex EluGen cartridge **INLET** port (see [Figure 85](#)).
5. Remove the coupler and connect the **EGC OUT** line to the Dionex EluGen cartridge **OUTLET** port.

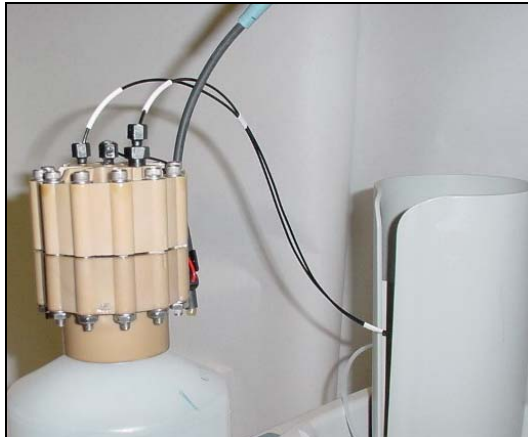


Figure 85. Dionex EluGen Cartridge Port Connections

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



CAUTION

The Dionex EluGen cartridge contains one of the following: a corrosive base (KOH, LiOH, or NaOH), a corrosive acid (MSA), or a concentrated K_2CO_3 solution. Wear protective eyewear and gloves when handling the cartridge.



MISE EN GARDE

La cartouche du Dionex EluGen contient un de ce qui suit: une base corrosive (KOH, LiOH, ou NaOH), un acide corrosif (MSA), ou une solution concentrée de K_2CO_3 . Porter des lunettes et des gants protectives en manipulant la cartouche.



VORSICHT

Die Dionex EluGen-Kassette enthält eine korrodierende Base (KOH, LiOH oder NaOH), eine korrodierende Säure (MSA) oder eine konzentrierte K_2CO_3 -Lösung. Tragen Sie daher beim Umgang mit Kassette eine Schutzbrille und Handschuhe.

- Slide the Dionex EluGen cartridge down into the holder until it stops (see [Figure 86](#)). Make sure the cable remains out of the holder.

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



Figure 86. Dionex EluGen Cartridge Installed in the Holder

- Remove the plug from the **EGC-1** connector on top of the Dionex ICS-2100.
- Orient the cartridge's blue 4-pin electrical cable connector as shown in [Figure 87](#). Push it onto the **EGC-1** connector on the Dionex ICS-2100. Twist the ring on the cable connector fingertight to secure it.



Figure 87. Connecting the Dionex EluGen Cartridge Cable

10. Disconnect the **TO INJ VALVE IN - P/ELUENT OUT** line from port **P (2)** on the injection valve.
11. Use a 10-32 to 10-32 coupler (P/N 042627) to connect the **TO INJ VALVE IN - P/ELUENT OUT** line to one end of the yellow 0.5 mL/min, 7 MPa (1000 psi) backpressure coil (P/N 053765) (see [Figure 88](#)).
12. Direct the free end of the backpressure coil to a temporary waste container.

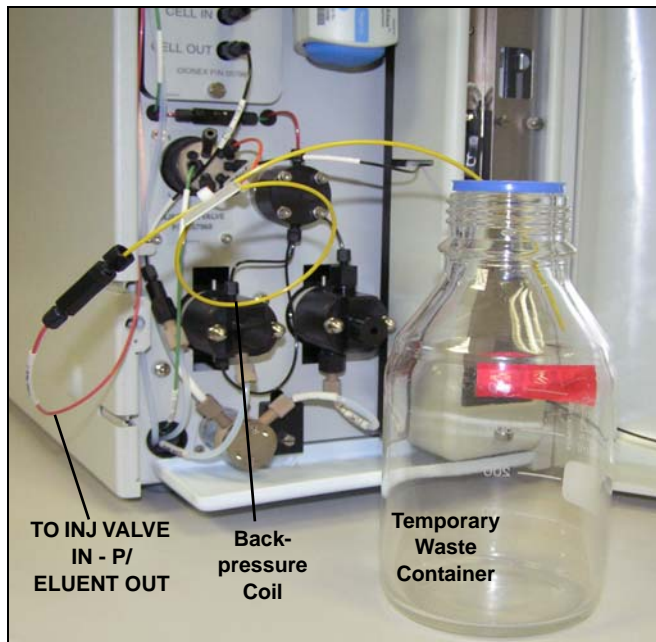


Figure 88. Plumbing Connections for Conditioning the Dionex EluGen Cartridge with Carbonate Eluent

Installing the Dionex EluGen Cartridge Vent Line

1. Locate the Dionex EluGen Cartridge Vent Line Tubing Kit (P/N 063092) supplied with the Dionex EluGen cartridge.
2. Slide the label onto one end of the tubing and then push the barbed luer lock onto the tubing.

3. Unscrew and remove the plug from the vent opening on the side of the Dionex EluGen cartridge (see [Figure 90](#)).



Figure 89. Dionex EluGen Cartridge Vent Plug

4. Screw the luer adapter onto the vent opening. Remove the cap on the luer adapter by twisting. **Save the cap.**
5. Twist the luer lock and Dionex EluGen cartridge vent line into the luer adapter (see [Figure 90](#)).

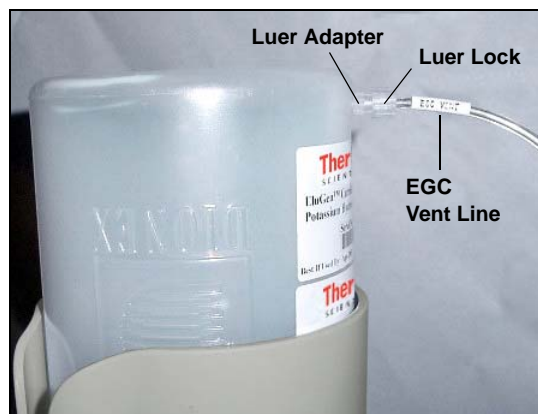


Figure 90. Installing the Dionex EluGen Cartridge Vent Line

NOTE To prevent leaks from the Dionex EluGen cartridge, always replace the luer adapter cap before moving the cartridge.

6. Direct the Dionex EluGen cartridge vent line to the rear of the Dionex ICS-2100 and snap it onto one of the tubing clips on the rear panel.
7. Direct the vent line to the waste container and insert it down into the waste, gas separator tube about 10 to 15 cm (4 to 6 in).

Recording the Dionex EluGen Cartridge Serial Number in Chromeleon

The serial number is printed on the Dionex EluGen cartridge label.

1. Open the Chromeleon Server Configuration program (click **Start** on the Windows taskbar and select **All Programs > Chromeleon > >Server Configuration**).
2. Double-click the Dionex ICS-2100 system icon. The properties dialog box for the Dionex ICS-2100 appears.
3. Click the **Eluent Generator** tab (see [Figure 91](#)).
4. Select the **EGC-1** check box.
5. Enter the Dionex EluGen cartridge serial number and click **OK**.

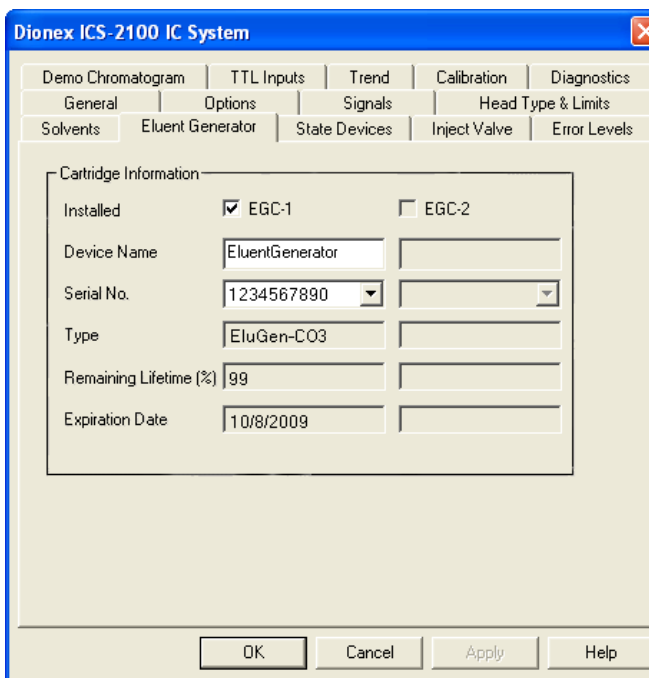


Figure 91. Eluent Generator Configuration Properties: CO₃ Example

Conditioning the Dionex EluGen Cartridge

After completing the installation steps described in the previous sections, condition the Dionex EluGen cartridge for 30 minutes before initial use.

1. Make sure the eluent reservoir is filled with ASTM filtered, Type I (18-megohm) deionized water.
2. Verify that the suppressor is off.

IMPORTANT

To avoid damaging the suppressor, always turn off the suppressor before conditioning the Dionex EluGen cartridge. The pump flow is on during conditioning, however, no flow reaches the suppressor.

3. Verify that the **Automatically turn on with pump** option is not selected on the Dionex ICS-2100 touch screen **SUPPRESSOR** page. Disabling this option lets you turn on the pump, without automatically turning on the suppressor.
4. On the Dionex ICS-2100 touch screen **HOME** page, set the pump flow rate to **1.00 mL/min**.
5. Turn on the pump.
6. On the touch screen **HOME** page, touch the **EGC** button to open the **ELUENT GENERATOR** page. Verify that the cartridge type is **Carb**.
If the cartridge type is wrong, verify that the cartridge serial number was entered correctly in the Chromeleon Server Configuration program (see [“Recording the Dionex EluGen Cartridge Serial Number in Chromeleon”](#) on page 92).
7. Set the **EGC-1** concentration to **9 mM**.
8. Turn on the EGC-1 current.
9. Run the Dionex EluGen cartridge at these settings for 30 minutes.
10. Turn off the EGC-1 current.
11. Turn off the pump.

Installing the Dionex EGC CO₃ Mixer

[Figure 92](#) illustrates the Dionex EGC CO₃ Mixer after installation.

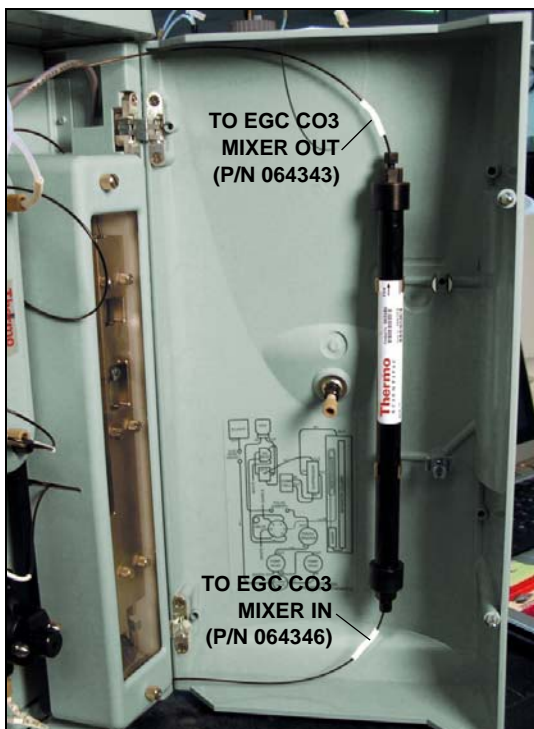


Figure 92. Dionex ICS-2100 with a Dionex EGC CO₃ Mixer Installed

1. Use a Phillips head screwdriver to remove the existing small diameter mounting clips from the inside of the Dionex ICS-2100 door.
2. Install the larger diameter mounting clips (P/N 063642) (see [Figure 93](#)).



Figure 93. Location of Mounting Clips for the Dionex EGC CO₃ Mixer

3. Orient the mixer with the outlet pointing upward and push it onto the clips (see [Figure 94](#)). The mixer outlet must point upward to ensure thorough mixing of the eluent.
4. Locate the 35 cm (14 in) length of black PEEK tubing (white labels) (P/N 064346). Connect the end labeled **TO EGC CO3 MIXER IN** to the mixer inlet.
5. Locate the 60 cm (24 in) length of black PEEK tubing (white labels) (P/N 064343). Connect the end labeled **TO EGC CO3 MIXER OUT** to the mixer outlet.



Figure 94. Dionex EGC CO₃ Mixer Installed on the Dionex ICS-2100 Door

Filling the Dionex EGC CO₃ Mixer with the Carbonate Eluent

Before initial use, follow the steps in this section to fill the Dionex EGC CO₃ Mixer with the carbonate eluent required for the application to be run. [Figure 95](#) illustrates the liquid flow path through the eluent generator components during initial filling of the Dionex EGC CO₃ Mixer with carbonate eluent.

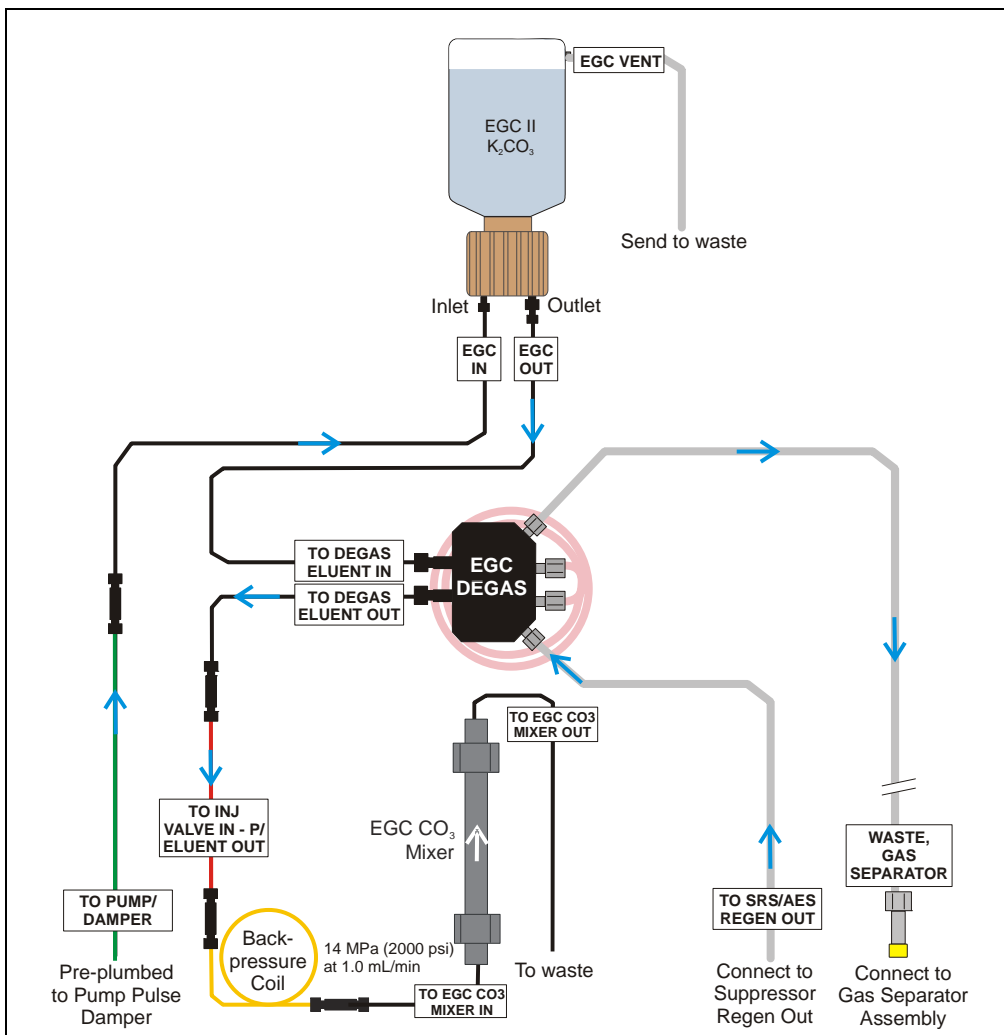


Figure 95. Plumbing for Filling the Dionex EGC CO₃ Mixer with Carbonate Eluent

1. Connect a 10-32 to 10-32 coupler to the mixer inlet and connect the outlet of the yellow PEEK backpressure coil to the coupler.
2. Direct the mixer outlet to the temporary waste container.
3. Verify that the suppressor is off.

IMPORTANT

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

4. Verify that the **Automatically turn on with pump** option is not selected on the Dionex ICS-2100 touch screen **SUPPRESSOR** page. Disabling this option lets you turn on the pump, without automatically turning on the suppressor.
5. Set the pump flow rate to the rate required for the application.
6. Turn on the pump.
7. Verify that the system backpressure is between 14 and 16 MPa (2000 and 2300 psi). If necessary, adjust the pressure by adding or removing backpressure tubing.
8. Set the **EGC-1** concentration to the value required for your application.
9. Turn on the **EGC-1** current.
10. Run at these settings until a consistent flow of eluent is exiting the mixer outlet. At a flow rate of 1 mL/min it will take about 16 minutes to fill a 4-mm mixer and about 5 minutes to fill a 2-mm mixer.

NOTE The void volume of the 4-mm mixer is about 16 mL. The void volume of the 2-mm mixer is about 5 mL.

11. Turn off the **EGC-1** current.
12. Turn off the pump.
13. Remove the yellow PEEK backpressure coil from the **TO INJ VALVE IN - P/ELUENT OUT** line and the mixer inlet.
14. Retain the coupler on the mixer inlet.

Completing the Eluent Generator Setup for Carbonate Eluent

Figure 96 illustrates the liquid flow path through the Dionex ICS-2100 after all setup steps are complete and the eluent generator is ready for operation.

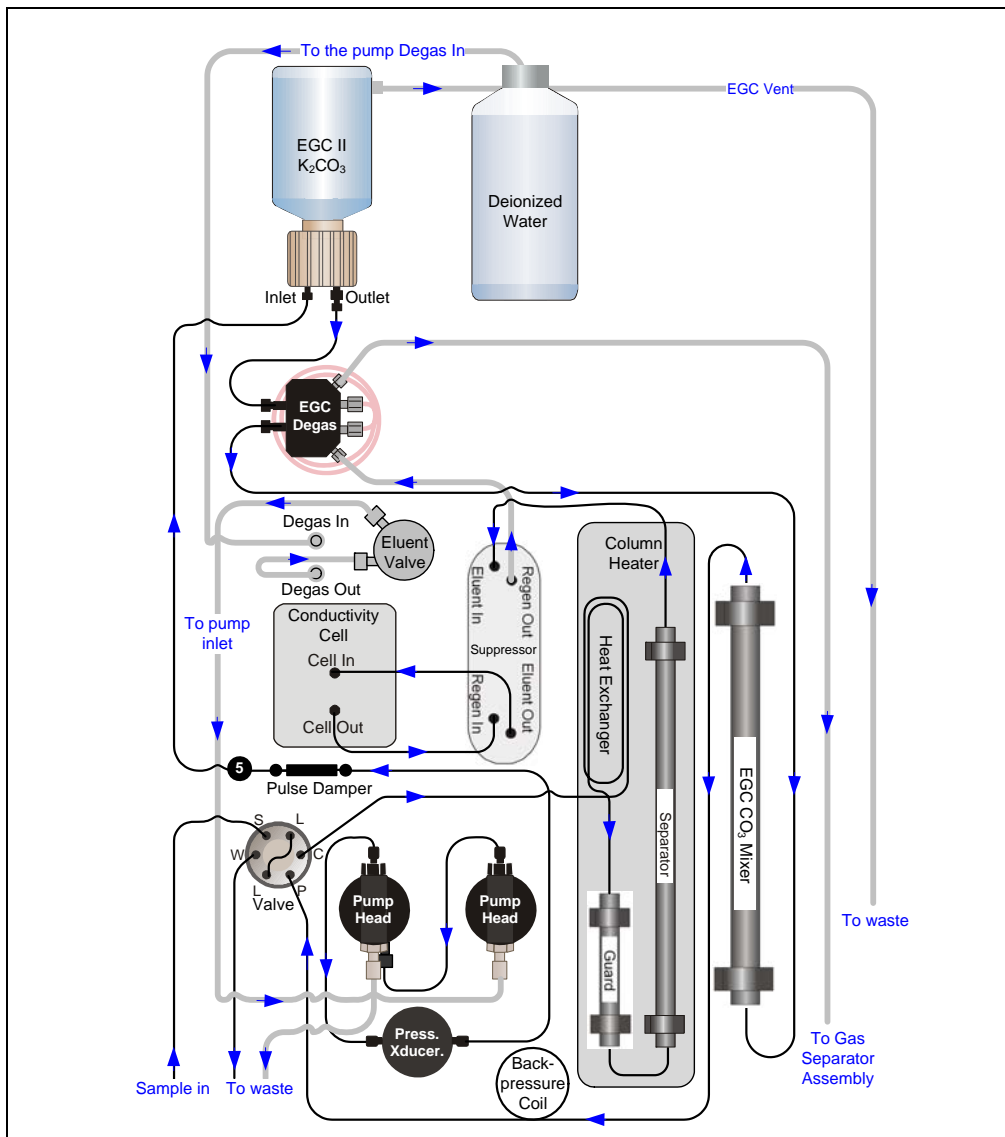


Figure 96. Dionex ICS-2100 Flow Schematic: Carbonate Eluent Generation

1. Connect the **TO INJ VALVE IN - P/ELUENT OUT** line to the coupler attached to the mixer inlet line. Route this line along the back of the drip tray to prevent it from being pinched when the Dionex ICS-2100 door is opened and closed.
2. Route the mixer outlet line to the back of the component panel (see [Figure 97](#)).
3. Connect the mixer outlet line to port **P (2)** on the injection valve.

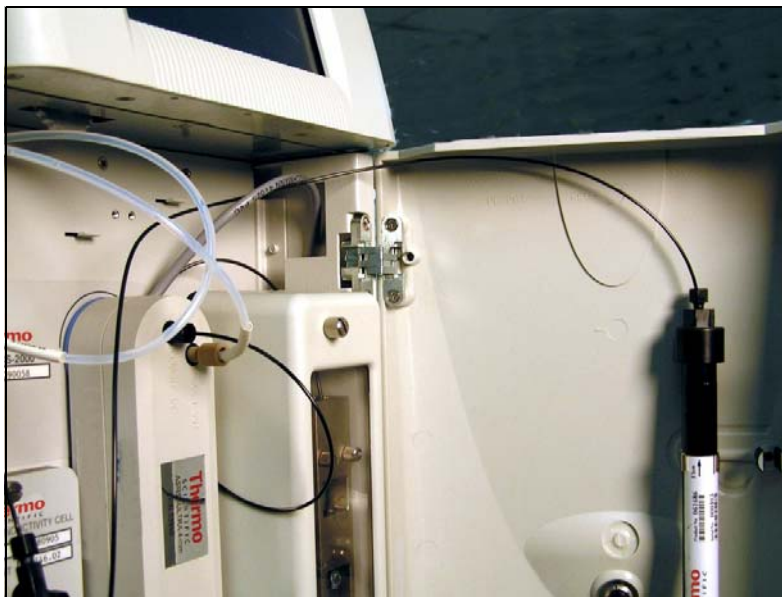


Figure 97. Mixer Outlet Routed to the Back of the Component Panel

NOTE Backpressure tubing may be required between the injection valve and the Dionex EGC CO₃ Mixer outlet. The Dionex EluGen cartridge requires 14 to 16 MPa (2000 to 2300 psi) of system backpressure for removal of electrolysis gas from the eluent produced by the cartridge. See [Section 19.1](#) for details.

4. Go on to [Section 19](#), “Equilibrating the System.”

19. Equilibrating the System

1. 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 reading from the Chromeleon Control panel.

The Dionex EluGen cartridge requires at least 14 MPa (2000 psi) of system backpressure for removal of electrolysis gas from the eluent produced by the cartridge. A system backpressure of 16 MPa (2300 psi) is ideal. If the pressure is too low, install a backpressure coil (see [Section 19.1](#)).

IMPORTANT

The recommended maximum operating pressure for the eluent generator is 21 MPA (3000 psi). Excessive backpressure may rupture the tubing in the Dionex EGC degas tubing assembly.

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.

19.1 Dionex EluGen Cartridge Backpressure Requirements

The Dionex EluGen cartridge requires at least 14 MPa (2000 psi) of backpressure for optimal removal of electrolysis gas from the eluent produced by the cartridge. During system equilibration (see [Section 19](#)), monitor the system pressure and verify that it is between 14 and 20 MPa (2000 and 3000 psi). A system backpressure of 16 MPa (2300 psi) is ideal.

If the pressure is too low, install a backpressure coil between the injection valve and the eluent outlet. The backpressure coils listed in the table below are included in the Dionex ICS-2100 Ship Kit (P/N 064375).

Connect one end of the backpressure coil to port **P (2)** on the injection valve; connect the other end to the **TO INJ VALVE IN - P/ELUENT OUT** line or to the mixer outlet, if a Dionex EGC CO₃ Mixer is installed.

Part Number	Description	Flow Rate	Approximate Back-pressure Added
AAA-053763	4-mm Backpressure Coil	2.00 mL/min	7 MPa (1000 psi)
	(red)	1.00 mL/min	3.5 MPa (500 psi)
AAA-053762	4-mm Backpressure Coil	2.00 mL/min	3.5 MPa (500 psi)
	(red)	1.00 mL/min	1.75 MPa (250 psi)
053765	2-mm Backpressure Coil	0.50 mL/min	7 MPa (1000 psi)
	(yellow)	0.25 mL/min	3.5 MPa (500 psi)
053764	2-mm Backpressure Coil	0.50 mL/min	3.5 MPa (500 psi)
	(yellow)	0.25 mL/min	1.75 MPa (250 psi)

- Connect the mixer outlet line to port **P (2)** on the injection valve.

NOTE Backpressure tubing may be required between the injection valve and the Dionex EGC CO₃ Mixer outlet. The Dionex EluGen cartridge requires 14 to 16 MPa (2000 to 2300 psi) of system backpressure for removal of electrolysis gas from the eluent produced by the cartridge. See [Section 19.1](#) for details.

- Go on to [Section 19](#), “Equilibrating the System.”

20. Verifying Operational Status

After the system has equilibrated, verify the actual pump pressure and stability by monitoring the pump pressure reading on the IC system panel on the Chromeleon

panel tabset (or the touch screen **HOME** page). Write down the short-term pressure fluctuations; they should be less than 0.13 MPa (20 psi).

You can acquire the pressure readings as a separate signal and plot the readings on the IC system panel.

1. Verify that the pump pressure signal is enabled in the Server Configuration program:
 - a. Right-click the IC system device in the timebase and click **Properties**.
 - b. Click the **Signals** tab.
 - c. Verify that the **Channel_Pressure** check box is selected (see [Figure 98](#)).

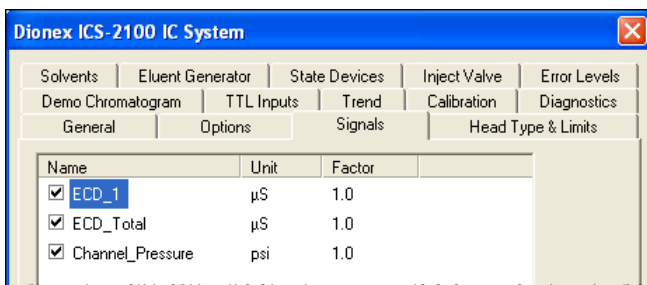


Figure 98. Pump Pressure Channel Enabled

2. Display the pressure channel plot on the Chromeleon panel:
 - a. Right-click anywhere on the plot section of the panel.
 - b. Click **Signals**.

- c. Under **Available Signals**, select **Channel_Pressure** and click **Add >>** to move the signal to the **Displayed Signals** list (see [Figure 99](#)). Click **OK**.

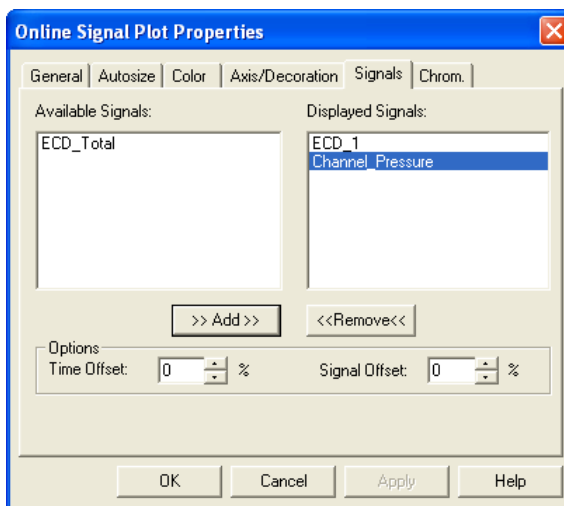


Figure 99. Online Signal Plot Properties

Pump pressure readings will now be plotted during data acquisition (along with the detector signals).

21. Connecting the Analog Output (Optional)

The analog output connector on the IC system rear panel outputs an analog voltage signal proportional to the conductivity measured by the cell. The selected data rise time filters the output. 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.

The analog output connector on the IC system rear panel outputs an analog voltage signal proportional to the conductivity measured by the cell. The selected data rise time filters the output. 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 instructions on how to set up the IC system for stand-alone operation with a Dionex AS Autosampler, refer to the TTL appendix in the system operator's manual.

22. Pressurizing the Eluent Reservoir (Optional)

The IC system 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).

The following required parts must be ordered separately:

- Barbed fitting (P/N 030071)
- Pipe thread reducer (P/N 030087)
- 3-mm (1/8-in) ID tubing (P/N 040793)
- Air regulator accessory (P/N 060054)

22.1 Connecting the Gas Source

[Figure 100](#) illustrates the eluent reservoir after all gas connections are complete.

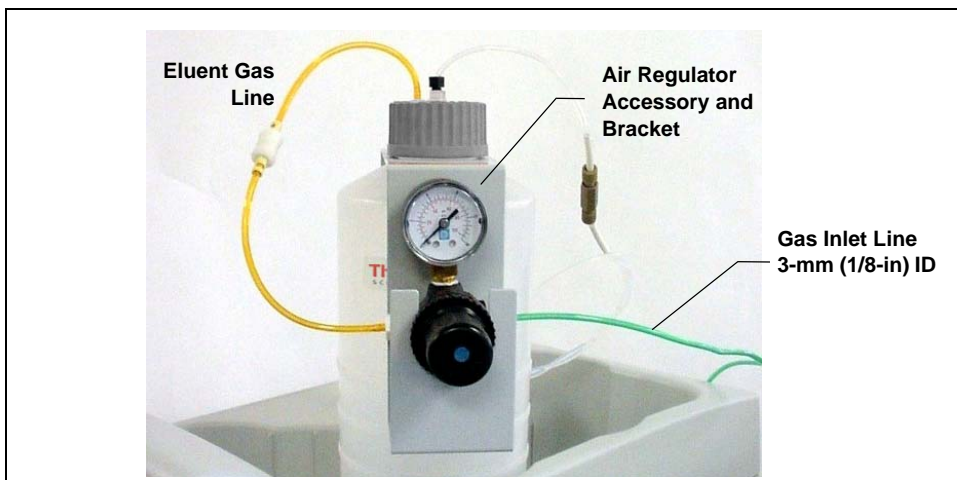


Figure 100. IC System Pressurized Eluent Reservoir Connections (Optional)

1. 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).
2. Push the other end of the tubing onto the inlet of the air regulator.
3. Remove the eluent reservoir cap.
4. Connect the gas line from the eluent reservoir cap to the gas line on the air regulator outlet.
5. Slip the air regulator accessory bracket over the neck of the eluent reservoir (see [Figure 100](#)).

22.2 Applying the Pressure

1. Before pressurizing, make sure the reservoir is filled and connected to the system (see [Section 15](#)).
2. 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.
3. Turn on the gas source.
4. Pull out the air regulator knob and turn it clockwise to pressurize the eluent reservoir.
5. Adjust the pressure to between 0.03 and 0.04 MPa (5 and 6 psi). Push the regulator knob back in.



Do not pressurize the eluent reservoir above 0.07 MPa (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.

23. Connecting the Pump Continuous Seal Wash (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.

[Figure 101](#) shows the seal wash plumbing after all connections are complete.

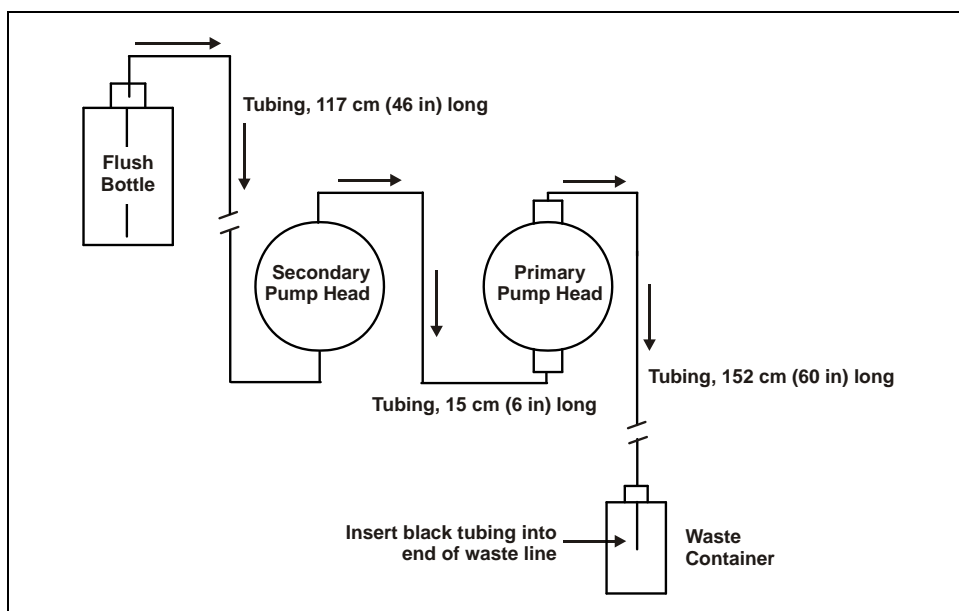


Figure 101. Piston Seal Wash Flow Schematic

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 IC system. During operation, gravity maintains flow through the pump heads.

Dionex ICS-2100 Installation Instructions

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 IC system 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 102](#)):
 - 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.

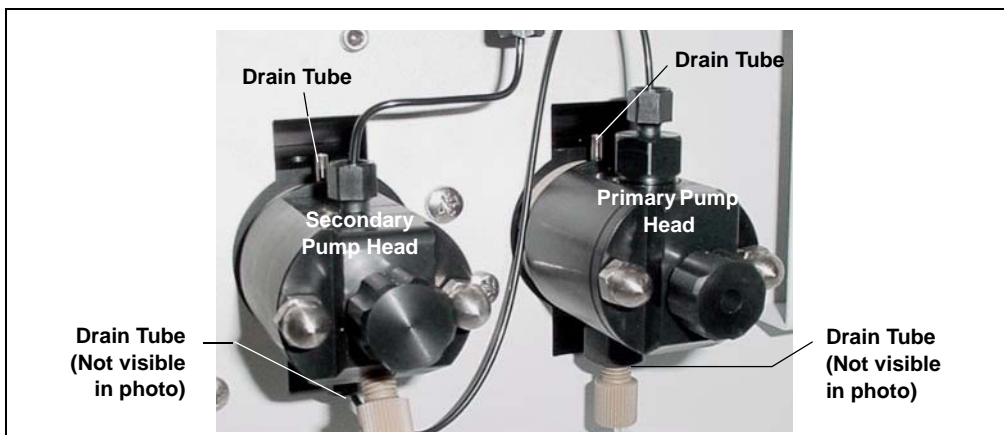


Figure 102. Primary and Secondary Pump Heads with Drain Tubes

- 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 IC system.
- c. Push the 15-cm (6-in) piece of clear tubing over the drain tube on the top of 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 079803) 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.

This completes the IC system installation procedure. For operating instructions, refer to your IC system operator's manual. The manual is on the Thermo Scientific Reference Library DVD (P/N 053891).

For a brief description of the steps required to begin processing samples using Chromeleon, refer to [Section 24](#). For details about using Chromeleon, refer to the Chromeleon Help.

24. Sample Processing Overview

You can use Chromeleon to create a sequence of sample injections to be processed automatically.

- For each injection, the sequence includes a program with commands and parameters for controlling the IC system and autosampler (if installed) and for acquiring sample data. To create a program, click **Create Program** on the **Sequence Control** panel on the panel tabset.
- The sequence also includes a quantification method for peak identification and area determination. To create a quantification method, select **File > New** and select **Method File** from the list.
- To create the sequence, click **Create Sequence** on the **Sequence Control** panel on the panel tabset. In the sequence, specify the samples to process, the names of the program and quantification method that you created, and other sample processing parameters (the sample name, sample type, injection volume, etc.).

- After creating the sequence, you can start sample processing. On the **Sequence Control** panel, click **Load Sequence** and then click **Start Batch**.

25. Troubleshooting the USB Configuration Error

Problem: When the IC system 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.

Solution:

Follow these steps to resolve the problem:

1. Click **Cancel** in the Windows message box.
2. Turn off the power to the USB device and unplug the USB cable from the computer.
3. Install Chromeleon (see [Section 6](#)).
4. Reconnect the USB cable to the computer and turn on the power to the device. Windows will now automatically recognize the USB device.