

Dionex VP Vacuum Pump Installation Instructions

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Dionex VP Installation Instructions

1. Introduction

The Thermo Scientific Dionex™ VP Vacuum Pump (Dionex VP) (see [Figure 1](#)) is a dual-stage diaphragm pump capable of providing a continuous vacuum. The pump is designed for use with a wide range of IC (ion chromatography) applications, consumables, and accessories.

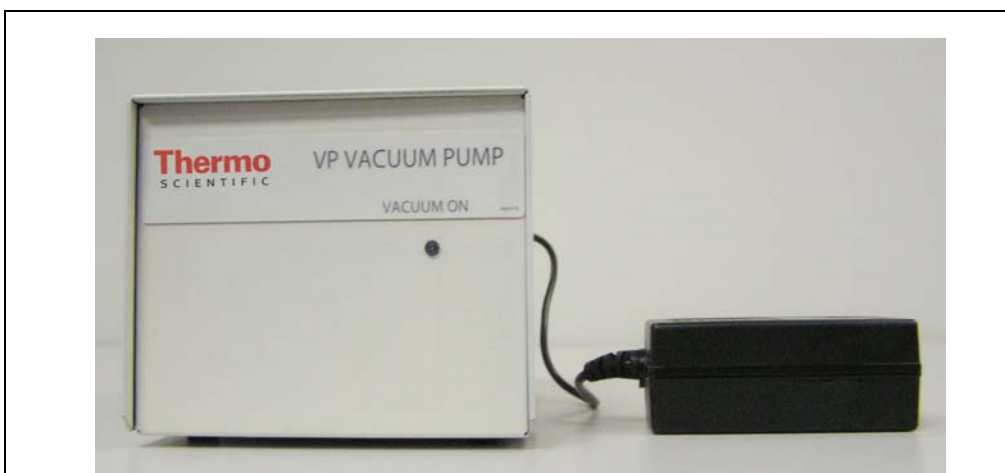


Figure 1. Thermo Scientific Dionex VP Vacuum Pump and 15V Power Supply

There are two modes of pump operation:

- In the *manual control* mode, the Dionex VP turns on and off when the user presses a button on the rear panel.
- In the *relay control* mode, the Dionex VP turns on and off in response to a signal from the relay output of a controlling device (for example, a Thermo Scientific Dionex ICS-3000 Detector/ Chromatography Module). Relay control must be programmed in the Thermo Scientific Dionex Chromeleon® Chromatography Data Management System.

When the pump is on, the **VACUUM ON** LED on the front panel is lit.

2. Description

Figure 2 illustrates the rear panel of the Dionex VP.



Figure 2. Dionex VP Rear Panel

- **RELAY** provides a connection to a relay output on the controlling device. The input has a signal (+) pin and an active ground (-) pin.
- **RELAY CNTRL ON/OFF** selects the Dionex VP operating mode:
When the **RELAY CNTRL** button is pressed in (the **ON** position), the *relay control* mode is selected.
When the **RELAY CNTRL** button is not pressed in (the **OFF** position), the *manual control* mode is selected. When a relay cable is not connected to the **RELAY** connector, use the **RELAY CNTRL** button to start and stop the pump.
- **DC IN** provides a connection to the external 15V power supply (P/N 940068).
- **EXHAUST** provides an outlet for venting evacuated air from the pump.

- **VACUUM** provides a connection for the outlet line to the ballast reservoir. The ballast reservoir line connects the vacuum to the consumable or accessory required for the application (for example, the Thermo Scientific Dionex CRD 300 Carbonate Removal Device or the Thermo Scientific Dionex RFIC™ Eluent Degasser in the Thermo Scientific Dionex ICS-3000 Eluent Generator or Thermo Scientific Dionex ICS-2000 Ion Chromatography System).

3. Safety Information

The Dionex VP was manufactured by Thermo Fisher Scientific at the following location: 527 Lakeside Drive, Sunnyvale, CA 94088-3603 U.S.A. The Dionex VP is designed for use with IC systems and should not be used for any other purpose. Operation of the pump in a manner not specified by Thermo Fisher Scientific may result in personal injury.

If you have a question regarding appropriate usage, contact Technical Support for Dionex products before proceeding. In the U.S. and Canada, call 1-800-346-6390. Outside the U.S. and Canada, call the nearest Thermo Fisher Scientific office.

3.1 Safety Messages

This manual contains warnings and precautionary statements that can prevent personal injury and/or damage to the Dionex VP when properly followed. Safety messages appear in bold type and are accompanied by icons, as shown below.



Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.



Indicates a potentially hazardous situation which, if not avoided, may result in death or serious injury.



Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.



Indicates that the function or process of the instrument may be impaired. Operation does not constitute a hazard.

Messages d'avertissement en français



Signale une situation de danger immédiat qui, si elle n'est pas évitée, entraînera des blessures graves à mortelles.



Signale une situation de danger potentiel qui, si elle n'est pas évitée, pourrait entraîner des blessures graves à mortelles.



Signale une situation de danger potentiel qui, si elle n'est pas évitée, pourrait entraîner des blessures mineures à modérées. Également utilisé pour signaler une situation ou une pratique qui pourrait gravement endommager l'instrument mais qui n'entraînera pas de blessures.

Warnhinweise in Deutsch



Bedeutet unmittelbare Gefahr. Mißachtung kann zum Tod oder schwerwiegenden Verletzungen führen.



Bedeutet eine mögliche Gefährdung. Mißachtung kann zum Tod oder schwerwiegenden Verletzungen führen.



Bedeutet eine mögliche Gefährdung. Mißachtung kann zu kleineren oder mittelschweren Verletzungen führen. Wird auch verwendet, wenn eine Situation zu schweren Schäden am Gerät führen kann, jedoch keine Verletzungsgefahr besteht.

Informational messages also appear throughout this manual. These are labeled **NOTE** and are in bold type:

NOTE **NOTES** call attention to certain information. They alert users to an unexpected result of an action, suggest how to optimize instrument performance, etc.

3.2 Product Labels

The TUV GS, C, US Mark safety label and the CE Mark label on the Dionex VP indicate that the pump is in compliance with the following standards.

EMC Susceptibility and Immunity

- UL 3101-1/10.93
- EN 61326:1987+A1:1998+A2:2001+A3:2003

Safety

- EN 61010-1:2001
- UL 61010-1:2004
- CAN/CSA-C22.2 No. 61010-1:2004

4. Product Specifications

Power Requirements	100 to 240 Vac, 50/60 Hz; 0.5 amp
Operating Temperature	4 to 40 °C (40 to 104 °F)
Operating Humidity	5% to 95% relative humidity, noncondensing
Dimensions	Height: 10.52 cm (4.14 in) Width: 10.52 cm (4.14 in) Depth: 18.12 cm (7.14 in)
Weight	2.0 kg (4.5 lbs); includes external 15V power supply

5. Installation

This section describes how to complete the typical connections to the Dionex VP (see [Figure 3](#)). These connections may vary slightly, depending on your application; for details, refer to the manual for the consumable or accessory required for the application. The manuals are included on the Thermo Scientific Reference Library DVD (P/N 053891).

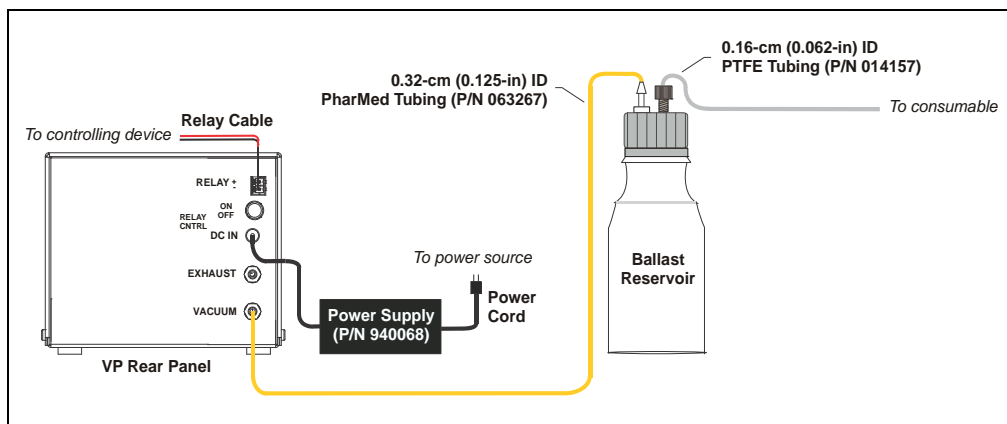


Figure 3. Typical Dionex VP Connections

5.1 Pump Setup

1. Locate the ballast reservoir and the 0.32-cm (0.125-in) ID PharMed[®] tubing (P/N 063267) provided in the Thermo Scientific Dionex VP Vacuum Pump Package (P/N 066463).
2. Push one end of the PharMed tubing onto the barbed fitting on the ballast reservoir cap (see [Figure 4](#)).

Connect the free end of the tubing to the **VACUUM** connector on the Dionex VP rear panel (see [Figure 2](#)).

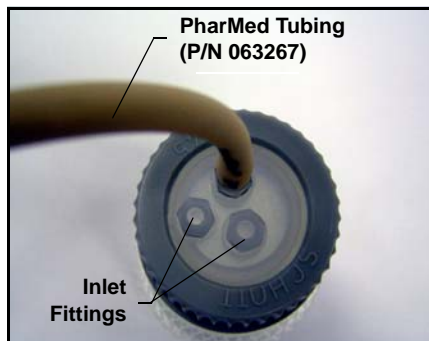


Figure 4. Ballast Reservoir Cap

3. Follow the instructions in the consumable or accessory manual to connect the product to the ballast reservoir. The Thermo Scientific Dionex VP Vacuum Pump Package (P/N 066463) includes the tubing and fittings required for this.

NOTE For an illustration of the typical connections between the Dionex VP and a Dionex CRD 300, see [Figure 7](#).

If these instructions are not included in the product manual, follow the steps below to complete the connections as shown in [Figure 3](#):

- a. Remove the plug from one of the inlet fittings on the reservoir cap (see [Figure 4](#)).
 - b. Locate the following items in the Thermo Scientific Dionex VP Vacuum Pump Package (P/N 066463): 1/8-in flangeless ferrule fitting (P/N 048949), 1/4-28 flangeless nut (P/N 048951), and 0.16-cm (0.062-in) ID PTFE (polytetrafluoroethylene) tubing (P/N 014157).
 - c. Install the ferrule fitting and nut on one end of the PTFE tubing. Connect this end of the tubing to the inlet fitting from which the plug was removed. Connect the other end of the tubing to the consumable or accessory.
4. Connect the 15V power supply (P/N 940068) provided in the Thermo Scientific Dionex VP Vacuum Pump Package (P/N 066463) to the **DC IN** connector on the Dionex VP rear panel (see [Figure 2](#)).
 5. Connect a power cord to the power supply and to a grounded, single-phase power source.



SHOCK HAZARD—To avoid electrical shock, use a grounded receptacle. Do not operate the Dionex VP or connect it to a power source without an earthed ground connection.



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



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



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



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



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



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

6. If you plan to operate the Dionex VP in the *manual control* mode (see [page 1](#)), check the following:
 - a. Make sure the **RELAY CNTRL** button is in the **OFF** position (the button is not pressed in).
 - b. Make sure the chromatography pump is on.

IMPORTANT

Never turn on the Dionex VP unless the chromatography pump is already on. To prevent damage to the consumable or accessory, eluent flow must be established before a vacuum is applied.

- c. Press the **RELAY CNTRL** button to turn on the Dionex VP. The Dionex VP is now ready for operation in the manual control mode.

7. If you plan to operate the Dionex VP in the *relay control* mode (see [page 1](#)), check that the **RELAY CNTRL** button is in the **ON** position (the button is pressed in). Then, complete these additional steps:
 - a. Locate the relay connector (P/N 923617) and twisted wire assembly (P/N 043598) in the Thermo Scientific Dionex VP Vacuum Pump Package (P/N 066463).
 - b. Insert the ends of the wires into the plug. (If necessary, strip the ends of the wires first.)
 - c. Connect a red signal wire to the + pin on the Dionex VP. Connect a black ground wire to the - pin.
 - d. Connect the other ends of the signal wires to the corresponding relay output signal and ground pins on the controlling device. For instructions on how to connect the Dionex VP to a Dionex ICS-3000 DP/SP, go to [page 9](#). For instructions on how to connect the Dionex VP to a Dionex ICS-1000/1500/2000, go to [page 10](#).

Connecting the Dionex VP to a Dionex ICS-3000 DP/SP

1. Locate the 25-position connector plug (P/N 923968) in the Dionex ICS-3000 DP/SP Ship Kit. Remove the cover of the plug (see [Figure 5](#)).

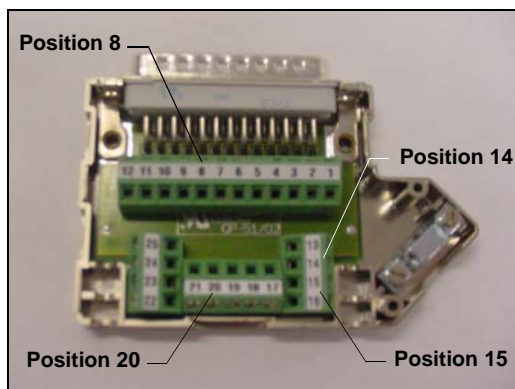


Figure 5. 25-Position Connector Plug (Cover removed)

2. Connect the Dionex VP connector plug to the 25-position connector plug. Refer to the table below for pin connections.

To attach a wire to the 25-position connector plug, insert it into the plug, and use a screwdriver to tighten the locking screw. Repeat for the second position.

IMPORTANT

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

Connections for One Dionex VP to a Dionex DP/SP

Connect this Dionex VP pin:	To this position on the connector plug:
Pin 1	Position 20
Pin 2	Position 8

Connections for a Second Dionex VP to a Dionex DP

Connect this Dionex VP pin:	To this position on the connector plug:
Pin 1	Position 14
Pin 2	Position 15

3. Replace the cover on the 25-position connector plug. Plug the connector into the digital I/O port on the Dionex DP/SP rear panel.

Go on to [Section 5.2](#) to set up Chromeleon.

Connecting the Dionex VP to a Dionex ICS-1000/1500/2000

1. Locate the 12-position connector plug (P/N 923686) in the Dionex ICS-1000/1500/2000 Ship Kit (see [Figure 6](#)).

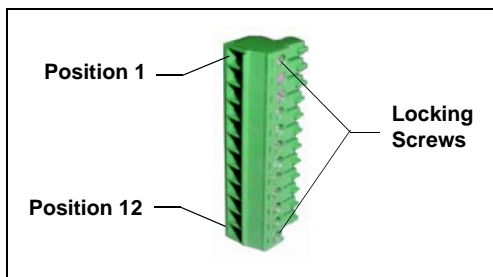


Figure 6. 12-Position Connector Plug

2. Connect the Dionex VP connector plug to the 12-position connector plug. Refer to the table below for pin connections.

To attach a wire to the 12-position connector plug, insert it into the plug, and use a screwdriver to tighten the locking screws.

IMPORTANT

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

Connect this Dionex VP pin:	To this position on the connector plug:
------------------------------------	--

Pin 1	Position 3
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Pin 2	Position 4
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3. Plug the 12-position connector plug into the TTL and relay connector on the Dionex ICS-1000/1500/2000 rear panel.

Go on to [Section 5.2](#) to set up Chromeleon.

5.2 Chromeleon Setup

This section briefly explains how to perform two tasks:

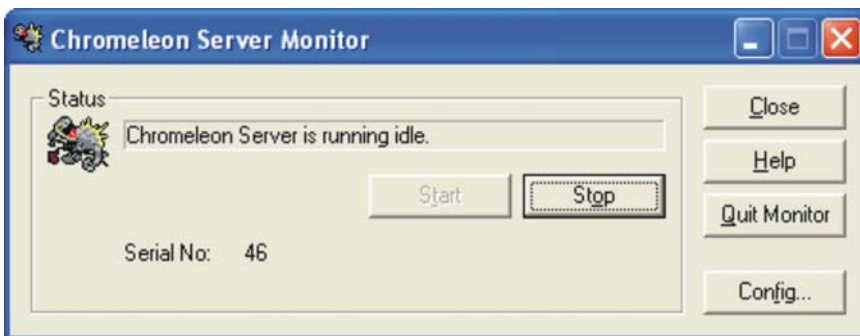
- Select a relay output for remote on/off control of the Dionex VP
- Program relay control of the Dionex VP in Chromeleon

If you need detailed instructions, refer to the Chromeleon user's guide or Help.

1. If it is not already running, start the Chromeleon Server Monitor. (Select **Start > All Programs** (or **Programs**, depending on the operating system) > **Chromeleon > Server Monitor**.)

The Server Monitor window opens.

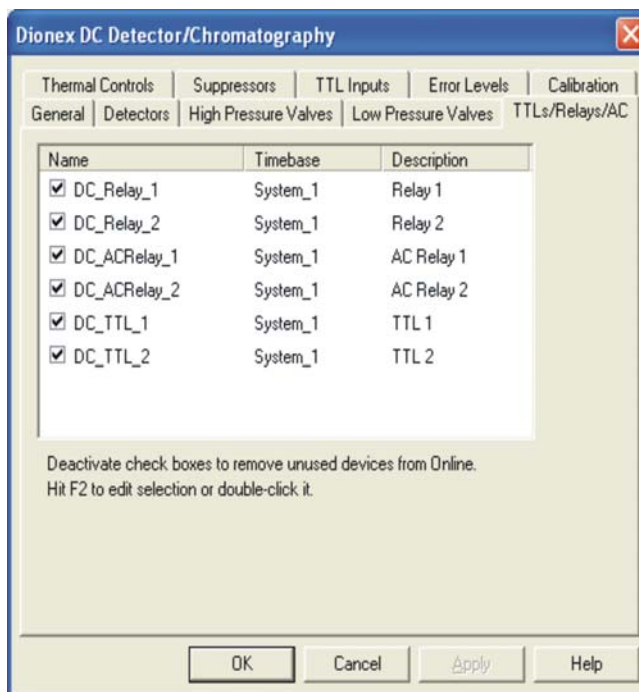
2. The Server Monitor status message should be "Chromeleon Server is running idle."



3. Open the Chromeleon Server Configuration program. (Select **Start > All Programs** (or **Programs**, depending on the operating system) > **Chromeleon > Server Configuration**.)
4. Click the + sign next to the timebase that includes the controlling device for the Dionex VP.
5. Right-click the icon for the controlling device.

The Properties dialog box for the device appears.

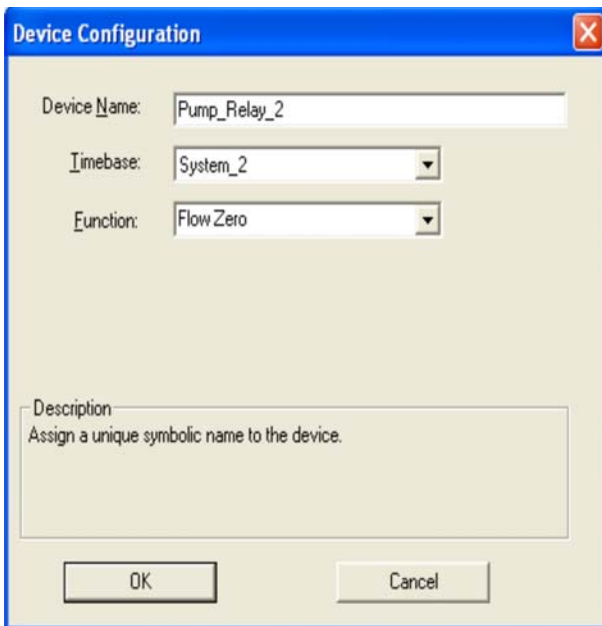
- Go to the tab page where relay properties are defined (the page name varies, depending on the device). For example, the **TTLs/Relays/AC** tab page for the Dionex ICS-3000 DC is shown here.



- Select the check box next to the relay output that will be used to control the Dionex VP.

For a Dionex ICS-3000 DP/SP:

- a. Highlight relay 2 or 4 on the **TTLs/Relays/AC** tab page. If the pump is a Dionex DP, assign relay 2 to the top pump and relay 4 to the bottom pump in the module.
- b. Press the **F2** key to display the Device Configuration dialog box.



- c. In the drop-down box, select **Flow Zero** as the **Function** for the selected relay. This ensures that the Dionex VP is automatically turned off whenever the chromatography pump is turned off or the flow rate is set to zero.

IMPORTANT

If the Dionex VP continues to draw a vacuum when the chromatography pump is not pumping liquid, the consumable or accessory may be damaged. For example, the vacuum may destroy the membrane inside the Dionex CRD.

NOTE The Flow Zero function is not available unless Dionex DP/SP Moduleware version 2.75 (or later) is installed.

- d. Click **OK**.

For a Dionex ICS-1000/1500/2000 pump:

- a. Highlight relay 2 on the **State Devices** tab page.
- b. Press the **F2** key to display the Device Configuration dialog box.
- c. Select **Flow Zero** as the **Function** for relay 2. This ensures that the Dionex VP is automatically turned off whenever the chromatography pump is turned off or the flow rate is set to zero.

IMPORTANT

If the Dionex VP continues to draw a vacuum when the chromatography pump is not pumping liquid, the consumable or accessory may be damaged. For example, the vacuum may destroy the membrane inside the Dionex CRD.

NOTE The Flow Zero function is not available unless Dionex ICS-1000/1500/2000 Moduleware version 3.0.0 (or later) is installed.

- d. Click **OK**.
8. Click **OK** to close the Properties dialog box.
9. If it is not already running, start the Chromeleon client. (Select **Start > All Programs** (or **Programs**, depending on the operating system) > **Chromeleon > Chromeleon**.)
10. In the Program Wizard, specify when to start and stop the relay selected in [Step 7](#).

For example, the **Relay and State Devices Options** tab page for the Dionex ICS-3000 DC is shown here.

6. Troubleshooting

If you are unable to eliminate a problem by following the instructions here, contact Technical Support for Dionex products before proceeding. In the U.S. and Canada, call 1-800-346-6390. Outside the U.S. and Canada, call the nearest Thermo Fisher Scientific office.

- **Dionex VP fails to respond to relay commands**

If the Dionex VP fails to turn on or off when the corresponding command is executed, check the following:

- a. Verify that the **RELAY CNTRL** button on the Dionex VP rear panel is in the **OFF** position (the button is not pressed in).
- b. Verify that the appropriate relay output was assigned to control the pump in the Server Configuration program (see [Section 5.2, Step 7](#)).

- **Dionex VP continuously emits a high-pitched noise**

A liquid leak in the plumbing will allow air to flow into the Dionex VP, prevent the pump from achieving a steady-state vacuum level, and produce a high-pitched noise during operation.

- a. Check all liquid line connections for leaks. Tighten fittings, or replace tubing and fittings as required.
- b. Tighten the ballast reservoir cap.

A. Connections from the Dionex VP to the Dionex CRD 300

The Dionex CRD 300 Carbonate Removal Device consists of a gas-permeable membrane with a silicone coating that is selective to CO₂. When the Dionex CRD 300 is running in the vacuum regeneration mode, the Dionex VP evacuates CO₂ from the regenerant channel that encloses the membrane. A bleed line helps remove gaseous carbon dioxide by bleeding a small amount of air into the regenerant channel.

[Figure 7](#) shows the typical tubing connections for the vacuum regeneration mode.

NOTE [Figure 7](#) is provided for reference only; refer to the **Dionex CRD 300 manual** for current product information. The manual is included on the Thermo Scientific Reference Library DVD (P/N 053891).

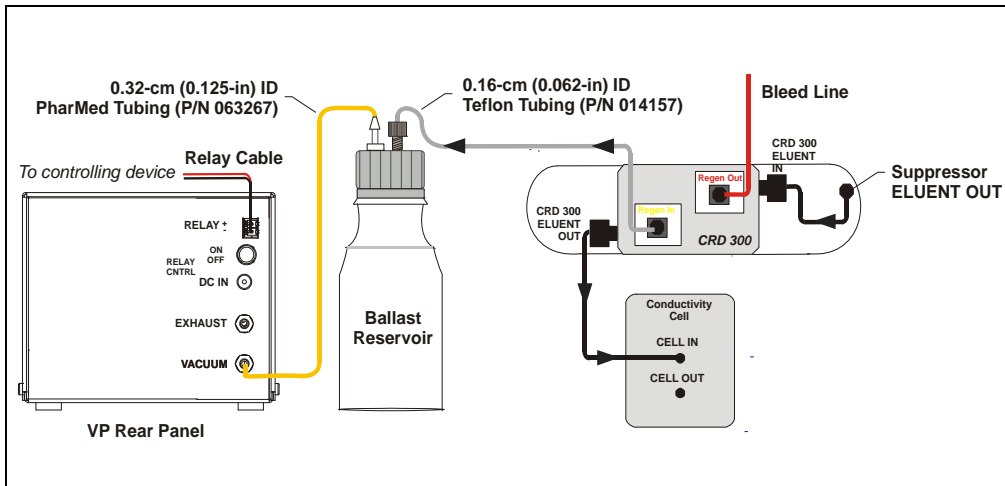


Figure 7. Example Flow Schematic: Dionex CRD 300 Vacuum Regeneration Mode