



LC10 CHROMATOGRAPHY ORGANIZER OPERATOR'S MANUAL



© Copyright Dionex Corporation, 1993

Document No. 034858
Release 01
August 1993

© 1993 Dionex Corporation
All rights reserved worldwide
Printed in the United States of America

This publication is protected by federal copyright law. No part of this publication may be copied or distributed, transmitted, transcribed, stored in a retrieval system, or transmitted into any human or computer language, in any form or by any means, electronic, mechanical, magnetic, manual, or otherwise, or disclosed to third parties without the express written permission of DIONEX Corporation, 1228 Titan Way, Sunnyvale, California 94088-3603 U.S.A.

DISCLAIMER OF WARRANTY AND LIMITED WARRANTY

THIS PUBLICATION IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND. DIONEX CORPORATION DOES NOT WARRANT, GUARANTEE, OR MAKE ANY EXPRESS OR IMPLIED REPRESENTATIONS REGARDING THE USE, OR THE RESULTS OF THE USE, OF THIS PUBLICATION IN TERMS OF CORRECTNESS, ACCURACY, RELIABILITY, CURRENTNESS, OR OTHERWISE. FURTHER, DIONEX CORPORATION RESERVES THE RIGHT TO REVISE THIS PUBLICATION AND TO MAKE CHANGES FROM TIME TO TIME IN THE CONTENT HEREINOF WITHOUT OBLIGATION OF DIONEX CORPORATION TO NOTIFY ANY PERSON OR ORGANIZATION OF SUCH REVISION OR CHANGES.

TRADEMARKS

SRS™ is a trademark of Dionex Corporation.

PRINTING HISTORY

Release 01, August 1993

1 • Description

1.1 Overview

The LC10 Chromatography Organizer organizes all post-analytical pump components for a typical DX 500 Class system. The LC10 comes equipped with a Rheodyne injection valve, leak sensor and column mount; automated versions of the LC10 come equipped with two solenoid valves. The LC10 can house the following system components, which must be ordered separately or with another module: guard columns, separator columns, SRS™ Self-Regenerating Suppressor, DS3 Detection Stabilizer, and detector cell(s) for the ED40 Electrochemical Detector and CD20 Conductivity Detector.

Four versions of the LC10 are available:

- LC10 with PEEK Manual Injection Valve (P/N 044172)
- LC10 with PEEK Automated Injection Valve (P/N 044088)
- LC10 with Stainless Steel Manual Injection Valve (P/N 044170)
- LC10 with Stainless Steel Automated Injection Valve (P/N 044171)

Versions with a PEEK valve are plumbed with PEEK tubing. Versions with a stainless steel valve are plumbed with stainless steel tubing.

1.2 Physical Description

Figures 1-1 and 1-2 illustrate the basic components of the LC10.

Rheodyne Injection Valve

The Rheodyne injection valve is a low-volume, 35 MPa (5000 psi) rotary injection valve.

LC10 Chromatography Organizer

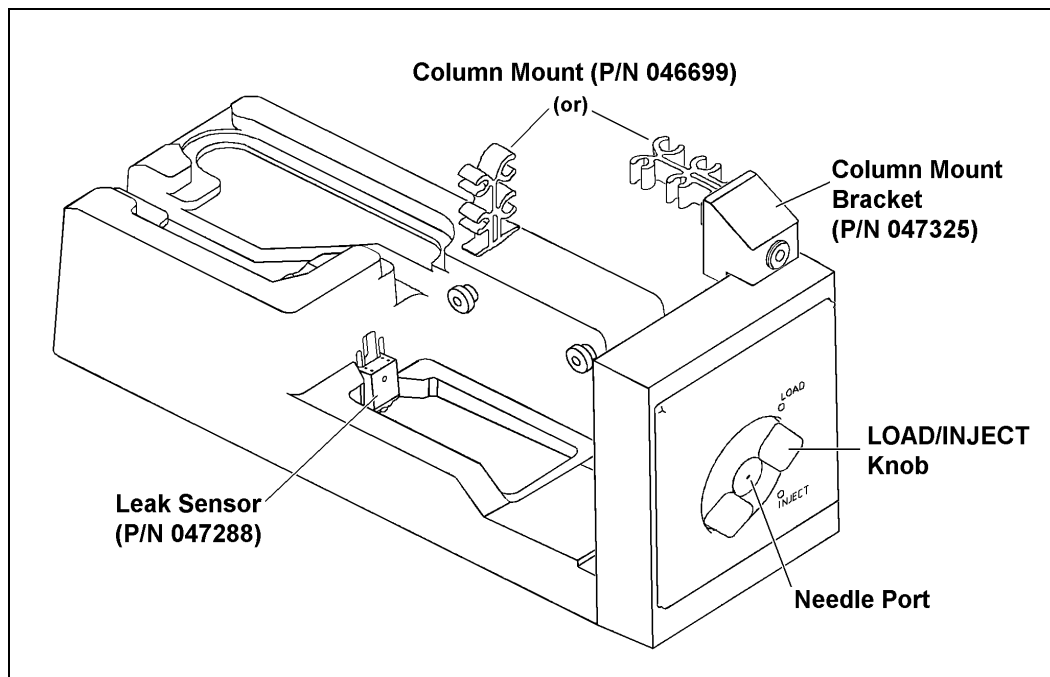


Figure 1-1. LC10 Chromatography Organizer (Front View)

The valve model number depends on the LC10 version:

PEEK Manual:	Model 9125 (P/N 046692)
PEEK Automated:	Model 9126 (P/N 046660)
Stainless Steel Manual:	Model 7725 (P/N 044150)
Stainless Steel Automated:	Model 7726 (P/N 044151)

The LC10 Ship Kit includes two accessories for the Rheodyne injection valve: a 25 μ L gas-tight syringe (P/N 041389) and a 25 μ L sample loop.

The injection valve position is controlled by the **LOAD/INJECT** knob (P/N 046459) in the middle of the front bezel. The needle port in the middle of the knob is used to load sample into the sample loop (see Section 3.1).

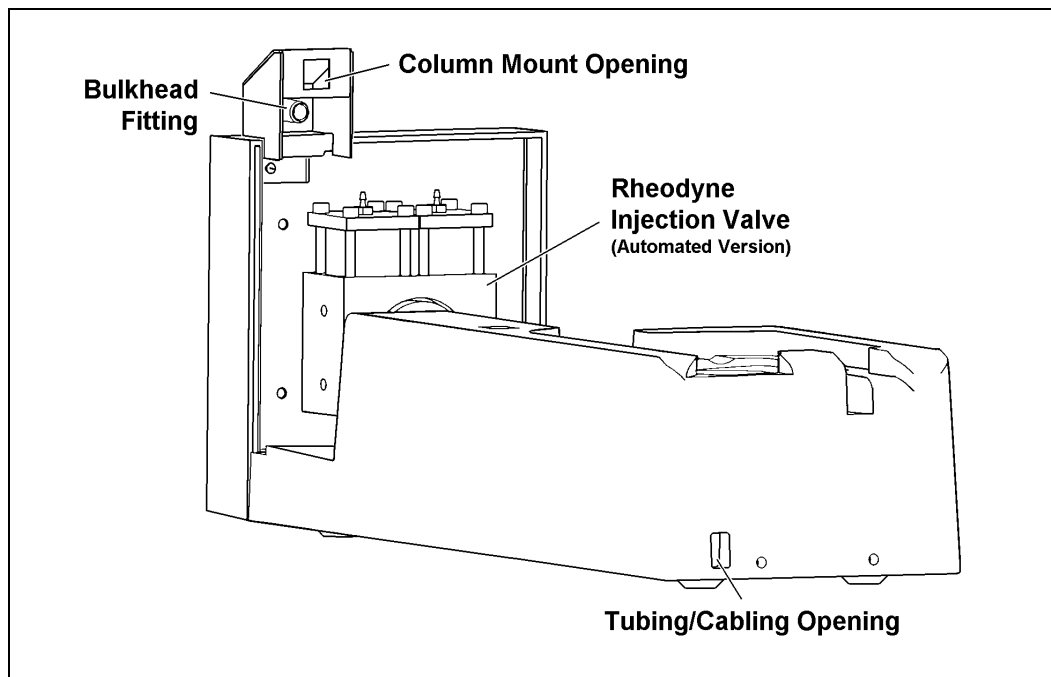


Figure 1-2. LC10 Chromatography Organizer (Rear View)

Column Mount

The column mount (P/N 046699) has 2-mm clips on one side and 4-mm clips on the other, and can accommodate 2-mm, 4-mm, and 4.6-mm separator columns. It can be installed in the LC10 base (for conductivity or amperometry detection) or in the column mount bracket (for absorbance detection).

Column Mount Bracket

The column mount bracket (P/N 047325) may be attached to the LC10 front bezel (see Section 2.6). It provides a means to install the column mount horizontally, so that the separator column is mounted vertically for use with the AD20 Absorbance Detector.

The bulkhead fitting on the column mount bracket may be used to fill the sample loop (see Section 3.1).

LC10 Chromatography Organizer

Leak Sensor and Drain Line

The molded recesses of the LC10 are slanted to collect liquid leaks in the leak sensor recess. When wet, the leak sensor (P/N 047288) sends a signal to the pump, which displays the follows message: “Liquid leak has been detected.”

A drain line (not shown here) is attached to the back of the leak sensor recess and extends through the tubing/cabling opening on the back of the LC10.

Solenoid Valves (Automated Versions Only)

Two solenoid valves (P/N 046659) control the position of the automated injection valve in response to signals sent from the pump microprocessor. The solenoid valves are mounted inside the LC10 base.

Tubing/Cabling Opening

The drain line, leak sensor cable, and gas/air line and cables for the solenoid valves (if present) exit via an opening in the rear of the LC10. The cables are labeled to correspond to their mating connections.

1.3 Operational Description

During an analysis, eluent from the pump enters the Rheodyne injection valve and passes through the sample loop. Eluent then flows out of the injection valve, through the guard column (if present) and separator column, through the suppressor or other post-column device, and on to the detector cell(s). When the analysis is completed, the eluent may flow through other post-cell devices before flowing eventually to waste. (See the relevant schematic in Section 2.3 for details.)

Inside the Rheodyne injection valve, eluent follows one of two flow paths, depending on the position of the **LOAD/INJECT** knob (Figure 1-3).

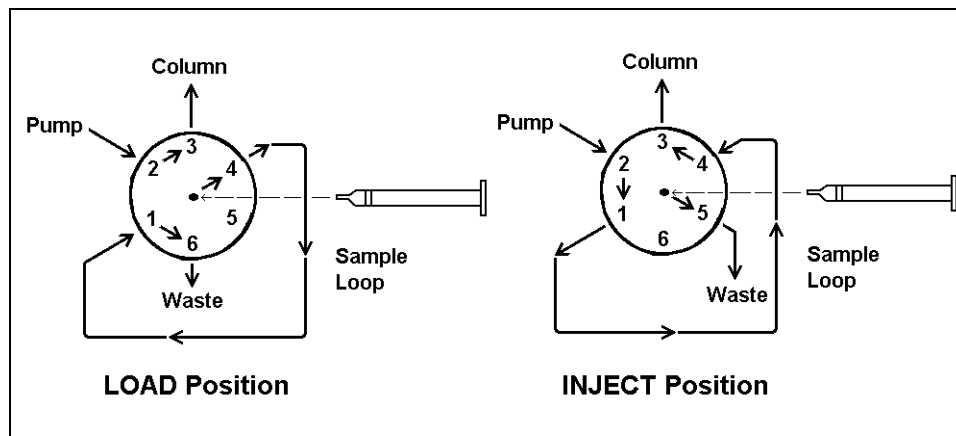


Figure 1-3. Rheodyne Injection Valve Flow Schematics

In the **LOAD** position, eluent flows in from the pump and out to the column without entering the sample loop; sample flows from the syringe into the valve and through the sample loop, and excess sample flows out to waste.

In the **INJECT** position, eluent flows in from the pump, through the sample loop, and out to the column (carrying the contents of the sample loop with it).

LC10 Chromatography Organizer

2.1 Overview

A Dionex-trained representative typically installs the DX 500 Class system, including the LC10 Chromatography Organizer, for you. These installation instructions are primarily for reference, should you later move the system. Contact your Dionex representative or the nearest Dionex Office for assistance, if necessary.

The installation procedure depends on the detection method to be used. The following chart shows the sections needed:

All detection modes: Sections 2.2 through 2.5

Conductivity detection: Add Sections 2.7, 2.8, and 2.9 or 2.10

Electrochemical detection: Add Sections 2.7 and 2.11

Absorbance detection: Add Sections 2.6 and 2.7

If you wish to load sample through the bulkhead fitting in the column mount bracket (as described in Section 3.1), also consult Section 2.6.

NOTE

The instructions in this chapter complement and in some cases duplicate the installation instructions in the column, detector, SRS, and DS3 manuals, but *they do not replace them*. Read the instructions in each of those manuals carefully.

2.2 Pre-installation Set-up

To prevent the LC10 or its components from being accidentally knocked onto the floor, allow at least 10 cm (six inches) of clearance from the edge of the work surface.

1. The LC10 shell shoe (P/N 046478) is a rubber, gray-colored rectangle with raised edges provided in the LC10 Ship Kit. The shoe keeps the LC10 close to the DX 500 pump without sliding.

LC10 Chromatography Organizer

- a) Slide half of the shoe under the DX 500 pump, tilting the pump if necessary. The raised edge of the shoe should rest securely in the recess on the underside of the pump enclosure.
 - b) Place the LC10 on top of the shoe, so that the other raised shoe edge rests in the matching recess on the underside of the LC10.
2. The LC10 Ship Kit contains tubing in three different IDs. Locate the proper tubing sizes for your system:
 - **For 4-mm column systems:** Use 0.25-mm (0.010-in) ID PEEK (P/N 042690) or stainless steel tubing for connections between system components.
 - **For 2-mm column systems:** Use 0.125-mm (0.005-in) ID PEEK (P/N 044221) or stainless steel tubing for connections between system components.
 - **For waste lines (2-mm and 4-mm systems):** Use 0.5-mm (0.020-in) ID PEEK tubing (P/N 042855) for valve waste lines and 0.25-mm (0.010-in) ID PEEK tubing (P/N 042690) for detector cell waste lines.
 3. The LC10 is plumbed with PEEK or stainless steel tubing and Dionex 10-32 ferrules (P/N 043274) and fittings (P/N 043275). If necessary, familiarize yourself now with the directions in *Installation of Dionex Ferrule Fittings* (Document No. 034213).

2.3 System Configuration

Figure 2-1 shows an LC10 with all components for which it is designed. Not every component is required for a given analysis.

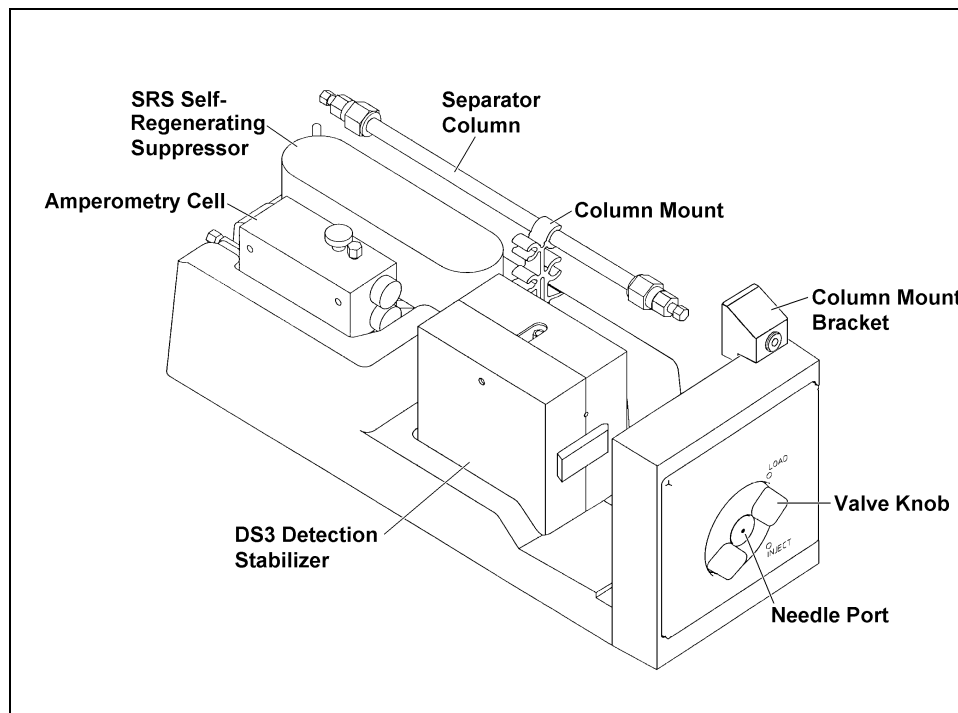


Figure 2-1. LC10 with Components Installed

The system plumbing depends primarily on the detection method. Before proceeding, consult the appropriate fluid schematic (Figures 2-2 to 2-4) and any related NOTES. Verify that you have all necessary components.

2.3.1 Suppressed Conductivity Detection (CD20 Conductivity Detector or ED40 Electrochemical Detector)

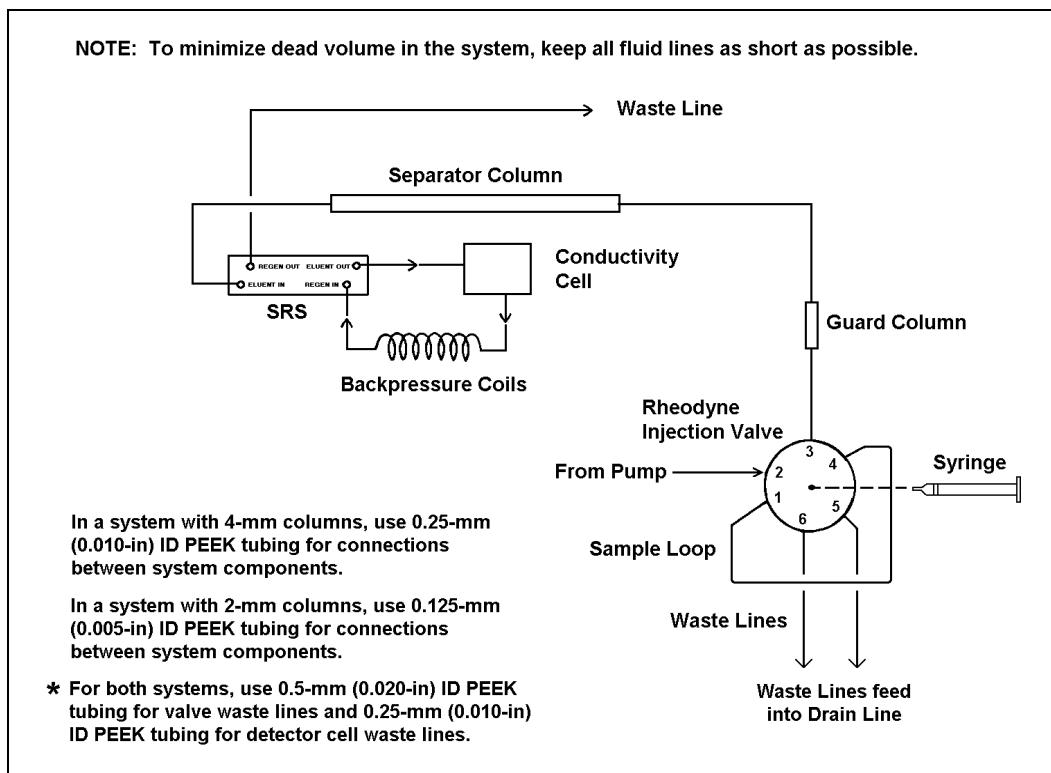


Figure 2-2. Fluid Schematic for a CD20/ED40 Conductivity Cell

NOTE

Figure 2-2 represents the SRS AutoSuppression Recycle Mode. For a representation of the SRS AutoSuppression External Water Mode, see the SRS operator's manual.

A second detector (such as the AD20 Absorbance Detector) may be installed in-line after the conductivity cell as long as the pressure at the cell inlet remains below 700 kPa (100 psi).

2.3.2 Amperometric Detection (ED40 Electrochemical Detector)

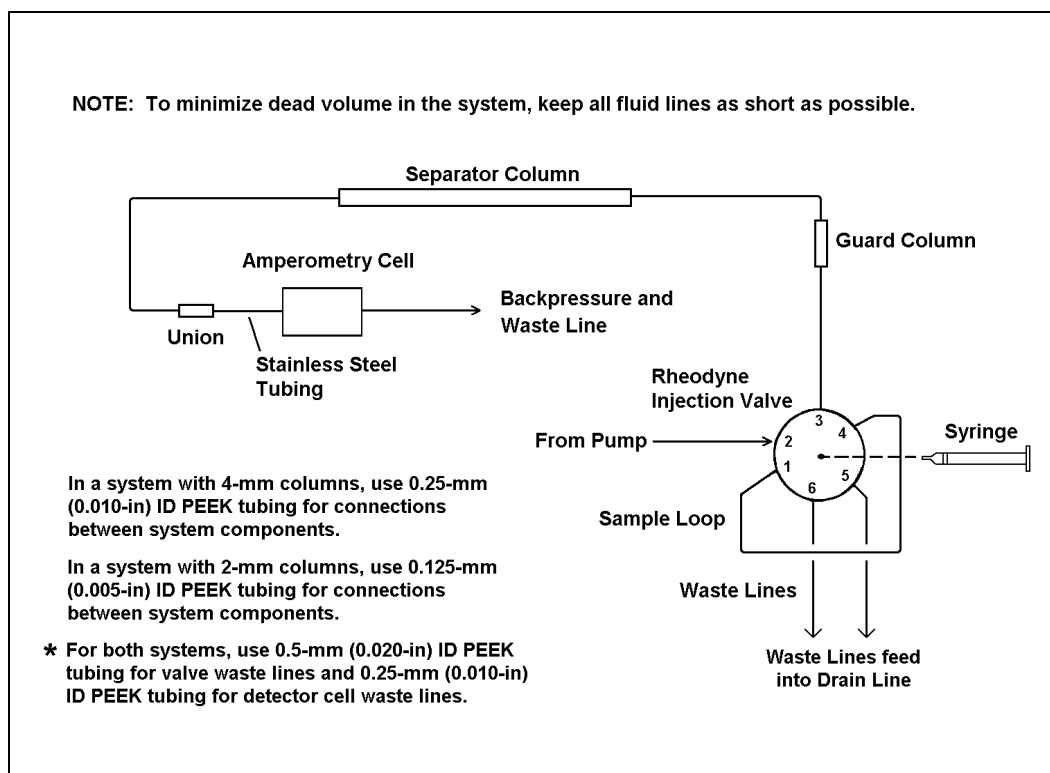


Figure 2-3. Fluid Schematic for an ED40 Amperometry Cell

NOTE

A second detector (such as the AD20 Absorbance Detector) may be installed in-line after the amperometry cell as long as the pressure at the amperometry cell inlet remains below 700 kPa (100 psi). (Because of the volume within the reference electrode section of the cell, there may be some band broadening at the second detector. This will be minimized by the reference electrode in the amperometry cell.)

2.3.3 Absorbance Detection (AD20 Absorbance Detector)

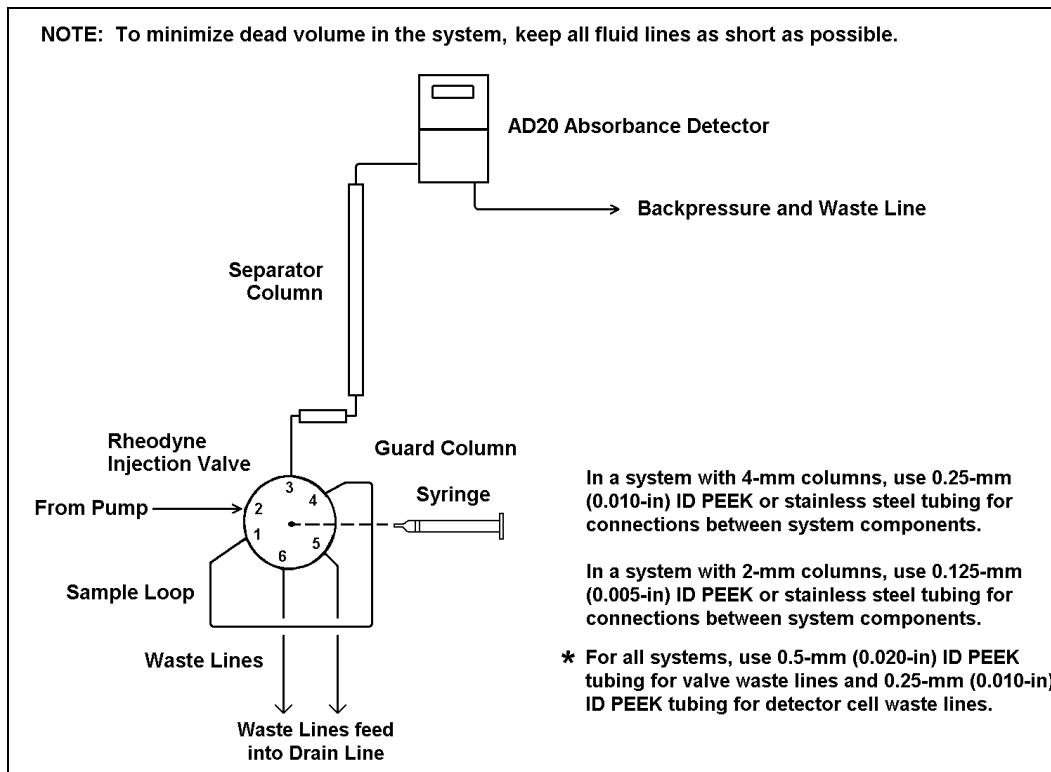


Figure 2-4. Fluid Schematic for an AD20 Detector

NOTE

The AD20 Absorbance Detector does not have a remote cell. Therefore, the separator column should be mounted vertically, as shown in Figure 2-6. In this configuration, the top of the separator column is level with the AD20, thus minimizing tubing length and dead volume within the system.

The AD20 cell inlet is located behind the AD20 front panel. Tubing from the separator column outlet to the cell inlet should be routed through one of the slots on either side of the detector front panel. See the *AD20 Absorbance Detector Operator's Manual* (Document No. 034853) for more information.

2.4 Rheodyne Injection Valve Connections

Refer to the relevant schematic in Section 2.3 while plumbing the liquid connections to the injection valve.

1. Using a ferrule and PEEK or stainless steel tubing in the appropriate ID (see Section 2.2), connect the eluent line from the pump pressure transducer to port #2 on the Rheodyne injection valve. (The port numbers are etched on the back of the valve. In addition, a label on top of the valve identifies ports #1 and #2; ports #3 through #6 follow in sequence, with port #6 close to port #1.)
2. Attach a 6-cm (2.5-in) piece of PEEK or stainless steel tubing with ferrule fittings to port #3. This tube will be connected to the separator column or guard column in Section 2.7.
3. Connect the 25 μ L PEEK or stainless steel sample loop (P/N 042857) between ports #1 and #4.

NOTE

Other sample loop sizes are available. Contact the nearest Dionex Regional Office for information.

4. Cut two pieces of 0.5-mm (0.020-in) ID PEEK tubing at least 75 cm (30 in) long. Install a ferrule and 10-32 fitting on one end of each piece of tubing; attach these ends to ports #5 and #6 on the Rheodyne valve. Route the free ends into the drain line at the back of the leak sensor recess (see Figure 1-1 for the location of the leak sensor); feed the remaining length of tubing into the drain line.
5. **Automated Versions Only:** Attach a pressure regulator to a source of pressurized gas (air or lab-quality nitrogen or helium). Connect the solenoid valve gas/air line to the regulator. Adjust the regulator to 690 KPa (100 psi) \pm 140 KPa (20 psi).



To avoid contamination and possible deterioration of the Rheodyne valve's air actuator seals, make sure laboratory pneumatic air is oil-free, dry, filtered, and maintained within the pressure limits specified above.

LC10 Chromatography Organizer

6. **Automated Versions Only:** Feed the two solenoid valve cables (labeled “LC AIR”) extending from the rear of the LC10 into the upper cable chase at the rear of the pump. Open the top door of the pump. Slide the cables forward until they can be grasped from the front. Attach the cables to the “LC AIR VALVES” connection on the DSP board in Slot 1 in the pump.

2.5 Leak Sensor and Drain Line

1. Push back and down on the leak sensor (P/N 047288) to verify that it is securely seated (see Figure 1-1).
2. Feed the leak sensor cable (labeled “LC LEAK”) extending from the rear of the LC10 into the upper cable chase at the rear of the pump. Open the top door of the pump. Slide the cable forward until it can be grasped from the front. Attach the cable to the “LC LEAK” connection on the DSP board in Slot 1 in the pump.
3. The drain line extends out the tubing/cabling in the back of the LC10. Route this line into an appropriate waste container below the level of the LC10. Make sure the drain line is not bent, pinched or elevated above the LC10 at any point.

2.6 Column Mount Bracket

1. Position the column mount bracket (P/N 047325) behind the front bezel as shown in Figure 2-5. Align the screw hole at the bottom of the column mount bracket with the screw hole on the back of the front bezel.
2. Thread a 4-mm screw (P/N 045686) through the column mount bracket into the screw hole on the back of the front bezel (Figure 2-5). Tighten firmly with a screwdriver.
3. **Absorbance Detection Only:** Install the column mount by squeezing its sides at the base and pushing it into the square opening at the back of the column mount bracket.

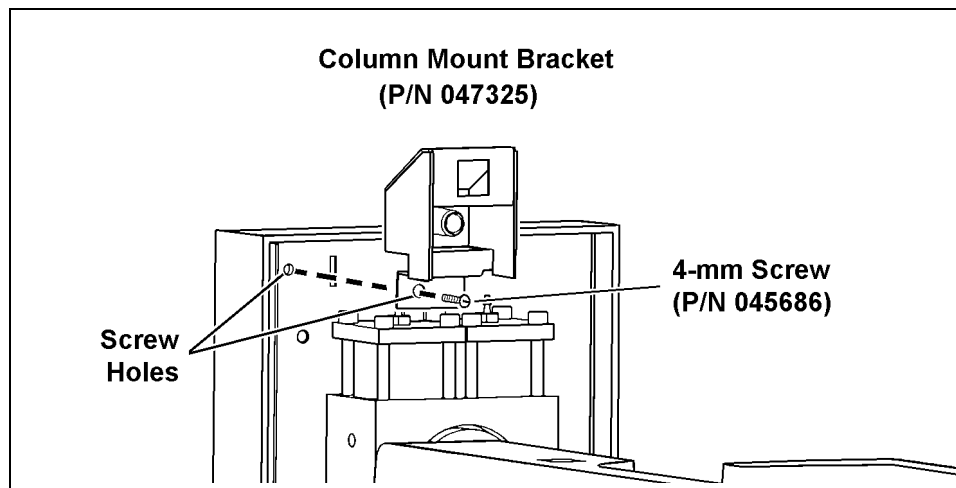


Figure 2-5. Installing the Column Mount Bracket

2.7 Separator Column

Columns are purchased and shipped separately from the LC10.

1. Before installing the separator column, pump deionized water through the injection valve at 3.0 mL/min for 1 to 2 minutes to clear any air from the liquid lines. Activate the injection valve several times by switching the position of the **INJECT/LOAD** knob to make sure that no air is trapped in the hydraulic system (depressurize the automatic injection valve first, if necessary). Trapped air reduces the efficiency of the separator column.
2. Reduce the flow rate to 2.0 mL/min and verify that the pressure through the system, with no columns installed, is less than 0.70 MPa (100 psi).
3. Stop the pump.
4. **Conductivity and Amperometric Detection Only:** Insert the column mount into the square opening on the right side of the LC10 molding (see Figure 2-1). If you are using 4-mm separator columns, orient the column mount with the larger clips toward the outside. If you are using 2-mm columns, orient the column mount with the smaller clips toward the outside.

LC10 Chromatography Organizer

5. Each column is shipped with a manual containing specialized installation and start-up instructions. After consulting the column manual for any special requirements, install the column in the LC10:
 - a. Remove the end plugs from the separator column and store them in a safe place.

NOTE

You must reinstall the end plugs in the column before placing it in storage.

- b. Using the appropriate PEEK or stainless steel tubing, connect the #3 port of the Rheodyne valve to the inlet of the guard column (if used).
- c. Connect the outlet of the guard column (or port #3 of the Rheodyne valve, if no guard column is installed) to the inlet of the separator column.
- d. Snap the separator column into the column mount. The guard column “floats” below the separator column, held in place by the connecting tubing.
- e. **Absorbance Detection Only:** Connect the separator column outlet to the detector cell inlet as explained in the detector manual. The finished configuration should look Figure 2-6.

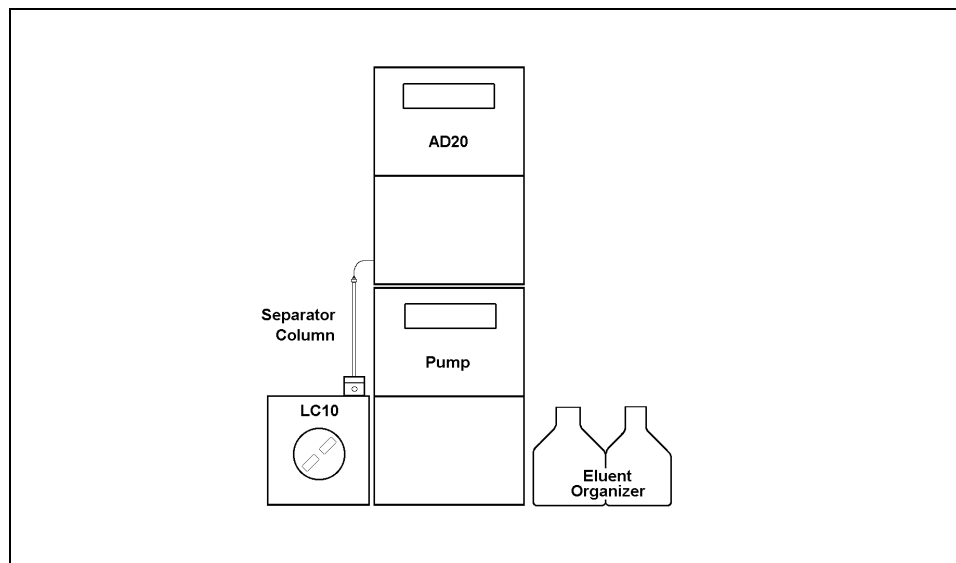


Figure 2-6. LC10 with AD20 Absorbance Detector

2.8 SRS Self-Regenerating Suppressor

The SRS Self-Regenerating Suppressor must be purchased separately from the LC10. The SRS is used for conductivity detection with the CD20 Conductivity Detector or ED40 Electrochemical Detector. It is not recommended for use in stainless steel-based systems.

These instructions explain how to plumb an SRS for use in the AutoSuppression Recycle Mode, as shown in Figure 2-2. For instructions on the SRS AutoSuppression External Water Mode, refer to the SRS operator's manual.

1. Place the SRS in the oblong, right rear pocket of the LC10 with the ELUENT OUT and REGEN IN ports directed toward the front of the LC10.
2. Using the appropriate PEEK tubing, connect the separator column outlet to the SRS ELUENT IN port.

LC10 Chromatography Organizer

3. Attach a waste line to the SRS REGEN OUT port. Route the free end of the line into a waste container below the level of the LC10. Make sure the waste line is not bent, pinched or elevated above the LC10 at any point.



Use the waste gas separator provided in the SRS Ship Kit to hold the waste line in the waste container. Do not cap or close the waste container during operation. See the SRS manual for more information.

4. Feed the SRS power cable into the cable chase at the rear of the CD20 or ED40. Open the door of the detector. Slide the cable forward until it can be grasped from the front. Attach the cable to the “SRS” connection on the SCR board in Slot 2 in the detector.
5. To complete installation of the SRS, refer to Section 2.9 or 2.10, as applicable.

2.9 Conductivity Cell (without DS3 Detection Stabilizer)

The conductivity cell must be purchased separately or with a CD20 Conductivity Detector or ED40 Electrochemical Detector.

1. Verify that the conductivity cell is installed in an external, grounded shield box.
2. Orient the cell so that the inlet is at the bottom and the outlet is at the top. (Flow should be from bottom to top.) This helps prevent air bubbles being trapped in the cell.
3. Mount the conductivity cell in the LC10 by positioning the keyhole slots in the conductivity cell shield box over the shoulder washers located on the LC10 (Figure 2-7). Pull the cell down into position.

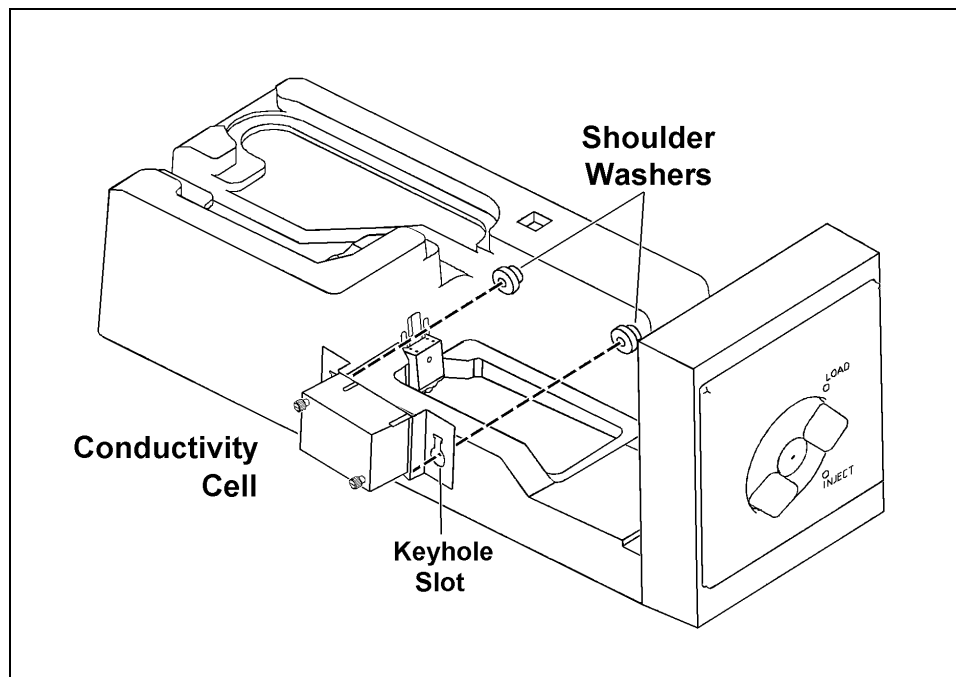


Figure 2-7. Mounting a Conductivity Cell in the LC10

4. Feed the cable labeled “C2” into the cable chase at the rear of the CD20 or ED40. Open the door of the detector. Slide the cable forward until it can be grasped from the front. Attach the cable to the “COND CELL” connection on the SP board in Slot 3 in the detector.
5. Using the appropriate PEEK tubing, connect the ELUENT OUT port of the SRS to the conductivity cell inlet
6. Using the proper backpressure coils, connect the conductivity cell outlet to the SRS REGEN IN port. See the SRS manual and CD20 or ED40 operator’s manual for details.

2.10 Conductivity Cell (with DS3 Detection Stabilizer)

A conductivity cell is installed in the DS3 Detection Stabilizer before shipment. The cell may be used with a CD20 Conductivity Detector or ED40 Electrochemical Detector.

1. Cut the DS3 leak/overflow tubing within 2.0 cm (0.75 in) of the DS3 enclosure.
2. Mount the DS3 in the LC10 by positioning the keyhole slots at the back of the DS3 over the shoulder washers located on the LC10 (Figure 2-7). Pull the DS3 down into position.
3. Route the cables labeled “C1” and “C2” into the cable chase at the rear of the CD20 or ED40. Open the door of the detector. Slide the cables forward until they can be grasped from the front. Plug the connector labeled “C1” into the “DS3” connection on the SCR board in Slot 2 in the detector. Plug the connector labeled “C2” into the “COND CELL” connection on the SP board in Slot 3.
5. Using the appropriate PEEK tubing, connect the SRS ELUENT OUT port to the inlet on the top corner of the DS3.
6. Using the proper backpressure coils, connect the eluent outlet of the DS3 to the SRS REGEN IN port. See the SRS manual and CD20 or ED40 operator’s manual for details.

2.11 Amperometry Cell



CAUTION

Before installing the amperometry cell, see the *ED40 Electrochemical Detector Operator's Manual* (Document No. 034855) for important preparation, assembly, and calibration instructions.

1. Using the appropriate PEEK tubing, connect the separator column outlet to the short length of stainless steel tubing at the amperometry cell inlet.



CAUTION

Do not remove the stainless steel tubing from the cell inlet. This tube extends the counterelectrode, thereby shielding the working electrode from electrical noise. It is an integral part of the cell.

2. Place the amperometry cell in the left rear pocket of the LC10.
3. Cut a length of 0.25-mm (0.010-in) PEEK tubing for a waste line. This tubing must be capable of generating 0.35 MPa (50 psi) of backpressure at the amperometry cell outlet. For a flow rate of 1 mL/min, 2 to 2.5 m (6 to 8 feet) should suffice. Use half this length for a flow rate of 2 mL/min.
4. Attach the waste line to the cell outlet on top of the cell. Route the free end of the line into a waste container below the level of the LC10. If you need more tubing to reach the waste container, use 0.5-mm (0.020-in) ID tubing, which generates almost no backpressure. Make sure the waste line is not bent, pinched or elevated above the LC10 at any point.
5. Verify that the detector cell is turned off. Connect the amperometry cable between the amperometry cell and the "EC CELL" connection on the SP board in Slot 3 in the ED40.

LC10 Chromatography Organizer

3 • Operation and Maintenance

3.1 Filling the Sample Loop

The Rheodyne injection valve may be filled completely or partially. These filling techniques differ in accuracy, precision, and the amount of sample required. Refer to the Rheodyne valve manual included in the LC10 Ship Kit before selecting a method.

There are four methods for filling the sample loop. Regardless of the method used, observe the following precaution:



When inserting needles into the needle port, use only 0.028-inch O.D. (22 gauge) x 2-in. long needles with 90° point style (square end). Using the incorrect needle size can damage the injector.

Before filling the injection valve sample loop, set the Rheodyne injection valve knob to **LOAD**.

- ***Direct injection into the valve:*** (Figure 1-3) Insert the syringe into the needle port on the injection valve. Overfill the sample loop with several sample loop volumes. (Excess sample will flow out through the waste line.) Leave the syringe in the needle port until the injection valve knob is turned to **INJECT**.



Do not use this method if the sample can be contaminated by contact with the metal needle of the loading syringe.

LC10 Chromatography Organizer

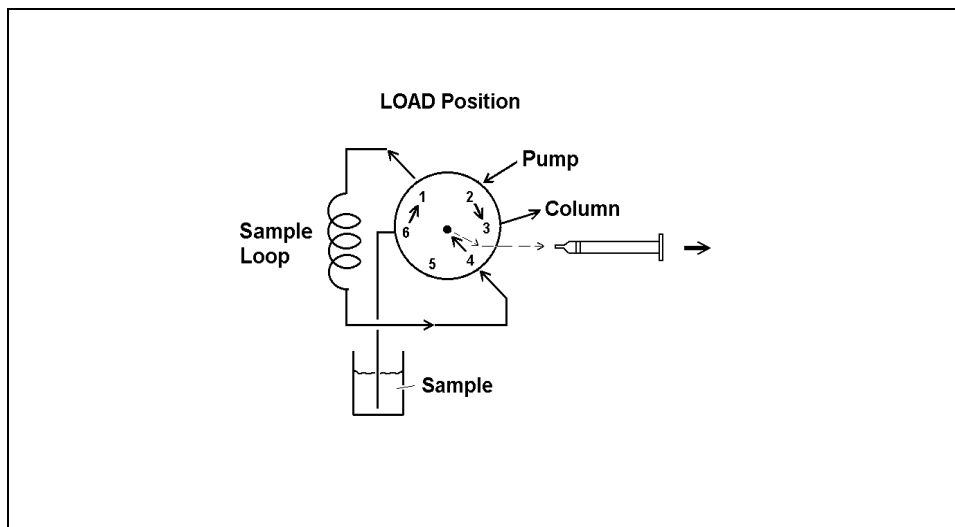


Figure 3-1. Drawing Sample through the Waste Line

- **Drawing sample through the waste line:** (Figure 3-1). Place the end of the waste line in port #6 into a container of sample. Insert the syringe into the needle port on the injection valve and draw sample into the syringe through the waste line. The sample loop is now filled with sample. Remove the waste line from the sample container. Leave the syringe in the needle port until the injection valve knob has been switched to **INJECT**.



CAUTION

Using suction to draw sample through the waste line may cause a small outgassing effect in the sample.

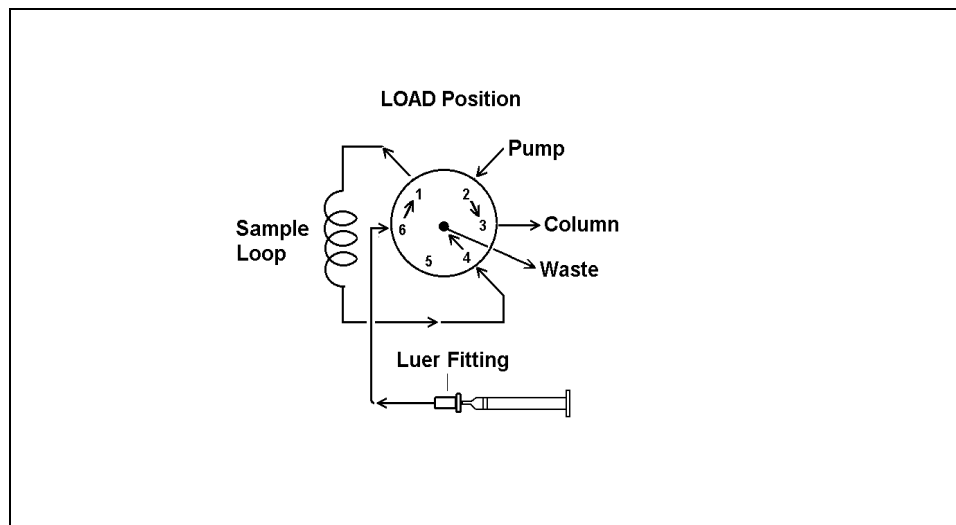


Figure 3-2. Loading Sample with the Bulkhead Fitting

- **Loading sample through the bulkhead fitting:** (Figure 3-2) Connect a luer fitting and sample-filled syringe to the bulkhead fitting in the column mount bracket (see Figure 1-2 for the location of the bulkhead fitting). Connect the injection valve waste line in port #6 to the rear of the bulkhead fitting. Insert the needle adaptor shipped with the Rheodyne valve into the needle port. (If necessary, refer to the Rheodyne valve manual.) Push sample through the waste line; waste sample will exit the valve through the needle adaptor. No sample will come into contact with the metal needle of the needle adaptor.
- **Loading from an automated sampler:** See the autosampler operator's manual for instructions.

3.2 Routine Maintenance

The following maintenance procedures are especially important for keeping the LC10 operating reliably:

- Periodically check all air and liquid lines for crimping or leaks. Move or reroute pinched lines; replace damaged lines.
- Replace worn-out or damaged fittings and tubing as necessary.
- If a leak is detected, locate and repair the leak as described in Section 4.1. Rinse all dried eluents (especially when they include salt solutions) off components with deionized water.
- See the Rheodyne valve manual (included with the LC10 Ship Kit) for maintenance procedures specific to the injection valve.

4 • Troubleshooting

Use this troubleshooting guide to isolate and solve problems that may occur while operating the LC10. If more than one possible cause for a problem is listed, read through the potential causes to determine which is the most applicable; the causes are listed in order of probability. If the problem persists, contact your Dionex Representative or the nearest Dionex Office.

For troubleshooting procedures specific to the Rheodyne injection valve, refer to the Rheodyne valve manual included in the LC10 Ship Kit.

When ordering replacement parts, please include the model and serial number of your LC10. If possible, also provide the part numbers and, where applicable, the revision number of the items you are ordering.

4.1 Liquid Leaks

- **Leaking fitting.**

Locate the source of the leak. Verify that all liquid line connections are tight. If the connections are made with Dionex ferrule fittings, see *Installation of Dionex Ferrule Fittings* (Document No. 034213) for instructions.

- **Broken liquid line.**

Cut the tubing at the break and replace the ferrule, or replace the tubing, using the extra material supplied in the LC10 Ship Kit.

- **Blocked or improperly installed waste line.**

Make sure the waste lines from the valve and cell are not crimped or otherwise blocked. Also make sure they are not elevated at any point after they exit the LC10.

4.2 Excessive System Backpressure

- **Restriction in hydraulic system.**
 1. Begin pumping eluent through the system (including the columns) at the flow rate normally used.
 2. Follow the appropriate hydraulic schematic (in Section 2.3) and work backward through the system, beginning at the cell exit. One at a time, loosen each fitting and watch for pump pressure variations. The connection at which the pressure drops indicates a restriction.
 3. Remove the restriction either by back-flushing or by replacing the section of tubing.
- **Flow rate through columns is too high.**
 1. Check the column manual for the proper operational flow rate. Reduce the flow rate if necessary.
 2. Measure the pump flow rate using a 10 mL graduated cylinder and stopwatch. Calibrate the pump flow rate as necessary.
- **Clogged column bed supports.**

Replace the bed supports as instructed in the column manual.
- **Columns are contaminated.**

Clean the columns (see *Column Rejuvenation Procedures*, Technical Note 2R, Document No. 032036, or refer to the column manual).

4.3 Peak Ghosting

Ghosting is the appearance of extraneous peaks in a chromatogram. These may be late-eluting peaks from a previous injection or they may result from a contaminated, malfunctioning or incorrectly installed injection valve. These peaks may co-elute with peaks of interest, resulting in non-reproducible peak heights.

- **Insufficient time between sample injections.**

Wait until the previous sample has been completely eluted before making another injection.

- **Insufficient flush between samples.**

Flush the sample loop with at least 10 loop volumes of deionized water or sample between sample injections.

- **Malfunctioning or incorrectly installed injection valve.**

Refer to the valve manual or Section 2.4 in this manual.

4.4 Non-Reproducible Peak Height or Retention Time

- **Column overloading.**

1. Change to a sample loop with a smaller volume.
2. Dilute the sample.

- **Liquid leaks.**

Locate and eliminate the leaks.

- **See Section 4.3.**

4.5 Abnormal Retention Time or Selectivity

- **System is not equilibrated following an eluent change.**

Allow the system to equilibrate with at least 20 column volumes of eluent (for example, 30 minutes at 2.0 mL/min for 4 mm anion separator columns).

- **Flow rate through system is incorrect.**

1. Select the correct flow rate.
2. Calibrate the pump flow rate.
3. Locate and eliminate any liquid leaks.

- **Contaminated or incorrect eluent.**

Remake the eluent using reagent grade chemicals and ASTM filtered Type I (18 megohm cm) grade deionized water.

- **Contaminated or degraded sample.**

Take appropriate precautions when preparing and storing samples to prevent contamination and degradation.

- **Column is contaminated.**

1. Clean the columns (see *Column Rejuvenation Procedures*, Technical Note 2R, Document No. 032036, or refer to the column manual).
2. If cleaning is unsuccessful, replace the column.

4.6 Automated Injection Valve Failure

- **Air is not reaching the injection valve.**
 1. Verify that the air supply is turned on and is regulated to 690 KPa (100 psi) \pm 140 KPa (20 psi).
 2. Verify that all tubing connections are secure. Push the air tubing securely over the barbed fittings on top of the injection valve.
 3. Listen for air leaks and replace leaking tubing. If you suspect an air leak inside the LC10 base, contact your Dionex Representative or the nearest Dionex Office.
 4. Verify that the solenoid valve gas/air lines are not crimped or pinched. Reposition crimped or pinched lines.
 5. Check the solenoid valve gas/air lines for blockage. Remove and replace any blocked tubing.
- **Pump is not programmed to trigger the injection valve.**

See the pump manual for instructions.
- **Defective solenoid valve.**

A defective solenoid valve usually “buzzes.” Contact your Dionex Representative or the nearest Dionex Office.

LC10 Chromatography Organizer
