

## **Dionex ICS-900 Ion Chromatography System Installation and Quick Start Instructions**

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Revision history:

Revision 01 released February 2008; initial release of system

Revision 02 released January 2012; Thermo Fisher Scientific transition

Revision 03 released October 2012; new part numbers assigned

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

# Dionex ICS-900 Installation and Quick Start Instructions

This manual provides instructions for the initial installation of the Thermo Scientific Dionex ICS-900 Ion Chromatography System.

An Installation Checklist is provided at the end of this manual (see [page 21](#)). While performing the installation, record each completed step on the checklist. When you finish, use the checklist to verify that all steps were performed.

## Facility Requirements

<b>Main Power</b>	90 to 265 VAC, 47 to 63 Hz (Auto-sensing power supply; no manual voltage or frequency adjustment required)
<b>Operating Temperature</b>	10 to 35 °C (50 to 95 °F)
<b>Humidity</b>	5% to 95% relative humidity, noncondensing
<b>Site</b>	Draft-free, away from air conditioning and heating vents
<b>Workbench</b>	Sturdy, vibration-free. Allow at least 15 cm (6 in) behind the Dionex ICS-900 for power connections and ventilation
<b>Deionized Water</b>	ASTM Type I (18-megohm) filtered, deionized water for eluent and regenerant

## Additional Documentation

This manual provides installation and plumbing instructions for the Thermo Scientific Dionex suppressor and columns, and setup instructions for Displacement Chemical Regeneration (DCR). For additional information (operation, troubleshooting, applications, etc.), refer to the appropriate product manual. The manuals are provided on the Thermo Scientific Reference

Library DVD (P/N 053891), located in the Dionex ICS-900 Ship Kit (P/N 067768).

For details about suppressor operating pressure requirements, refer to the flier *Backpressure Coil Pressure Test for Dionex Suppressors* (Document No. 031759) (shipped with the suppressor).

## Unpack the Dionex ICS-900

1. Open the shipping box and remove the foam and the shipped items (bottles, Certificate of Conformity, Ship Kit, etc.) from the top of the box (see [Figure 1](#)).



Figure 1. Opened shipping box

2. Using the cardboard side handles, carefully lift the Dionex ICS-900 out of the box (see [Figure 2](#)) and set it on the workbench.



Figure 2. Removing the Dionex ICS-900 from the box

3. Remove the cardboard and foam cradle.
4. Remove the polyethylene bag.
5. Inspect the Dionex ICS-900 for any shipping damage.

## Connect a Thermo Scientific Dionex AS Autosampler (Optional)

1. Place the AS to the left of the Dionex ICS-900 on the workbench.
2. Route the needle seal line that extends from the inject port in the AS through the autosampler right side slot (see [Figure 3](#)) and then through the Dionex ICS-900 left side slot to the Dionex ICS-900 injection valve.

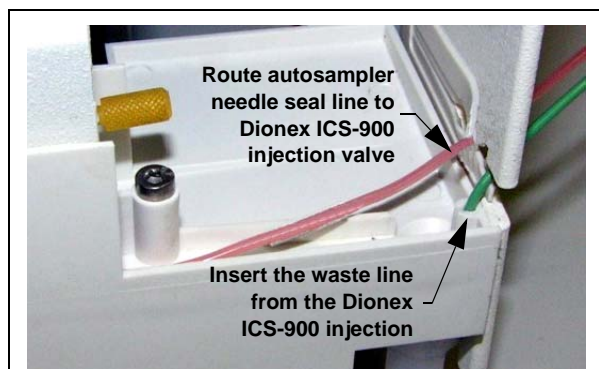


Figure 3. AS Autosampler drip tray

### IMPORTANT

The needle seal line from the autosampler inject port to the Dionex ICS-900 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 Dionex ICS-900. To ensure correct autosampler function, do not cut this line or replace it with a different line.

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

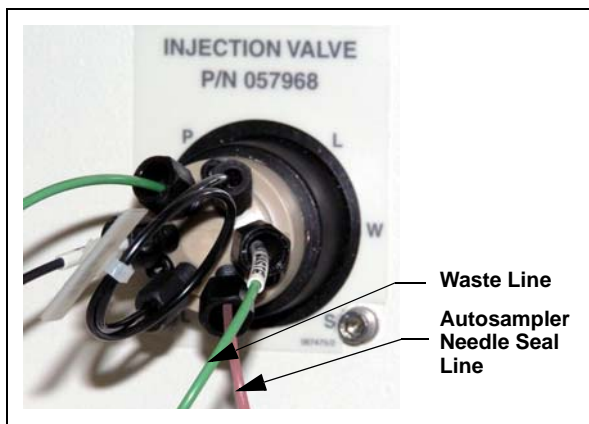


Figure 4. Dionex ICS-900 injection valve

4. Notice the green waste line connected to port **W** on the injection valve. This line is routed to the Dionex ICS-900 rear panel through the tubing chase. It must be shortened and rerouted to the AS drip tray:
  - a. Pull the green waste line back through the tubing chase to the front of the Dionex ICS-900.
  - b. Cut this line to shorten it to 30 cm (12 in).
  - c. Bend the shortened 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.
  - d. Push the end into the small round opening on the right side of the AS drip tray (see [Figure 3](#)).

### 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-900 (see [page 9](#)), all AS injection types are supported. In addition, all injection valve commands (whether issued from Chromeleon™, Chromeleon Xpress, or the AS front panel) can control the injection valve.

## Connect a Thermo Scientific Dionex AS40 Automated Sampler (Optional)

1. Place the AS40 to the left of the Dionex ICS-900 on the workbench.
2. Route the outlet line from the AS40 through the Dionex ICS-900 left side slot to the injection valve.
3. Connect the outlet line from the AS40 to port **S** on the injection valve (see [Figure 5](#)).

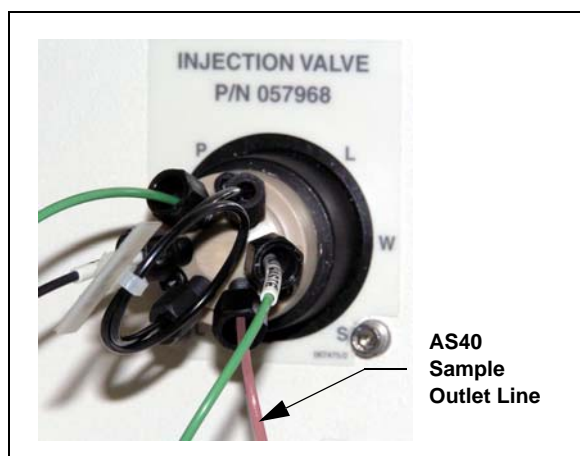


Figure 5. Dionex ICS-900 injection valve

4. Locate the relay control cable (P/N 047946) supplied with the AS40.
5. Remove the 2-position connector plug from the pair of wires labeled **LOAD** on the relay control cable.
6. Locate the 12-position connector plug (P/N 923686) in the Dionex ICS-900 Ship Kit (see [Figure 6](#)).

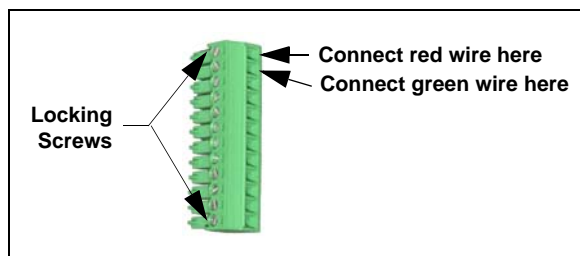


Figure 6. 12-position connector plug

7. Attach the red wire from the relay control cable to the first position on the plug, and attach the green wire to the second position.

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



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

8. Plug the 12-position connector plug into the TTL and relay connector on the Dionex ICS-900 rear panel (see [Figure 7](#)). Make sure the wires connect to the **RELAY OUT 1** pins.
9. Plug the AS40 relay control cable's 10-position connector plug into the **RELAY CONTROL** connector on the AS40 rear panel (see [Figure 7](#)).

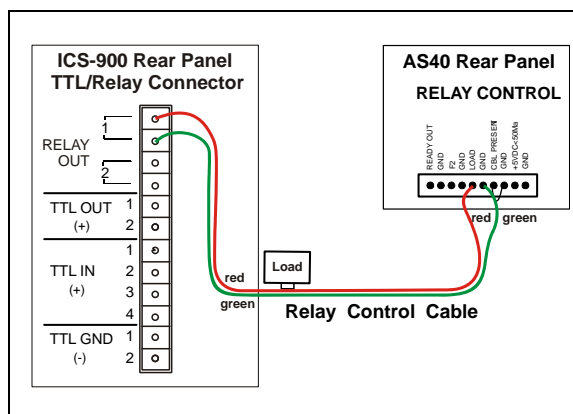


Figure 7. Example AS40 Automated Sampler connection

## Unpack the PC (If supplied by Thermo Fisher Scientific)

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.

## Install the Software

If you purchased Chromeleon or Chromeleon Xpress and a PC from Thermo Fisher Scientific, omit this section and go directly to [“Start the Chromeleon Server” on page 5](#).

1. Refer to <http://www.thermoscientific.com/dionex> to verify that the PC meets current system specifications.
2. For a local PC: Log onto Windows® XP or Windows® 2000 as an **administrator**.  
For a network PC: Log on as a user with local PC administrator privileges.
3. Verify that at least 250 MB of free disk space is available on the drive on which you plan to install Chromeleon or Chromeleon Xpress.  
**Chromeleon only:** 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).
4. Insert the Chromeleon CD-ROM into the PC drive.
5. On the Chromeleon Setup screen (see [Figure 8](#)), click **Install Chromeleon** and follow the on-screen instructions.



Figure 8. Chromeleon Setup screen

If the Setup screen does not appear automatically, go to the Autorun folder on the

Chromeleon CD-ROM and double-click **autorun**.

6. 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.
7. After installing the software, restart the PC.

## Install the Software License Dongle

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 [“Connect to the PC” on page 6](#).

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.**
2. Microsoft Windows automatically detects the Dionex ICS-900 and launches the Found New Hardware Wizard (see [Figure 9](#)).

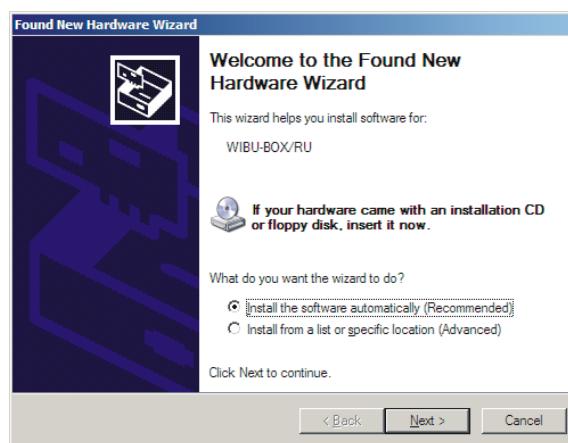


Figure 9. Found New Hardware Wizard

3. Complete the wizard by selecting the following options:
  - a. If asked whether Windows can connect to Windows Update to search for software, select **No, not this time**.



- b. Accept the default option (**Install the software automatically**) and click **Next>**. It is not necessary to insert a hardware installation CD-ROM.
4. After installing the software, the wizard displays a screen similar to the example in [Figure 10](#).

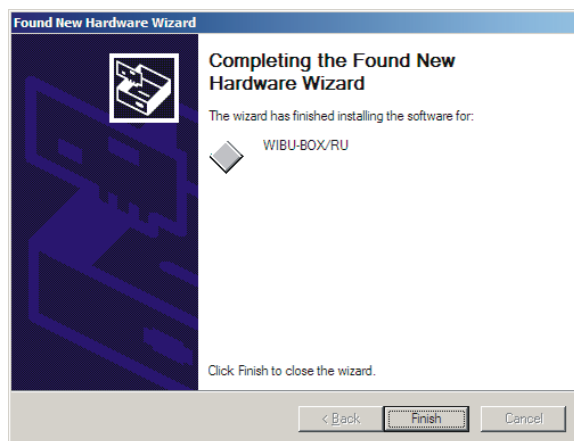


Figure 10. Found New Hardware Wizard complete

5. Click **Finish** to exit the wizard.
6. Store the Chromeleon CD-ROM in a safe place, away from heat and moisture.

## Install 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 (or Programs) > Chromeleon > Chromeleon** to start the Chromeleon client.
2. On the **Help** menu, select **About Chromeleon** (or **About Chromeleon Xpress**).

3. Click the **Preferences** button and select the **License** tab (see [Figure 11](#)).

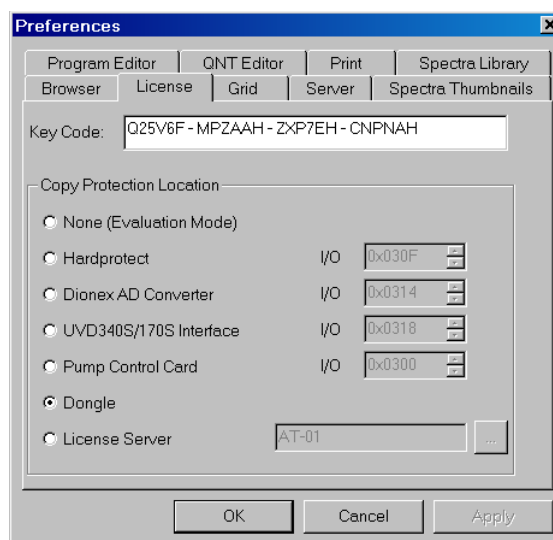




Figure 11. Chromeleon License

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 Client screen should now display the following information:
  - The serial number of the dongle.
  - All purchased license features (devices controlled, number of timebases, and software options) should be labeled **On**.
6. Click **OK** to close the screen.

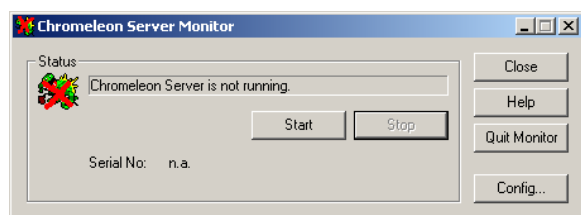
## Start the Chromeleon Server

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** (or **Programs**) > **Chromeleon** > **Server Monitor**. The Server Monitor window opens (see [Figure 12](#)).



*Figure 12. Chromeleon Server Monitor window*

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.

## Connect to the PC

Select one of the following methods for connecting the Dionex ICS-900 to the PC on which Chromeleon or Chromeleon Xpress is installed:

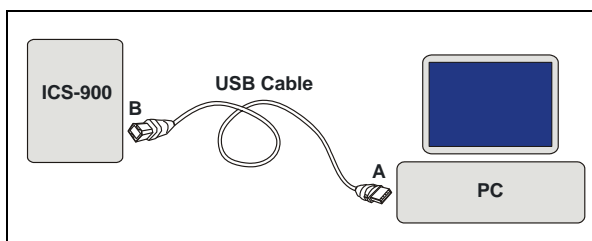
- Connect the Dionex ICS-900 directly to a USB port on the PC.
- Connect the Dionex ICS-900 to an external USB 2.0 hub and connect the PC to the hub.

### IMPORTANT

Before connecting the USB cable and turning on the Dionex ICS-900 power, verify that Chromeleon or Chromeleon Xpress is installed on the PC (see [page 4](#)).

### To connect the Dionex ICS-900 directly to the PC:

1. Locate the USB cable (P/N 960777) provided in the Dionex ICS-900 Ship Kit.
2. Plug the USB cable's "A" connector into the USB port on the PC (see [Figure 13](#)).
3. Plug the "B" connector into the USB receptacle on the Dionex ICS-900 rear panel (see [Figure 14](#)).



*Figure 13. Example connections:  
One Dionex ICS-900 connected to the PC*



*Figure 14. Dionex ICS-900 rear panel*



## To connect the Dionex ICS-900 to an external hub:

The Dionex ICS-900 Ship Kit includes one USB cable (P/N 960777). An external hub and a second USB cable are required for this configuration.

Refer to [Figure 15](#) to connect the Dionex ICS-900, the PC, and any additional devices (for example, an AS) to the external USB hub.

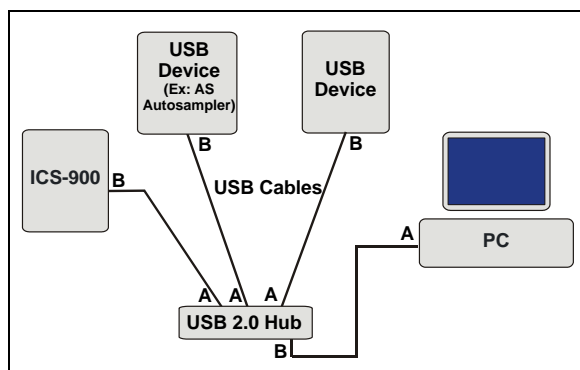


Figure 15. Example connections:  
Multiple devices connected to an external hub

### IMPORTANT

The USB standard limits the USB cable length to 5 m (5.5 yds). 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 m (32 yds) from the PC.

### IMPORTANT

Carefully secure all USB cables, the external hub, and the hub power cable so that they cannot be accidentally disconnected.

## Connect the Power Cord

1. Verify that the main power switch on the rear panel of the Dionex ICS-900 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) from the main power receptacle on the rear panel (see [Figure 14](#)) to a grounded power source.



WARNING

**SHOCK HAZARD**—To avoid electrical shock, use a grounded receptacle. Do not operate the Dionex ICS-900 or connect it to AC power mains without an earthed ground connection.



CAUTION

The power supply cord is used as the main disconnect device. Make sure the socket-outlet is located near the Dionex ICS-900 and is easily accessible.



CAUTION

Operation at AC input levels outside of the specified operating voltage range may damage the Dionex ICS-900.



MISE EN GARDE

**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.



MISE EN GARDE

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.



WARNUNG

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



VORSICHT

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

## Install the Dionex ICS-900 Device Driver

1. If you have not already done so, turn on the PC power.
2. For a local PC: Log onto Windows XP or Windows 2000 as an **administrator**.  
  
For a network PC: Log on as a user with local PC administrator privileges.

**IMPORTANT** Before turning on the Dionex ICS-900 power, verify that Chromeleon or Chromeleon Xpress is installed. If the chromatography software is not installed first, the Windows operating system will be unable to identify the new USB device.

3. Turn on the power switch on the rear of the Dionex ICS-900. Also turn on the power switch on the rear of the AS Autosampler (if installed).
4. The Found New Hardware Wizard appears (see [Figure 16](#)). Use the wizard to install the Dionex ICS-900, as described below:



Figure 16. Found New Hardware Wizard

- a. If asked whether Windows can connect to Windows Update to search for software, select **No, not this time**.
- b. Accept the default option (**Install the software automatically**) and click

**Next>**. It is not necessary to insert a hardware installation CD-ROM.

- c. When the wizard reports that the software for the module has been installed, click **Finish**.

The Chromeleon USB Auto Configuration Wizard appears (see [Figure 17](#)).

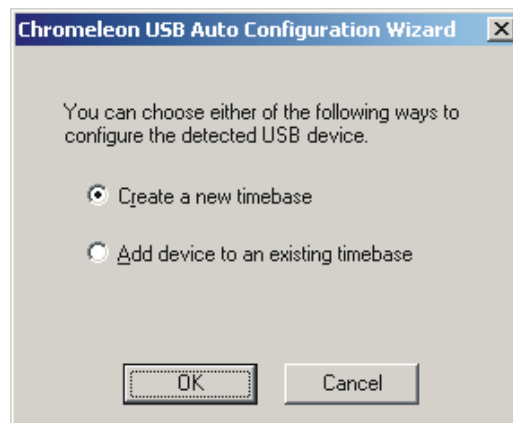


Figure 17. USB Auto Configuration Wizard

- d. Accept the default option (**Create a new timebase**) and click **OK**.

The Auto Configuration dialog box opens (see [page 9](#)).

5. If you are installing an AS in addition to the Dionex ICS-900, ignore the Auto Configuration dialog box for now and repeat [Step b](#) and [Step c](#) for the AS.

### Troubleshooting Tip

If a Microsoft Windows message box asks for the USB configuration file (cmwdmusb.inf), it indicates that you connected the Dionex ICS-900 to the PC and turned on the Dionex ICS-900 power before installing Chromeleon or Chromeleon Xpress. See [page 20](#) for how to resolve the problem.

## Create a Timebase

The USB Auto Configuration Wizard (see [Figure 18](#)) appears automatically when you power up a USB device that is not already assigned to a timebase. Use the wizard to create a new timebase for your Dionex ICS-900.

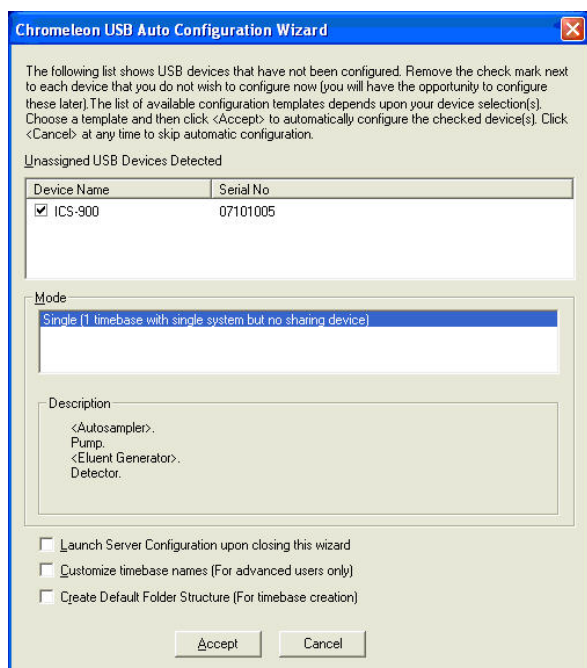


Figure 18. USB Auto Configuration Wizard: Creating a timebase

1. Review the names displayed in the **Unassigned USB Devices Detected** list. Clear the check mark before the name of any device that you do not want to configure at this time.
2. In the **Mode** window, select a predefined configuration template for the new timebase.
3. (Optional) Select the **Launch Server Configuration upon closing this wizard** check box. The check box is disabled if the Server Configuration program is already running.
4. Click **Accept** to create a new timebase.

If you selected the **Launch Server Configuration upon closing this wizard** option, the Server

Configuration automatically opens when you close the wizard (see [Figure 19](#)). If the Server Configuration was already open, it is updated with the new configuration information.

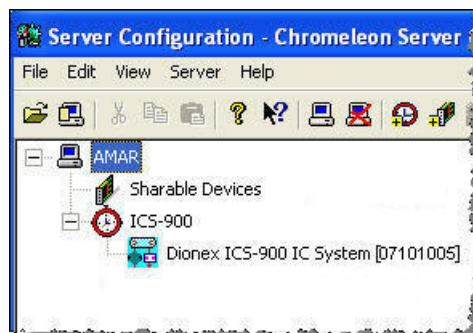


Figure 19. Server Configuration

## Configure Devices

When a device is added to a timebase, default configuration properties are selected. You can verify that the default settings are correct for your system and select other settings, if needed.

1. In the Server Configuration, right-click the Dionex ICS-900 device in the timebase and select **Properties**.
2. Verify that the correct device is assigned to control the injection valve in the Dionex ICS-900.
  - a. On the Dionex ICS-900 Properties dialog box, click the **Inject Valve** tab.
  - b. For Pump\_InjectValve, verify the **Controlled By** setting:

If the timebase includes an AS, the **Controlled By** setting must be **AS** (see [Figure 20](#)).

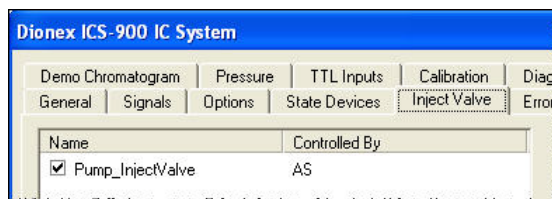


Figure 20. Dionex ICS-900 Properties: Inject valve controlled by AS

If the timebase includes an AS40 or no autosampler, the **Controlled By** setting must be **Dionex ICS-900** (see [Figure 21](#)).

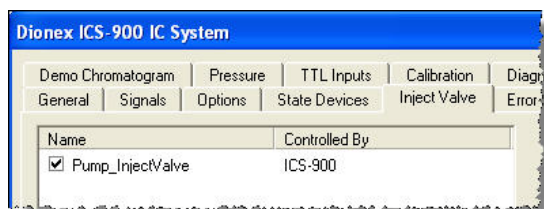


Figure 21. Dionex ICS-900 Properties: Inject valve controlled by Dionex ICS-900

- c. To change a **Controlled By** setting, select the Pump\_InjectValve name, press **F2**, and select the device.
3. Check the detection limits, standby flow rate, and inactivity time-out period settings.
    - a. On the Dionex ICS-900 Properties dialog box, click **Options** (see [Figure 22](#)).
    - b. Under **Set Detection Limits**, verify that the default conductivity range (0 to 500  $\mu$ S) is selected. The larger range (0 to 10,000  $\mu$ S) is used only for specialized applications.
    - c. To have the pump flow rate automatically reduced after a period of inactivity, select a **Standby Flow Rate** and an **Inactivity Time Out Period**. To disable this feature, select **0 (Off)**.

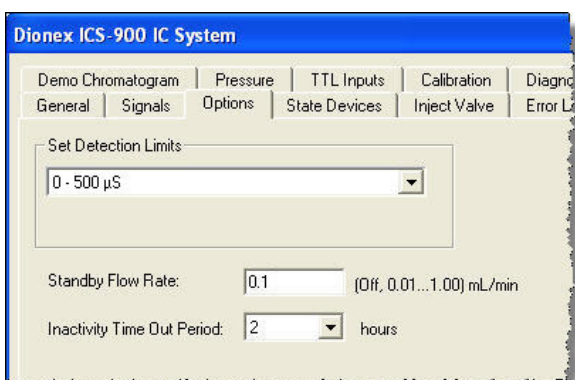


Figure 22. Dionex ICS-900 Properties: Options

4. Select the TTL and relay output settings:
  - a. On the Dionex ICS-900 Properties dialog box, click **State Devices**.
  - b. Select the check boxes for the TTL and relay outputs you plan to use; clear the check boxes for those you do not plan to use.
  - c. If an AS40 is installed, verify that Pump\_ECD\_Relay\_1 is selected (see [Figure 23](#)).

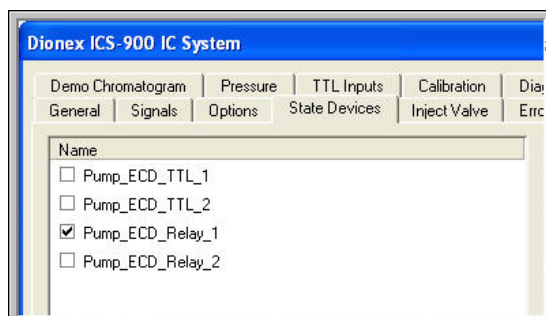


Figure 23. Dionex ICS-900 Properties: State Devices

5. Click **OK** to close the Properties dialog box.
6. On the **File** menu, click **Save Installation**.
7. 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 an AS40 autosampler or manual injections. Click **Close**.
8. Exit the Server Configuration program.

## Connect to the Panel Tabset

1. Click **Start** on the Windows taskbar and select **All Programs** (or **Programs**) > **Chromeleon** > **Chromeleon** to start the Chromeleon client.
2. If Chromeleon is installed, select **View** > **Default Panel Tabset** on the toolbar to display the panel tabset.

If Chromeleon Xpress is installed, the panel tabset displays automatically when you start the client.

3. Click the **Dionex ICS-900** tab on the panel tabset to view the Dionex ICS-900 Control panel (see [Figure 24](#)).

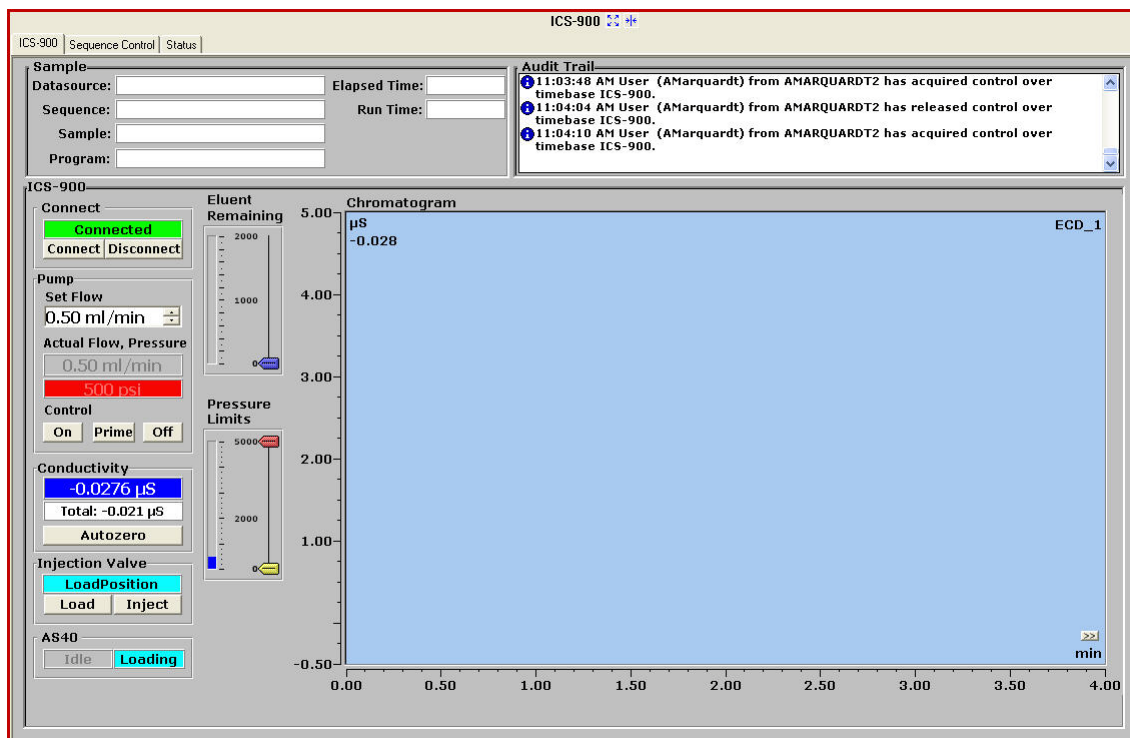


Figure 24. Dionex ICS-900 Control panel on the panel tabset

**NOTE** When the Dionex ICS-900 Control panel is opened as part of the panel tabset, controls for an AS40 Automated Sampler are included, even if one is not present. If you are using manual injections, you may ignore the AS40 controls.

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



## Prepare Eluent

1. Rinse the eluent bottle with deionized water.
2. Prepare 2 L of eluent. Refer to the instructions in the column manual.
3. Fill the eluent bottle with the prepared eluent, insert the stopper assembly tubing into the bottle, and hand-tighten the cap.
4. Place the bottle in the tray on the top of the Dionex ICS-900.

## Prepare Regenerant

1. Verify that you have the correct regenerant bottle assembly (P/N 068222 for anion analyses; P/N 068223 for cation analyses):
  - For anions, verify that the cap is labeled **ANION** and the **REGEN BOTTLE OUT** line extends to the bottom of the bottle.
  - For cations, verify that the cap is labeled **CATION** and the **REGEN BOTTLE OUT** line extends only about 1 cm (0.4 in) into the bottle.
2. Rinse the regenerant bottle with deionized water.
3. Fill the bottle about halfway with deionized water.
4. Determine the regenerant concentration required for the application. See the following guidelines; also refer to the Displacement Chemical Regeneration (DCR) kit and column manuals.

### Guidelines for regenerant concentration

The optimal regenerant concentration can be estimated for a known eluent strength by:

**Anion Regenerant Concentration = (mM eluent) x 2**

**Cation Regenerant Concentration = (mM eluent) x 5**

For example, if you are using 20 mM methane sulfonic acid (MSA) as the eluent for cation analysis, use a regenerant concentration of 100 mM tetrabutylammonium hydroxide (TBAOH).

5. Empty the required amount of concentrate (TBAOH for cations; sulfuric acid for anions) into the bottle.



**For acid concentrates (such as the anion regenerant), always pour the concentrate into deionized water, not into the empty bottle.**



**Pour les concentrés acides (comme le régénérant anionique), versez toujours le concentré dans de l'eau désionisée et non dans le réservoir vide.**



**Gießen Sie bei säurehaltigen Konzentraten (beispielsweise dem Kationenelutionsmittel) das Konzentrat immer in entionisiertes Wasser und nicht in den leeren Behälter.**

6. Fill the bottle almost to the top with deionized water and then place the bottle in the tray on the top of the Dionex ICS-900.

**NOTE** To avoid staining the Dionex ICS-900, be careful not to spill TBAOH on the instrument.

7. Using the concentrate bottle, pour additional deionized water into the bottle until it is completely filled to the top. If a few drops spill over, then it is full enough.



**The regenerant bottle must be filled all the way to the top at all times.**

8. Insert the stopper assembly tubing into the bottle and hand-tighten the cap.
9. Invert the bottle 3 or 4 times to disperse the concentrate.



**After analysis begins, do not mix the contents of the regenerant bottle.**



## Connect Bottle Lines

Connect the liquid lines from the Dionex ICS-900 to the corresponding lines exiting the eluent and regenerant bottles (see [Figure 25](#)).

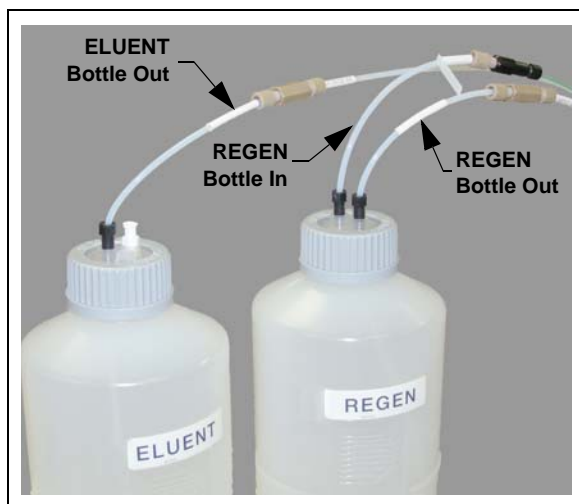


Figure 25. Liquid lines connected to bottles

## Hydrate the Suppressor

1. Remove the suppressor from the box.
2. Remove the fitting plugs from all ports on the suppressor.
3. Use a syringe to push the following types and amounts of fluid into the suppressor ports:
  - **AMMS™ 300:** Push about 3 mL of 100 mM H<sub>2</sub>SO<sub>4</sub> through the **ELUENT OUT** port and about 5 mL of 100 mM H<sub>2</sub>SO<sub>4</sub> through the **REGEN IN** port.
  - **CMMS™ 300:** Push about 3 mL of 200 mM NaOH through the **ELUENT OUT** port and about 5 mL of 200 mM NaOH through the **REGEN IN** port.
4. Allow the suppressor to sit for at least 20 minutes to fully hydrate it.

## Set Up Waste Lines

1. Untape the coiled waste and liquid lines from the rear panel.
2. Verify that a DCR waste backpressure tubing assembly (P/N 060214) is installed on the **REGEN OUT** waste line (see [Figure 26](#)).

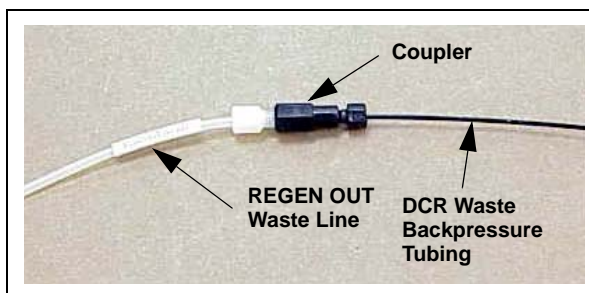


Figure 26. DCR waste backpressure tubing assembly

The tubing assembly provides backpressure to help compress any air bubbles formed in the suppressor's regenerant chamber.

### IMPORTANT

If you shorten or replace the **REGEN OUT** waste line, always reinstall the **DCR waste backpressure tubing assembly**. Otherwise, **baseline spikes occur**.

3. Place the ends of the waste lines into a waste container.
4. Check the waste lines periodically to be sure they are not bent, pinched, or elevated at any point.

## Set the Eluent Level

On the Dionex ICS-900 Control panel, move the **Eluent Remaining** slider to indicate the volume of liquid in the bottle (see [Figure 27](#)).

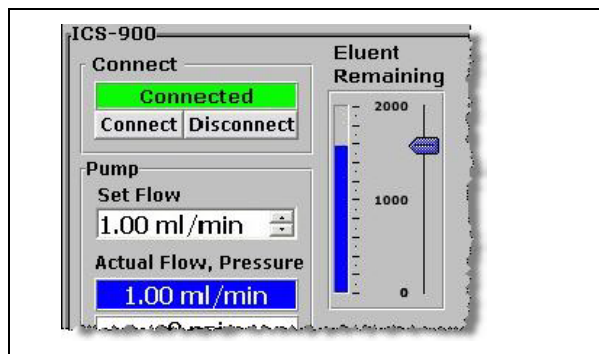


Figure 27. Setting the eluent level

The Dionex ICS-900 determines the eluent usage by monitoring the flow rate and the length of time the pump is on. As the eluent is used up, the Dionex ICS-900 updates the **Eluent Remaining** slider and gauge.

### IMPORTANT

For the eluent level on the Control panel to be accurate, you must enter the level each time the bottle is filled.

## Verify Communication

While observing the Dionex ICS-900 front panel LEDs, click the **Disconnect** and then the **Connect** button on the Dionex ICS-900 Control panel. If Chromeleon or Chromeleon Xpress is communicating with the Dionex ICS-900, the LEDs appear as follows:

- The **Power** and **Ready** LEDs are on when the Dionex ICS-900 is connected (see [Figure 28](#)).
- Only the **Power** LED is on when the Dionex ICS-900 is disconnected.

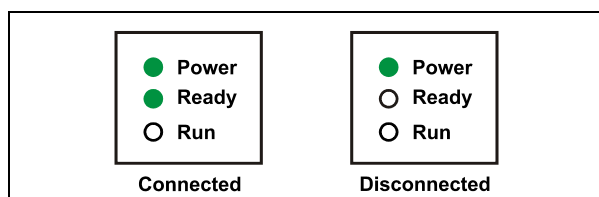


Figure 28. Dionex ICS-900 LEDs: Connected and disconnected states

## Prime the Pump

The priming procedure for a new pump consists of two parts:

- Starting the priming with a syringe.
- Completing the priming with the **Prime** command.

### To start priming with a syringe:

- Verify that the pump is turned off.
- Disconnect the waste line from the luer fitting on the secondary (left) pump head and connect a 10 mL syringe (P/N 079803) to the luer fitting (see [Figure 29](#)).

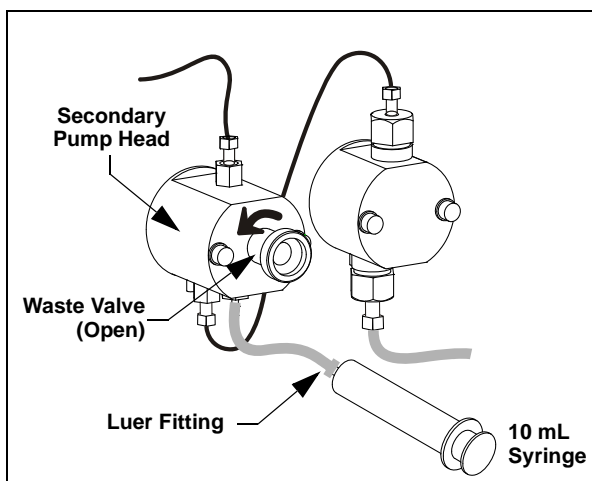


Figure 29. Priming the eluent lines

- Open the waste valve on the secondary pump head by turning the knob one-half turn counterclockwise.
- Draw the syringe back to begin removing air from the flow path.
- When a small amount of liquid enters the syringe, remove the syringe from the luer fitting, and reconnect the waste line.

**NOTE** When the liquid lines and pump heads contain liquid, it is difficult to draw the syringe back. In this case, use the **Prime** command alone to remove any air in the lines.

**To complete the priming with the Prime command:**

1. With the waste valve open, click **Prime** on the Dionex ICS-900 Control Panel (see [Figure 24](#)). The pump will begin pumping at approximately 3 mL/min.
2. Continue priming the Dionex ICS-900 until no air bubbles are exiting the pump waste line.
3. Click **Pump Off**.
4. Close the waste valve. **Do not overtighten.**

## Plumb the System

For reference, [Figure 30](#) shows the system flow schematic after all plumbing is completed.

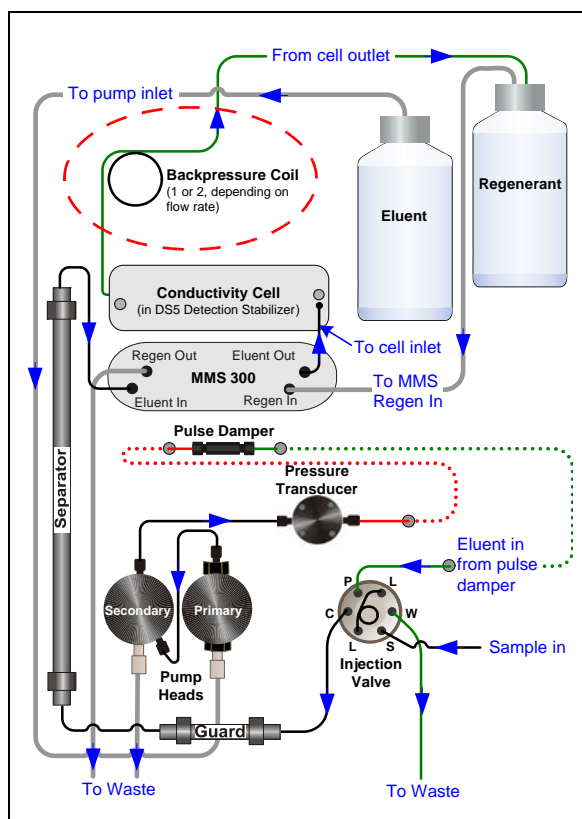


Figure 30. System flow schematic

### Notes for 2-mm Column Users

- If you plan to use a 2-mm column, exchange the tubing from the injection valve to the guard column, guard column to the analytical

column, analytical column to the suppressor with equivalent lengths of red 0.125-mm (0.005-in) ID tubing. For details, see the instructions in the *Dionex ICS-900 Operator's Manual* (P/N 065215).

- A microbore tubing kit (P/N 052324) is available
- A smaller volume sample loop may also be required. Refer to the column manual for additional information.

## Flush the System

1. Disconnect the line labeled **GUARD IN** from the union connecting it to **GUARD OUT** (see [Figure 31](#), item ①). The other end of **GUARD IN** is connected to port C on the injection valve.
2. Direct the **GUARD IN** line to a waste container.
3. On the Dionex ICS-900 Control panel, set the flow rate to 1 mL/min.
4. Start the pump and let it run for 15 minutes. Stop the pump.

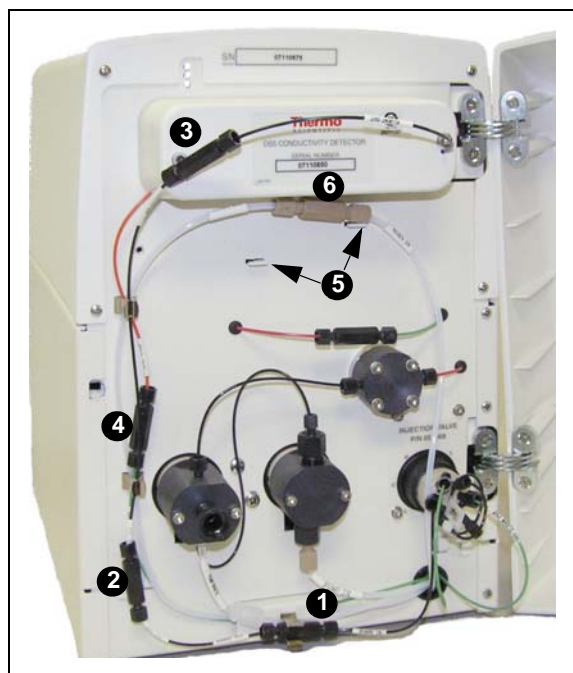


Figure 31. Dionex ICS-900 component panel

## Flush the Columns

**NOTE** Flushing is required only for new guard and separator columns.

### To flush the guard column:

1. Remove the guard and separator columns from their boxes.
2. Remove the fitting plugs from the ends of each column.
3. Orient the guard column with the arrow on the label pointing in the direction of flow (away from the injection valve) and connect **GUARD IN** to the inlet of the guard column.
4. Remove the union from **GUARD OUT** and connect **GUARD OUT** to the guard column outlet.
5. Disconnect **COL IN** from the union connecting it to **COL OUT** (see [Figure 31](#), item **2**).
6. Direct **COL IN** (the guard column outlet) to a waste container.
7. On the Dionex ICS-900 Control panel, set the flow rate to the recommended rate for the column.
8. Start the pump and let it run for 15 minutes.

### To flush the separator column:

1. Orient the separator column with the arrow on the column label pointing toward the conductivity detector cell and connect **COL IN** to the separator column inlet.
2. Remove the union from **COL OUT** and connect **COL OUT** to the separator column outlet.
3. Disconnect **ELUENT IN** from the union connecting it to **ELUENT OUT** (see [Figure 31](#), item **3**).
4. Direct **ELUENT IN** to a waste container.
5. Start the pump and let it run for 15 minutes.
6. Reconnect **ELUENT IN** to the union on **ELUENT OUT**. The column is now connected directly to the cell inlet. This is a temporary connection.

## Install the Columns

1. Push the guard column onto the clips (see [Figure 32](#)).
2. Push the separator column onto the clips (see [Figure 32](#)).

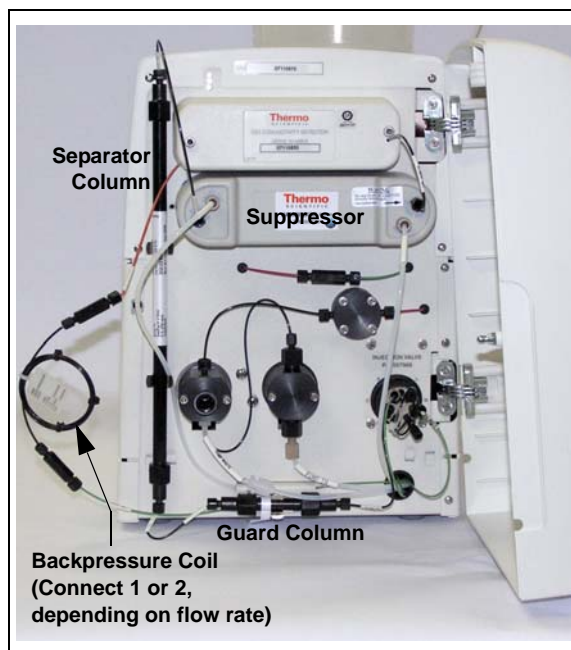


Figure 32. Dionex ICS-900 with columns and suppressor

## Connect Backpressure Coils

Connect backpressure coils between the conductivity cell outlet and the regenerant bottle inlet (see [Figure 32](#)).

1. Determine the number and type of backpressure coils required for your system.

**Standard bore systems:** Use one or two black backpressure coils (P/N 045877), supplied in the Dionex ICS-900 Ship Kit.

Flow Rate	Number of Coils
1.5 to 3.0 mL/min	1 (black)
0.5 to 1.5 mL/min	2 (black)

**Microbore systems:** Use one or two red backpressure coils (P/N 045878), supplied in the microbore tubing kit (P/N 052324).

Flow Rate	Number of Coils
0.3 to 0.5 mL/min	1 (red)
Less than 0.3 mL/min	2 (red)

2. Remove the union connecting the green and orange lines labeled **CELL OUT** (see [Figure 31](#), item ④) and connect the backpressure coils.

### Install the Suppressor

1. Install the hydrated suppressor onto the brackets located below the conductivity cell (see [Figure 31](#), item ⑤).
2. Remove the union connecting **REGEN IN** and **REGEN OUT** (see [Figure 31](#), item ⑥) and connect these two lines to the corresponding ports on the suppressor.

### Fill the Regenerant Line

1. Turn on the pump and allow it to run until liquid fills the **REGEN OUT** line and begins entering the suppressor **REGEN IN** port. Turn off the pump.
2. Remove the union connecting **ELUENT IN** and **ELUENT OUT** and connect these two lines to the corresponding ports on the suppressor.

### Equilibrate the System

1. Turn on the pump and run at the flow rate recommended for the column.
2. Allow the system to equilibrate. During equilibration, the Dionex ICS-900 Control panel displays the background conductivity (the conductivity of the eluent without the offset performed by the autozero command).
3. Offset the background and zero the conductivity reading by clicking the **Autozero** button on the Control panel.

4. Monitor the system pressure to make sure it is at the expected pressure for the installed column (refer to the column manual for details) and is stable. Column manuals typically provide pressure specifications for systems that do not include a guard column. Expect the Dionex ICS-900 system pressure (with a guard column) to be 15% to 20% higher than the specification in the column manual.
  - If the pressure is less than expected, air may be trapped in the system. Release the air by removing the pump fitting (**P**) on the injection valve (see [Figure 5](#)). Allow the air to escape and then reconnect the fitting.
  - If the pressure is too high, there may be a restriction in the system plumbing. Refer to the Dionex ICS-900 operator's manual for troubleshooting information.
5. Check for leaks in the regenerant bottle.
6. Check that liquid is flowing out of the suppressor **REGEN OUT** waste line.
7. 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.

### Verify Operational Status

After the system has equilibrated, verify the actual pump pressure and stability by monitoring the pump pressure. Record the short-term pressure fluctuations; they should be less than 0.13 MPa (20 psi). If the pressure fluctuates by more than this amount, prime the pump (see [page 14](#)).



## Set Up an Application

Application templates let you quickly get started running. This section explains how to use an application template to create a *sequence* (a list of samples to be processed).

### To start the Application Wizard:

1. On the panel tabset, click the **Sequence Control** tab.
2. Under **Prepare System**, click **Application Wizard** (see [Figure 33](#)).

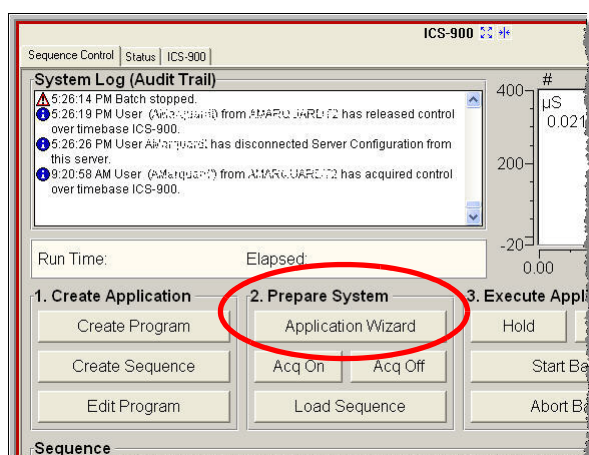


Figure 33. Sequence Control panel on the panel tabset

3. On the Chromeleon Application Wizard, click **Application Template**, and then select a template from the list. See the example in [Figure 34](#).

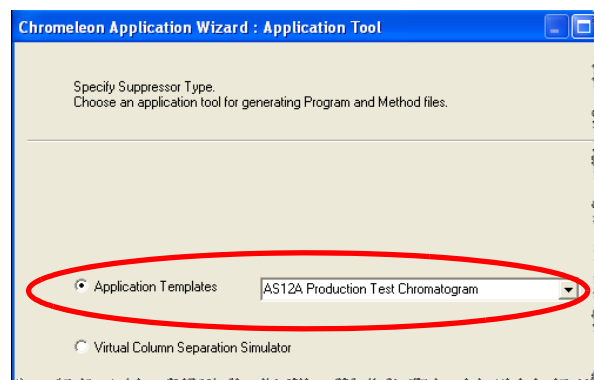


Figure 34. Example Application Wizard: Application Tool

4. Click **Next>**.
5. Under **Generate program and method files**, click **in a new sequence via Sequence Wizard** (see [Figure 35](#)).

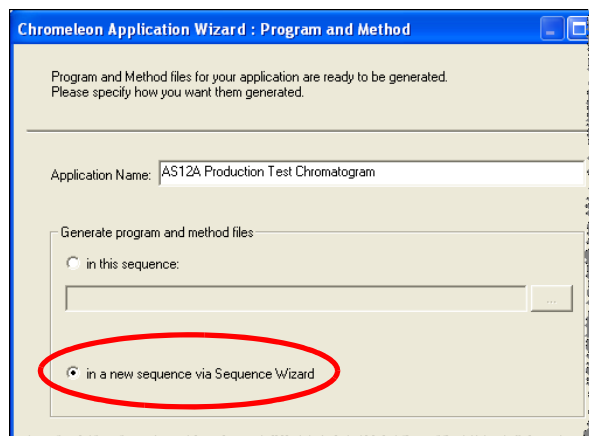


Figure 35. Example Application Wizard: Program and Method

6. Click **Next>**.

### To define unknown samples:

1. Enter the following parameters to define an unknown sample:
  - a. Select **Use Template**.
  - b. In the **Template for Sample Name** field, type **Sample**, click the right arrow, and select **Sample Number #n**.
  - c. In the **Number of Vials** field, type **1**.
  - d. Accept default settings for the remaining parameters on the page.

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

2. Click **Apply**.



Figure 36 shows the Application Wizard after a sample has been defined.

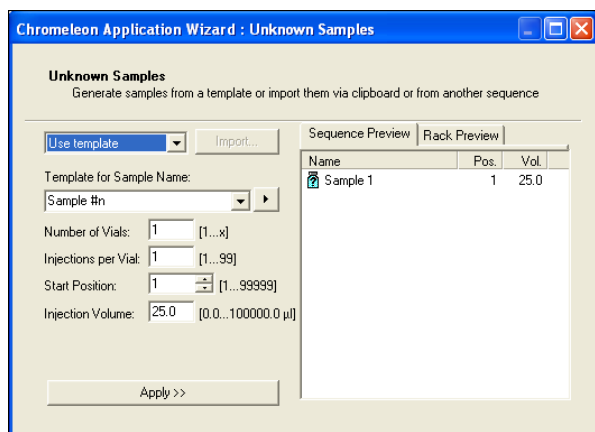


Figure 36. Example Application Wizard: Unknown Samples

3. Click **Next>**.

#### To define standard samples:

1. Define one or more standard samples now, or omit this step and define standard injections later.

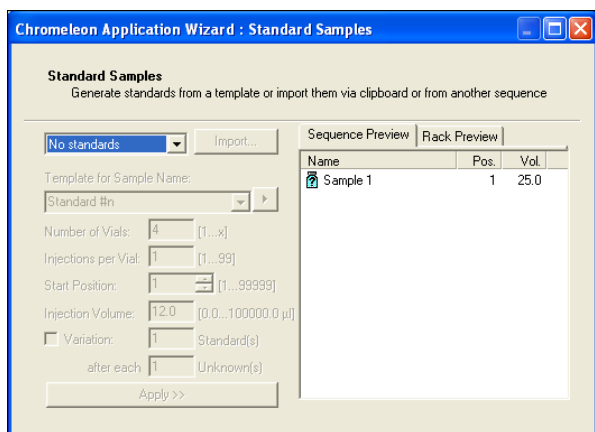


Figure 37. Example Application Wizard: Standard Samples

2. Click **Next>**.

#### To save the sequence:

1. Enter a **Sequence Name** and specify where to save the sequence (see Figure 38).

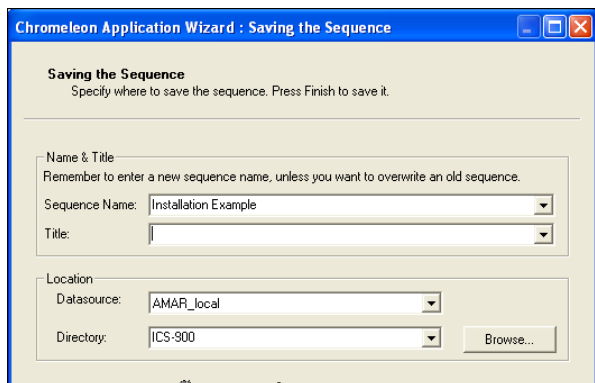


Figure 38. Example Application Wizard: Saving the sequence

2. Click **Finish** to save the sequence, and then click **Done**.

The sequence created here is a starting point only. You can add additional samples, change injection parameters, and edit the program and method files. Refer to the Chromeleon or Chromeleon Xpress Help for details.

## Run the Sequence

1. On the panel tabset, click the **Sequence Control** tab.
2. Under **Prepare System**, click **Load Sequence** (see Figure 39).

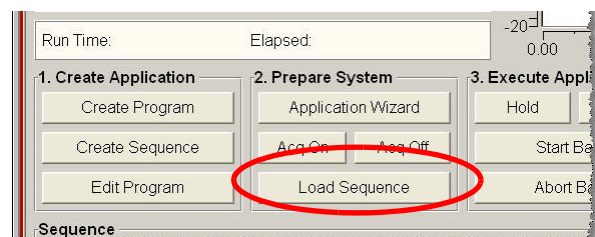
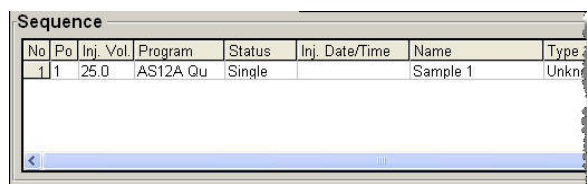


Figure 39. Sequence Control Panel: Loading a sequence

3. Browse to the sequence created in the Application Wizard and click **Open**.

The sequence is displayed on the page (see [Figure 40](#)).



No	Po	Inj. Vol.	Program	Status	Inj. Date/Time	Name	Type
1	1	25.0	AS12A Qu	Single		Sample 1	Unkn

Figure 40. Loaded sequence

- Under **Execute Application**, click **Start Batch** (see [Figure 41](#)).

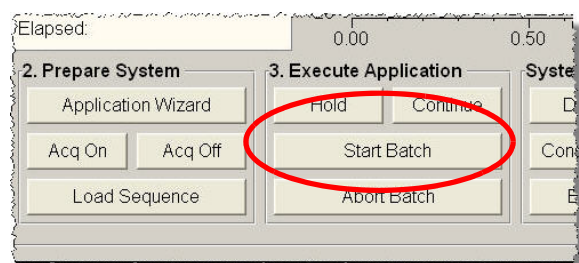
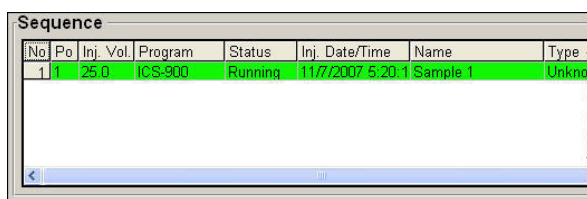


Figure 41. Sequence Control panel: Starting the batch

- The first injection in the sequence begins running and is highlighted in the list (see [Figure 42](#)).



No	Po	Inj. Vol.	Program	Status	Inj. Date/Time	Name	Type
1	1	25.0	ICS-900	Running	11/7/2007 5:20:1	Sample 1	Unkn

Figure 42. Injection running

This completes the Dionex ICS-900 installation and quick start instructions. For detailed operation instructions, refer to the *Thermo Scientific Dionex ICS-900 Ion Chromatography System Operator's Manual* (Document No. 065215), provided on the Thermo Scientific Reference Library DVD (P/N 053891).

## Installation Troubleshooting

**Problem:** When the Dionex ICS-900 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 to the PC and the Dionex ICS-900 power turned on before Chromeleon or Chromeleon Xpress was installed.

### Solution:

- Click the **Cancel** button in the Windows message box.
- Turn off the Dionex ICS-900 power and unplug the USB cable from the PC.
- Install Chromeleon or Chromeleon Xpress (see [page 4](#)).
- Reconnect the USB cable to the PC and turn on the Dionex ICS-900 power. Windows will now automatically recognize the new Dionex ICS-900.

---

## Dionex ICS-900 Installation Checklist

- ☐ Unpacked the Dionex ICS-900; checked for damage and verified that all items were received
- ☐ Connected the autosampler (if used)
- ☐ Installed the software, the USB dongle (if used), and the software license
- ☐ Connected the USB cable
- ☐ Connected the power cord
- ☐ Turned on the power to the PC, the Dionex ICS-900, and the AS Autosampler (if installed)
- ☐ Installed the Dionex ICS-900 device driver
- ☐ Created a timebase and configured devices
- ☐ Connected to the Chromeleon panel tabset
- ☐ Verified that the correct regenerant bottle assembly was received:
  - For anion analyses, the cap is labeled **ANION** and the **REGEN BOTTLE OUT** line extends to the bottom of the bottle
  - For cation analyses, the cap is labeled **CATION** and the **REGEN BOTTLE OUT** line extends only about 1 cm (0.4 in) into the bottle
- ☐ Prepared the eluent and regenerant
- ☐ Connected the bottle lines to the Dionex ICS-900
- ☐ Hydrated the suppressor
- ☐ Set up the waste lines; verified that the black DCR waste backpressure tubing is installed on the **REGEN OUT** line
- ☐ Primed the pump
- ☐ Flushed the system, guard column, and separator column
- ☐ Installed the columns and suppressor
- ☐ Connected the backpressure coils; verified that the correct type and number are installed
- ☐ Filled the regenerant line
- ☐ Equilibrated the system

