

Dionex ICS-4000 Capillary HPIC System

Installation Instructions

065469 Revision 01

December 2012

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Software version: Chromeleon 7.1 SR2 MUa and later

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The cETLus or cTUVus and CE marks on the model/data labels on the Dionex ICS-4000 module indicate that the module is in compliance with the following standards.

Low Voltage/Safety Directive: 2006/95/EC
EMC Directive: 2004/108/EC

Safety Standards: EN 61010-1
UL 61010-1
CAN/CSA-C22.2 No. 61010-1

EMC Standards: EN 61326-1

EMC compliance has been evaluated by MET Laboratories, Inc. Low voltage safety compliance has been evaluated by TUV.

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THIS DEVICE COMPLIES WITH PART 15 OF THE FCC RULES. OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS: (1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE, AND (2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE RECEIVED, INCLUDING INTERFERENCE THAT MAY CAUSE UNDESIRE OPERATION.



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CAUTION Symbol	CAUTION	VORSICHT	ATTENTION	PRECAUCION	AVVERTENZA
	Electric Shock: This instrument uses high voltages that can cause personal injury. Before servicing, shut down the instrument and disconnect the instrument from line power. Keep the top cover on while operating the instrument. Do not remove protective covers from PCBs.	Elektroschock: In diesem Gerät werden Hochspannungen verwendet, die Verletzungen verursachen können. Vor Wartungsarbeiten muß das Gerät abgeschaltet und vom Netz getrennt werden. Betreiben Sie das Gerät nicht mit abgenommenem Deckel. Nehmen Sie die Schutzabdeckung von Leiterplatten nicht ab.	Choc électrique: L'instrument utilise des tensions capables d'infliger des blessures corporelles. L'instrument doit être arrêté et débranché de la source de courant avant tout intervention. Ne pas utiliser l'instrument sans son couvercle. Ne pas enlever les étuis protecteurs des cartes de circuits imprimés.	Descarga eléctrica: Este instrumento utiliza altas tensiones, capaces de producir lesiones personales. Antes de dar servicio de mantenimiento al instrumento, éste deberá apagarse y desconectarse de la línea de alimentación eléctrica. No opere el instrumento sin sus cubiertas exteriores quitadas. No remueva las cubiertas protectoras de las tarjetas de circuito impreso.	Shock da folgorazione. L'apparecchio è alimentato da corrente ad alta tensione che può provocare lesioni fisiche. Prima di effettuare qualsiasi intervento di manutenzione occorre spegnere ed isolare l'apparecchio dalla linea elettrica. Non attivare lo strumento senza lo schermo superiore. Non togliere i coperchi a protezione dalle schede di circuito stampato (PCB).
	Chemical: This instrument might contain hazardous chemicals. Wear gloves when handling toxic, carcinogenic, mutagenic, or corrosive or irritant chemicals. Use approved containers and proper procedures to dispose waste oil.	Chemikalien: Dieses Gerät kann gefährliche Chemikalien enthalten. Tragen Sie Schutzhandschuhe beim Umgang mit toxischen, karzinogenen, mutagenen oder ätzenden/reizenden Chemikalien. Entsorgen Sie verbrauchtes Öl entsprechend den Vorschriften in den vorgeschriebenen Behältern.	Chimique: Des produits chimiques dangereux peuvent se trouver dans l'instrument. Portez des gants pour manipuler tous produits chimiques toxiques, cancérigènes, mutagènes, ou corrosifs/irritants. Utiliser des récipients et des procédures homologuées pour se débarrasser des déchets d'huile.	Química: El instrumento puede contener productos químicos peligrosos. Utilice guantes al manejar productos químicos tóxicos, carcinógenos, mutágenos o corrosivos/irritantes. Utilice recipientes y procedimientos aprobados para deshacerse del aceite usado.	Prodotti chimici. Possibile presenza di sostanze chimiche pericolose nell'apparecchio. Indossare dei guanti per maneggiare prodotti chimici tossici, cancerogeni, mutageni, o corrosivi/irritanti. Utilizzare contenitori aprovo e seguire la procedura indicata per lo smaltimento dei residui di olio.
	Heat: Before servicing the instrument, allow any heated components to cool.	Hitze: Warten Sie erhitzte Komponenten erst nachdem diese sich abgekühlt haben.	Haute Temperature: Permettre aux composants chauffés de refroidir avant tout intervention.	Altas temperaturas: Permita que los componentes se enfrien, ante de efectuar servicio de mantenimiento.	Calore. Attendere che i componenti riscaldati si raffreddino prima di effettuare l'intervento di manutenzione.
	Fire: Use care when operating the system in the presence of flammable gases.	Feuer: Beachten Sie die einschlägigen Vorsichtsmaßnahmen, wenn Sie das System in Gegenwart von entzündbaren Gasen betreiben.	Incendie: Agir avec précaution lors de l'utilisation du système en présence de gaz inflammables.	Fuego: Tenga cuidado al operar el sistema en presencia de gases inflamables.	Incendio. Adottare le dovute precauzioni quando si usa il sistema in presenza di gas infiammabili.
	Eye Hazard: Eye damage could occur from splattered chemicals or flying particles. Wear safety glasses when handling chemicals or servicing the instrument.	Verletzungsgefahr der Augen: Verspritzte Chemikalien oder kleine Partikel können Augenverletzungen verursachen. Tragen Sie beim Umgang mit Chemikalien oder bei der Wartung des Gerätes eine Schutzbrille.	Danger pour les yeux: Des projections chimiques, liquides, ou solides peuvent être dangereuses pour les yeux. Porter des lunettes de protection lors de toute manipulation de produit chimique ou pour toute intervention sur l'instrument.	Peligro par los ojos: Las salicaduras de productos químicos o partículas que saltan bruscamente pueden causar lesiones en los ojos. Utilice anteojos protectores al manipular productos químicos o al darle servicio de mantenimiento al instrumento.	Pericolo per la vista. Gli schizzi di prodotti chimici o delle particelle presenti nell'aria potrebbero causare danni alla vista. Indossare occhiali protettivi quando si maneggiano prodotti chimici o si effettuano interventi di manutenzione sull'apparecchio.
	General Hazard: A hazard is present that is not included in the above categories. Also, this symbol appears on the instrument to refer the user to instructions in this manual. When the safety of a procedure is questionable, contact your local Technical Support organization for Thermo Fisher Scientific Sunnyvale Products.	Allgemeine Gefahr: Es besteht eine weitere Gefahr, die nicht in den vorstehenden Kategorien beschrieben ist. Dieses Symbol wird im Handbuch außerdem dazu verwendet, um den Benutzer auf Anweisungen hinzuweisen. Wenn Sie sich über die Sicherheit eines Verfahrens im unklaren sind, setzen Sie sich, bevor Sie fortfahren, mit Ihrer lokalen technischen Unterstützungsorganisation für Thermo Fisher Scientific Sunnyvale Produkte in Verbindung.	Danger général: Indique la présence d'un risque n'appartenant pas aux catégories citées plus haut. Ce symbole figure également sur l'instrument pour renvoyer l'utilisateur aux instructions du présent manuel. Si la sûreté d'une procédure est incertaine, avant de continuer, contacter le plus proche Service Clientèle pour les produits de Assistance Technica locale para los productos de Thermo Fisher Scientific Sunnyvale.	Peligro general: Significa que existe un peligro no incluido en las categorías anteriores. Este símbolo también se utiliza en el instrumento par referir al usuario a las instrucciones contenidas en este manual. Cuando la certidumbre acerca de un procedimiento sea dudosa, antes de proseguir, pongase en contacto con la Oficina de Asistencia Tecnica local para los productos de Thermo Fisher Scientific Sunnyvale.	Pericolo generico. Pericolo non compreso tra le precedenti categorie. Questo simbolo è utilizzato inoltre sull'apparecchio per segnalare all'utente di consultare le istruzioni descritte nel presente manuale. Quando è in dubbio la misura di sicurezza per una procedura, prima di continuare, si prega di mettersi in contatto con il Servizio di Assistenza Tecnica locale per i prodotti di Thermo Fisher Scientific Sunnyvale.

CAUTION Symbol	CAUTION	危險警告	危險警告
	Electric Shock: This instrument uses high voltages that can cause personal injury. Before servicing, shut down the instrument and disconnect the instrument from line power. Keep the top cover on while operating the instrument. Do not remove protective covers from PCBs.	電撃: この計測器は高電圧を使用し、人体に危害を与える可能性があります。保守・修理は、必ず作業を停止し、電源を切ってから実施して下さい。上部カバーを外したままで計測器を使用しないで下さい。プリント配線板の保護カバーは外さないで下さい。	電撃: 儀器設備使用會造成人身傷害的高伏電壓。在維修之前，必須先關儀器設備並切除電源。務必要在頂蓋蓋上的情況下操作儀器。請勿拆除PCB保護蓋。
	Chemical: This instrument might contain hazardous chemicals. Wear gloves when handling toxic, carcinogenic, mutagenic, or corrosive or irritant chemicals. Use approved containers and proper procedures to dispose waste oil.	化学物質: 危険な化学物質が計測器中に存在している可能性があります。毒性、発がん性、突然変異性、腐食・刺激性などのある薬品を取り扱う際は、手袋を着用して下さい。廃油の処分には、規定の容器と手順を使用して下さい。	化学品: 儀器設備中可能存在有危險性的化學物品。接觸毒性致癌、誘變或腐蝕／刺激性化學品時，請配帶手套。處置廢油時，請使用經過許可的容器和程序。
	Heat: Before servicing the instrument, allow any heated components to cool.	熱: 熱くなった部品は冷えるのを待ってから保守・修理を行って下さい。	高溫: 請先等高溫零件冷卻之後再進行維修。
	Fire: Use care when operating the system in the presence of flammable gases.	火災: 可燃性のガスが存在する場所でシステムを操作する場合は、充分な注意を払って下さい。	火災: 在有易燃氣體的場地操作該系統時，請務必小心謹慎。
	Eye Hazard: Eye damage could occur from splattered chemicals or flying particles. Wear safety glasses when handling chemicals or servicing the instrument.	眼に対する危険: 化学物質や微粒子が飛散して眼を傷つける危険性があります。化学物質の取り扱い、あるいは計測器の保守・修理に際しては防護眼鏡を着用して下さい。	眼睛傷害危險: 飛濺の化學品或顆粒可能造成眼睛傷害。處理化學品或維修儀器設備時請佩戴安全眼鏡。
	General Hazard: A hazard is present that is not included in the above categories. Also, this symbol appears on the instrument to refer the user to instructions in this manual.	一般的な危険: この標識は上記以外のタイプの危険が存在することを示します。また、計測器にこの標識がついている場合は、本マニュアル中の指示を参照して下さい。	一般性危險: 說明未包括在上述類別中的其他危險。此外，儀器設備上使用這個標誌，以指示用戶本使用手冊中的說明。
	When the safety of a procedure is questionable, contact your local Technical Support organization for Thermo Fisher Scientific Sunnyvale Products.	安全を確保する手順がよくわからない時は、作業を一時中止し、お近くのサーモエレクトロンサンローゼプロダクトのテクニカルサポートセンターにご連絡ください。	如對安全程序有疑問，請在操作之前與當地的菲尼根技術服務中心聯繫。

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Preface

This manual provides instructions for the initial installation of the Thermo Scientific Dionex™ ICS-4000 Capillary HPIC System.

Related Documentation

In addition to this guide, the following related documents are provided on the Thermo Scientific Reference Library DVD (P/N 053891).

- *Dionex ICS-4000 Capillary HPIC System Operator's Manual* (Document No. 065468)
- *Dionex AS-AP Autosampler Operator's Manual* (Document No. 065361)
- *Dionex AS-DV Autosampler Operator's Manual* (Document No. 065259)
- Manuals for consumable products (columns, suppressors, CR-TC, EGC, CRD)
- *Chromeleon 7 Installation Guide*
- *Installing Chromeleon 6.8 with a Dionex Ion Chromatograph* (Document No. 031883)

Safety and Special Notices

Make sure you follow the precautionary statements presented in this guide. The safety and other special notices appear in boxes.

Safety and special notices include the following:



CAUTION Highlights hazards to humans, property, or the environment. Each CAUTION notice is accompanied by an appropriate CAUTION symbol.

IMPORTANT Highlights information necessary to prevent damage to the system or software, loss of data, or invalid test results; or might contain information that is critical for optimal performance of the system.

Note Highlights information of general interest.

Tip Highlights helpful information that can make a task easier.

Contacting Us

❖ **For Technical Support for Dionex products**

In the U.S. and Canada, call 1-800-346-6390.

Outside the U.S. and Canada, call the nearest Thermo Fisher Scientific office.

❖ **For additional contact information**

Go to www.thermoscientific.com/Dionex

Deionized Water Requirements for IC

For eluent generation or when manually preparing eluent and regenerant, use ASTM Type I (18 megohm-cm) filtered and deionized water that meets the specifications listed in [Table 1](#).

Table 1. ASTM filtered, Type I deionized water specifications for ion chromatography

Contaminant	Specification
Ions—Resistivity	>18.0 (megohm-cm)
Organics—TOC	<10 ppb
Iron/Transition Metals*	<1 ppb
Pyrogens	<0.03 (Eu/mL)
Particulates > 0.2 µm	<1 (units/mL)
Colloids—Silica	<10 ppb
Bacteria	<1 (cfu/mL)
* Iron/transition metal content not specified for ASTM Type I Water	

Fitting and Tube Connection Guidelines

The following sections provide guidelines and instructions for tube fitting connections used in the Dionex ICS-4000.

Ferrule Fitting Guidelines

Use blue, high-pressure 10-32 fitting bolts (P/N 074449) and blue, high-pressure 10-32 double-cone ferrules (P/N 074373) for all connections. Fitting bolts and ferrules are included in the Dionex ICS-4000 Ship Kit (P/N 075161).

Follow the steps below to tighten a fitting for a high-pressure connection.

❖ **To tighten a high-pressure fitting**

1. Use your fingers to tighten the fitting bolt as tight as you can.
2. After finger-tightening, use a wrench to tighten the fitting an additional three-quarter turn (270 degrees).
3. If leaks occur, replace the fitting bolt (P/N 074449), ferrule (P/N 074373), and tubing.

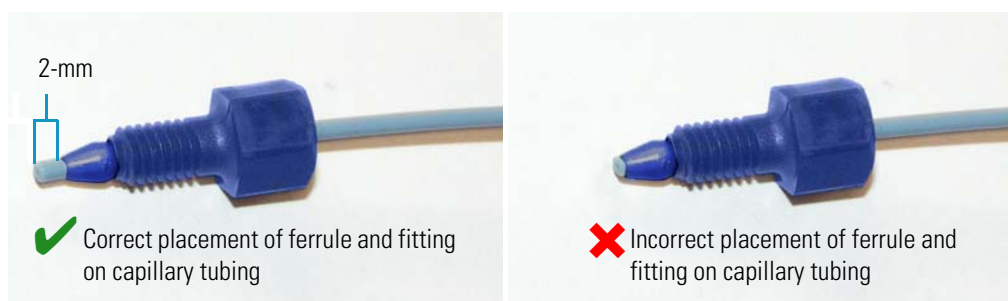
Capillary Tube Fitting Guidelines

The 0.062 mm (0.0025 in) ID blue PEEK tubing (capillary tubing) used for Dionex IC Cube connections is cut at the factory using a specialized precision cutter. This tubing is provided in the Dionex IC Cube Tubing Kit (P/N 072186). Do not shorten or lengthen this tubing or substitute different tubing.

❖ **To install capillary tube fittings**

1. Install the fitting bolt and ferrule onto the tubing. Position the ferrule at least 2 mm (0.1 in) from the end of the tubing (see [Figure 1](#)).

Figure 1. Ferrule and fitting bolt placement for capillary tubing connections



2. Insert the tubing into the port until it stops.

Figure 2. Fitting installation



3. While maintaining pressure on the tubing to keep it in place in the port, tighten the fitting bolt fingertight and then tighten the fitting further by following the instructions in [“Ferrule Fitting Guidelines.”](#)

Cutting Non-Capillary Tubing

If a connection does not require precision-cut capillary tubing, you can use a tubing cutter to cut tubing to the required length. Make sure the cut is at a right angle to the length of the tubing and there are no nicks or burrs on the end. A tubing cutter (P/N 049584) is included in the Dionex ICS-4000 Ship Kit (P/N 075161). Refer to the instructions provided with the cutter.

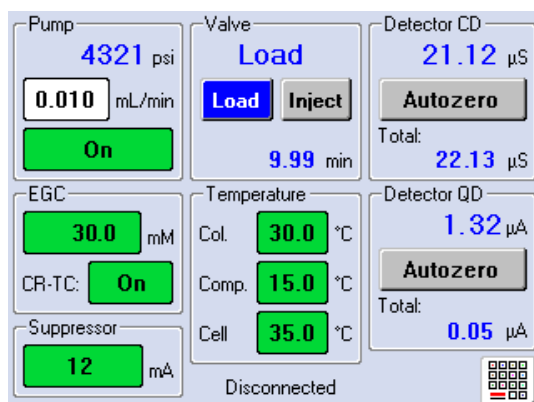
Overview of Touch Screen Operation

The touch screen provides direct control of most Dionex ICS-4000 operating functions. When you select an operating command or parameter from the touch screen, the command or parameter is executed immediately.

Using the Touch Screen

The Home screen (see [Figure 3](#)) provides controls for the most commonly used operating functions.

Figure 3. Home screen example



- To select a control (button, edit box, menu, etc.), touch and release the control with your fingertip. When you lift your finger, the action is taken.

Tip To cancel and not initiate the action, slide your finger away from the control before lifting.


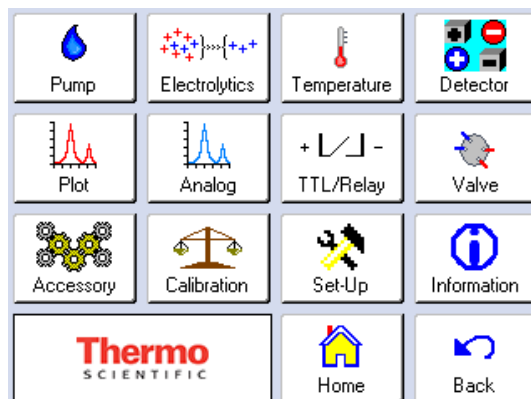
- To access operating functions not available from the Home screen, touch the menu  button. The Menu screen opens (see Figure 4). Touch the button for the screen you want to view.

Figure 4. Menu screen





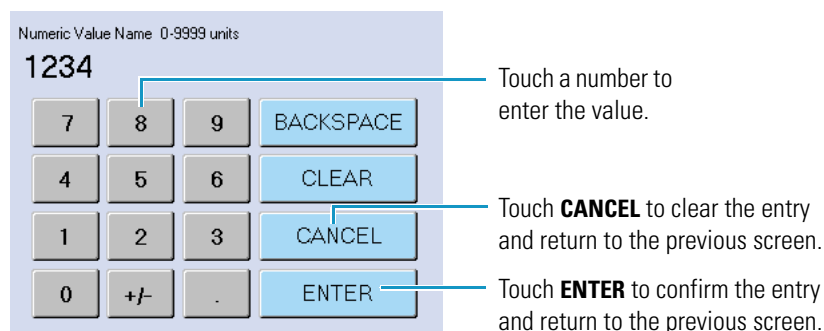
- To return to the Home screen, touch the home  button.
- To return to the previous screen, touch the back  button.
- To change a numerical value (for example, the flow rate), touch the box showing the current value (for example, **0.010** mL/min). A number keypad opens (see Figure 5). Touch the numbers on the keypad and then touch **ENTER**.

Figure 5. Number keypad



Tip The background color on some controls indicates the status of the corresponding device.

- Red means the device is off.
- Amber means the device is on, but not ready for operation.
- Green means the device is on and is ready for operation.

Using the Touch Screen with Chromeleon

When the Dionex ICS-4000 is connected to Chromeleon, Connected is displayed on the Home screen. In this mode, most of the controls on the touch screens are disabled. This prevents touch screen commands from conflicting with Chromeleon commands.

In general, when the Dionex ICS-4000 is connected to Chromeleon, you can:

- View all operational status information (pressure, flow rate, conductivity readings, etc.)
- Go to any of the touch screens
- View a plot of the detector data from the Plot screen and adjust the plot display using the controls on the screen

To restore touch screen (local) control, disconnect the Dionex ICS-4000 from Chromeleon. To disconnect from Chromeleon, click the **Connected** button on the Chromeleon 7 ePanel or the **Connected** check box on the Chromeleon 6.8 panel tabset.

Configurations

The table below describes some of the common Dionex ICS-4000 system configurations.

System configuration	Typical components included
Dionex ICS-4000 with conductivity detection	<ul style="list-style-type: none">• Thermo Scientific Dionex ICS-4000 Conductivity Detector (CD)• Thermo Scientific Dionex CES™ 300 Capillary Electrolytic Suppressor (ACES 300™ or CCES 300™)• Carbonate Removal Device (CRD) (an option for anion analyses)• Capillary analytical column and guard column• For Reagent-Free™ IC (RFIC™)-EG: Dionex ICS-4000 Eluent Generator (EG) with capillary eluent generator cartridge (EGC) and capillary Continuously- Regenerated Trap Column (CR-TC)
Dionex ICS-4000 with conductivity detection and charge detection	<ul style="list-style-type: none">• Components listed above for conductivity detection• Thermo Scientific Dionex ICS-4000 Charge Detector (QD)• Thermo Scientific Dionex QDC 300 (Capillary)
Dionex ICS-4000 with electrochemical detection	<ul style="list-style-type: none">• Thermo Scientific Dionex ICS-4000 Electrochemical Detector (ED)• ED amperometry cell with working and reference electrodes• Capillary analytical column• For RFIC-EG: EG with EGC and CR-TC

Unpacking Instructions



CAUTION Two or more persons must lift the Dionex ICS-4000, which weighs more than 23 kg (50 lb). Lift the Dionex ICS-4000 only from each side of the cabinet bottom. Lifting from the front door will damage the door hinges.



MISE EN GARDE Au moins deux personnes peuvent soulever l'Dionex ICS-4000, qui pèse plus de 32 kg (50 lb). Ne soulevez l'Dionex ICS-4000 que par chaque côté du fond de l'armoire. Son soulèvement par la porte du panneau avant endommagera les charnières de la porte.



VORSICHT Der Dionex ICS-4000 wiegt über 23 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 Dionex ICS-4000 nicht an der Vordertür an, da dadurch die Türangeln beschädigt werden könnten.

Note Check the shipping container for any external signs of damage. If the container shows signs of damage, contact Dionex immediately.

1. Follow the instructions printed on the shipping container to turn the container on its side, open the bottom flaps, and turn it right side up again (see [Figure 6](#)).



Figure 6. Shipping container with bottom flaps opened

2. Lift up the shipping container to remove it (see [Figure 7](#)) and set the container aside. Remove the top foam packing insert.



Figure 7. Lift up the shipping container

3. Remove the ship kit box from the top of the module (see [Figure 8](#)) and remove the foam packing cage.
4. With two or more persons, grasp each side of the Dionex ICS-4000 cabinet bottom, lift up the module, and then place it on the bench.
5. Remove the polyethylene bag the module is shipped in.
6. Check that the main power switch on the rear panel is turned off.



Figure 8. Ship kit on top of the module

Unpacking an autosampler

1. If you are installing an autosampler, follow the instructions in the autosampler manual to unpack the autosampler now.
2. Place the autosampler on the left side of the Dionex ICS-4000 on the workbench.

Installation Instructions

Follow the installation instructions in this chapter step-by-step, in the order presented. These instructions have been carefully developed to ensure that installation of the Dionex ICS-4000 Capillary HPIC System is successful.

Installation Steps

- Unpacking Consumable Devices
 - Plugging in the EGC and CR-TC
 - Installing Cartridges in the Dionex IC Cube
 - Installing the Detector
 - Setting Up the Computer and Software
 - Connecting the Power Cord
 - Installing the USB Device Driver
 - Configuring the Dionex ICS-4000 in Chromeleon
 - Connecting an Autosampler
 - Connecting the Drain and Waste Lines
 - Degassing the Water
 - Setting Up the Reservoir
 - Priming the Pump
 - Flushing the EG Tubing Assembly
 - Checking the Conductivity Reading of the Water
 - Performing the Installation Qualification
 - Hydrating the Suppressor
 - Setting Up the EGC and CR-TC
 - Installing the Columns and Column Cartridge
 - Completing the Plumbing
 - Equilibrating the System
 - Installing a Dionex QDC 300 (Capillary)
-

Unpacking Consumable Devices

Remove the EGC, CR-TC, CES, and CRD (if included) from their shipping boxes. Save the EGC shipping container; it may be required for storage or disposal of the EGC.



CAUTION The EGC 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 d'EGC 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 EGC-Kartusche enthält eine korrosive Base (KOH, LiOH oder NaOH), eine korrosive Säure (MSA) oder eine konzentrierte K_2CO_3 -Lösung. Tragen Sie daher beim Umgang mit der Kartusche eine Schutzbrille und Handschuhe.

Plugging in the EGC and CR-TC

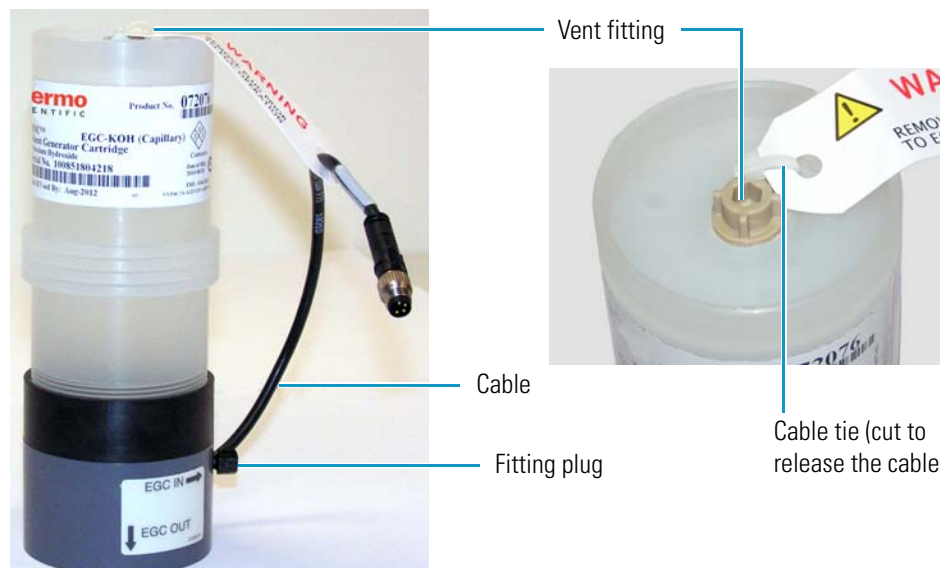
1. Lift up the touch screen panel to access the front tray (see [Figure 9](#)).

Figure 9. Front tray before installing EGC and CR-TC



2. The EGC cable is attached to a vent fitting on the top of the cartridge with a cable tie (see [Figure 10](#)). Cut the cable tie to release the cable.

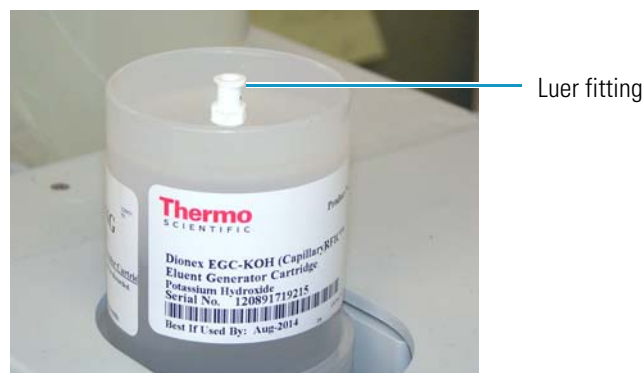
Figure 10. EGC with cable attached to vent fitting



3. Verify that the vent fitting is tightened. This prevents cartridge leaks during installation.
4. Remove the fitting plugs from the **EGC IN** and **EGC OUT** ports on the EGC (see [Figure 10](#)).
5. While holding the EGC with the ports on the bottom, shake the EGC vigorously and tap it with the palm of your hand 10 to 15 times to dislodge air bubbles that may be trapped in the chamber.
6. Unscrew the vent fitting from the top of the EGC and install the luer adapter shipped with the EGC (see [Figure 11](#)). Save the vent fitting.

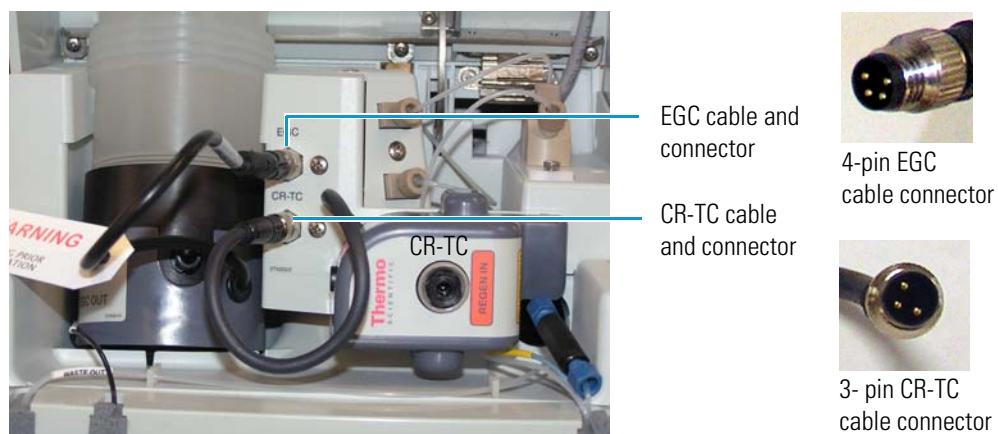
IMPORTANT To ensure proper ventilation, always install the luer fitting on the top of the EGC before operation. If you need to remove the EGC from the system, install the vent fitting to prevent leaks.

Figure 11. EGC with luer fitting installed



7. Hold the EGC with the ports on the bottom and slide it into the EGC holder on the left side of the tray. The EG tubing assembly (see [Figure 9](#)) may prevent the EGC from sliding all the way into the holder. Do not connect the tubing yet.
8. Remove the fitting plugs from the ports on the CR-TC. Hold the CR-TC with the **ELUENT IN** port (red label) on the left and push the CR-TC firmly onto the ball studs located to the right of the electrical connectors (see [Figure 9](#)).
9. Connect the EGC and CR-TC electrical cables:
 - a. Align the pins inside the cable connector with the holes in the front tray connector. The EGC has a 4-pin connector and the CR-TC has a 3-pin connector (see [Figure 12](#)).
 - b. Push the cable connector firmly onto the front tray connector and twist the locking ring fingertight to secure it.

Figure 12. Front tray with EGC and CR-TC connected



Installing Cartridges in the Dionex IC Cube

The Dionex IC Cube™ houses four removable component cartridges for running capillary IC applications. To access the Dionex IC Cube, pull open the front door. The Dionex IC Cube is installed in the center section of the compartment (see [Figure 13](#)). The required cartridges depend on the detection type (see [Table 2](#)).

Figure 13. Dionex ICS-4000 with front door open

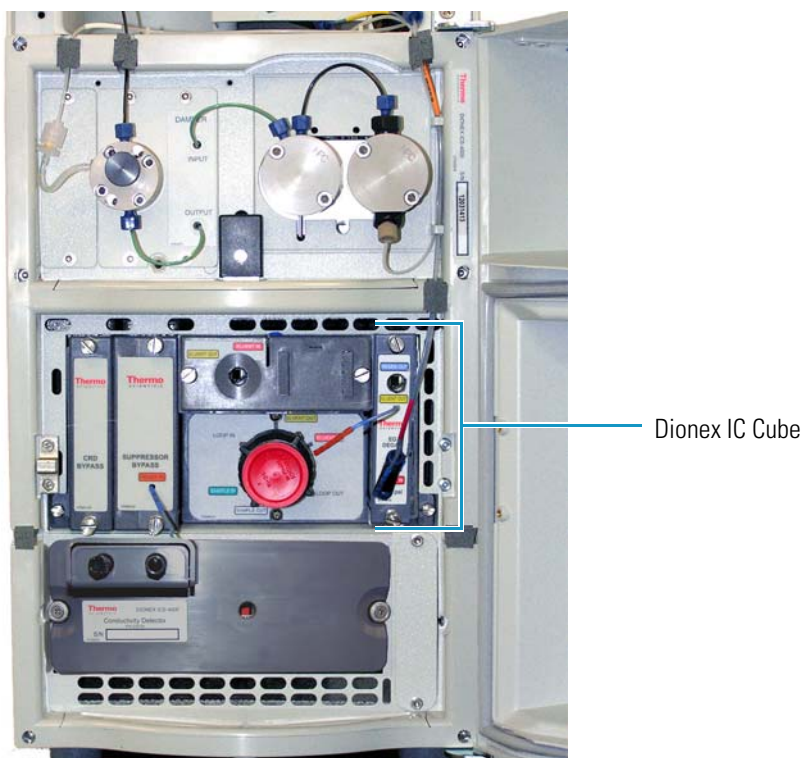


Table 2. Dionex IC Cube cartridge requirements

Detection Type	Required Cartridges
Conductivity —or— Conductivity with charge detector	<ul style="list-style-type: none"> • EG degas (typically installed at the factory) • CES • CRD (an option for anion applications) • CRD bypass (required if a CRD cartridge is not installed) • Column
Electrochemical	<ul style="list-style-type: none"> • EG degas (typically installed at the factory) • Suppressor bypass • CRD bypass • Column

If you are setting up the system for electrochemical detection and the EG degas cartridge is already installed, no additional cartridges are required. Leave the suppressor bypass and CRD bypass cartridges in place and go on to [“Setting Up the Computer and Software”](#) on [page 10](#).

❖ **To install an EG degas, CRD, or CES cartridge**

1. To install an EG degas cartridge, remove the cap from the regenerant port on the rear of the cartridge, slide the cartridge into the right-most slot of the Dionex IC Cube and tighten the thumbscrews fingertight.
2. To install a CRD and/or CES cartridge:
 - a. Loosen the thumbscrews on the corresponding bypass cartridge and pull the bypass cartridge out of the Dionex IC Cube. Save the bypass cartridge.
 - b. Remove the caps from the regenerant ports on the rear of the cartridge, slide the cartridge into its slot in the Dionex IC Cube and tighten the thumbscrews fingertight.

IMPORTANT Save the CRD and/or CES bypass cartridges that were removed. They must be reinstalled if the Dionex ICS-4000 is used for an application that does not require these components.

Installing the Detector

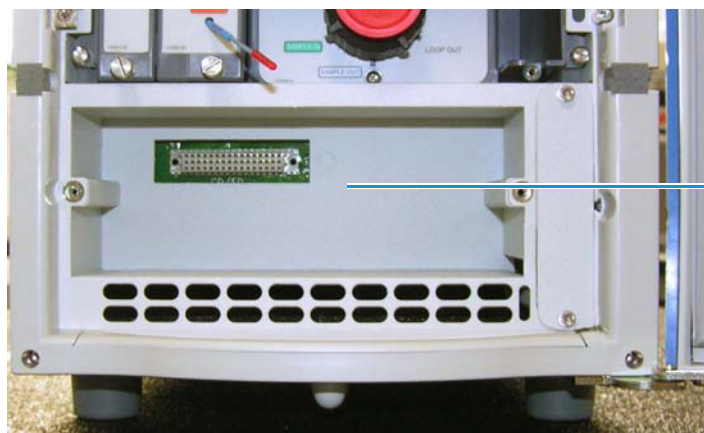
If the detector is not already installed in the system, follow the instructions below to install either a Dionex ICS-4000 Electrochemical Detector (ED) (P/N 075121) or Dionex ICS-4000 Conductivity Detector (CD) (P/N 075120). If a CD is included, optionally install a Dionex ICS-4000 Charge Detector (QD) (P/N 078449).

IMPORTANT Always turn off the Dionex ICS-4000 system power before installing or un-installing an ED, CD, or QD.

❖ **To install a CD or ED**

1. If the system power is on, flip the power switch on the rear panel to turn off the power.
2. Locate the detector installation location in the lower section of the compartment (see [Figure 14](#)).

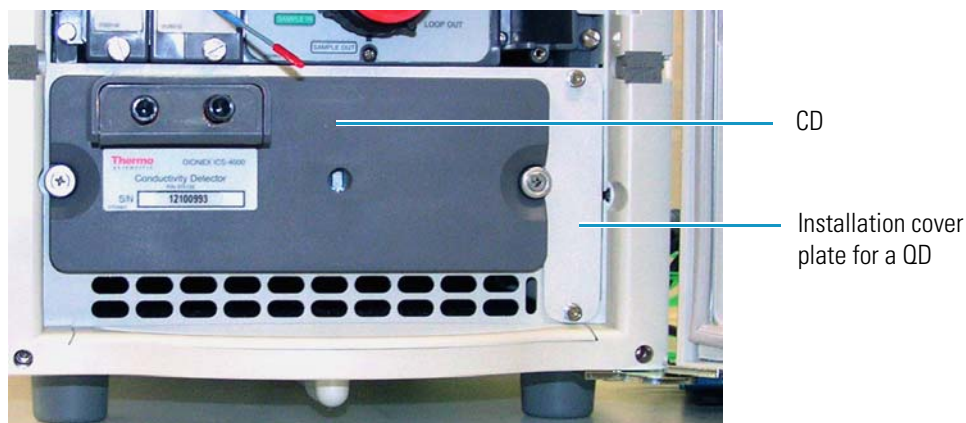
Figure 14. Lower section of the compartment without a detector



Installation location
for a CD or ED

3. For a CD, orient the detector with the cell inlet and outlet ports on the top. For an ED, orient the detector with the electrical connectors on the right side.
4. Slide the detector into the compartment and tighten the thumbscrews fingertight (see [Figure 15](#)).

Figure 15. Detector installed in compartment (CD shown)



❖ **To install a QD**

1. If the system power is on, flip the power switch on the rear panel to turn off the power.
2. Locate the cover plate for the QD installation location on the right of the CD (see [Figure 15](#)).
3. Use the 2.5 mm hex wrench (P/N 075362) provided in the Ship Kit (P/N 075161) to loosen the screws on the cover plate, and then remove the plate.
4. Orient the QD with the electrical connector on the left and insert the QD into the slot (see [Figure 16](#)). Tighten the thumbscrews fingertight.

Figure 16. CD and QD installed in compartment



Setting Up the Computer and Software

Note You can set up the computer and software now or wait until later in the installation procedure. The hardware installation procedure can be completed using the front panel touch screen only.

❖ To set up the computer

1. Remove the computer and all documentation from the computer box and place them on a workbench.
2. Chromeleon 7 and Chromeleon 6.8 run under Microsoft® Windows® operating systems. If you purchased a PC outside of North America, verify that the PC meets current system specifications. Refer to <http://www.thermoscientific.com/dionex>.

When you purchase Chromeleon and a PC from Thermo Fisher Scientific, the chromatography software and computer hardware are installed at the factory.

3. Follow the instructions in the computer installation guide to hook up the PC components.

Setting Up the Chromatography Software

Software setup consists of installing the Chromeleon software and software license on the computer (if they are not already installed) and starting the Chromeleon 7 Instrument Controller Service or Chromeleon 6.8 Server.

Installing the Software and License




To install Chromeleon software and the software license if they were not installed at the factory, follow the instructions in the appropriate installation guide. The guides are provided on the Thermo Scientific Reference Library DVD (P/N 053891).

- For Chromeleon 7, refer to *Chromeleon 7 Installation Guide*.
- For Chromeleon 6.8, refer to *Installing Chromeleon with a Dionex Ion Chromatograph* (Document No. 031883).

Starting the Instrument Controller Service or Server




If you have not already done so, turn on the computer power and log onto Windows as an administrator. For a network computer, log on as a user with local computer administrator privileges.

❖ To start the Chromeleon 7 Instrument Controller Service

Right-click the Chromeleon tray icon  (which is crossed out in red) and click **Start Chromeleon Instrument Controller**. The icon changes to gold  to indicate that the Instrument Controller Service is starting. When the Instrument Controller Service is running (idle), the icon changes to gray .

If the Chromeleon tray icon is not on the taskbar, click **Start > All Programs > Chromeleon 7 > Services Manager** to open the Services Manager and click **Start Instrument Controller**.

❖ To start the Chromeleon 6.8 Server

Right-click the Chromeleon Server Monitor tray icon  (which is crossed out in red) and click **Start Server**. The icon changes to gold  to indicate that the Chromeleon Server is starting. When the Chromeleon Server is running (idle), the icon changes to gray .

If the Server Monitor icon is not on the taskbar, click **Start > All Programs > Chromeleon > Server Monitor** to open the Server Monitor and click **Start**.

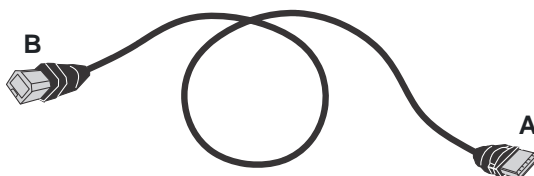
Connecting to the Computer

You can connect the system directly to a USB port on the Chromeleon computer or to a USB 2.0 external hub that is connected to the computer. Use an external hub when:

- The number of USB devices in the system exceeds the number of available USB ports.
- The Dionex ICS-4000 is more than 5 meters (5.5 yds) from the PC.

All USB connections require standard A-to-B cables. The “A” connector is the flat, rectangular end of the cable; the “B” connector is the smaller, hexagonal end (see [Figure 17](#)).

Figure 17. USB Cable



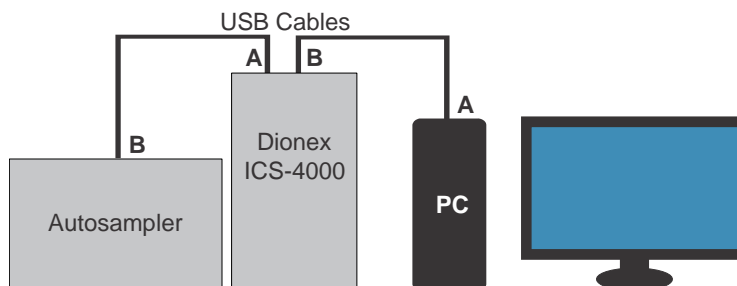
IMPORTANT

- The USB standard limits the USB cable length to 5 m (5.5 yds). Each USB device can be separated from the computer by no more than five hubs. Thus, each USB device can be located no more than 30 m (32 yds) from the PC.
- Before connecting the USB cables, verify that Chromeleon 7 or Chromeleon 6.8 was installed on the PC and the license code was entered. If the chromatography software is not installed first, Windows will be unable to identify the new USB device when the power is turned on. See [page 10](#) for software installation information.
- Do not turn on the power to the Dionex ICS-4000 or other USB device until after you connect the USB cable.

❖ To connect the Dionex ICS-4000 to the computer

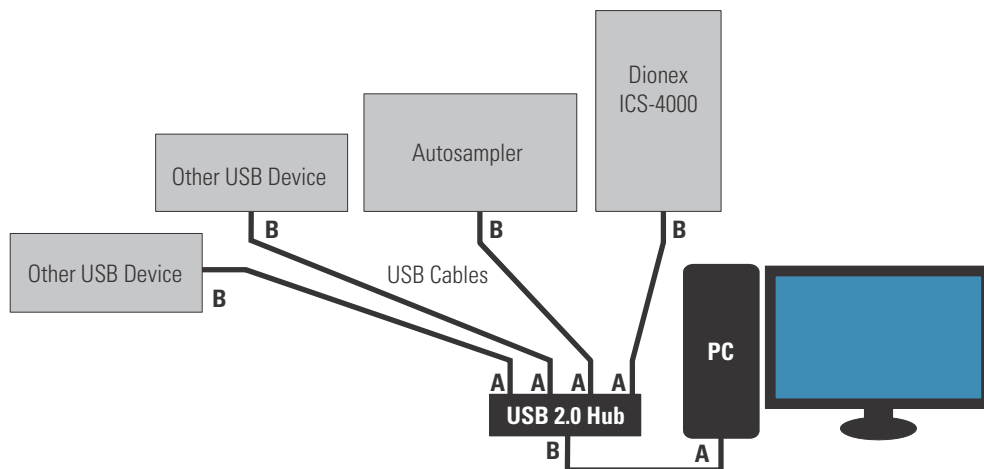
1. Locate the USB cable (P/N 960777) in the Ship Kit (P/N 075161).
2. To connect directly to the computer, connect the USB cable between the USB connector on the Dionex ICS-4000 rear panel and a USB port on the Chromeleon computer.

Figure 18. Example USB connections: System connected directly to the computer



To connect using an external hub, connect the USB cable to the hub and connect the hub to the computer. For installation details, refer to the manual provided by the hub vendor.

Figure 19. Example USB connections: System connected to an external hub



3. If you are installing an autosampler, locate the USB cable supplied with the autosampler and connect the cable between the USB connector on the autosampler and a USB port on the Dionex ICS-4000 or to an external hub.

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

Connecting the Power Cord

❖ To connect the power cord

1. Verify that the power switch on the rear panel of the Dionex ICS-4000 is turned off. The 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.



WARNING 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.



CAUTION 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.



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



AVERTISSEMENT 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.

Installing the USB Device Driver

❖ To install the USB device driver

IMPORTANT Before turning on the system power, verify that Chromeleon 7 or Chromeleon 6.8 was installed on the PC and the license code was entered.

1. Before turning on the power, make sure that you have plugged in the EGC and CR-TC cables and installed the Dionex IC Cube cartridges (EG degas, CES, CRD) and the detector. Chromeleon recognizes the installed devices at power-up and includes them in the configuration.
2. Turn on the power switch on the rear panel of the Dionex ICS-4000.
3. If you are installing an autosampler, turn on the autosampler power now also.
4. Windows automatically detects the new USB devices. A message flashes on the screen to inform you that new hardware was found.
5. The driver installation varies, depending on the version of Windows installed on the computer:
 - Windows Vista or Windows 7 automatically performs the USB driver installation. After the installation is complete, the Chromeleon New Instrument (Chromeleon 7) or New Timebase (Chromeleon 6.8) dialog box appears. Accept the default option (**Create a new instrument** or **Create a new timebase**) and click **OK**.

The Chromeleon USB Auto Configuration Wizard appears. If you are installing more than one device leave the wizard open and wait for Windows to complete the driver installation for all devices. Then, go on to [“Configuring the Dionex ICS-4000 in Chromeleon.”](#)

- Windows XP launches the Found New Hardware Wizard. 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**) and click **Next>**.
 - When the hardware wizard reports that the software for the first device has been installed, click **Finish**.

The Chromeleon USB Auto Configuration Wizard box appears. If you are installing more than one device, leave the wizard open and complete the Found New Hardware Wizard for the other devices. After completing the driver installation for all devices,

go on to “[Configuring the Dionex ICS-4000 in Chromeleon.](#)”

Configuring the Dionex ICS-4000 in Chromeleon

The Chromeleon USB Auto Configuration Wizard appears automatically when a USB device that is not assigned to a Chromeleon 7 instrument or Chromeleon 6.8 timebase is powered up. You can use the wizard to create a new instrument or timebase for your Dionex ICS-4000.

If you prefer, click **Cancel** to close the wizard, and then manually create an instrument or timebase.

- For instructions on how to manually create an instrument in Chromeleon 7, refer to the Chromeleon 7 Help or the *Chromeleon 7 Installation Guide*.
- For instructions on how to manually create a timebase in Chromeleon 6.8, refer to the Chromeleon 6.8 Help or to *Installing Chromeleon with a Dionex Ion Chromatograph* (Document No. 031883).

The software installation manuals are provided on the Thermo Scientific Reference Library DVD (P/N 053891).

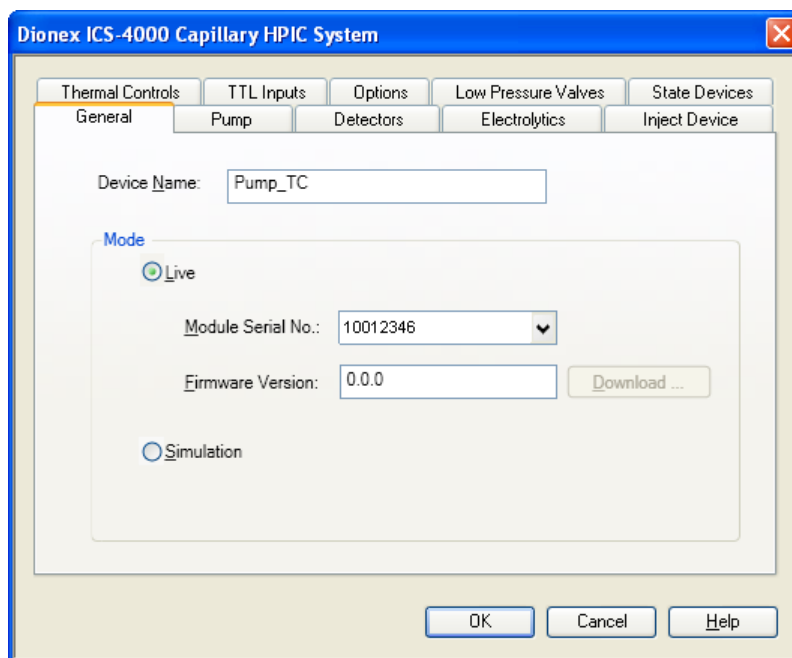
Selecting Configuration Properties

When you add the Dionex ICS-4000 to an instrument or timebase, Chromeleon assigns default configuration properties. Follow the instructions below to select the settings appropriate for your system.

❖ To select configuration properties

1. Under the instrument or timebase, right-click the Dionex ICS-4000 System and click **Properties**.

2. On the **General** page, click **Live** and select the serial number of the Dionex ICS-4000 in the list.



3. On each of the remaining tab pages, verify that the devices installed in your system (detector, electrolytic devices, valves, and so on) are enabled. Select the appropriate settings for each device. For details about the options on a page, click **Help**. In most cases, you can use the default options selected by Chromeleon.

Connecting an Autosampler

This section provides brief instructions for connecting an autosampler to the Dionex ICS-4000 injection valve. For detailed instructions on how to install an autosampler, refer to the operator's manual for the autosampler you are connecting. The manuals are provided on the Thermo Scientific Reference Library DVD (P/N 053891).

❖ To connect the autosampler sample transfer line

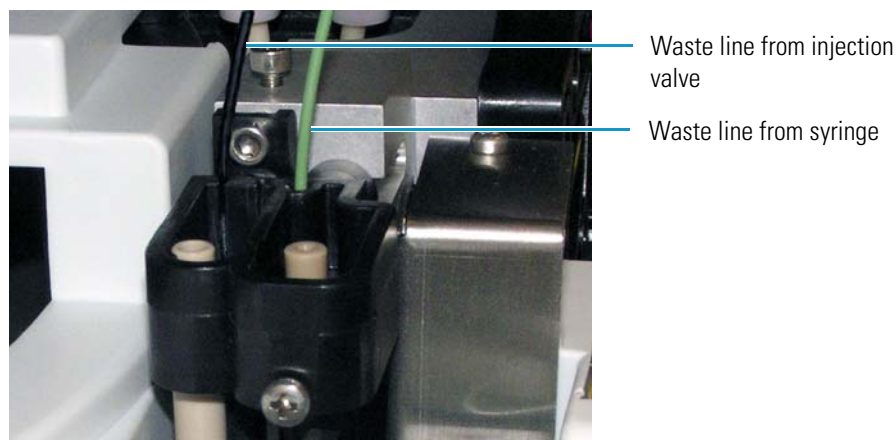
1. Place the autosampler to the left of the Dionex ICS-4000 on the workbench.
2. Route the sample transfer line from the autosampler through the side slot on the lower left side of the Dionex ICS-4000 to the Dionex IC Cube.
3. Connect the line to the **SAMPLE IN** port on the injection valve.

❖ To connect a waste line

1. For a Thermo Scientific Dionex AS-DV Autosampler:
 - a. Cut a length of 0.25 mm (0.010 in) ID black PEEK tubing (P/N 042690) long enough to reach from the injection valve to the waste container.

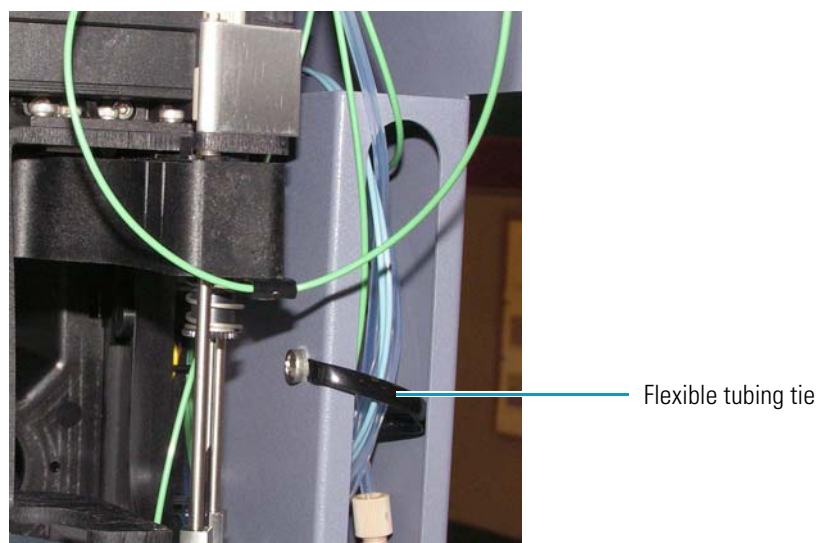
- b. Connect one end to the **SAMPLE OUT** port on the injection valve and route the other end to waste.
2. For a Thermo Scientific Dionex AS-AP Autosampler:
 - a. Cut a length of 0.25 mm (0.010 in) ID black PEEK tubing (P/N 042690) long enough to reach from the injection valve to the waste container.
 - b. Connect one end to the **SAMPLE OUT** port on the injection valve.
 - c. Route the line to the Dionex AS-AP waste port and insert the line into one of the round openings in the waste port (see [Figure 20](#)).

Figure 20. Injection valve waste line installed in Dionex AS-AP waste port



- d. To ensure the waste line does not interfere with needle arm movement, secure the excess tubing with the flexible tubing tie in the slotted compartment next to the needle (see [Figure 21](#)).

Figure 21. Flexible tubing tie in Dionex AS-AP slotted compartment



Connecting the Drain and Waste Lines

Any leaks that may occur in the system are routed to the drain port on the rear of the system. Waste lines from the pump and eluent generator exit the rear of the system.

❖ To connect the drain and waste lines

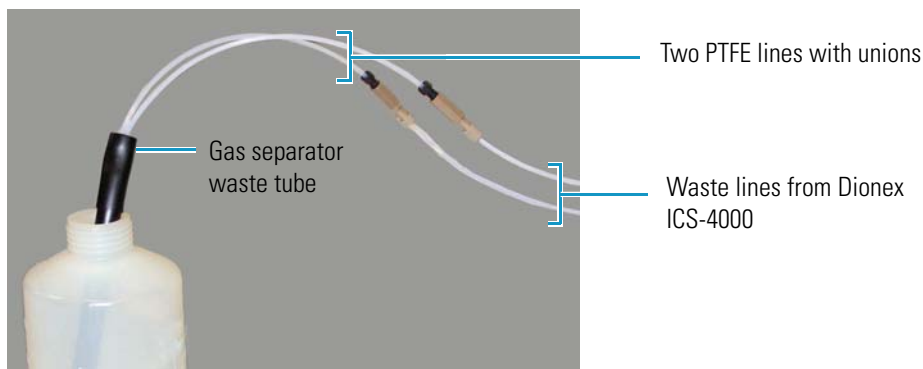
1. Locate the corrugated drain line (P/N 055075) in the Ship Kit (P/N 075161).
2. Push the line onto the drain port (see [Figure 22](#)) and place the open end of the line into a waste container or appropriate drain.

Figure 22. Drain port with drain line attached



3. Locate the gas separator waste tube assembly (P/N 045460) in the Ship Kit.
4. Untape the coiled waste lines from the rear panel and connect the ends to the unions on the 3 mm (1/8 in) ID white PTFE tubing extending out of the gas separator waste tube assembly (see [Figure 23](#)).

Figure 23. Gas separator waste tube assembly



5. Place the end of the gas separator waste tube into a waste container or appropriate drain. Make sure the tube and the waste container are open to the atmosphere.

IMPORTANT For correct drainage, make sure the drain and waste lines are not bent, pinched, or elevated at any point. Do not allow the ends of the lines to be submerged in waste liquid.

Degassing the Water

Degas the deionized water that will be used to fill the eluent reservoir. See “[Deionized Water Requirements for IC](#)” on [page xii](#).

Note If you did not set up the computer and software yet, you can do this while waiting for water degassing to finish.

Setting Up the Reservoir

One of the following reservoirs is shipped with the Dionex ICS-4000:

- 1-liter polypropylene reservoir (P/N 063291)
- 2-liter polypropylene reservoir (P/N 062510)
- 1-liter polystyrene reservoir (P/N 075313)



CAUTION Do not use the reservoirs for offline vacuum degassing of eluents. The reservoirs were not designed for this purpose.



MISE EN GARDE N'utilisez pas le réservoir en plastique pour le dégazage à vide hors ligne d'éluants. Le réservoir n'a pas été conçu à cette fin.



VORSICHT Verwenden Sie den Plastikbehälter zum Offline Vakuum-Entgasen von Eluenten. Die Behälter sind dafür nicht ausgelegt.

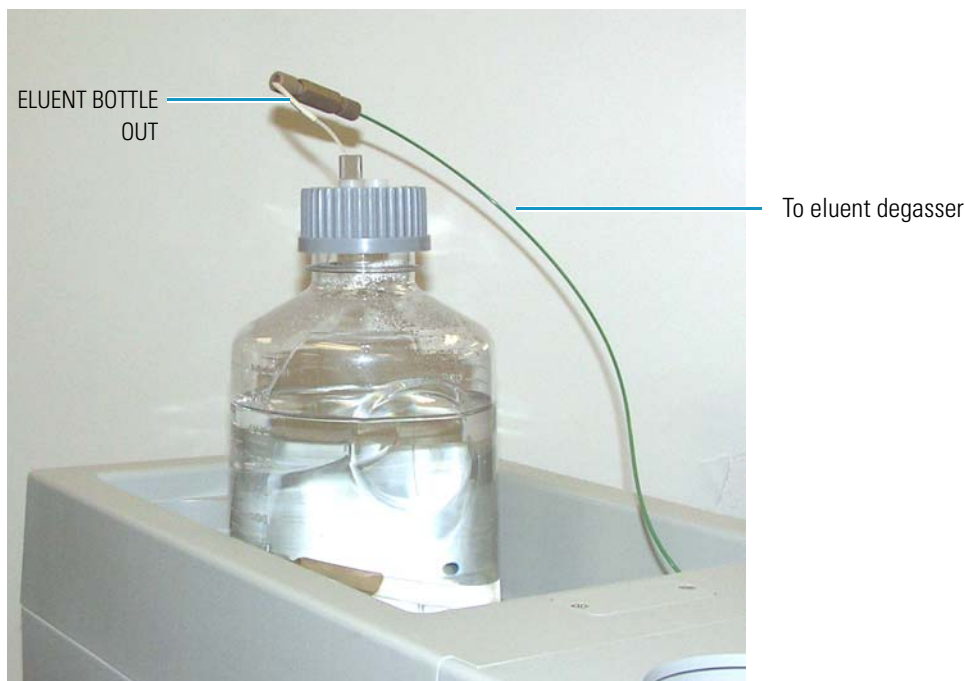
IMPORTANT Always use ASTM filtered, Type I (or better) (18 megohm-cm) deionized water that meets the specifications in [Table 1](#) on [page xvii](#) to rinse reservoirs, fill reservoirs used for eluent generation or seal washing, or to manually prepare eluent.

❖ To set up the reservoir

1. Rinse the eluent reservoir with deionized water and then fill it with degassed deionized water. This water will be used to:
 - Flush the system
 - Condition and hydrate consumable devices (EGC, CR-TC, CES, CRD)
 - Generate eluent
2. Place the reservoir in the reservoir organizer on top of the Dionex ICS-4000.

3. If an end-line filter is not installed, locate the filter (P/N 045987) in the Dionex ICS-4000 Ship Kit (P/N 075161) and install it on the end of the reservoir's eluent line.
4. Thoroughly rinse the end-line filter with deionized water.
5. Install the reservoir cap, making sure the end of the line extends to the bottom of the reservoir, and that the filter is submerged in liquid. This prevents air from being drawn through the eluent lines. Hand-tighten the cap.
6. Connect the liquid line from the pump to the **ELUENT BOTTLE OUT** line from the reservoir cap (see [Figure 24](#)).

Figure 24. Completed eluent reservoir connections (reservoir P/N 075313 shown)



For non-RFIC-EG systems: You can prepare the eluent for the application now or wait until after completing the system installation and the IQ. For eluent preparation instructions, refer to the manual for the column that will be installed. Column manuals are provided on the Thermo Scientific Reference Library DVD (P/N 053891).

Online Degassing of Liquids

The Dionex ICS-4000 includes a built-in degasser that provides continuous, online liquid degassing. Deionized water or eluent from the eluent reservoir passes through the degasser before it enters the pump.

If a Dionex AS-AP will be used with the Dionex ICS-4000, a separate vacuum degasser can be installed for degassing the flush fluid used with the autosampler. A Dionex AS-AP Degas Kit (P/N 079883) is available that includes the degas module, tubing, and fittings needed to install the degasser in the Dionex AS-AP and connect it to the Dionex ICS-4000. Installation instructions are included in the kit.

Pressurizing Reservoirs

The eluent reservoirs available for use with the Dionex ICS-4000 can be pressurized. Although not *required*, pressurizing reservoirs with helium or nitrogen is recommended under the following circumstances:

- When using eluents that are sensitive to contamination.
- When combining aqueous and nonaqueous components (for example, water and acetonitrile). Pressurizable reservoirs allow eluents to be stored under a specific atmosphere.

For instructions, see [“Pressurizing Eluent Reservoirs”](#) on [page 45](#).

Setting Up the Pump Seal Wash System

If the Dionex ICS-4000 will be equipped with a pump seal wash system, install the system now. Instructions are provided with the Dionex ICS-4000 Seal Wash Kit (P/N P/N 078434).

Priming the Pump

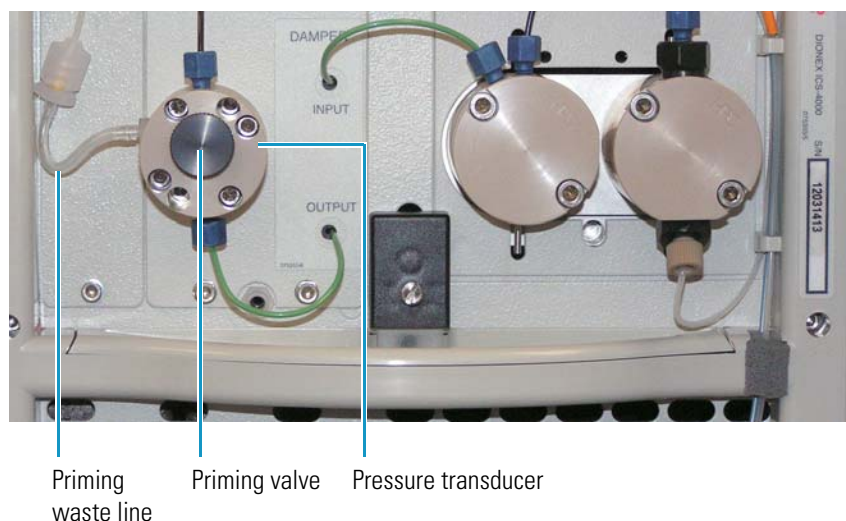
Before priming, check that the following tasks have been done:

- Eluent reservoir is filled.
- Reservoir cap is installed and hand-tightened.
- Liquid line from the pump to the reservoir cap is connected.
- (Optional) Piston seal wash system is set up.
- (Optional) Reservoirs are pressurized.

❖ To prime the pump

1. Open the priming valve on the pressure transducer (see Figure 25) by turning the knob one-quarter to one-half turn counterclockwise.

Figure 25. Pump priming valve



2. Disconnect the system from Chromeleon, if it is currently connected.
3. On the touch screen, select **Pump** on the Menu screen to open the Pump screen.
4. Under Prime/Flush, touch the flow rate list and select **2.00 mL/min**.
5. Touch **Prime**.

Prime the pump until all air is purged and no air bubbles can be seen exiting the waste line that extends from the left side of the pressure transducer (see Figure 25).

6. To stop priming, touch **Off**. Close the priming valve by turning the knob clockwise. Tighten no more than fingertight.

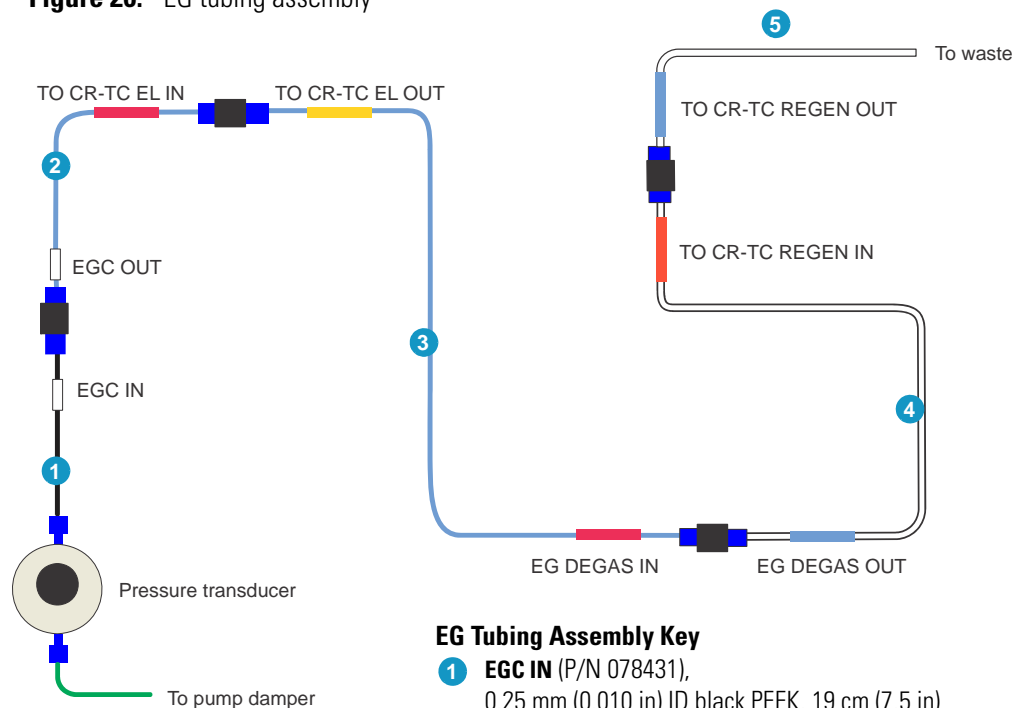
IMPORTANT Do not use any tools to tighten the priming valve! Overtightening may destroy the cap seal. Open or close the priming valve only when the system pressure is less than 0.7 MPa (100 psi).

Note You can also prime the pump from Chromeleon. On the Chromeleon 7 ePanel Set or the Chromeleon 6.8 panel tabset, click the **ICS-4000** tab. Click **Prime**. A message asks you to verify that the purge (priming) valve is open. Click **Execute despite warnings** (Chromeleon 7) or **OK** (Chromeleon 6.8).

Flushing the EG Tubing Assembly

The EG tubing assembly in the front tray (see [Figure 9](#)) includes five lengths of tubing connected to each other with unions (see [Figure 26](#)). The tubing will be used to plumb the EGC, CR-TC, and EG degas.

Figure 26. EG tubing assembly



EG Tubing Assembly Key

- 1** EGC IN (P/N 078431),
0.25 mm (0.010 in) ID black PEEK, 19 cm (7.5 in)
- 2** EGC OUT / TO CR-TC EL IN (P/N 072204)
0.062 mm (0.0025 in) ID blue PEEK, 18 cm (7 in)
- 3** TO CR-TC EL OUT / EG DEGAS IN (P/N 078432)
0.062 mm (0.0025 in) ID blue PEEK, 33.65 cm (13.25 in)
- 4** EG DEGAS OUT / TO CR-TC REGEN IN (P/N 078433)
1.58 mm (0.062 in) ID clear ETFE, 30.5 cm (12 in)
- 5** TO CR-TC REGEN OUT (P/N 072225)
1.58 mm (0.062 in) ID clear ETFE, 2.1 m (7 ft)

❖ To flush the EG tubing assembly

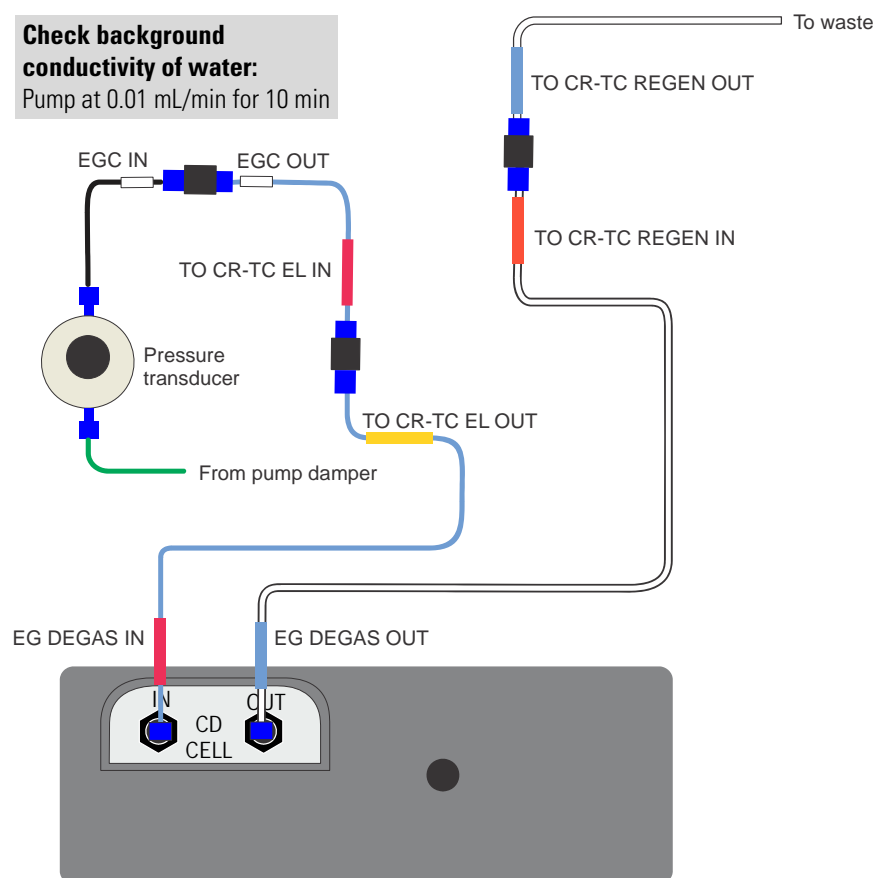
On the Pump screen, under Prime/Flush, select **0.05 mL/min** and touch **Flush**. Run the pump for 10 min.

Checking the Conductivity Reading of the Water

❖ To check the background reading of the water for conductivity detection

For reference, [Figure 27](#) shows the plumbing connections for checking the background conductivity of the water.

Figure 27. Flow schematic for checking the background conductivity



1. On the EG tubing assembly, disconnect the **EG DEGAS IN** tubing from its union and connect this tubing to the cell **IN** port.
2. Connect the **EG DEGAS OUT** tubing to the cell **OUT** port.
3. On the Pump screen, under Prime/Flush, select **0.01 mL/min**. Flush for about 10 min and monitor the Total Conductivity reading on the Home screen. The reading for conductivity detection should be $<1 \mu\text{S}$. If it is higher, refill the reservoir with fresh, degassed deionized water and recheck the reading.

Performing the Installation Qualification

The purpose of running the Installation Qualification (IQ) is to verify that the Dionex ICS-4000 is correctly installed and that it meets performance specifications. For instructions, refer to *IC System Installation Qualification* (Document No. 031739), provided on the Thermo Scientific Reference Library DVD (P/N 053891). Allow about 1 hour to complete the IQ. When you finish, continue the Dionex ICS-4000 installation.

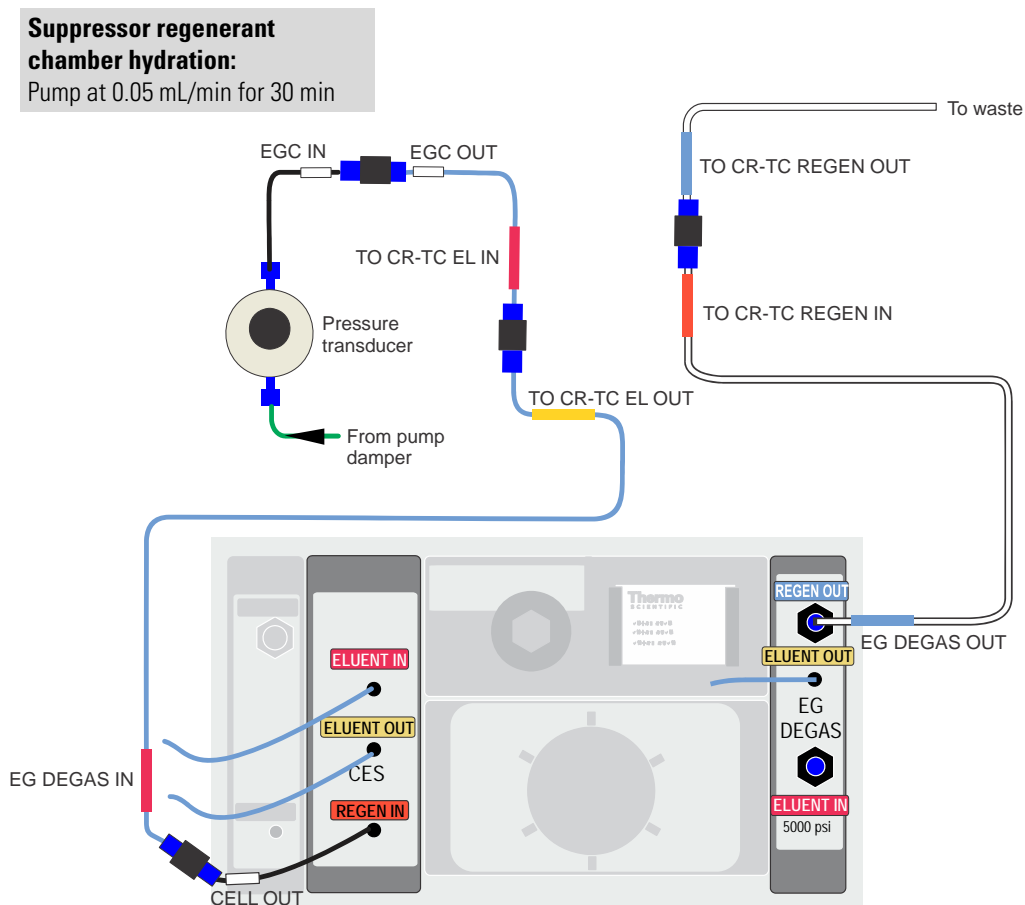
Note If you are installing an ED, set up the eluent generator, before performing IQ (see [page 27](#)). The IQ procedure for an ED requires KOH eluent. The procedure for a CD requires only deionized water.

Hydrating the Suppressor

❖ To hydrate the suppressor regenerant chamber

For reference, [Figure 28](#) shows the plumbing connections for hydrating the suppressor regenerant chamber.

Figure 28. Flow schematic for hydrating the suppressor regenerant chamber

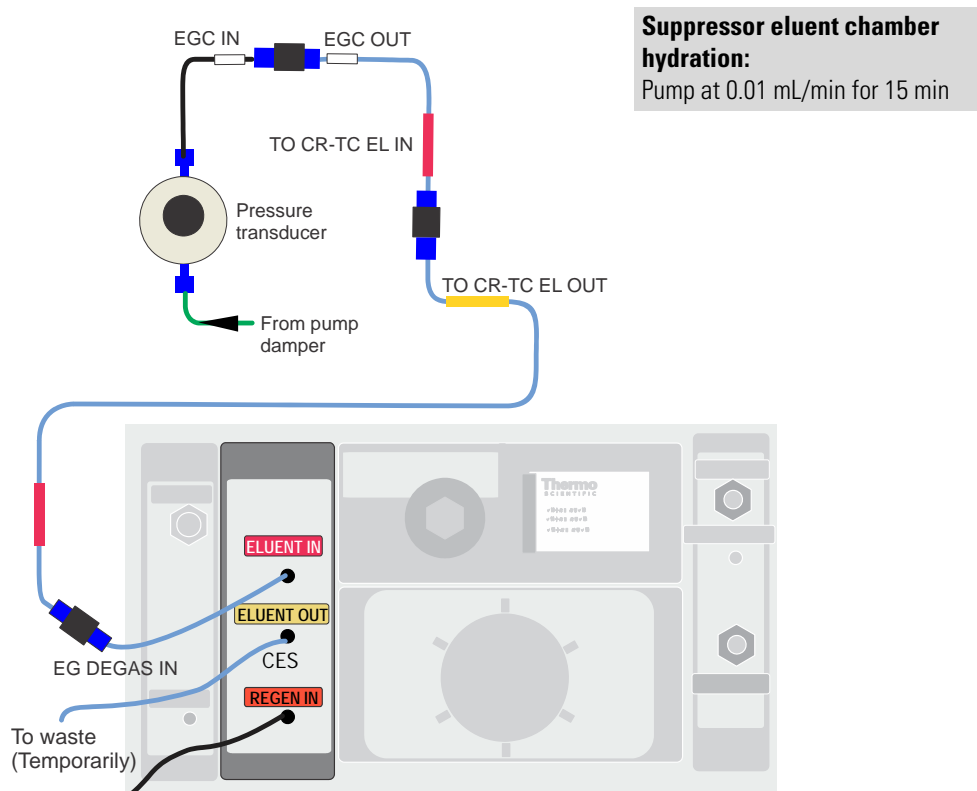


1. Connect the **EG DEGAS IN** tubing to the tubing that is pre-plumbed to the CES **REGEN IN** port (the tubing is labeled **CELL OUT**).
2. Connect the **EG DEGAS OUT** tubing to the EG degas **REGEN OUT** port.
3. On the Pump screen under Prime/Flush, select **0.05 mL/min**. Touch **FLUSH**.
4. Run the pump for 30 minutes and then turn off the pump flow.

❖ **To hydrate the suppressor eluent chamber**

For reference, [Figure 29](#) shows the plumbing connections for hydrating the suppressor eluent chamber.

Figure 29. Flow schematic for hydrating the suppressor eluent chamber



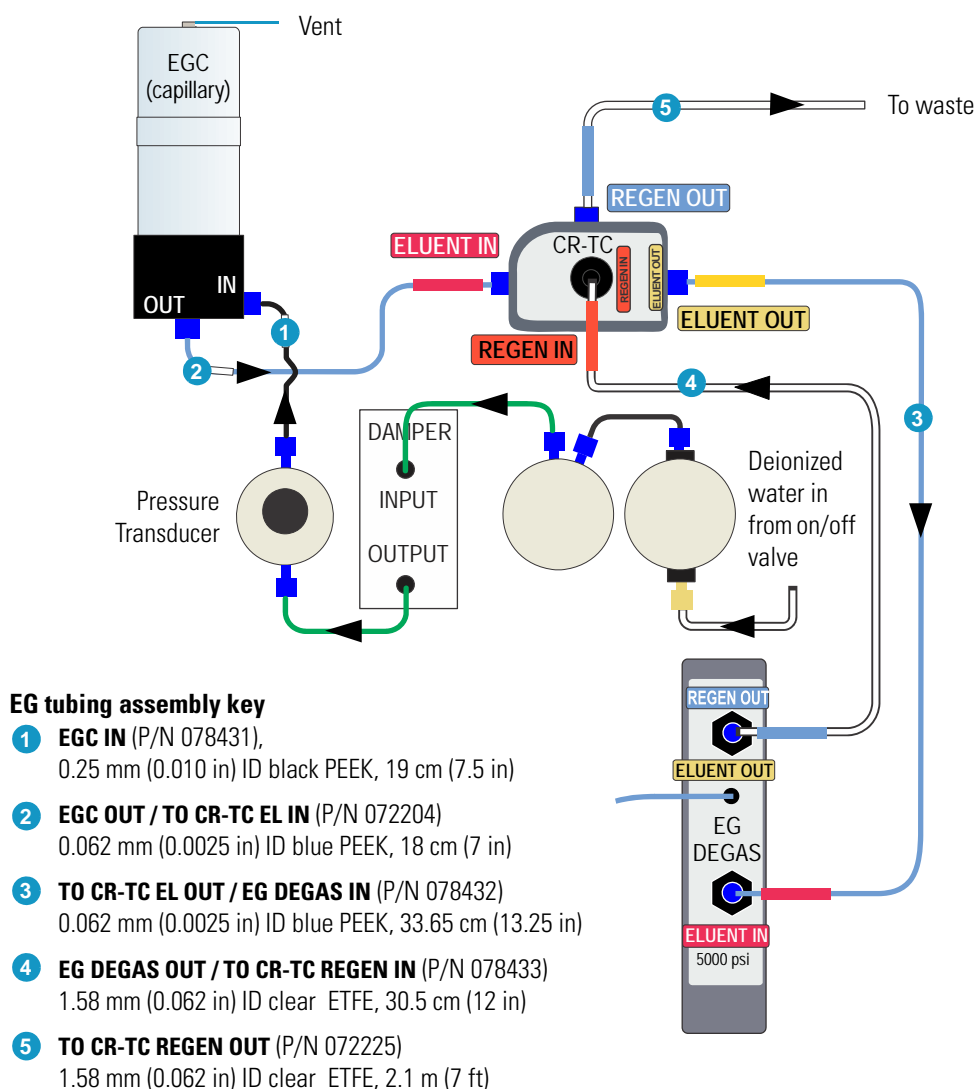
1. Disconnect the **EGC DEGAS IN** tubing from the CES **REGEN IN** port and connect this tubing to the tubing pre-plumbed to the CES **ELUENT IN** port.
2. Direct the pre-plumbed CES **ELUENT OUT** line to waste.
3. On the Pump screen under Prime/Flush, select **0.01 mL/min**. Run the pump for 10 minutes and then turn off the pump flow. This hydrates the suppressor eluent chamber.

Setting Up the EGC and CR-TC

Before you begin:

- Refer to the EGC and CR-TC manuals for the optimal operating conditions for your application.
- Refer to [Figure 30](#) for an overview of the final eluent generator plumbing after all setup steps are complete.

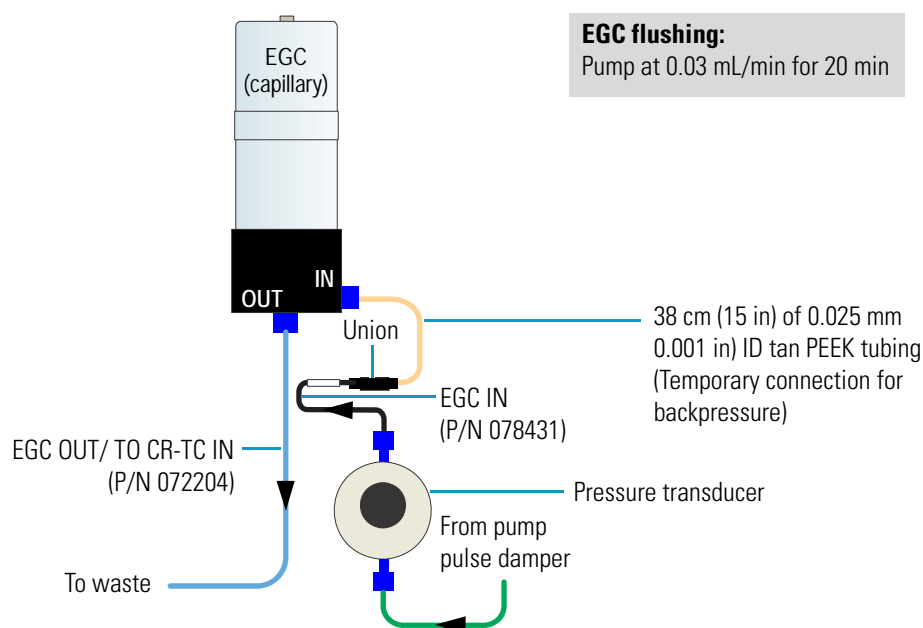
Figure 30. Eluent generator flow schematic (after setup is complete)



❖ **To flush the EGC**

For reference, [Figure 31](#) shows the plumbing connections for flushing the EGC.

Figure 31. Flow schematic for flushing the EGC

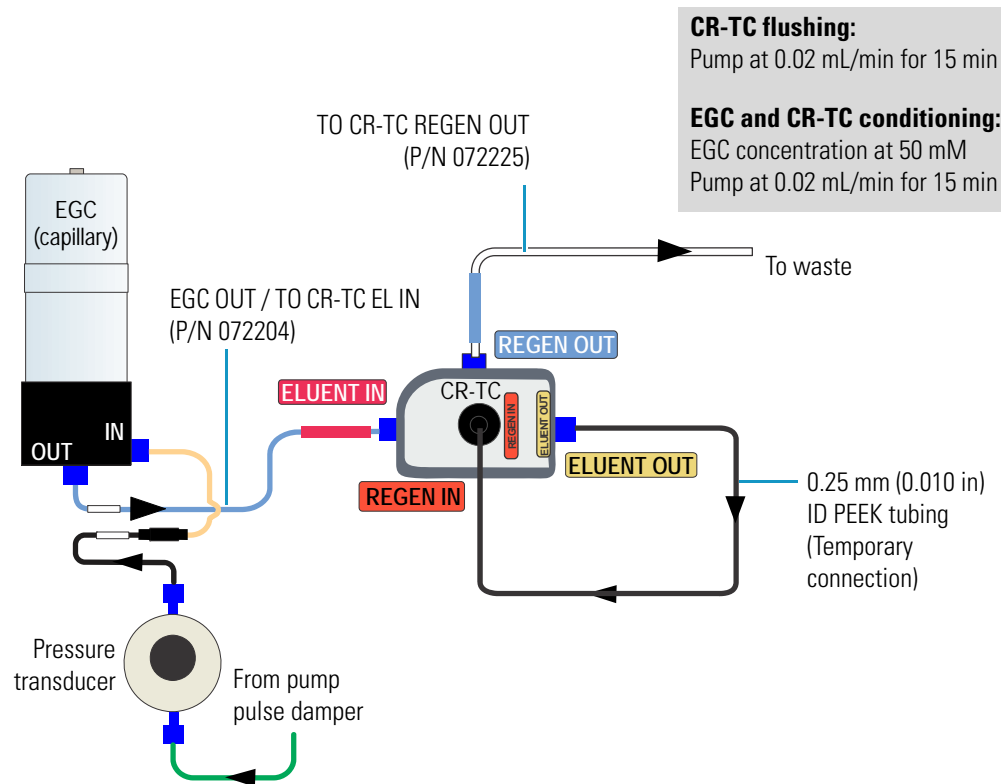


1. Locate the following items in the Dionex ICS-4000 Ship Kit:
 - 38 cm (15 in) piece of 0.025 mm (0.001 in) ID tan PEEK tubing (P/N 074582)
 - Two 10-32 fitting bolts and two double-cone ferrules
2. Connect the tan PEEK tubing (P/N 074582) between the **EGC IN** line and the **EGC IN** port. This is a temporary connection for backpressure.
3. Set the pump flow to **0.03 mL/min**. Wait for fluid to flow from the **EGC OUT** port on the bottom of the EGC.
4. Connect the **EGC OUT** tubing to the **EGC OUT** port. Slide the EGC back into its holder. Direct the other end to waste.
5. Flush the EGC for 20 minutes.

❖ **To flush the CR-TC**

For reference, [Figure 32](#) shows the plumbing connections for flushing the CR-TC.

Figure 32. Flow schematic for flushing the CR-TC and Conditioning the EGC and CR-TC



1. Remove the plugs from the ports on the CR-TC.
2. Locate the 0.25 mm (0.010 in) ID black PEEK tubing (P/N 042690) in the Dionex ICS-4000 Ship Kit.
3. Connect a piece of black PEEK tubing between the **ELUENT OUT** and **REGEN IN** ports of the CR-TC (see [Figure 32](#)). This is a temporary connection.
4. Disconnect the **TO CR-TC EL IN** line from its union and connect this line to the CR-TC **ELUENT IN** port (see [Figure 32](#)).
5. Disconnect the **TO CR-TC REGEN OUT** line from its union and connect this line to the CR-TC **REGEN OUT** port (see [Figure 32](#)).
6. Flush the CR-TC for 15 minutes at **0.02 mL/min**.

2 Installation Instructions

Installing the Columns and Column Cartridge

❖ To condition the EGC and CR-TC

1. Verify that the luer adapter is installed on the top of the EGC to allow venting of the EGC.

IMPORTANT To ensure proper ventilation, always install the luer fitting on the top of the EGC before operation. If you need to remove the EGC from the system, install the vent fitting plug to prevent leaks.

2. Verify that the pump flow rate is **0.02 mL/min**.
3. Set the EG concentration to **50 mM** and turn on the EGC and CR-TC power.
4. Condition the EGC and CR-TC for 15 minutes and then turn off the EGC and CR-TC power, and the pump flow.
5. Remove the temporary tan backpressure tubing from the **EGC IN** line and EGC **IN** port.

Installing the Columns and Column Cartridge

IMPORTANT Before continuing, refer to the manual for the column you are installing. Make sure to complete all start-up steps described in the manual. Column manuals are included on the Thermo Scientific Reference Library DVD (P/N 053891).

❖ To assemble the columns and inlet line

1. Cut off the label from the analytical column along the dotted line and slide the label into the holder on the front of the cartridge (see [Figure 33](#)).

Figure 33. Column cartridge with column label



2. Locate the Dionex IC Cube Tubing Kit (P/N 072186) in the Dionex ICS-4000 Ship Kit (P/N 075161). The kit contains precision cut tubing and the fittings required for the column connections.
3. The figures below illustrate the precision cut tubing and column assemblies required for three different column configurations. Connect the columns and tubing as shown in the figure that corresponds to your configuration.

Figure 34. Tubing assembly for a 250 mm analytical column with a 50 mm guard column

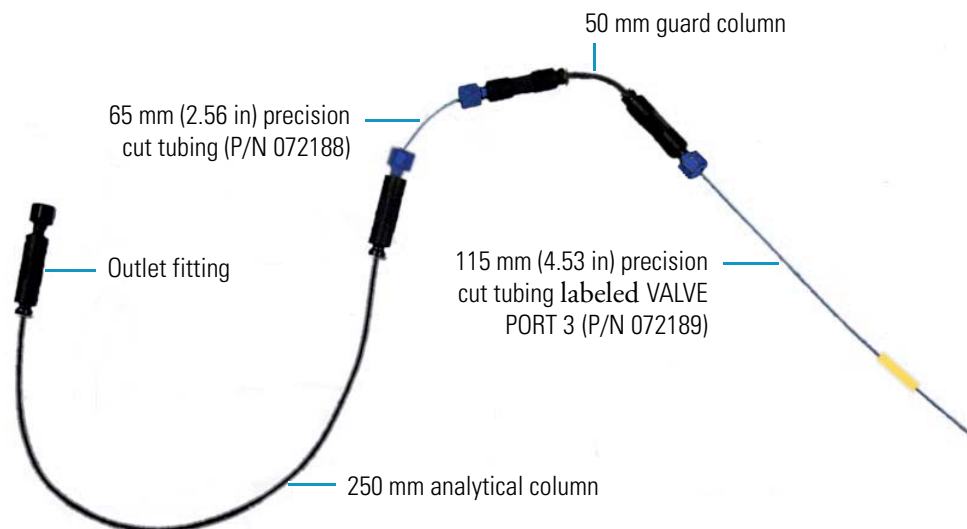


Figure 35. Tubing assembly for a 150 mm analytical column with a 35 mm guard column

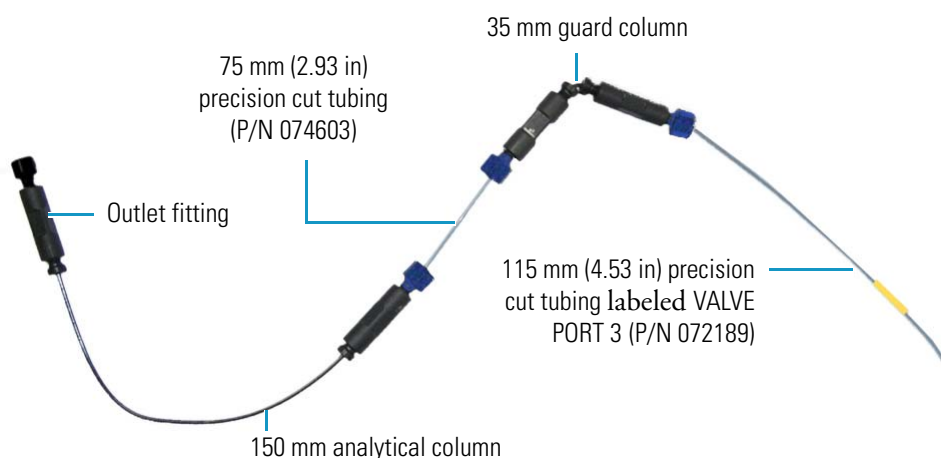
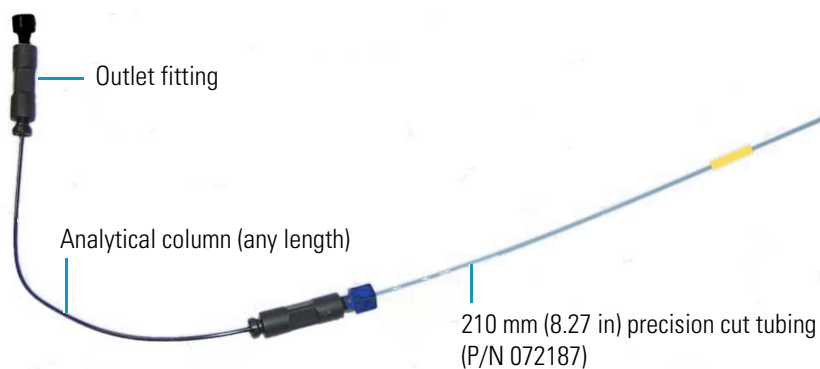


Figure 36. Tubing assembly for a analytical column (any length) without a guard column



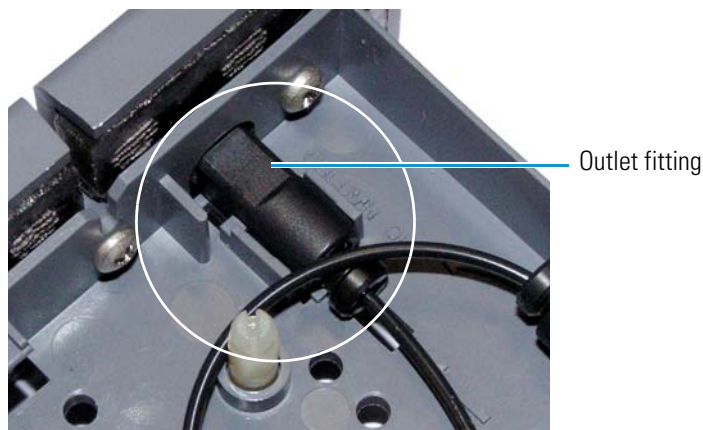
2 Installation Instructions

Installing the Columns and Column Cartridge

❖ To install the assembled columns and tubing in the column cartridge

1. Raise the lid of the column cartridge to open it.
2. Remove the fitting plug from the outlet fitting on the analytical column. Orient the fitting with a flat side up (see [Figure 37](#)) and push it into the opening at the front of the column cartridge until it stops.

Figure 37. Analytical column outlet fitting in column cartridge



3. Coil the analytical column inside the cartridge as shown in [Figure 38](#) or [Figure 39](#) and secure the column and the inlet fittings in the clips on the column cartridge.

Figure 38. Analytical and guard columns installed in column cartridge

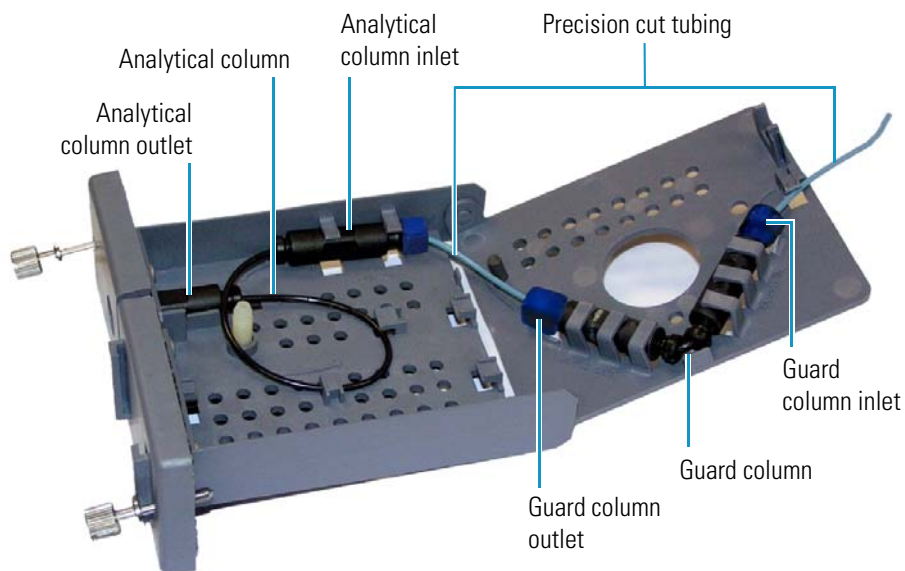
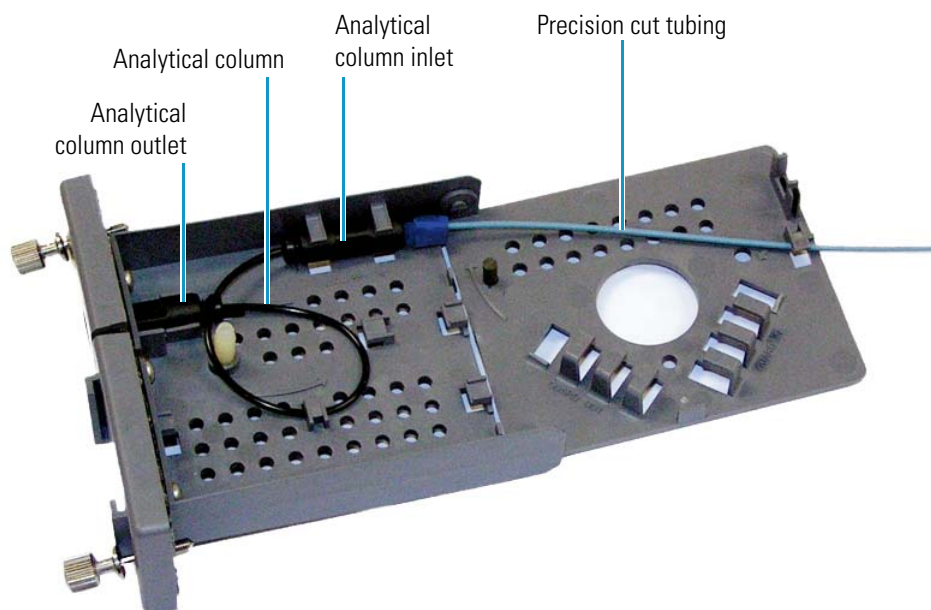


Figure 39. Analytical column installed in column cartridge



4. Close the lid (you should hear a click) and route the inlet line into the slot on the front of the column cartridge (see [Figure 40](#)).

Note The column cartridge lid should snap closed easily. If the lid does not close easily, do not force it. Open the lid and verify that the columns and tubing are installed correctly and secured in the clips.

Figure 40. Column cartridge closed; with column inlet line routed through slot



5. Slide the column cartridge into the Dionex IC Cube column heater and tighten the two thumbscrews.
6. Before connecting the column to the suppressor, flush the columns for one hour, or as instructed in the column manual.

Completing the Plumbing

Completing the High-Pressure Fluidic Connections

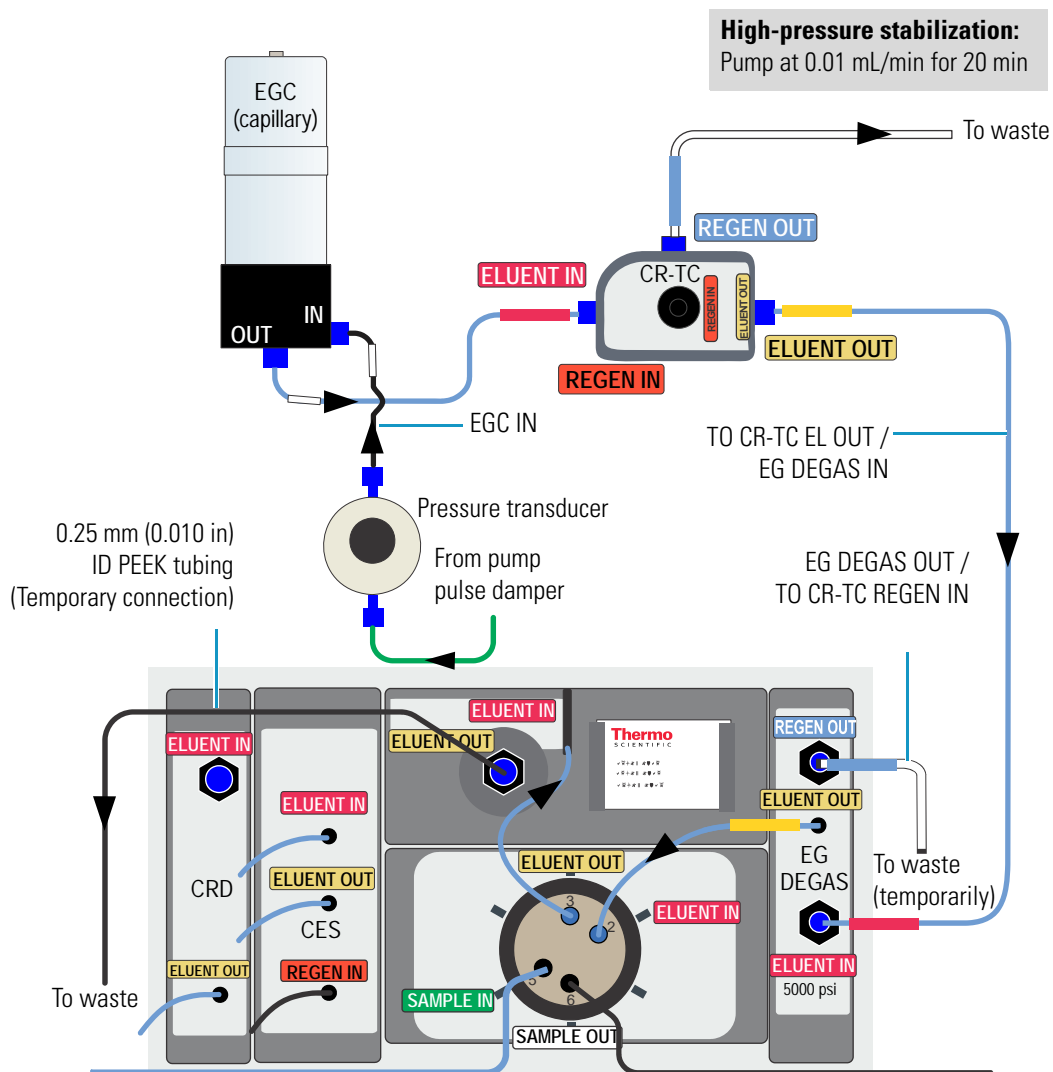
IMPORTANT To ensure no air is trapped in the system and that the pressure stabilizes, connect the high-pressure fluidics in the order given below and with the pump flow on.

- Before making a connection, wait until liquid is flowing from the port or tubing.
- After making a connection, wait 1 min before tightening the fitting.

❖ To complete the high-pressure fluidic connections

For reference, [Figure 41](#) shows the plumbing connections required for high-pressure stabilization.

Figure 41. Flow schematic for high-pressure stabilization



1. Connect the **EGC IN** line to the **EGC IN** port (see [Figure 41](#)).
2. Connect the **TO CR-TC EL OUT / EG DEGAS IN** line (P/N 078432) between the CR-TC **ELUENT OUT** port and EG degas **ELUENT IN** port.
3. Connect the **EG DEGAS OUT / TO CR-TC REGEN IN** line (P/N 078433) to the EG degas **REGEN OUT** port. Temporarily direct the other end of the line to waste.
4. Set the pump flow rate to **0.01 mL/min**.
5. Connect the pre-plumbed EG degas **ELUENT OUT** line to the injection valve **ELUENT IN** port.
6. Connect the column cartridge **ELUENT IN** line to the injection valve **ELUENT OUT** port.
7. Connect a piece of 0.25 mm (0.010 in) ID black PEEK tubing to the column cartridge **ELUENT OUT** port. Direct the other end of the tubing to waste (see [Figure 41](#)). This is a temporary connection.
8. Wait for 20 min to allow the system pressure to stabilize.

To plumb a CD, go to “[Completing the Low-Pressure Fluidic Connections for Conductivity Detection](#).”

To plumb an ED, go to “[Completing the Low-Pressure Fluidic Connections for Conductivity Detection](#)” on [page 36](#).

Completing the Low-Pressure Fluidic Connections for Conductivity Detection

For reference, [Figure 42](#) shows the completed plumbing connections for conductivity detection without a CRD and [Figure 43](#) shows the completed connections with a CRD. Numbers on the schematics indicate the order in which connections are made.

Figure 42. Fluidic connections for conductivity detection without a CRD

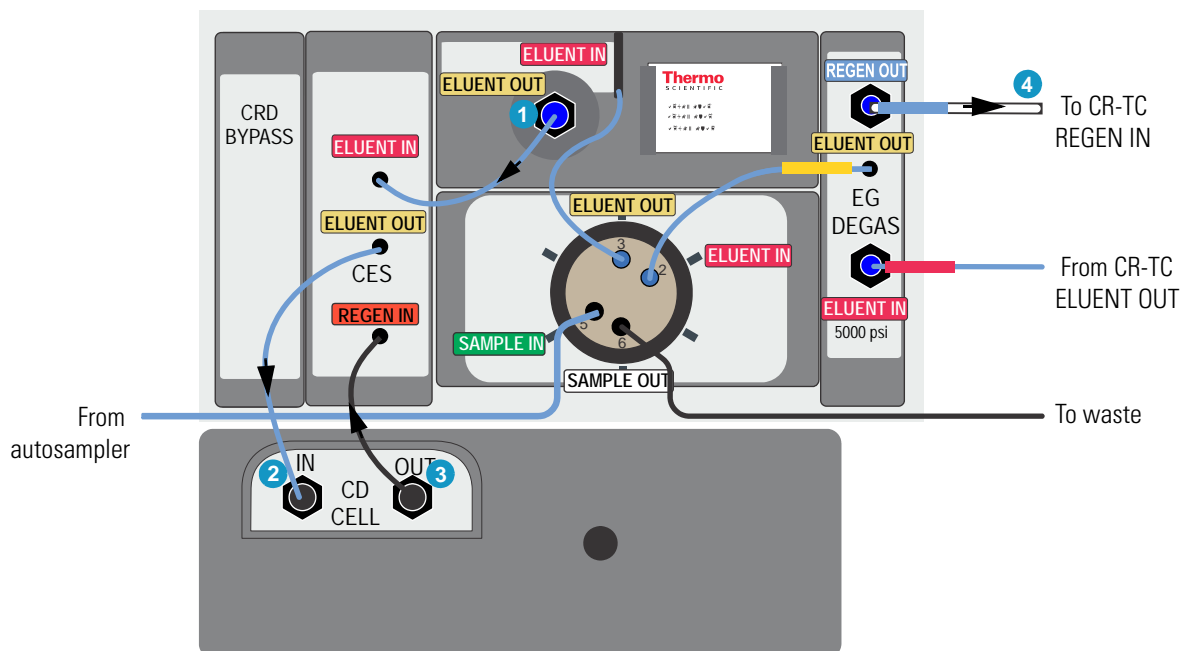
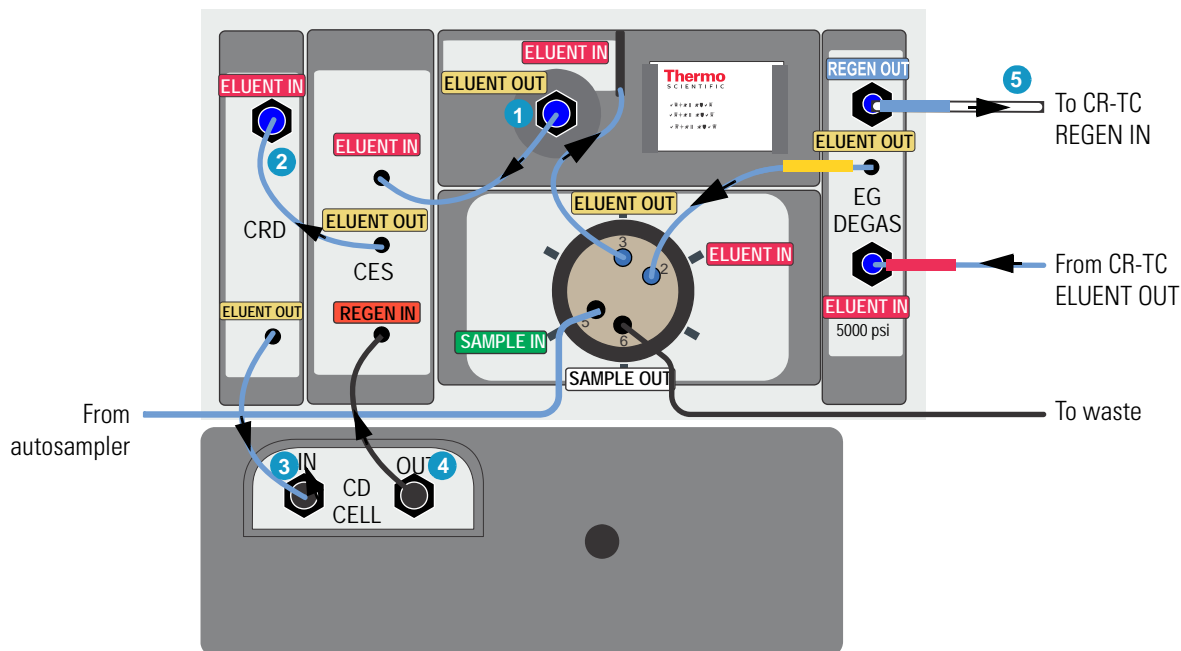


Figure 43. Fluidic connections for conductivity detection with a CRD



❖ **To complete the low-pressure connections for conductivity detection**

Note If a charge detector is installed in your system, complete the plumbing instructions for conductivity detector described here. After equilibrating the system, complete the hydration and installation procedure for the Dionex QDC 300 (Capillary).

1. Remove the temporary tubing from the column cartridge **ELUENT OUT** port.
2. Wait until liquid is flowing out of this port and then connect the pre-plumbed CES **ELUENT IN** line to the port. Wait about 1 min before tightening the fitting.
3. Wait until liquid is flowing out of the CES **ELUENT OUT** tubing and then connect this tubing to either the CD cell **IN** port or to the CRD **ELUENT IN** port (if a CRD is installed). Wait about 1 min before tightening the connection.

If a CRD is installed, wait until liquid is flowing out of the CRD **ELUENT OUT** tubing and then connect this tubing to the CD cell **IN** port. Wait about 1 min before tightening the connection.

4. Connect the CES **REGEN IN** tubing to the CD cell **OUT** port. Wait about 1 min before tightening the connection.
5. Connect the EG degas **REGEN OUT** tubing to the CR-TC **REGEN IN** port.

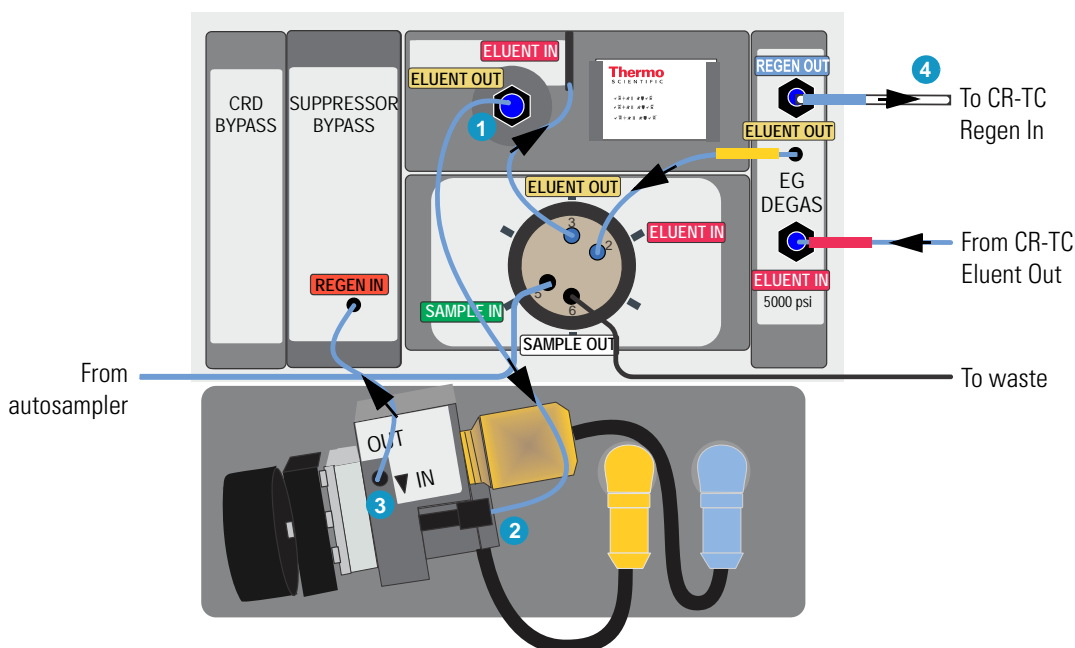
Completing the Low-Pressure Fluidic Connections for Electrochemical Detection

IMPORTANT Before completing the fluidic connections, install the working electrode and the reference electrode in the cell. For instructions, see “Installing the ED Amperometry Cell” on page 49.

❖ **To complete the low pressure connections for electrochemical detection**

For reference, Figure 44 shows the Dionex IC Cube plumbing after all connections for electrochemical detection are completed.

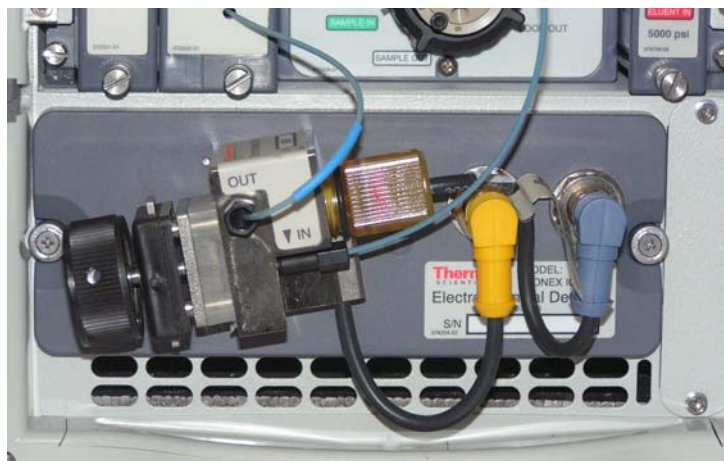
Figure 44. Fluidic connections for an ED (pH-Ag/AgCl reference electrode shown)



1. Locate the following items in the ED Cell Inlet Tubing Kit (P/N 074221) shipped with the cell:
 - 23 cm (9.00 in) piece of blue capillary tubing (P/N 071870) (cell inlet line)
 - Fittings for connecting the tubing
2. Remove the temporary tubing from the column cartridge **ELUENT OUT** port.
3. Wait until liquid is flowing out of this port and then use a 10-32 fitting bolt (P/N 043275) and 10-32 double-cone ferrule (P/N 043276) to connect the cell inlet line (P/N 071870) to the port (see Figure 44, connection #1). Wait about 1 min before tightening the fitting.
4. Wait until liquid is flowing out of this line and then use the long 10-32 fitting bolt (P/N AAA-057227) and split-cone ferrule (P/N 062978) to connect the line to the ED cell **IN** port (see Figure 44, connection #2). Wait about 1 min before tightening the connection.

5. Orient the cell assembly with the yoke knob on the left and then push the cell onto its mounting location on the ED (see Figure 45). Connect the reference electrode cable and the cell cable.

Figure 45. ED cell installed on detector (pH-Ag/AgCl reference electrode shown)



6. Connect the pre-plumbed line from the Suppressor Bypass **REGEN IN** port to the ED cell **OUT** port. (see Figure 44, connection #3)
7. Connect the line from the EG degas **REGEN OUT** port to the CR-TC **REGEN IN** port (see Figure 44, connection #4).
8. If you are using a PdH reference electrode, follow the instructions in the next section to condition the electrode before initial use.

Conditioning the PdH Reference Electrode

Condition the PdH reference electrode after plumbing the cell.

❖ To condition the PdH reference electrode

1. Verify that the pump flow rate is set to **0.01 mL/min** and the motor is on.
2. Set the EGC concentration to **100 mM** and turn on the power to the EGC and CR-TC.
3. Verify that eluent is exiting the cell.
4. On the **ICS-4000 ED** panel in Chromeleon, select the following settings:
 - a. Set the ED reference electrode type to **PdH** and turn on the PdH power.
 - b. Select **DC Amperometry** mode, set the DC voltage to **0.000 V**, and turn on the cell voltage.
 - c. Switch to **Integrated Amperometry** mode, click **Set Integrated Amperometry**, and select the **Gold, PdH RE, Carbo, Quad** waveform.
5. Condition the electrode for 1 hour at these settings.
6. Turn off the pump flow. This turns off the power to the EGC, cell, and PdH.

Equilibrating the System

This section describes the steps for manually equilibrating the system.

❖ To equilibrate the system

1. On the Chromeleon 7 ePanel Set or Chromeleon 6.8 panel tabset, verify that each device listed below (if installed in your system) is turned on and the selected setting for the device (flow rate, eluent concentration, temperature, and so on) is correct for your application:
 - Pump
 - EGC
 - CR-TC
 - EPM
 - Suppressor
 - Temperature control devices (lower compartment, Dionex IC Cube column heater, CD cell heater). Set the temperature of the lower compartment to 15 °C. Set the temperature of the column heater as required for the installed column type.
2. In Chromeleon 7, click **Monitor Background** on the toolbar above the ePanel Set. In Chromeleon 6.8, select **Control > Acquisition On**. Chromeleon begins plotting the detector signal and pump pressure readings.
3. View the detector signals and monitor the background. Offset the detector background and zero the reading by clicking **Autozero**.
4. Verify that the detector baseline is at the expected reading for your application and is stable. Refer to the column manual for the appropriate background for your application. Column manuals are included on the Thermo Scientific Reference Library DVD (P/N 053891).
5. Monitor the pump pressure and make sure it is at the expected reading for the installed column and it is stable.
6. Verify that all installed temperature control devices are at their set temperatures and are stable.

Note

- Equilibration time varies, and it may take some time to reach the expected values.
- Because capillary IC systems use low flow rates and consume very little eluent, you can leave a capillary IC system on at all times, allowing it to remain equilibrated and always ready to run the next sample.

Installing a Dionex QDC 300 (Capillary)

Note

- Before installing the Dionex QDC 300 (Capillary) (QDC) verify that the background conductivity is $\leq 2 \mu\text{S}/\text{cm}$.
- Always hydrate the QDC before use to ensure the QDC membranes are fully hydrated and ready for operation.

❖ Before installing the QDC

Complete the instructions in the previous sections of this manual to install the other consumables and plumb the system. Then, equilibrate the system with the eluent required for the analysis and wait until the background conductivity is $\leq 2 \mu\text{S}/\text{cm}$. Leave the pump flow on during the QDC installation.

❖ To install the QDC on the CD and QD

Hold the QDC with the label on the left side (see [Figure 46](#)) and align the ball stud and electrical connector on the back of the cell with their respective receptacles on the front of the CD (see [Figure 47](#)). Press firmly to ensure that the electrical connector on the back of the QDC plugs into the connector on the QD.

Figure 46. Dionex QDC 300 (Capillary)

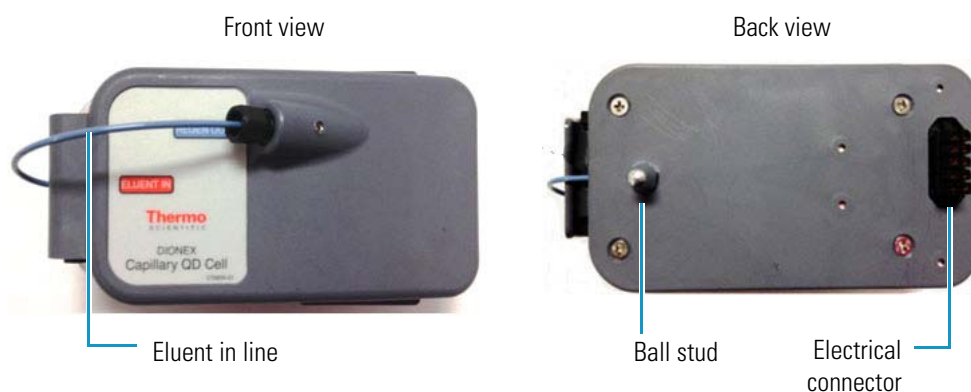


Figure 47. CD and QD before installation of the QDC

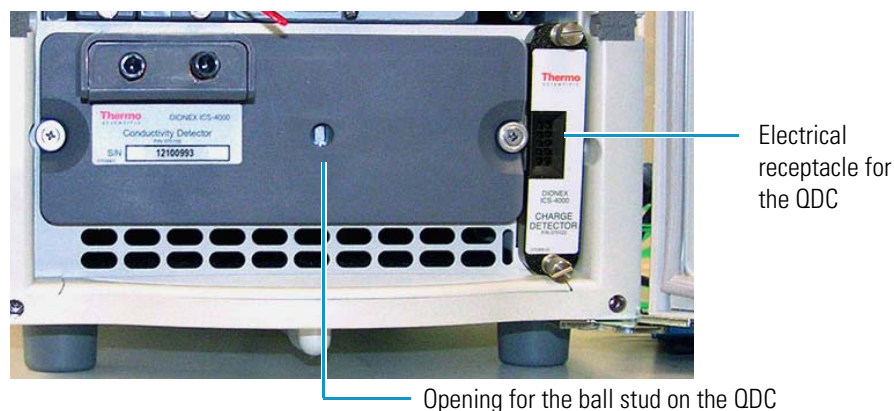


Figure 48 shows the QDC after installation on the CD and QD.

Figure 48. QDC mounted on the CD and QD



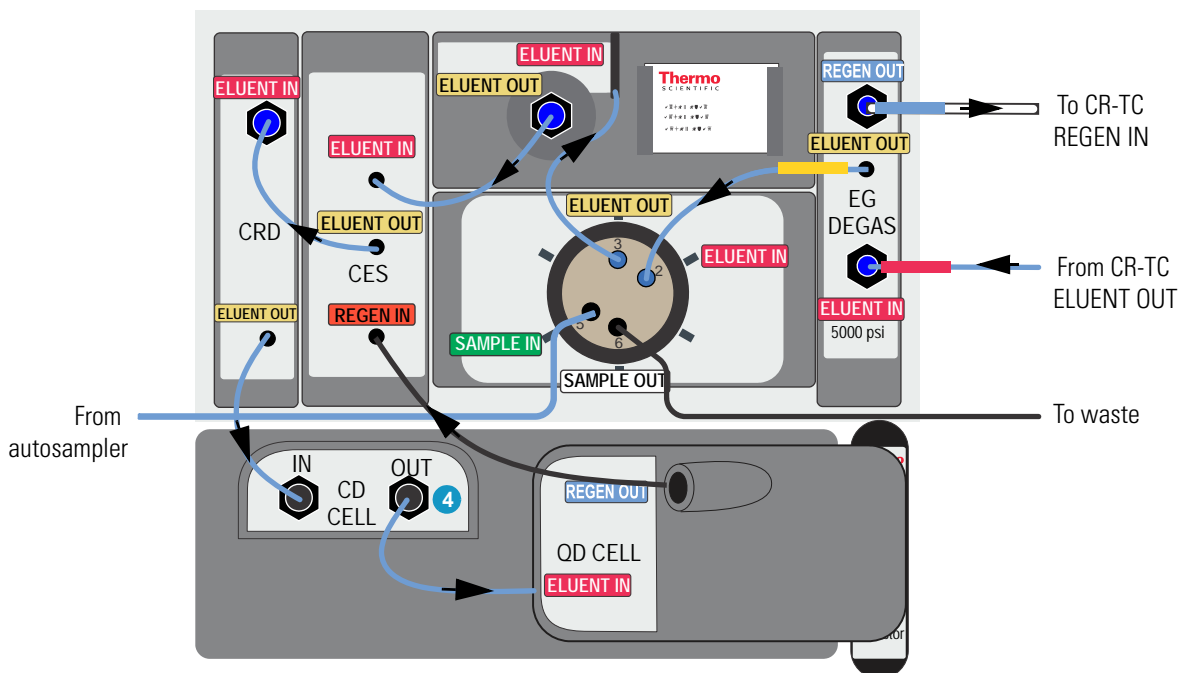
❖ **To hydrate the QDC**

1. Disconnect the QDC **ELUENT IN** line from the QDC **REGEN OUT** port (see Figure 46).
2. Disconnect the pre-plumbed CES **REGEN IN** line from the CD cell **OUT** port.
3. Turn off the CES current.
4. Connect the QDC **ELUENT IN** line to the CD cell **OUT** port.
5. Connect a temporary waste line to the QDC **REGEN OUT** port and allow the effluent from the CD cell to flow through the QDC out to waste. Wait 5 min. This ensures that any contaminants from the QDC are sent to waste and do not enter the CES regenerant chamber.
6. Verify that liquid is exiting the waste line and then turn on the cell from the **ICS-4000 QD** panel in Chromeleon.
7. Hydrate the QDC for 20 min.
8. Remove the waste line from the QDC **REGEN OUT** port.

❖ **To complete the plumbing**

For reference, [Figure 49](#) shows the Dionex IC Cube and detector plumbing after all connections for conductivity detection with charge detection are completed.

Figure 49. Fluidic connections for conductivity detection with charge detection



1. Connect the pre-plumbed CES **REGEN IN** line to the QDC **REGEN OUT** port.
2. Turn on the CES current from the **Electrolytics** panel in Chromeleon. The QDC is now ready for use.

This completes the Dionex ICS-4000 installation procedure. For operating instructions, refer to the *Dionex ICS-4000 Capillary HPIC System Operator's Manual* (Document No. 065468). The manual is provided on the Thermo Scientific Reference Library DVD (P/N 053891).

2 Installation Instructions

Installing a Dionex QDC 300 (Capillary)

Pressurizing Eluent Reservoirs

The Dionex ICS-4000 does not require pressurized eluent reservoirs. However, pressurizing reservoirs with helium or nitrogen is recommended under the following circumstances:

- When using eluents that are sensitive to contamination.
- When combining aqueous and nonaqueous components (for example, water and acetonitrile). Pressurizable reservoirs allow eluents to be stored under a specific atmosphere.

All eluent reservoirs available for use with the Dionex ICS-4000 can be pressurized. To pressurize the eluent reservoirs, a Dionex ICS-4000 Regulator Kit (P/N 078520) is required. The kit includes the following parts:

- Pressure regulator and gauge assembly
- Mounting bracket with mounting screws and washers
- Tubing and fittings for connecting to the gas source

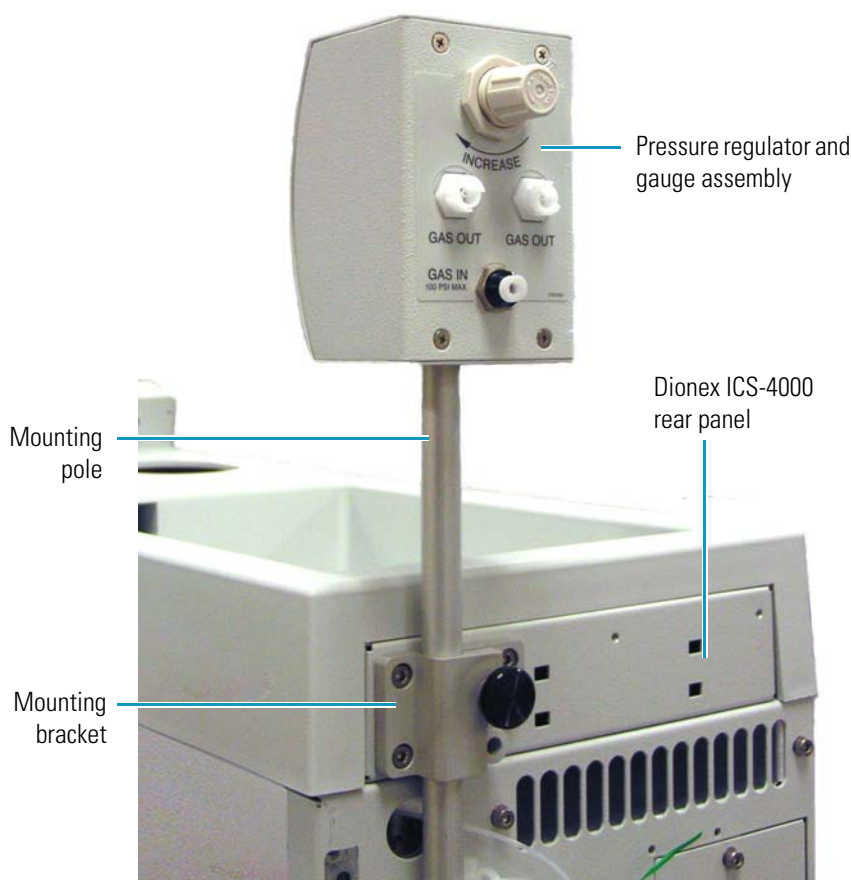
Figure 50. Pressure regulator and gauge assembly



❖ **To mount the assembly on the Dionex ICS-4000 rear panel**

1. Position the mounting bracket over the three screw holes on the upper left side of the rear panel.
2. Use the screws and 3 mm Allen wrench provided in the Regulator Kit to attach the bracket to the rear panel (see [Figure 3](#)).
3. Slide the mounting pole into the mounting bracket until the pressure regulator and gauge assembly is 15 to 20 cm (6 to 8 in) above the bracket. Tighten the knob to secure the pole to the bracket.

Figure 51. Pressure regulator and gauge assembly mounted on rear panel



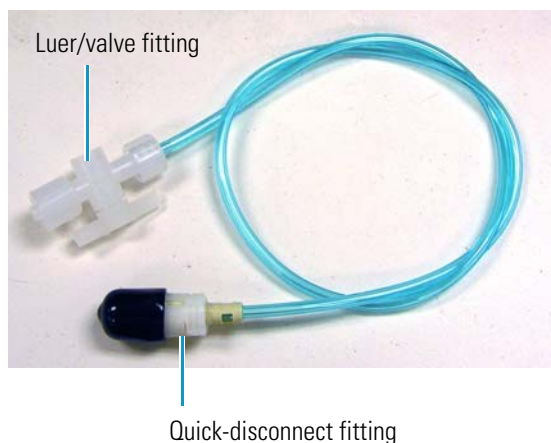
❖ **To connect the gas source**

1. Locate the 1/4 in NPT to 1/8 in adapter (P/N 063505) and the orange, 3 mm (1/8 in) ID air line tubing (P/N 052297) provided in the Regulator Kit.
2. Push one end of the orange tubing into the **GAS IN** fitting on the regulator (see [Figure 53](#)).
3. Connect the other end of the orange tubing to a clean helium or nitrogen source regulated to between approximately 0.17 and 0.34 MPa (25 and 50 psi). If needed for your gas source, use the adapter to connect the tubing to the gas source.

❖ **To connect the reservoir**

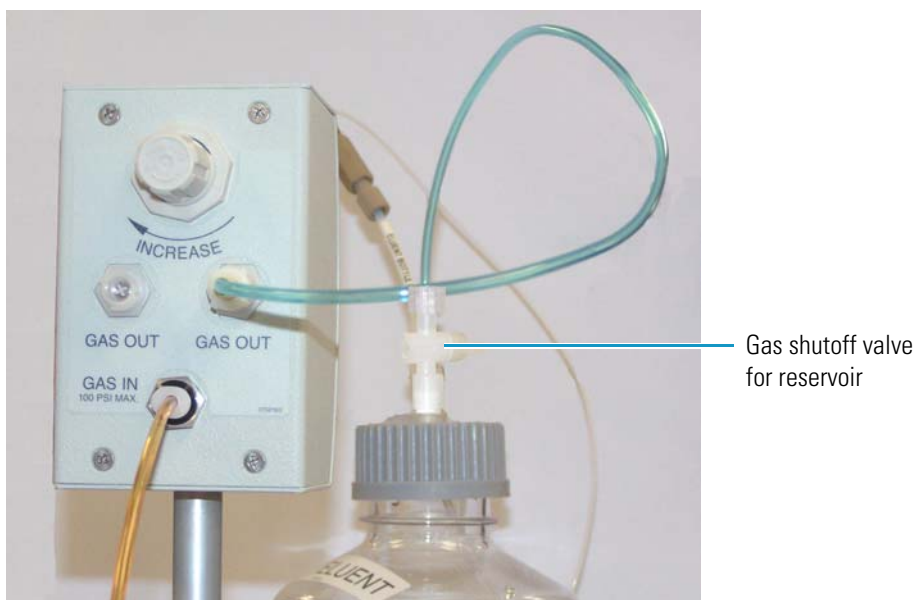
1. Locate a gas source tubing assembly (P/N 063942) in the Regulator Kit. Each assembly consists of a length of blue, 3 mm (1/8 in) ID air line tubing with a quick-disconnect fitting on one end and a luer/valve fitting on the other end (see [Figure 52](#)).

Figure 52. Gas source tubing assembly



2. Remove the black cap from the quick-disconnect fitting on the blue tubing and twist off the bottom half of the quick-disconnect fitting. This half of the fitting is not needed.
3. Push the fitting onto a **GAS OUT** fitting on the regulator (see [Figure 53](#)) and twist to complete the connection.

Figure 53. Gas connections to the regulator and reservoir



4. Push the luer/valve fitting onto the luer fitting on the reservoir cap. This is the gas shutoff valve for the reservoir.

❖ **To pressurize the reservoir**

IMPORTANT Before pressurizing the reservoir, connect the liquid line from the pump to the reservoir and fill the reservoir. For instructions, see “[Setting Up the Reservoir](#)” on [page 19](#).

1. Turn the gas regulator knob fully counterclockwise (to the left) to ensure that there is no pressure to the reservoir when the gas source is turned on.
2. Close the gas shutoff valve on the reservoir cap.
3. Turn on the gas source to 0.34 MPa (50 psi) \pm 0.07 MPa (10 psi).
4. Turn the gas regulator knob clockwise and adjust the pressure to between 30 and 40 kPa (5 and 6 psi).



CAUTION Never pressurize eluent reservoirs above 70 kPa (10 psi). Pressurizing reservoirs above this limit can cause the reservoir to explode.



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



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

5. If the liquid line from the pump is connected, you may open the gas shutoff valve on the reservoir cap.

Installing the ED Amperometry Cell

This appendix provides instructions for installing the ED amperometry cell. Complete these instructions before plumbing the cell in the system.

Contents

- Unpacking and Disassembling the Cell
- Installing a Working Electrode
- Installing the pH-Ag/AgCl Reference Electrode
- Installing the PdH Reference Electrode

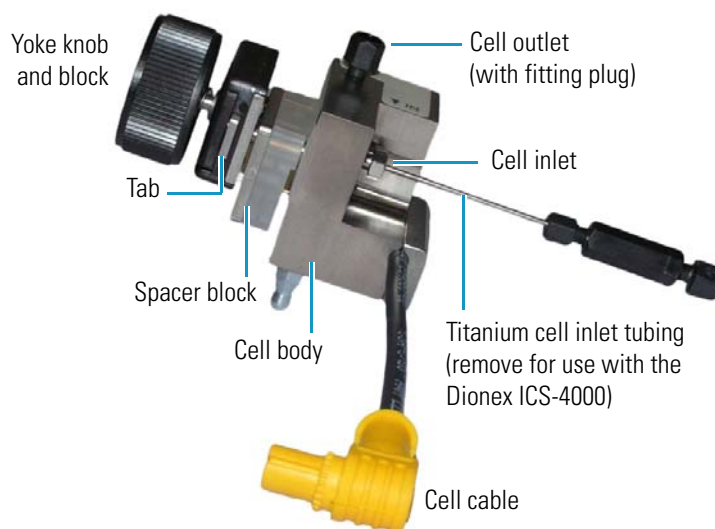
IMPORTANT Always wear gloves when handling the ED cell. Never touch the electrode surface.

Unpacking and Disassembling the Cell

❖ To unpack and disassemble the cell

1. Remove the ED cell from the box. Refer to [Figure 54](#) to identify the cell parts.

Figure 54. ED cell components



B Installing the ED Amperometry Cell

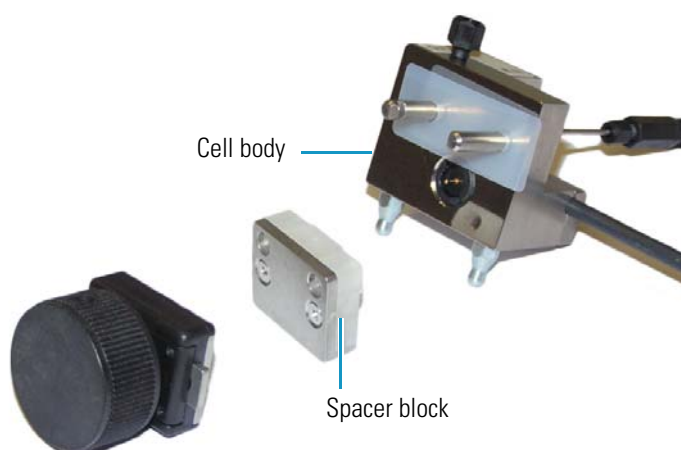
Unpacking and Disassembling the Cell

2. Loosen the yoke knob that holds the spacer block to the cell body by unscrewing it two to three turns.
3. Squeeze the tabs on the sides of the yoke block and pull the knob with yoke block off the spacer block.

Note Handle the inside surfaces of the cell carefully to prevent scratches which may subsequently cause leaks.

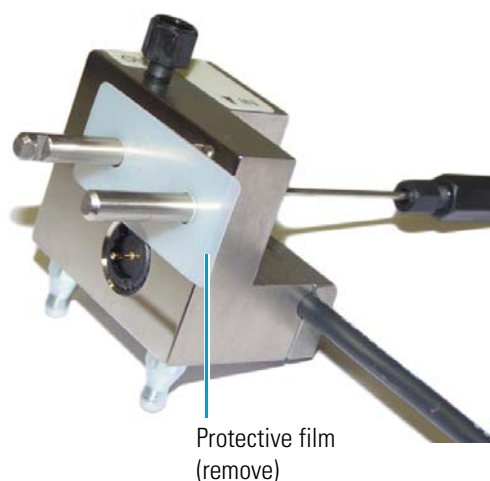
4. Slide the spacer block off the alignment pins on the cell body (see [Figure 55](#)). The spacer block is for use only with disposable working electrodes. If you will be installing a conventional working electrode, you can remove the spacer block and save it for possible future use.

Figure 55. ED cell disassembled



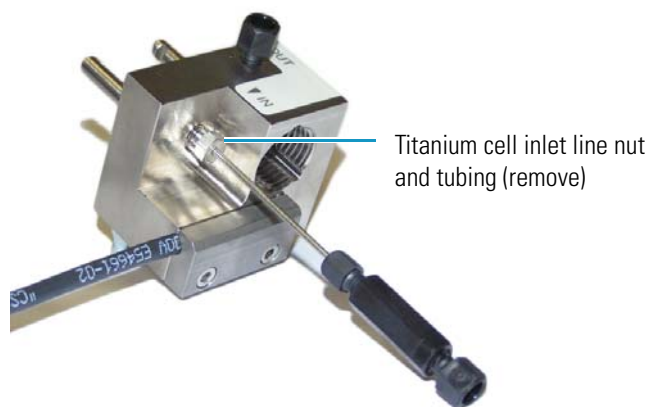
5. Remove the protective film from the alignment pins on the cell body (see [Figure 56](#)).

Figure 56. ED cell body with protective film



6. Use an open-end wrench to loosen the nut on the titanium inlet line assembly (see [Figure 57](#)) and then remove the assembly. This inlet line assembly is used in Dionex IC systems that run analytical IC applications. It is not used for capillary IC applications.

Figure 57. ED cell body with titanium inlet line assembly



7. Rinse the surface of the cell with ASTM Type I (18 megohm-cm) filtered and deionized water.
8. Clean the polished surface of the cell with a damp, clean, lint-free tissue.

Installing a Working Electrode

You can use either a disposable working electrode or a conventional working electrode.

Installing a Disposable Working Electrode

For installation instructions for disposable working electrodes, refer to the installation guide shipped with the electrodes (see below) or to the Product Manual for Disposable Electrodes (Document No. 065040), which is included on the Thermo Scientific Reference Library DVD (P/N 053891).

- *Disposable Silver Electrode Installation Guide for ED* (Document No. 065137)
- *Disposable Platinum Electrode Installation Guide for ED* (Document No. 065139)
- *Disposable Gold Electrode Installation Guide* (Document No. 065191)

IMPORTANT When you install a disposable electrode, make sure that you install the correct gasket. Use a 0.001-in PTFE gasket (P/N 072117, Pkg. of 2) with the Dionex ICS-4000.

After installing a disposable working electrode, install the reference electrode:

- To install a pH-Ag/AgCl reference electrode, go on to [page 53](#).
- To install a PdH reference electrode, go on to [page 58](#).

Installing a Conventional Working Electrode

Notes on Polishing Conventional (Nondisposable) Working Electrodes

- Do not polish new conventional working electrodes before installation.
- After an electrode has been used for a period of time, a layer of contamination may build up. When this occurs, the electrode must be polished. For details, refer to *Polishing Gold Working Electrodes* (Document No. 031154).

Items Needed for Installing a Conventional Working Electrode

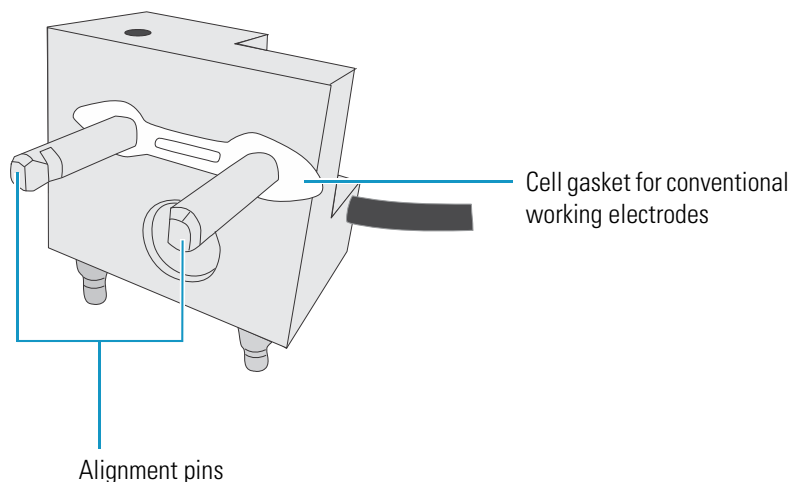
- ED cell gasket for conventional working electrodes (P/N 045972)
- Blunt-end tweezers

Note Install the working electrode before connecting the cell to the ED.

❖ To install a conventional working electrode

1. Use tweezers to install the gasket over the alignment pins on the cell body (see [Figure 58](#)). When correctly installed, one end of the gasket extends beyond the cell body, to facilitate gasket installation and removal.

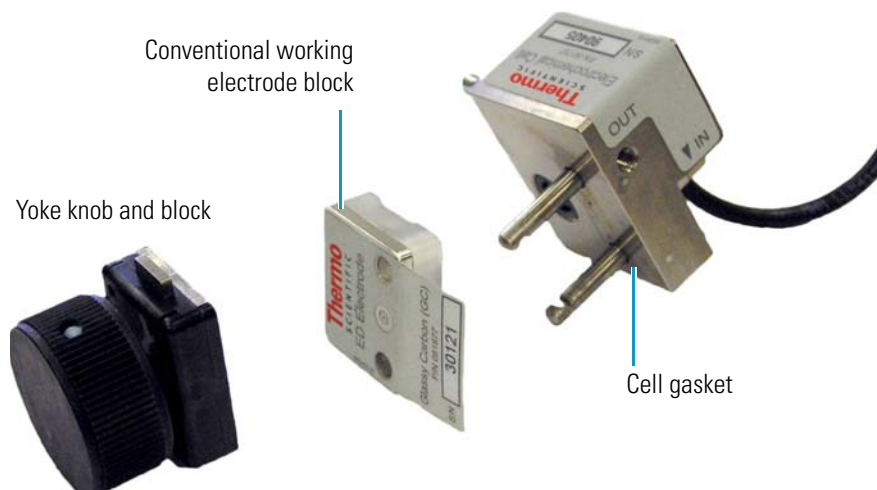
Figure 58. ED cell gasket for conventional working electrode



2. Verify that the gasket is flat against the cell body and is not wrinkled.

3. Orient the working electrode block as shown in [Figure 59](#) and then slide it onto the alignment pins.

Figure 59. ED cell with conventional working electrode



4. Install the yoke knob on the alignment pins and fingertighten the knob by turning it a full 360 degrees.

Note It is not possible to overtighten the yoke knob. After the knob clicks into place, it cannot be tightened any further. The yoke knob ensures that constant pressure is applied to the cell.

5. Install the reference electrode:
 - If you are installing a pH-Ag/AgCl reference electrode, go on to [page 53](#).
 - If you are installing a PdH reference electrode, go on to [page 58](#).

Installing the pH-Ag/AgCl Reference Electrode

❖ To prepare the pH-Ag/AgCl reference electrode

1. Remove the pH-Ag/AgCl reference electrode (P/N 061879) from its box (see [Figure 60](#)).

Figure 60. pH-Ag/AgCl reference electrode in storage cap



IMPORTANT The ICS-4000/5000 ED pH-Ag/AgCl reference electrode (P/N 061879 is similar in appearance to the Dionex AS-AP pH electrode (P/N 075529). However, these two electrodes are not interchangeable. Before continuing, check the label on the electrode to verify that you have the correct type.

2. Hold the electrode vertically, with the cable up and the storage cap down to prevent spilling the storage fluid in the cap. Unscrew the storage cap from the electrode. Be careful not to spill the contents. Save the cap.

IMPORTANT Always store the pH-Ag/AgCl reference electrode in the storage cap filled with saturated KCl solution when the cell is not in use. This prevents the pH-Ag/AgCl reference electrode membrane from drying out and damaging the electrode.

3. Rinse the pH-Ag/AgCl reference electrode thoroughly in ASTM Type I (18 megohm-cm) filtered and deionized water to remove any precipitated salt.

❖ To calibrate the pH-Ag/AgCl reference electrode

1. Make or purchase two buffer solutions.
 - A pH 7 buffer solution
 - A buffer solution that matches the pH of the eluent used in your application (for example, pH 4 or pH 10)

Refer to [Table 3](#) for a list of recommended buffer solutions and their part numbers.

Table 3. Recommended pH buffer solutions

pH	Purpose	Thermo Scientific Dionex P/N	Fisher Scientific P/N	
		500 mL Bottle	500 mL Bottle	1 L Bottle
4	Calibration and Check Standard	033238	SB101-500	SB101-1
6	Check Standard Only	080220	SB104-500	SB104-1

Table 3. Recommended pH buffer solutions

pH	Purpose	Thermo Scientific Dionex P/N	Fisher Scientific P/N	
7	Calibration and Check Standard	033239	SB107-500	SB107-1
8	Check Standard Only	080169	SB112-500	SB112-1
10(K) ^a (K based)	Calibration and Check Standard	033240a	SB116-500a	SB116-1a
10(Na) ^b (Na based)	Calibration and Check Standard	080221b	SB141-500b	SB141-1b

- a. This pH 10 standard is based on only potassium compounds. Use this standard when sodium is *not* present in the sample.
- b. This is a concentrate that must be diluted 10:1 before use. Take a clean 1 L bottle; measuring gravimetrically add 105 g of concentrate; fill with deionized water for a total of 1 L of pH 10 buffer. This pH 10 standard is based on NaOH and KCL. Use this standard when sodium *is* present in the sample.

Note A small error can be observed at pH 9 or higher when sodium is present in the sample or calibration buffer. If sodium is present in the samples to be measured, it is best to use a pH 10 calibration buffer made with sodium or sodium and potassium. See Table 3 for a recommended buffer solution.

2. Orient the cell assembly with the yoke knob on the left and push the cell onto its mounting location on the ED. Connect the cell electrical cable to the ED (see [Figure 61](#) and [Figure 62](#))

Figure 61. ED cell mounting location

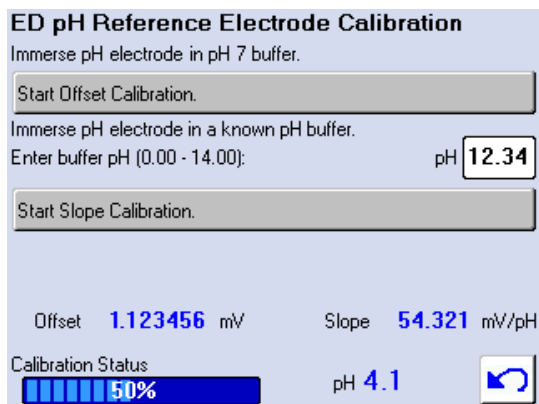


Figure 62. ED cell installed on the detector



3. Connect the reference electrode electrical cable to the ED; do not install the electrode in the cell yet.
4. On the touch screen, select **Calibration** on the Menu screen. Under Detector Calibration, touch **pH Reference Electrode**. The ED pH Reference Electrode Calibration screen opens (see Figure 63).

Figure 63. ED pH Reference Electrode Calibration touch screen



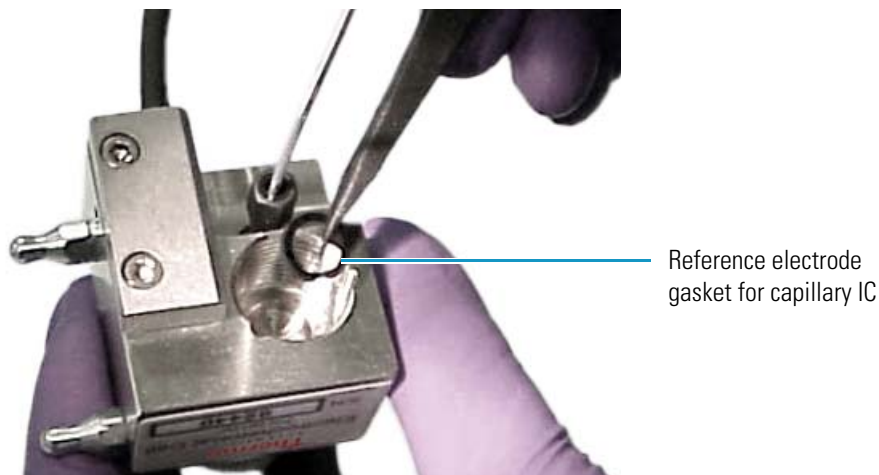
5. Follow the instructions on the panel to calibrate the electrode.
6. Disconnect the reference electrode cable and the cell cable.
7. Grasp the cell body and pull straight out to remove the cell from the detector.

❖ **To install the pH-Ag/AgCl reference electrode in the cell**

1. To avoid any hydraulic pressure buildup when inserting the reference electrode into the cell, make sure that fitting plugs are not installed on the cell inlet and outlet fittings.

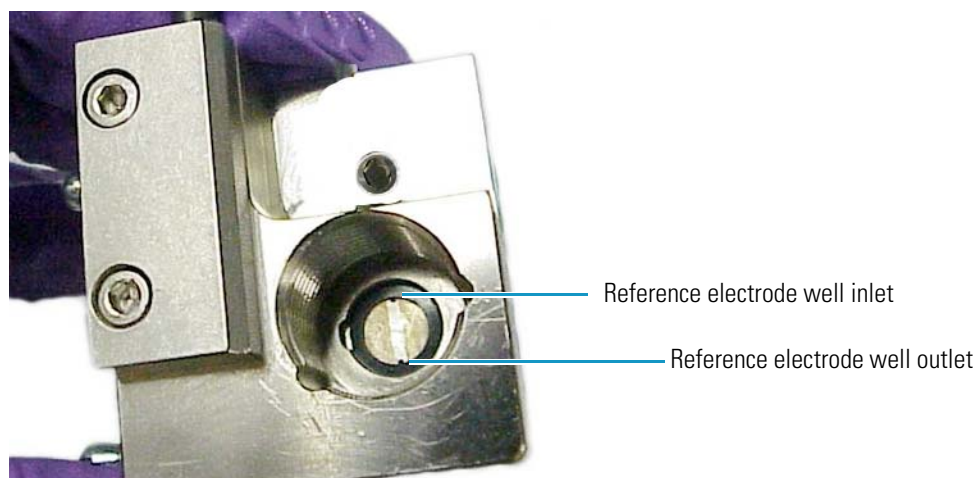
2. Using tweezers, install the reference electrode gasket for capillary IC (P/N 072162) into the bottom of the reference electrode well (see [Figure 64](#)).

Figure 64. pH-Ag/AgCl reference electrode O-ring



3. Make sure the gasket is centered in the bottom of the well and that it does not block the inlet or outlet of the well. The inlet and outlet are small round openings in the bottom of the well (see [Figure 65](#)).

Figure 65. Reference electrode well with gasket for capillary IC installed



4. Verify that the reference electrode O-ring has been removed and the reference electrode gasket is correctly installed in the bottom of the well.

B Installing the ED Amperometry Cell

Installing the PdH Reference Electrode

5. Screw the pH-Ag/AgCl reference electrode into the reference electrode well and tighten it fingertight (see [Figure 66](#)).

Figure 66. pH-Ag/AgCl reference electrode O-ring in the reference electrode well



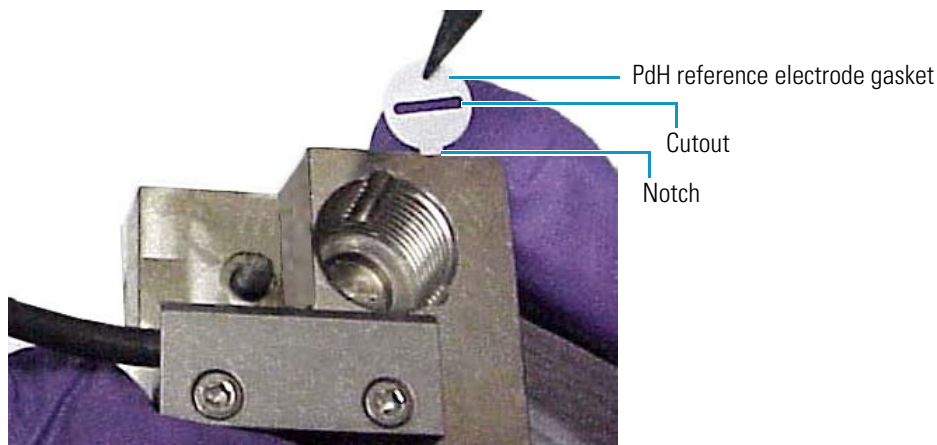
6. To complete the cell plumbing, go to [“Completing the Low-Pressure Fluidic Connections for Electrochemical Detection”](#) on page 38.

Installing the PdH Reference Electrode

❖ To install the PdH reference electrode

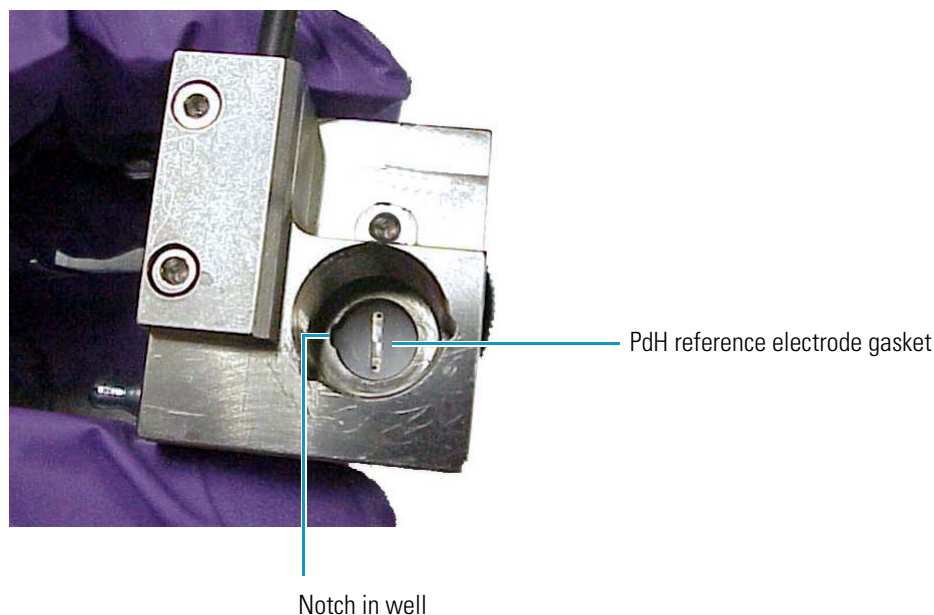
1. To avoid any hydraulic pressure buildup when inserting the reference electrode into the cell, make sure that fitting plugs are not installed on the cell inlet and outlet fittings.
2. Using tweezers, grasp the PdH reference electrode gasket (P/N 072214) on its edge (see [Figure 67](#)). To avoid deforming the gasket cutout, do not place the tweezer tips on the cutout.

Figure 67. PdH reference electrode gasket



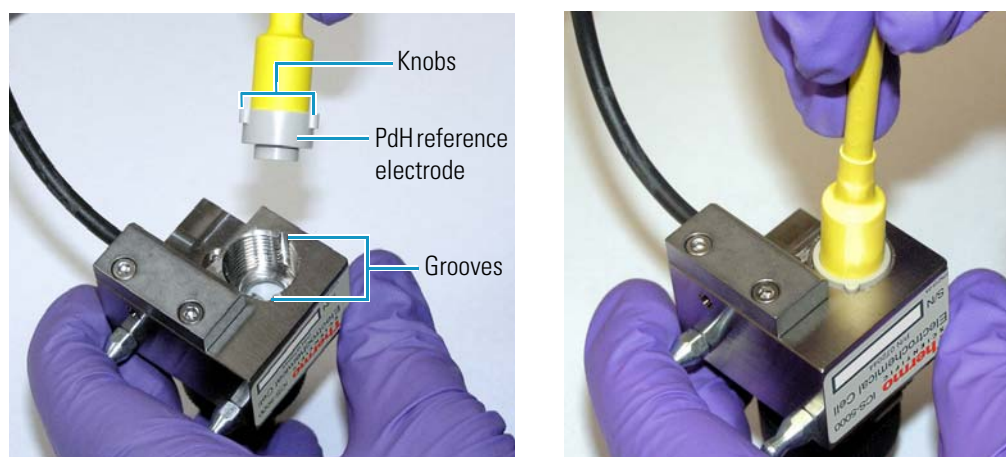
3. Align the gasket so that the notched edge of the gasket aligns with the corresponding notch in the reference electrode well. Then, press the gasket into the well (see Figure B-16).

Figure 68. Reference electrode gasket well with PdH reference electrode gasket installed



4. Align the fitting on the end of the PdH reference electrode so that the knobs on the fitting align with the grooves in the reference electrode well (see Figure 69).
5. Insert the fitting into the well.

Figure 69. PdH reference electrode fitting installation

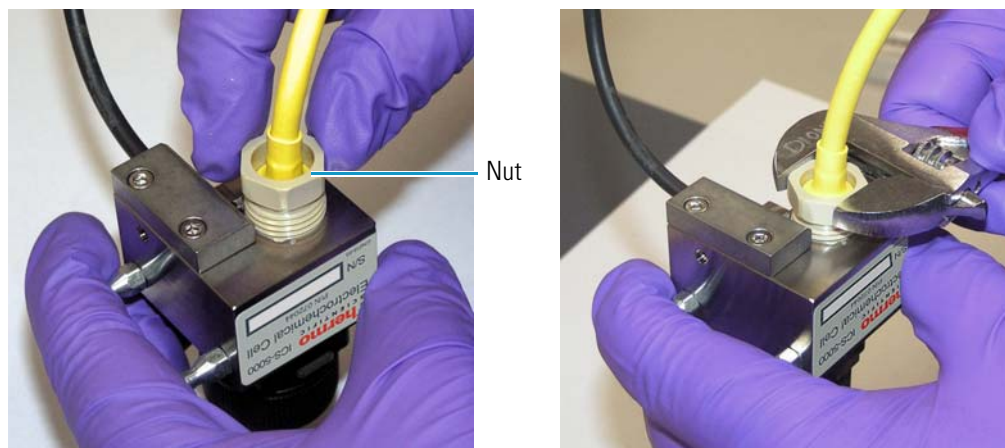


6. Screw the nut on the PdH reference electrode into the reference electrode well and tighten it fingertight (see Figure B-18). After tightening with your fingers, use a wrench to tighten the nut an additional 20 to 30 degrees.

B Installing the ED Amperometry Cell

Installing the PdH Reference Electrode

Figure 70. PdH reference electrode nut installation



7. Orient the cell assembly with the yoke knob on the left and then push the cell onto its mounting location on the ED.
8. To complete the cell plumbing, go to [“Completing the Low-Pressure Fluidic Connections for Electrochemical Detection”](#) on page 38.

Installing Valve and Pump Options

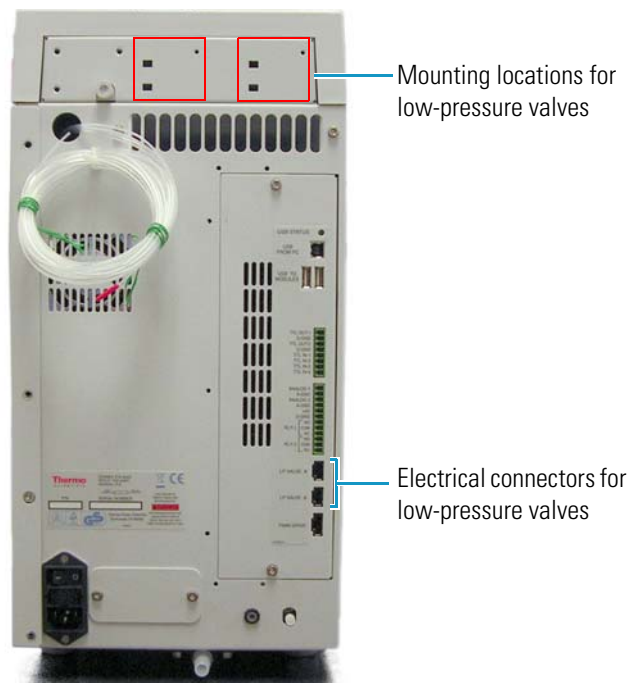
This appendix describes how to install the following options in the Dionex ICS-4000:

- Low-pressure valves
- Peristaltic pump

❖ To install a low-pressure valve

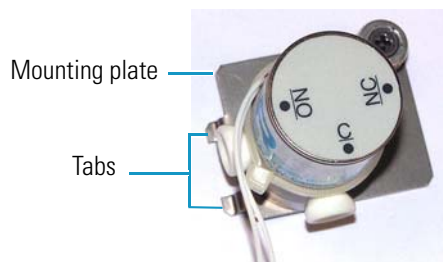
1. On the Dionex ICS-4000 rear panel, locate the two low-pressure valve mounting locations and the two low-pressure valve electrical connectors (**LP VALVE A** and **LP VALVE B**) (see [Figure 71](#)).

Figure 71. Low-pressure valve mounting locations on rear panel



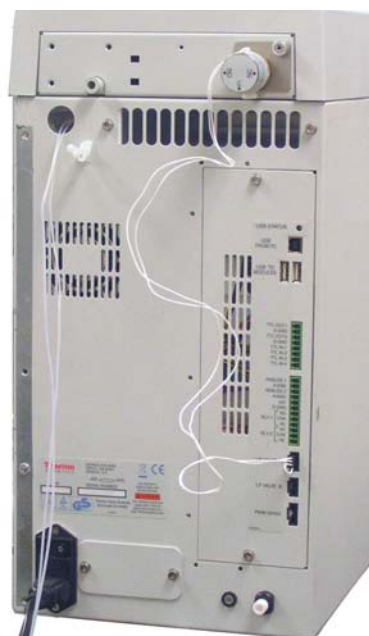
2. Insert the two tabs on the valve mounting plate (see [Figure 72](#)) into the slots on one of the valve mounting locations. Tighten the captive thumbscrew.

Figure 72. Low-pressure valve



3. Cut off the cable ties on the valve cable and then plug the cable into a valve connector on the rear panel (see [Figure 73](#)). Plumb the valve as required for your application.

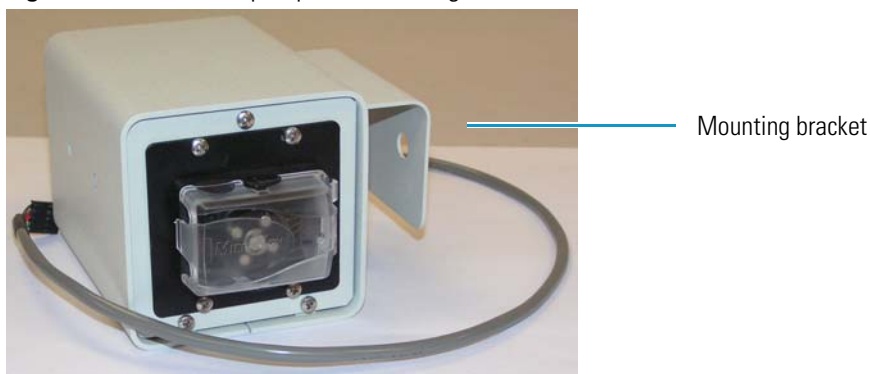
Figure 73. Low-pressure valve installed on rear panel



❖ **To install an optional peristaltic pump**

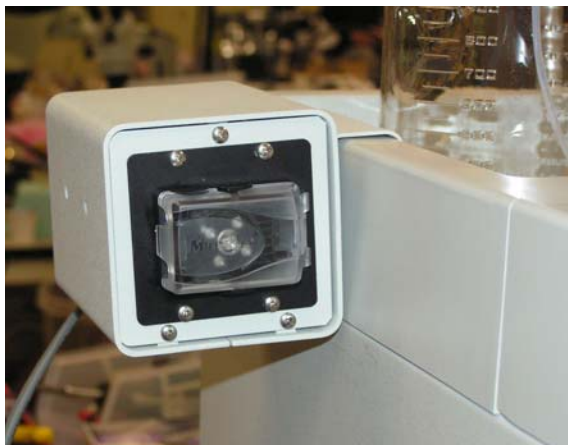
1. The peristaltic pump is attached to a mounting bracket (see [Figure 74](#)) that is designed to fit over the eluent organizer on top of the Dionex ICS-4000. The pump and bracket are shipped from the factory for installation on the left side of the system (see [Figure 75](#)). If you prefer a right-side installation, remove the mounting bracket and reattach it on the opposite side of the pump housing.

Figure 74. Peristaltic pump and mounting bracket



2. Fit the mounting bracket over the side of the eluent organizer (see [Figure 75](#)).

Figure 75. Peristaltic pump installed on top left side of system



3. Plug the pump cable into the **PWM DRIVE** connector on the rear panel (see [Figure 76](#)).

Figure 76. Rear panel with peristaltic pump cable connected

