

Agilent Capillary Electrophoresis System

User's Guide



Agilent Technologies

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WARNING

For details of safety,
see Safety Information
on page 224.

Warning Symbols Used In This Book



The apparatus is marked
with this symbol when
the user should refer to
the instruction manual
in order to protect the
apparatus against
damage.



Eye damage may result
from directly viewing
the light produced by the
deuterium lamp used in
this product. Always
turn off the deuterium
lamp before opening the
metal lamp door on the
side of the instrument.

User's Guide

Introduction

This handbook gives an overview on your Agilent capillary electrophoresis system. It is designed to get you started working with the system. We strongly advise you to make extensive use of the help system when working with the system. There you find detailed reference and task information which complements the overview given in this guide. Refer to Getting Help later in this section for information on using the online help system. Refer to Where to Find Information for help in finding information for certain tasks.

Getting Help

You can get help by choosing the Help item from the top menu. This puts you into the help index. From there you can browse through the information by selecting the appropriate jumps (underlined words). To access specific information in help:

When you are in the Agilent ChemStation software:

- select a context-sensitive element and press F1.

When you are in the online help.

- search for a specific keyword using the search command,
- select a jump – a jump is an underlined word you can select to go to a topic related to the word, or
- select a word or phrase with a dotted underline to see its definition.

The help system also comprises online information on how to use help.

Table 1 **Where to Find Information**

Task	Refer to
Installation of the Agilent CE system, installing the external water bath, installing the high sensitivity cell	Chapter 1 "The Core Agilent CE Instrument"
Setting up the Agilent CE system for CE analysis, fraction collection, CE+p	Chapter 2 "Capillary Electrophoresis"

Table 1 **Where to Find Information, continued**

Task	Refer to
How to use the Agilent CE system for capillary electrochromatography	Chapter 3 "Capillary Electrochromatography"
How to connect and operate the Agilent CE system for CE-MS and what else can be done with CE-MS adapter kit	Chapter 4 "Online CE-ESI-MS with the Agilent CE System"
How to maintain the Agilent CE system	Chapter 5 "Maintaining Your Agilent CE Instrument"
Setting up a sequence	Help system
Data analysis	Help system
Setting up a report	Help system
Spectral library search	<i>ChemStation Applications</i> handbook and help system
Setting up customized reports	<i>ChemStation Applications</i> handbook
Safety information	"Safety Information" on page 224
Learning ChemStation concepts	<i>Understanding Your ChemStation</i> handbook
Learning the theory of the technique	<i>High Performance Capillary Electrophoresis: An Introduction</i> The CE Partner CD-ROM: <i>The comprehensive, interactive tool for beginners and advanced users of CE</i>

What Learning Products are Available?

The Agilent CE system is supplied with:

- *User's Guide*
- *High Performance Capillary Electrophoresis: An Introduction*

The Agilent ChemStation is supplied with:

- *Installing Your Agilent ChemStation*
- *Installing and Understanding Your Spectra Module*
- *Understanding Your Agilent ChemStation*
- Help system

In This Book

- Chapter 1 “The Core Agilent CE Instrument” describes the installation of the Agilent CE system, external water bath for tray cooling, detector filter assembly, changing fuses and the core CE diagram screen, which is used for instrument control.
- Chapter 2 “Capillary Electrophoresis” with user interface explanation describes the tasks that need to be performed on the Agilent CE system when preparing an analysis. In addition some new functions are described such as fraction collection and capillary electrophoresis plus high pressure.
- Chapter 3 “Capillary Electrochromatography”, a new separation technique, lists parameters that make up a CEC method and describes their meaning.
- Chapter 4 “Online CE-ESI-MS with the Agilent CE System” describes the online CE coupling to the Agilent 1100 Series LC/MSD.
- Chapter 5 “Maintaining Your Agilent CE Instrument” describes standard operating procedures which should be used to maintain the functionality of your system.

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The Core Agilent CE Instrument

How to install the Agilent CE instrument

The Core Agilent CE Instrument

This chapter describes how to install the Agilent CE instrument.

For details of how to install the computer and software, refer to the *Installing Your Agilent ChemStation* handbook.

Installing the Agilent CE Instrument

What You Will Do

- choose a suitable place,
- unpack the Agilent CE instrument, and
- set up the Agilent CE instrument.

Choosing a Suitable Place

Check carefully before you begin to install, that the place you have chosen meets the requirements below.

Dimensions 425 × 575 × 520 mm
 (16.8 × 22.7 × 20.5 inches)
 (width × height × depth)

Leave adequate space, at least 80 mm (3 inches), at rear for access to connectors.

Add space required for PC and printer.

Weight 56 kg (115 lbs)

Environment Temperature 5–40 °C
 Humidity: 15–80 % < 31 °C (non condensing)

Line Power 100–120 V AC ± 10 % or 220–240 V AC ± 10 %

Line Frequency 48–55 Hz or 57–66 Hz

Power

Consumption 650 VA

BTU Rating 2216.5 Btu/h

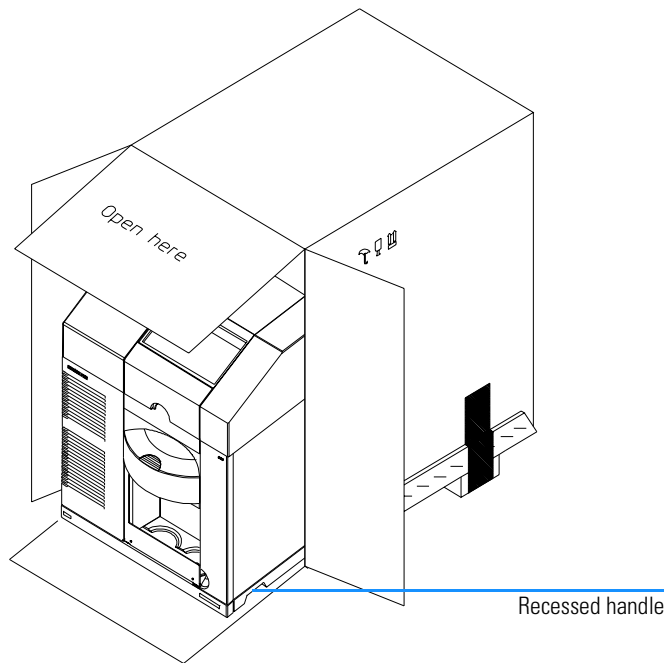
CEC/CE+p External pressure supply (15 bar max) of oil-free air or nitrogen

Unpacking the Agilent CE Instrument

- 1** The Agilent CE instrument is heavy—it should be carried by two people. Use the recessed handles on both sides to carry the Agilent CE instrument.
- 2** Open the box in which the Agilent CE instrument was shipped.
- 3** Pull the Agilent CE instrument out of the box and position it in a suitable place.

Figure 1

Unpacking the Agilent CE Instrument



Accessories

The accessories shipped with the Agilent CE instrument are in the drawer on top of the instrument box. Check that you have the complete set using Table 1.

Table 1

Accessories	
Description	Part Number
Agilent CE accessory kit, comprising: Tools Fuses Fittings for external water bath tubing Fitting and tube for external pressure (CE+p and CEC mode needed) Spare filters Spare screws Caps Vials	G1600-68701
Agilent CE start-up kit, comprising: Straight capillary, 40-cm length, 50- μ m id Straight capillary, 56-cm length, 50- μ m id Extended light path capillary, 56-cm length, 50- μ m id Alignment interface for straight capillary, 50- μ m id Alignment interface for extended light path capillary, 50- μ m id Capillary insertion tools	G1600-68706

Setting up Your Agilent CE Instrument

WARNING

Ensure that line-power cord is disconnected before setting up your Agilent CE instrument. For translations, see page 227.

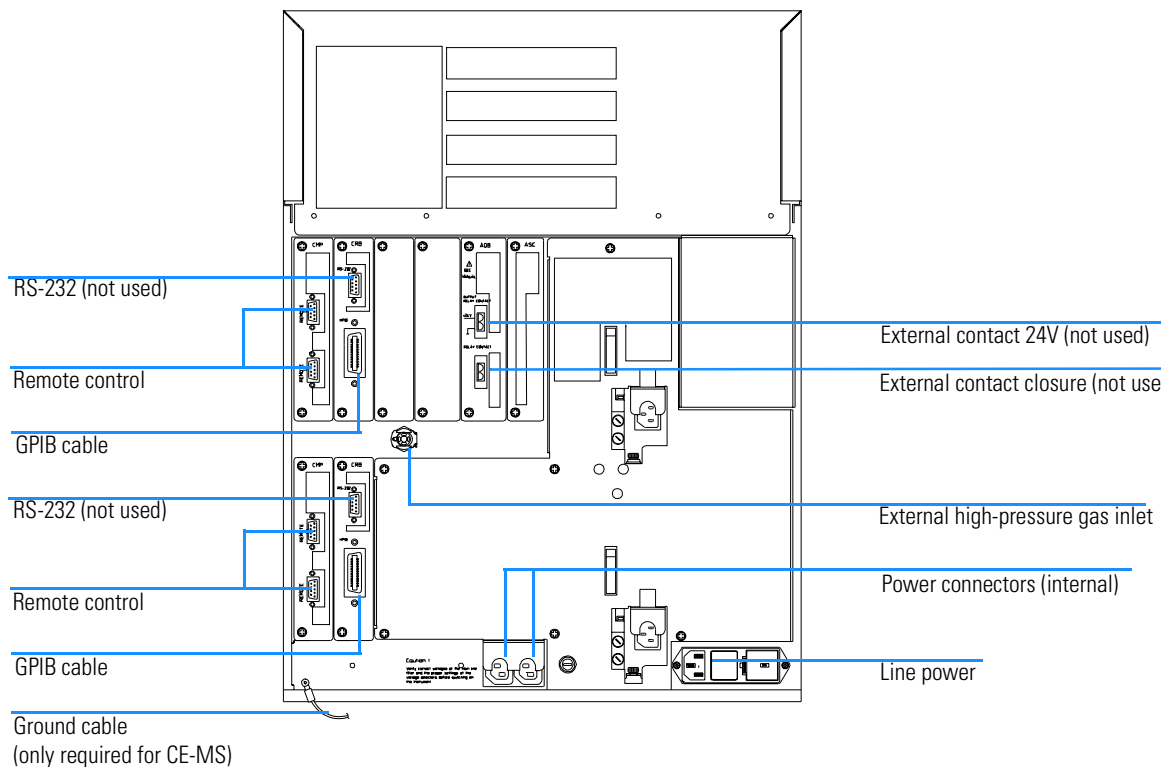
After you have unpacked the Agilent CE instrument and positioned it in a suitable place on your bench you need to

- 1 Connect cables at the rear of the Agilent CE instrument.
- 2 Install the bottles of the replenishment system.
- 3 Check the line power setting and the fuses.

Connectors

The Agilent CE instrument has the following connectors at the rear.

Figure 2 Connections at Rear of Instrument



Connecting Cables

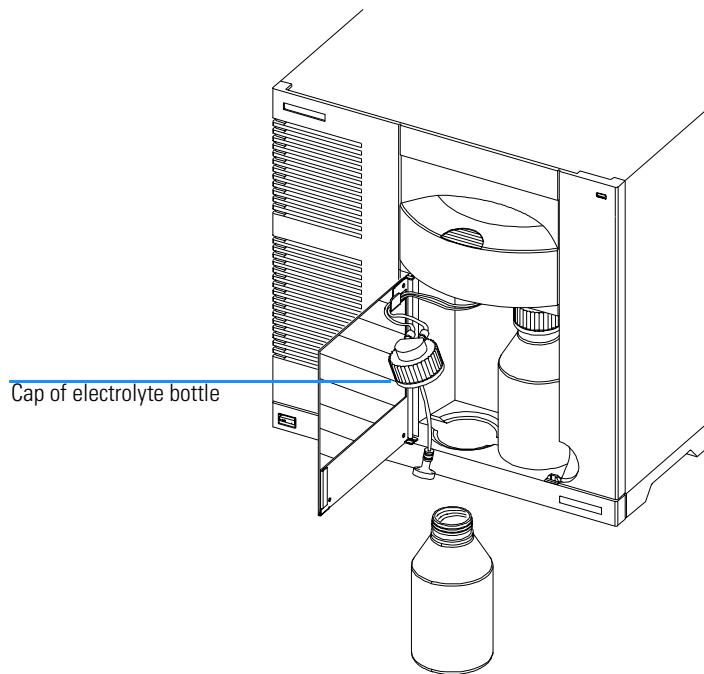
Connect the following cables as shown in Figure 2.

- 1 Two GPIB cables—the first GPIB cable is used to transfer signals from the core instrument to the detector, the second GPIB Cable connects the Agilent ChemStation to the Agilent CE instrument
- 2 One start/stop-cable that is used to connect the core of the instrument to the DAD.
- 3 One power cable (two power cables are already installed).
- 4 One ground cable (required for CE-MS).

Installing the Replenishment Bottles

Figure 3

Installing the Replenishment Bottles



WARNING

Use only bottles with part number 9300-1748 with this instrument. There is pressure and vacuum applied to the bottles. The bottles specified above have a protective coating. For translations, see page 228.

- 1 Inspect the bottles supplied with the Agilent CE instrument. Make sure you only use clean glassware.
- 2 Install the bottles in the Agilent CE instrument.
- 3 Tighten the caps. Make sure the caps are tightened firmly.
- 4 Before using the replenishment system for the first time it needs to be cleaned. Refer to “Preparing/Cleaning the Replenishment System” on page 204.

Checking the Line Power Switch and the Fuses

The following procedure describes how to set the line power select switch located in the rear of the instrument. The line power select switch is only changed if the Agilent CE instrument is moved from one power setting to another, for example from 120 V AC to 240 V AC.

WARNING

Make sure that the line power setting of the instrument complies with the specification of your country before connecting the line power cord. The line power setting can be checked through the slit of the fuse holder on the rear of the instrument, see Figure 2. See instructions on how to set the line power setting. For translations, see page 229.

WARNING

Make sure that the fuses installed in the instrument comply with the specifications before connecting the line power cord. See instructions on how to access the fuses. For translations, see page 229.

WARNING

The Agilent CE instrument panels and cabinet must be grounded during operation. The Agilent CE instrument, and any other instruments connected to it, must be operated from a three-contact power source, with the ground contacts securely connected to ground. Get an electrician to check and verify ground at the source. For translations, see page 229.

Setting the Line Power Switch

What You Will Do

- access and remove the fuse holder,
- remove and reposition the line select plug, and
- change the line fuses and the power supply fuses.

WARNING

When changing the setting of the line power select switch the line fuses and the fuses of the power supplies need to be replaced with fuses complying with the new setting before the instrument is switched on again. For translations, see page 232.

WARNING

Make sure line-power cord is disconnected before changing line-voltage setting. For translations, see page 232.

Accessing and Removing the Line Fuse Holder

Material Needed

Small flat screwdriver

- 1** The fuse holder must be removed to access the line select plug.
- 2** The fuse holder is attached to the instrument by a latch. Put a flat screwdriver M3 into the slit to release the latch.

Figure 4 **Location of Line Fuse Holder**

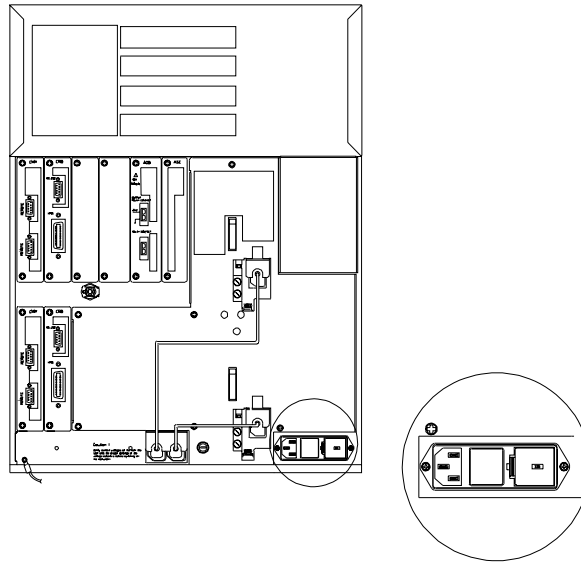
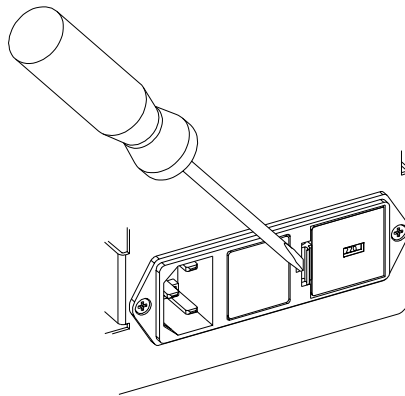


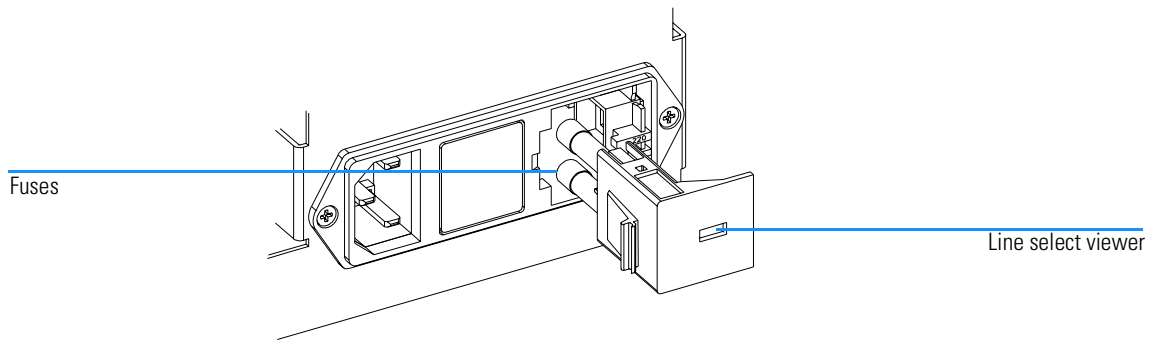
Figure 5 **Accessing the Line Fuse Holder**



- 3** Remove the fuse holder from the instrument.

Figure 6

Removing the Line Fuse Holder



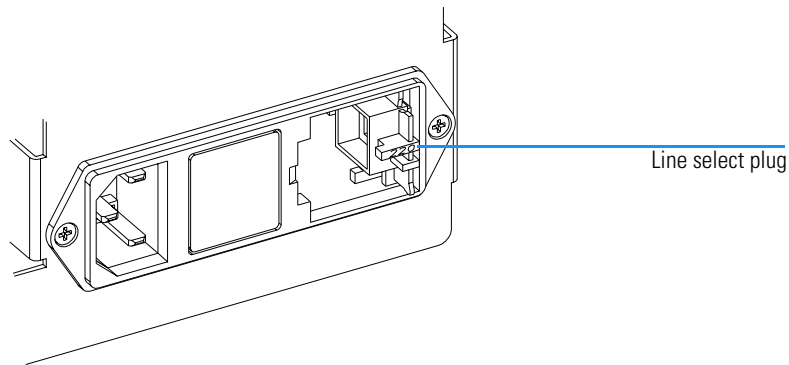
- 4 Note the line select viewer in the line fuse holder.

Removing and Repositioning the Line Select Plug

- 1 Grasp the line select plug and pull it out. The line select plug is held tightly in place. Use a pair of needle nose pliers to pull it out.

Figure 7

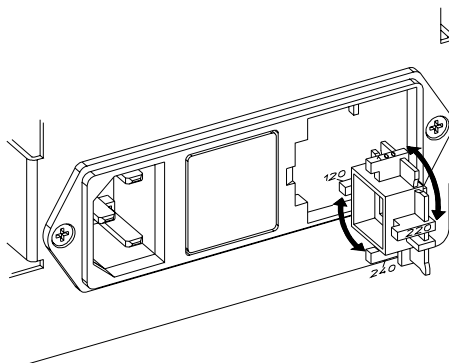
Removing the Line Select Plug



- 2 Position the line select plug so that the desired line voltage will be seen in the line select viewer. If the power setting of your network is 230 V set the line power select switch to 220 V.

Figure 8

Positioning the Line Select Plug



- 3 Push the line select plug back into its socket.

Continue with changing the fuses as described in “Changing the Line Fuses of the Instrument” on page 23.

Changing the Line Fuses of the Instrument

The following procedure describes how to change the line fuses located in the rear of the instrument.

The fuses should be changed when they have blown or after the line power setting has been changed. When a fuse has blown you should first try to find out which problem caused this before replacing the fuse.

What You Will Do

- access the fuse holder,
- replace the fuses, and
- reinstall the fuse holder.

Material Needed

Description	Part Number
Two line fuses T3A/250 V (line voltage 220–240 V), or	2110-0029
Two line fuses T6.25A/250V (line voltage 100–120 V)	2110-0422
Small flat screwdriver	

For 110 V a 6-A time delay fuse is also acceptable.

Replacing the Line Fuses

- 1 Remove the fuses from the fuse holder by gently pulling them out.
- 2 Replace the burnt fuses with the new ones specified above.

WARNING

Make sure line-power cord is disconnected before installing or replacing a fuse. For continued protection against risk of fire replace only with fuses of specified type and current ratings. For translations, see page 234.

Reinstalling the Fuse Holder

- 1 Reinstall the fuse holder by pushing it back into its original position.
- 2 You will hear the latch being closed again with a click.

Make sure the desired line voltage appears in the line select viewer.

Changing the Fuses for the Power Supplies

The following procedures describe the steps necessary to change the fuses for the power supplies located in the rear of the instrument.

The fuses should *only* be changed when the line power setting has been changed. If the fuses have blown there is a severe problem in the instrument, call Agilent Technologies.

What You Will Do

- access the fuse holder,
- replace the fuse, and
- reinstall the fuse holder.

Material Needed

Description	Part Number
Four fuses 220/240 V, F2 A/250 V, or	2110-0002
Four fuses 100/120 V, 3 A/250 V	2110-0003
Small flat screwdriver	

WARNING

Make sure line-power cord is disconnected before installing or replacing a fuse. For translations, see page 235.

Accessing the Fuse Holder for the Power Supply Fuses

- 1 Put a small flat screwdriver into the slit of one of the fuse holders and turn it to the left to release the fuse holder.

Figure 9

Location of the Fuse Holders for the Power Supply Fuses

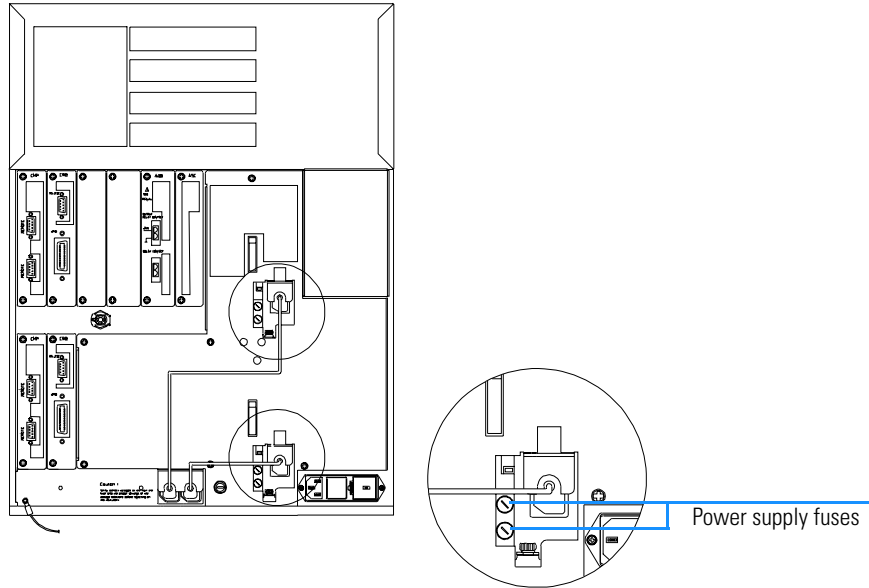
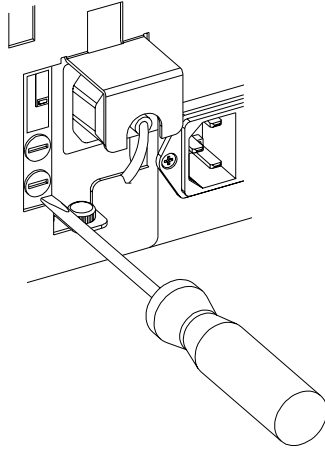


Figure 10

Accessing the Power Supply Fuses



- 2 Remove the fuse holder from the power supply.

Replacing the Fuse

- 1 Remove the fuse from the fuse holder by gently pulling it out.
- 2 Replace the fuse with a new one specified above.

Reinstalling the Fuse Holder

- 1 Reinstall the fuse holder by pushing it back into its original position.
- 2 Put a flat screw driver into the slit of the fuse holder and turn to the right to fasten the fuse holder.

Repeat the above steps for all four fuses of the two power supplies.

The Core Agilent CE Instrument
Changing the Fuses for the Power Supplies

Table 2

Specifications of Fuses		
Description	Part Number	Customer Replaceable
Two line fuses (line voltage 220–240 V) T3 A/250 V	2110-0029	Yes see “Changing the Line Fuses of the Instrument” on page 23
<i>Or</i> two line fuses (line voltage 100–120 V) T6.25 A/250 V	2110-0422	Yes see “Changing the Line Fuses of the Instrument” on page 23
Four fuses for power supplies (line voltage 220–240 V) F 2 A/250 V	2110-0002	Only when changing power setting
<i>Or</i> four fuses for power supplies (line voltage 100–120 V) F 3 A/250 V	2110-0003	Only when changing power setting
Air-pump fuse T 6.25 A/250 V	2110-0422	Yes
ELC-PCB F 8 A/250 V	2110-0342	No
TDR-PCB F 8 A/250 V	2110-0342	No
Four fuses for motors (tray and lifts) T 1.5 A/250 V (PDV)	2110-0304	No
Two fuses on acquisition board (AQB) F 250 mA/250 V	2110-0004	No
Eight fuses for valves F 500 mA/125 V (PDV)	2110-0716	No

The Core Agilent CE Instrument
Changing the Fuses for the Power Supplies

Supplement

This section describes:

- installing the external water bath for tray cooling, and
- installing the DNA filter kit.
- installing the high sensitivity cell

External Water Bath for Tray Cooling (Optional)

The two connections at the side panel (see Figure 11) of the instrument can be used to install an external water bath for the tray of the Agilent CE instrument.

The temperature setting for the cooling liquid is done at the external water bath. The temperature display in the CE Diagram displays the actual temperature of the tray controlled by the cooling liquid. The external water bath can't be controlled by the Agilent CE instrument.

Good Practices

To avoid problems when using the external water bath consider the following points.

- The tubes used should have a thermal insulation to avoid condensation.
- Use a displacer to minimize the amount of liquid that is released in case of leaking cooling lines.
- The device should be equipped with a liquid level sensor to switch off automatically when liquid is lost.
- Do not operate the devices at temperatures below +1°C to avoid formation of ice on internal surfaces.

External Water Bath Requirements

- Minimum cooling power 100 W, at bath temperatures of 5 °C.
- Temperature precision better than ± 0.2 °C.
- Safety requirements must meet national standards and also:
 - be suitable for unattended operation,
 - be suitable for continuous operation, and
 - have controllable high temperature protection.
- Requirements for external liquid circulation:
 - suitable for external circulating of liquid,

External Water Bath for Tray Cooling (Optional)

suitable for connection of 8-mm id tubes,
minimum circulating liquid flow rate 8-l/min,
minimum differential pressure of 150 mbar, and
maximum pressure of 500 mbar.

- Requirements for pressure pump:

A pump with the capacity to generate a differential pressure of at least 0.15 bar. For a single action pump, a high pressure capability of 0.15 bar is required. The high pressure must not exceed 0.5 bar and the low pressure must not exceed -0.5 bar.

- Cooling liquid:

distilled water plus maximum 3 % anti-freeze.

- Bath temperature:

minimum allowed temperature is 1 °C, and
maximum allowed temperature is 50 °C.

Connecting an External Water Bath

WARNING

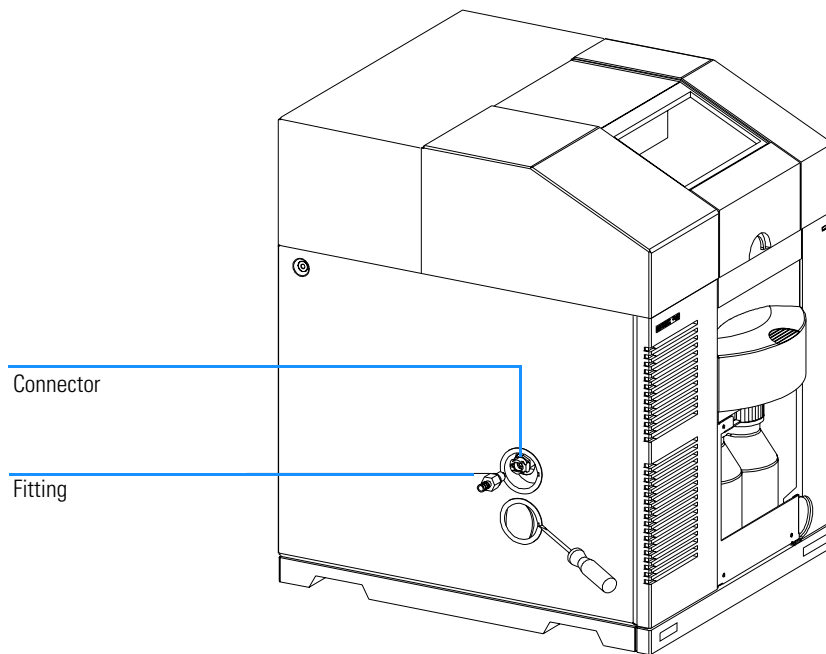
Make sure both the water bath and the Agilent CE instrument are switched off when installing the external water bath. For translations, see page 236.

The Core Agilent CE Instrument
External Water Bath for Tray Cooling (Optional)

- 1 Remove the plastic protectors on the side panel of the instrument using a flat screwdriver.

Figure 11

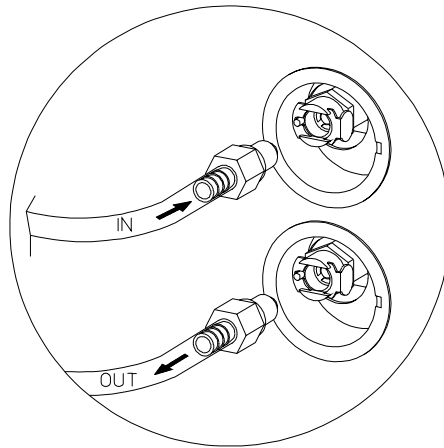
Connections for External Tray Cooling



- 2 The startup kit supplied with the Agilent CE instrument includes two fittings for flexible tubing with 8mm internal diameter. Use those fittings for the flexible tubing used with your external water bath.
- 3 Connect the fittings to the connectors on the instrument (see Figure 12). Use the upper connector for incoming liquid, the lower connector for outgoing liquid.

Figure 12

Connecting the Tubing for an External Tray Cooling



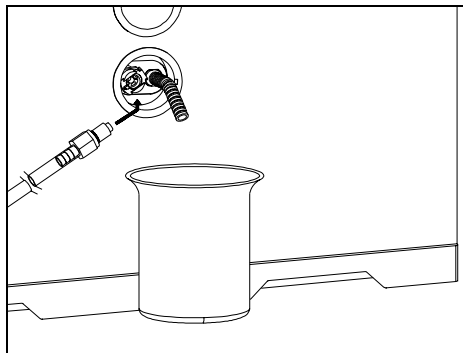
Installing Drainage Tubing

The tubing drains condensation out of the instrument which may appear if you connect an external water bath to cool your samples in the sample tray.

- 1 Behind the lower of the two plastic grommets is 10 cm of corrugated tubing. Place a beaker of at least 200-ml capacity under this tubing to collect the drained condensation, see Figure 13.

Figure 13

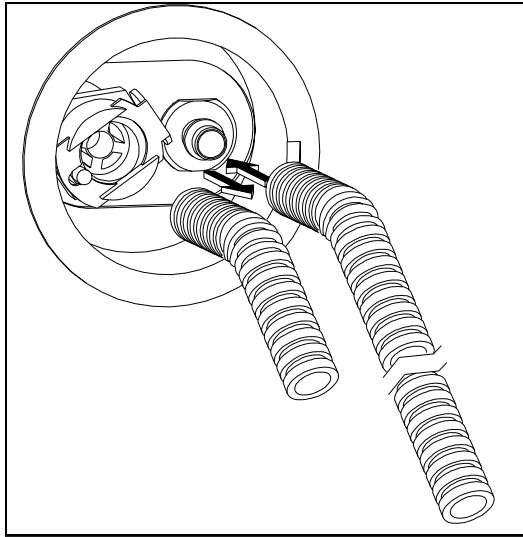
Condensation Drain



- 2 If you want to use a larger reservoir under the lab bench, remove the 10 cm of corrugated tubing and connect the 100-cm length of tubing supplied in the startup kit, see Figure 14.

Figure 14

Changing the Drain Tubing



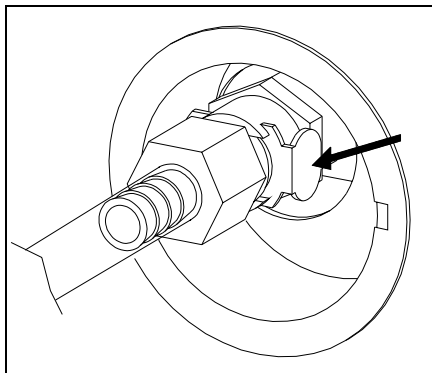
Disconnecting the External Water Bath

To disconnect the external water bath.

- 1 Switch off the external water bath and the Agilent CE instrument.
- 2 Push the shutter (see Figure 15) on the connector to release the self shutting connector.

Figure 15

Releasing the Fitting



- 3 Secure the two connections with the plastic caps.

Installing Drainage Tubing

Disconnect external water baths and empty the tubing inside the Agilent CE instrument before shipping it. Temperatures below 0° C can cause traces of liquid in the tubing to freeze.

To empty the tubing inside the Agilent CE instrument, connect the two self shutting connectors and pump the liquid out.

If you operate the external water bath at very low temperatures and at a high ambient humidity level there is a possibility that water can condense inside the Agilent CE instrument. This water can drip onto the base plate inside the instrument. If the amount of condensing water is very high, the leak sensor of the Agilent CE instrument is activated and the instrument reaches an error state. In this case shut off the Agilent CE instrument and the external water bath immediately. Use a tissue to dry the leak sensor. Avoid condensation by:

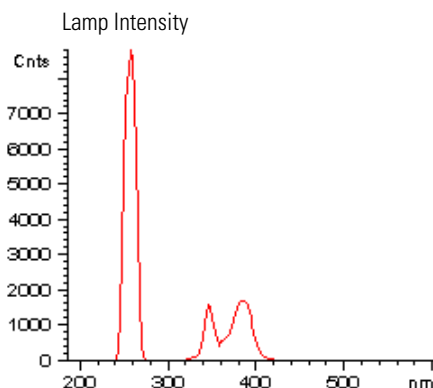
- raising the temperature at the water bath, and/or
- lowering the ambient humidity level.

Installing the Detector Filter Assembly G1600-62700 (Optional)

The detector filter transmits light of a defined wavelength range. Figure 16 shows a typical transmission spectrum. Maximum transmission is between 256–266 nm.

Figure 16

Transmission Spectrum



The filter kit (part number G1600-62700) for gel-filled capillaries contains:

- filter assembly (part number G1600-62701), and
- filter tool (part number G1600-03801).

Do not touch the surface of the filter or any other optical parts. Store the filter or other optical parts in the shipping container. Fingerprints may lead to baseline drifts and may also increase baseline noise of detector response.

Parts required:

- 12 mm hexagonal socket screwdriver (included in startup kit),
- Pozidriv screwdriver (included in startup kit), and
- a pair of tweezers.

Installing the Filter

Before you install the filter, do the following:

- 1 Select the detector icon in the CE diagram screen.
- 2 Select Lamp Off from the menu to switch the lamp off.
- 3 Select Maintenance from the instrument menu to lower all lifts.
- 4 Select Exit from the File menu to exit the Agilent ChemStation. Exit both the online and offline copy (if offline is also activated).
- 5 Turn off line power of the Agilent CE instrument.
- 6 Disconnect the line power cord from the Agilent CE instrument.

Removing the Detector Cover

- 1 Open the top cover.
- 2 Remove the capillary cassette.

WARNING

Make sure you have disconnected the line power cord of the Agilent CE instrument before you proceed. For translations, see page 237.

- 3 Take off the detector cover by opening the two push turn locks. To open them press them down and turn them counterclockwise, see Figure 17.

Figure 17

Before Removing the Detector Cover

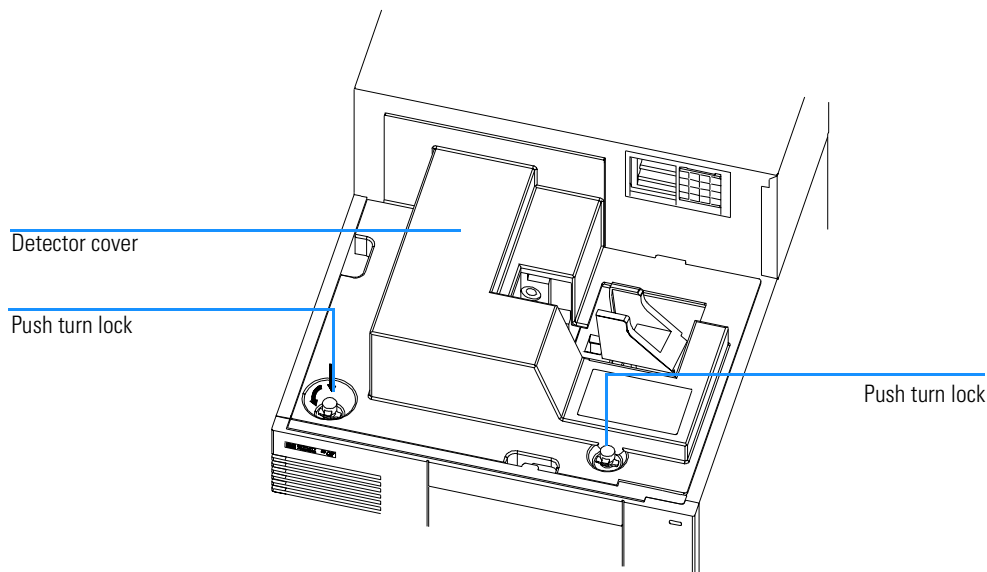
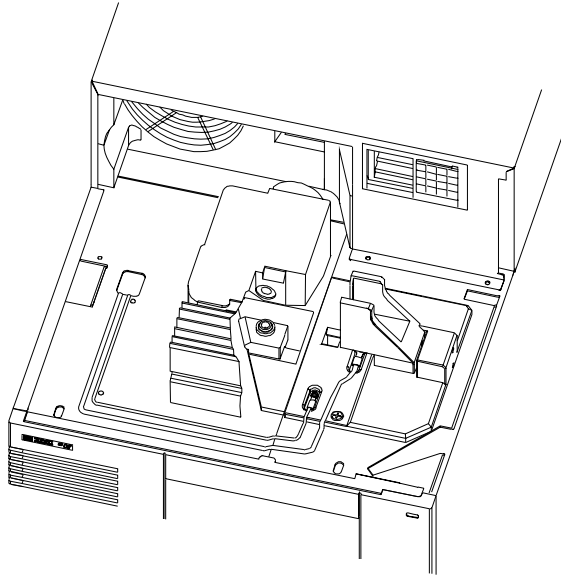


Figure 18

After Removing the Detector Cover



WARNING

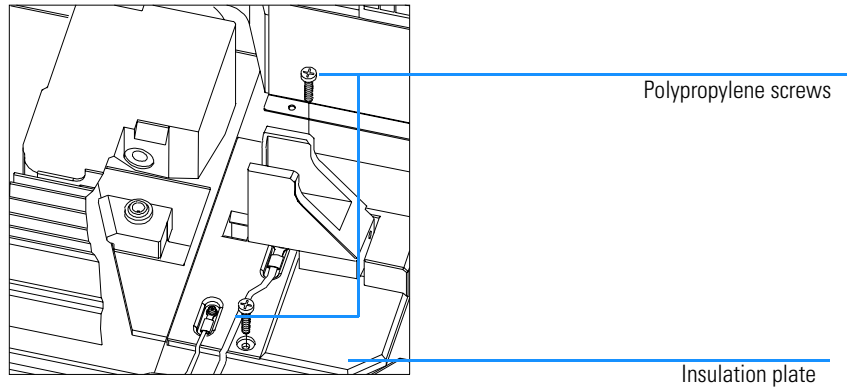
If the Agilent CE instrument has been in use, the lamp housing can be very hot. Avoid touching the lamp housing. For translations, see page 238.

Removing the Insulation Plate

- 1 Use a Pozidriv screwdriver to unscrew the 2 polypropylene screws which secure insulation plate, see Figure 19.

Figure 19

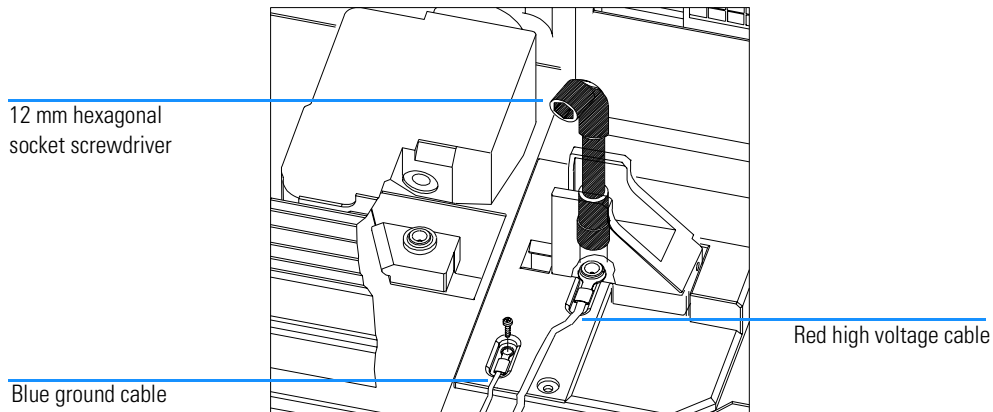
Screws Securing the Insulation Plate



- 2 Use a Pozidriv screwdriver to remove the screw that secures the blue ground cable, see Figure 20.
- 3 Use the 12 mm hexagonal socket screwdriver to unscrew the inlet electrode, see Figure 20.

Figure 20

Removing the Inlet Electrode

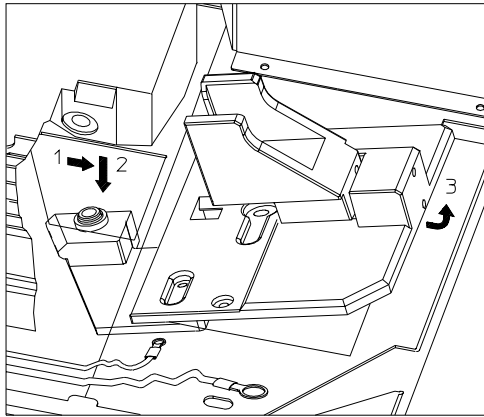


- 4 Carefully lift the red high voltage wire. The inlet electrode will come out.

- 5 Slowly slide the insulation plate to the right (1), lift it up (2 and 3), and remove it, ensuring that the outlet electrode does not hit the foam of the tray cooling or the lift station, see Figure 21.

Figure 21

Removing the Insulation Plate

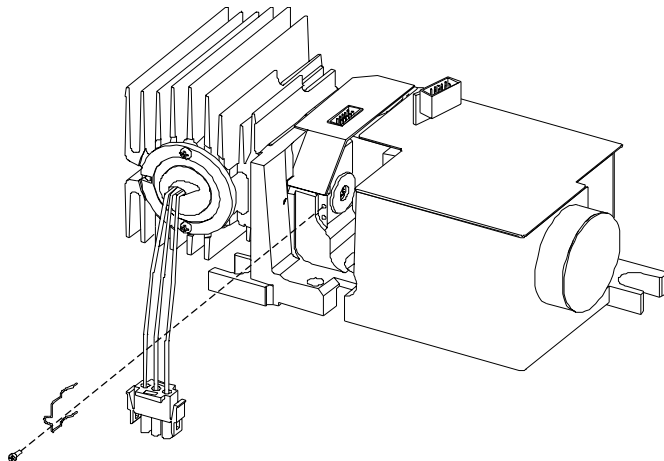


Removing the Standard Lens Holder Assembly

- 1 Mark the position of the lens holder assembly with a colored pen. If you subsequently have to reinstall the lens holder assembly, ensure that it is rotated to the original position. This is to avoid loss in light throughput.

Figure 22

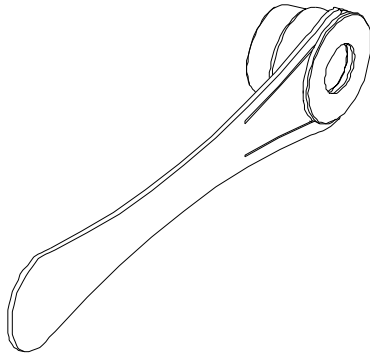
Lens Holder Assembly



- 2 Remove the screw which secures the lens holder from the detector housing using the Pozidriv screwdriver.
- 3 Note the orientation of the spring which holds the lens assembly and pull it out from the detector housing. It may be necessary to use a pair of tweezers.
- 4 Remove the lens assembly and store it in the filter shipping container.
- 5 Take the filter tool and slide it into the grooves of the filter assembly, see Figure 23.

Figure 23

Filter Tool



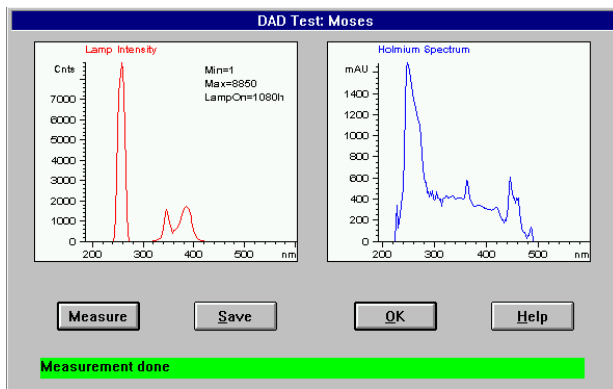
- 6** Insert the filter assembly with the help of the tool. Take care that the filter is seated correctly.
- 7** Reinsert the spring, taking care that the spring is fitted in the correct way.
- 8** Secure the spring with the screw.
- 9** Reassemble the instrument.

Checking the Proper Function of the Filter

Restart the instrument and check the proper function of the filter as follows.

- 1** Install the red alignment interface (G1600-60230) without the capillary into the cassette.
- 2** The detector lamp should be switched on for one hour, to allow stabilization, before proceeding with the DAD test. Select More DAD followed by DAD Test from the Instrument menu.
- 3** Start the DAD test with Measure. If the filter is correctly installed the intensity curve and the holmium spectra curve must look like the typical curve in Figure 24.

Figure 24 **DAD Test with Filter Installed**



Tips and Hints

For operation set the wavelength in a range from 256 nm to 266 nm, for example:

- sample wavelength 262 nm and bandwidth 2 nm,
- sample wavelength 262 nm and bandwidth 4 nm, or
- sample wavelength 262 nm and bandwidth 6 nm.

A reference wavelength is not recommended. If you have to use it, choose 370 nm with bandwidth 40 nm.

Useful parts, see Figure 22.

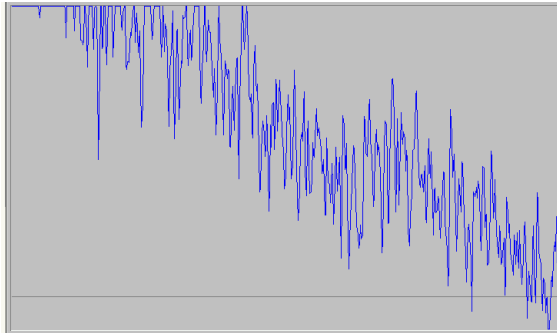
- Screw (part number 0515-1508)
- Spring clip (part number G1600-21200)

What Can Happen if you Work in the Low UV Range with the Filter Installed

With the filter installed, only a limited wavelength range can be used. A signal recorded outside this range will be extremely noisy and even; no peaks are shown.

Figure 25

Signal at 200 nm with Filter Installed (Attenuation 3)



Installing the High Sensitivity Cell (Optional)

General Information

The high sensitivity detection cell increases sensitivity (signal to noise) up to 10-fold over standard 75 μm id capillaries. It comes prealigned in a special optical alignment interface (cell holder) that matches the Agilent CE system.

Part numbers and accessories for the high sensitivity detection cell:

G1600-68713 High Sensitivity Detection Cell Kit

- G1600-60027 High Sensitivity Detection Cell
- G1600-63200 Replacement Fittings
- G1600-60002 Capillary Cassette
- G1600-68715 High Sensitivity Detection Cell Capillary Kit-72

Replacement Capillary Kits

- G1600-68716 High Sensitivity Detection Cell Capillary Kit-56:
56 cm inlet capillary (75 μm id), and
8.5 cm outlet capillary (75 μm id)
- G1600-68715 High Sensitivity Detection Cell Capillary Kit-72:
72 cm inlet capillary (75 μm id), and
8.5 cm outlet capillary (75 μm id)
- G1600-68714 High Sensitivity Detection Cell Capillary Kit-88:
88 cm inlet capillary (75 μm id), and
8.5 cm outlet capillary (75 μm id)

What is Needed?

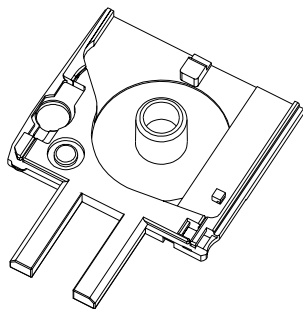
What is Needed?

Older capillary cassettes do not match the new interface design of the high sensitivity detection cell. The new cassettes are modified with a cut-out for fitting, see Figure 26. Please make sure that you have a modified cassette before you continue.

- All buffers, samples and solvents should be filtered through a 0.2 μm filter.
- All vials should be cleaned inside.
- The electrodes, prepunchers and replenishment system should be clean.

Figure 26

Cut-out on New Capillary Cassette for Fitting High Sensitivity Detection Cell



CAUTION

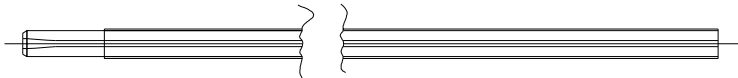
Make sure that you prepare a clean bench for the following procedure. If dust particles enter the capillary or the high sensitivity detection cell, this may lead to poor performance of the cell. Compressed air is very useful for cleaning the parts before they are assembled. For translations, see page 239.

Preparing Capillaries and Fittings for Coupling to High Sensitivity Detection Cell

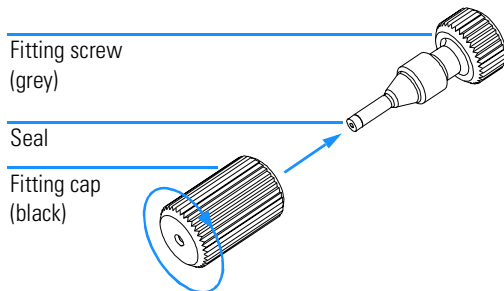
The capillaries have one end prepared for coupling to the high sensitivity detection cell. The polyimide coating is removed from this end and the edges are bevelled. This end is protected by a cover sleeve upon delivery.

Figure 27

Prepared End of Capillary (Polyimide Removed)



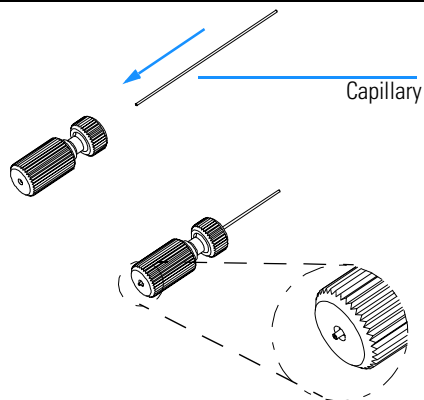
1 Take the fittings and fitting cap out of the bag. Loosely screw the fitting cap onto the fitting screw until you feel it stop. Don't tighten the screw. Purge with compressed air to remove any particles.



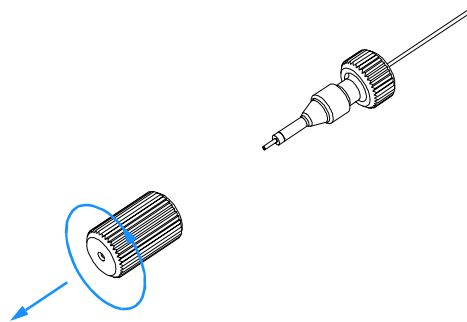
Never slide the capillary through the fitting screw without the fitting cap screwed on. The seal inside the fitting screw could come out, and is difficult to replace.

Preparing Capillaries and Fittings for Coupling to High Sensitivity Detection Cell

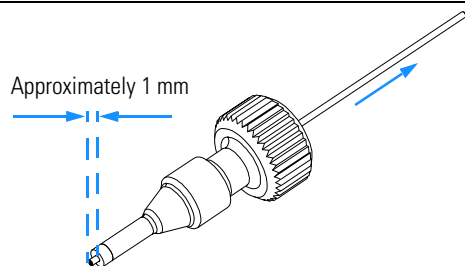
2 Start with the shorter capillary (outlet capillary). Pull the protective cap off the bevelled capillary tip. Only the capillary end with bevelled edges and without polyimide fits correctly to the cell. Do not touch the capillary tip. Push the capillary through the fitting screw until the capillary tip is just visible through the end of the fitting cap.



3 Remove the fitting cap from the fitting screw. Check the capillary tip for particles and remove them if necessary with compressed air. Always store the fitting cap in a bag to protect it from dust.



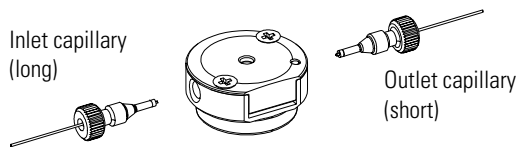
4 Pull the capillary back until it is approximately 1 mm proud of the seal. Don't slide it forward, as this could cause the seal to come out of the fitting.



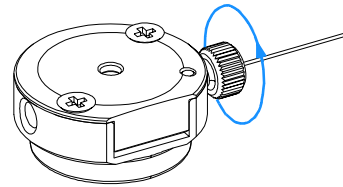
5 Repeat steps 1 to 4 with the inlet capillary. The capillaries and fittings are now ready for coupling to the cell.

Coupling the Capillaries to the High Sensitivity Detection Cell

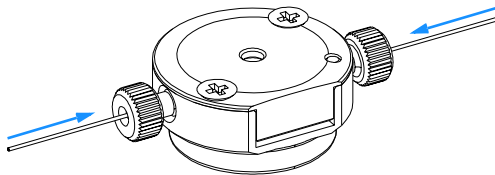
Make sure that you have a clean bench for the following procedure. If dust particles enter the capillary or the cell, this may lead to poor performance of the cell. Also check the ends of both capillaries and fittings for dust particles.



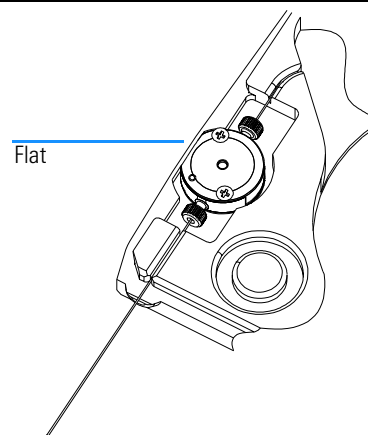
1 Hold the capillary straight and avoid touching the sides of the cell with the capillary tip. Lightly screw the outlet capillary to the cell holder until you feel the stop. Don't tighten the screw yet.



2 Screw the inlet capillary to the cell holder. Hold both capillaries just behind the screw fitting and gently push the capillaries towards each other. Tighten fittings.



3 The cell is now ready for installing into the cassette. Avoid pulling on the capillaries during installation of the cassette in the instrument.

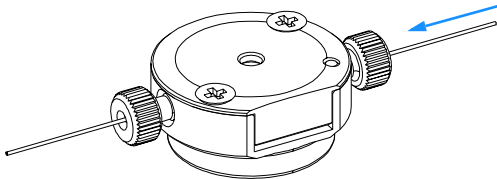


Realigning the Capillaries to the High Sensitivity Detection Cell

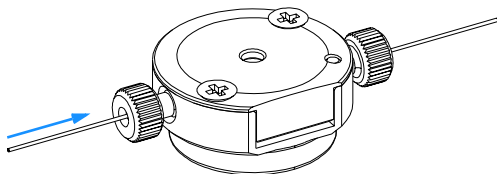
Realigning the capillaries is necessary if one of the problems described in “Troubleshooting” on page 55 occurs.

Make sure that you have a clean bench for the following procedure. If dust particles enter the capillary or the cell, this may lead to poor performance of the cell.

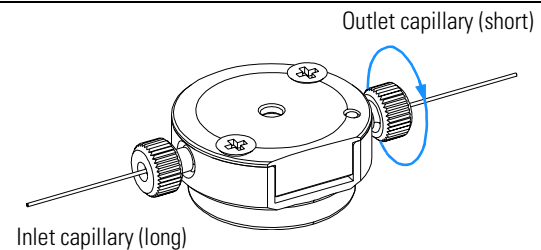
2 Push the outlet capillary gently towards the cell holder. Lightly screw the outlet capillary back to the cell holder. Be sure not to pull the capillary. Don't tighten the screw yet.



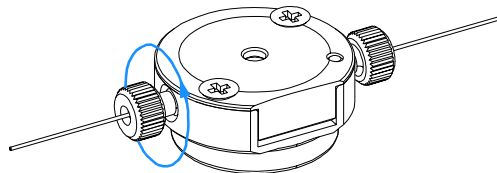
4 Push the inlet capillary gently towards the cell holder.



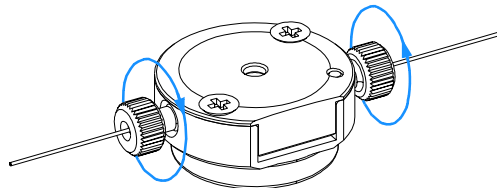
1 Open the outlet fitting screw by turning it approximately 360° counterclockwise.



3 Open the inlet fitting screw by turning it approximately 360° counterclockwise.



5 Screw the inlet capillary to the cell holder. Tighten the fittings.



The high sensitivity detection cell is now ready for installing into the cassette.

NOTE: Avoid pulling on the capillaries during installation into the cassette and instrument.

Storing the High Sensitivity Detection Cell

Short term

- Leave the capillaries connected to the high sensitivity detection cell.
- Put a buffer vial on the inlet and the outlet capillary.

Long term

- For standard and coated capillaries leave them connected to the high sensitivity detection cell.
- Place a vial filled with water at the inlet and flush for 15 minutes.
- Place an empty vial at the inlet and flush for 15 minutes. That will dry the capillary and the high sensitivity detection cell with air.
- For CEC capillaries remove the CEC capillary first and store according the care and use sheet.
- Flush the high sensitivity detection cell with water to remove the buffer.
- Dry the high sensitivity detection cell with air.

The high sensitivity detection cell should be stored in a clean environment (e.g. the plastic container in which the cell is shipped).

Troubleshooting

If, after installation of the high sensitivity detection cell you have problems like those shown in Figure 28 and Figure 29, there are several procedures you can try to get the system running properly.

Figure 28

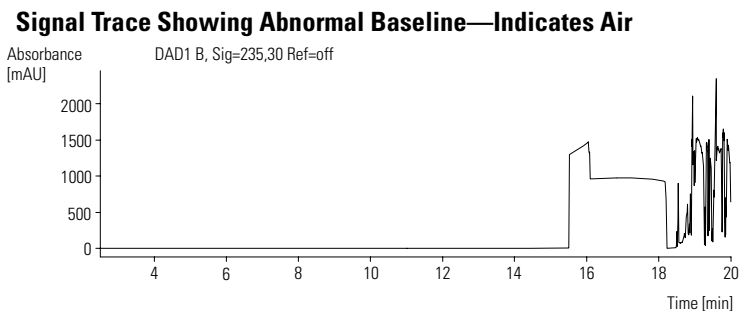
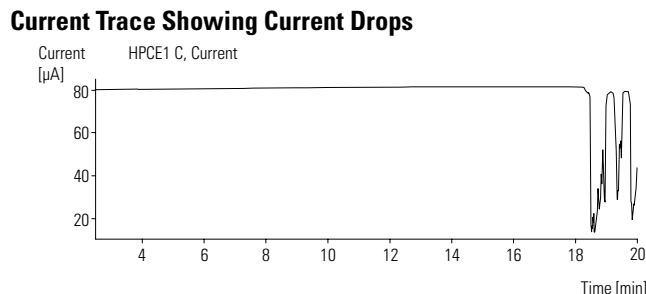


Figure 29



If you encounter one or several of the following problems:

- baseline jumps in the UV-signal due to coupling problems,
- increased baseline noise due to insufficiently filtered buffers, samples or dirty vials,
- current breakdown when high voltage is applied,
- no current,
- leak current (indicated by yellow bar (current) in graphical user interface),
- current trace showing current drops due to air bubbles in the cell,
- buffer leaks due to improperly coupled capillaries.

Troubleshooting

Then one of the following may have occurred:

- the capillaries are not properly coupled to the high sensitivity detection cell,
- air bubbles are in the cell,
- particles (from a dirty workbench or vials or from a broken capillary tip) are in the cell,
- the cell is not properly cleaned.

If particles enter the high sensitivity detection cell, this may lead to air bubbles and/or increased baseline noise. As the air bubbles grow, you will observe large baseline drifts or jumps and current drops (see Figure 28 and Figure 29).

CAUTION

Make sure you have a clean bench when you couple/decouple the high sensitivity detection cell assembly. Store the capillaries with the protection cap attached and the cell in the dust-protected box. For translations, see page 240.

Loose fittings can lead to dead volumes at the capillary/cell interface and thus generate band broadening. Also air bubbles may enter the high sensitivity detection cell. Tighten the fittings to the cell holder.

Steps to solve these problems:

- 1 Perform the realignment.
- 2 Use degassed buffer. Look for air bubbles in buffer and sample vials.
- 3 Flush the high sensitivity detection cell and capillary for a longer period of time with running buffer (approximately 10 minutes), then apply 50 mbar pressure for 5 minutes.
- 4 Filter buffers and samples with a 2 μm pore-size filter or use buffer prepared under cleanroom conditions.
- 5 If steps 1 through 4 do not improve the situation, flush with 1 N NaOH at elevated temperature (40–60 °C) for at least 60 minutes followed by a flush with water for 3 minutes. This is also recommended if you encounter high baseline noise after repeatedly running samples which stick to the cell windows. The capillary has to be conditioned again with your running buffer after this procedure.

CAUTION

Do not use step 5 with coated capillaries, packed columns or any other capillary where NaOH is problematic. For translations, see page 241.

- 6 Use the “Cleaning Procedure for the High Sensitivity Detection Cell” on page 58.

CAUTION

The high sensitivity detection cell and fittings are made out of different materials: fused Silica, PEEK (polyetheretherketone) and FVMQ (fluorosilicone rubber). Do not use solvents that can degrade these materials. For translations, see page 242.

Cleaning Procedure for the High Sensitivity Detection Cell

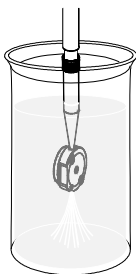
As in micro-scale technique the operational parts must be protected from contamination with μ -particles. These particles are frequently smaller than can be seen although their effects can be extremely detrimental to the separations. This procedure should ensure that the effects of blockage or contamination with μ -particles can be reversed even in extreme cases.

4.5 ml of HELLMANEX II is included as part of the kit. For replacement, please order 1.3 kg bottle part number 5062-8529.

- 1 Prepare a 2 % solution (v/v) of HELLMANEX II in capillary electrophoresis grade water (double distilled de-ionized—part number 5062-8578) by adding 1 ml of HELLMANEX II to approximately 50 ml water in a clean glass beaker.
- 2 Place the cell housing in the beaker and make sure that it is completely immersed in the solution.
- 3 Flush this diluted solution through the cell via the fitting holes using a 1 ml pipette to ensure maximal wetting of the cell assembly. This procedure will also remove air bubbles from inside the cell. See Figure 30.

Figure 30

Flushing the High Sensitivity Detection Cell



- 4 Place the beaker in an ultra-sonic bath and sonicate for at least 15 minutes. The high sensitivity detection cell housing may change color slightly.
- 5 Remove the high sensitivity detection cell from the beaker and flush with CE grade water.
- 6 Place the high sensitivity detection cell in a fresh clean beaker containing CE-grade water and sonicate again for approximately 10 minutes.
- 7 Remove the high sensitivity detection cell from the beaker and take special care to dry the window area thoroughly. Do not allow water to evaporate from this area as this may deposit a film over the window.

- 8** Using a microscope check that the windows are clean before recoupling the capillaries to the high sensitivity detection cell.

Troubleshooting Matrix**Table 3**

Troubleshooting Matrix		
What Can Be Seen?	Step 1	Step 2
Current drop, current leaks	Realign	Change fittings, then capillary, use the "Cleaning Procedure for the High Sensitivity Detection Cell" on page 58
Excess baseline noise	Flush with buffer	Use the "Cleaning Procedure for the High Sensitivity Detection Cell" on page 58
Tailing peaks	Realign	Change inlet capillary
Baseline jumps	Flush with buffer for 10 minutes	Realign then use the "Cleaning Procedure for the High Sensitivity Detection Cell" on page 58

Controlling the Agilent CE Instrument

After your Agilent CE system has been properly installed (see “Installing the Agilent CE Instrument” on page 13) you can begin exploring the system. Your Agilent CE system comprises the Agilent CE instrument and the Agilent ChemStation. The Agilent CE instrument doesn’t have a keyboard itself. It is completely controlled by the Agilent ChemStation through the CE diagram. Each component of the instrument is reflected by an icon in the CE diagram.

Before You Start the Agilent CE Instrument

Use the following as a checklist before you start the Agilent CE instrument. Make sure that:

- the replenishment bottles are installed and properly tightened,
- the cassette (with a capillary installed) is inserted into the system,
- you do not need to put the vials into the tray before you start the Agilent CE instrument, and
- the cassette door and the tray door are closed.

Starting Up the Agilent CE Instrument

The power switch of the instrument is located in the front left corner of the instrument. Press this switch to turn on line power.

After the instrument is started, the fans and the pump start working. The instrument starts to build-up internal pressure (~ 1bar) first followed by vacuum.

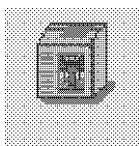
The LED’s colors on the front cover have the following meaning:

Color	Meaning
Green	Analysis running, do not use instrument with the exception of manual operation of the tray. Some entry fields are shaded gray.
Yellow	Not-ready condition. The run cannot be started yet. When you start the LED will come on after a certain time. Click on the Agilent CE system status bar to see what is not ready (e.g. temperature).

Red Error condition. There is a problem with the instrument or communication to the PC, which requires your action. Check the logbook. To get more information double click Starting Your Computer and the Agilent ChemStation Software

Starting Your Computer and the Agilent ChemStation Software

When you have switched on your computer and it has booted up start the Agilent ChemStation by double click on the Instrument Online Icon from the Agilent ChemStation menu.



If you have problems starting the Agilent ChemStation, check that the software has been properly installed.

When you have double clicked the Instrument Online icon the software is loaded with the last method that was used. The software boots in exactly the status you had left it. If in the graphical instrument control screen, the CE diagram is not active after startup, choose Instrument actuals from the Window menu to reactivate it, or type `Diagram` in the command line and press `ENTER`.

After startup of the instrument the CE State shows Not initialized in the Status window. Choose System INIT from the instrument menu, to initialize the system.

During initialization the instrument tests different functions and adjustments. The tray as well as all three lift stations are moved to a defined position, and the lamp is switched on. Do not use the instrument or the graphical user interface during initialization. Wait until the system has reached the ready state. If there is a vial in tray position 49 or 50 (reserved positions) or in any other position the lift is moving then the system asks you to remove that vial before you proceed.

If there are no bottles (electrolyte or waste) in the replenishment system or they are not properly tightened, the Error LED (red) will come on because no pressure can be built up. Check the logbook for more information.

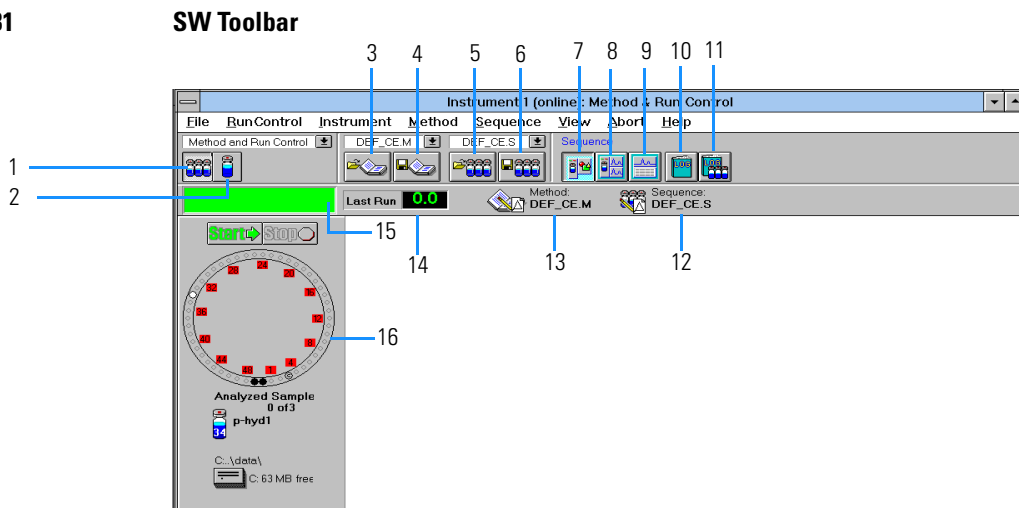
Working with the CE Diagram

When you start the Agilent ChemStation the CE diagram appears by default as the main screen. The CE diagram displays the Agilent CE system showing the actual status of the system as a whole. Each icon represents one component of the system.

Common SW Toolbar

To change values for a component you choose the appropriate icon. This will bring up the menu. The menu may comprise sets of items; for help, for changing parameters in your method and for control of the instrument. For more assistance click HELP in the menu bar.

Figure 31



- 1 Work with sequences
- 2 Work with single vial
- 3 Load method
- 4 Store method
- 5 Load sequence
- 6 Store sequence

- 7 Change the layout to show the sampling area and the diagram
- 8 Change the layout to show the sampling area and two online samples
- 9 Change the layout to show the sampling area and online signal display
- 10 Display the current logbook
- 11 Display the current sequence logbook
- 12 View the current sequence
- 13 View the current method
- 14 View the run time
- 15 Status display
- 16 Displays sample tray when working with sequences otherwise shows single vial information

Where to Find More Info:

- online help system,
- *Installing your ChemStation* manual,
- *Understanding your ChemStation* manual,
- *Installing and Understanding your Spectra Module* manual, and
- *Macro Programming information (see help system).*

Capillary Electrophoresis

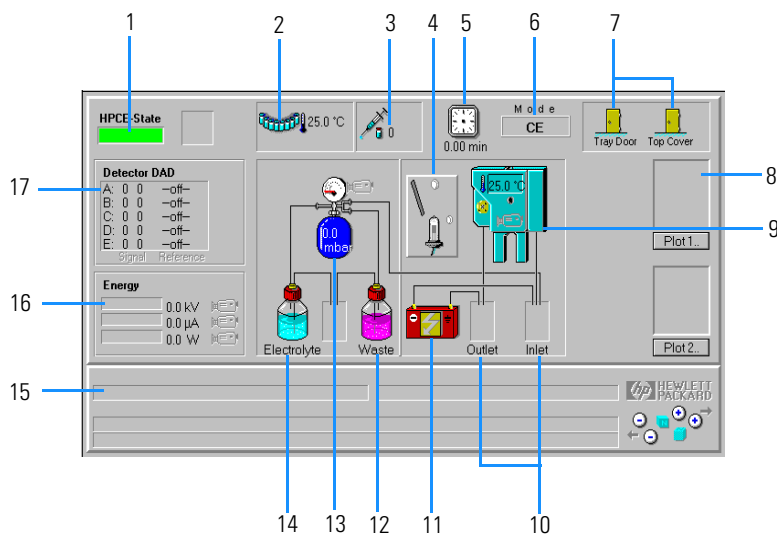
How to use your Agilent CE instrument for
capillary electrophoresis separations

Capillary Electrophoresis

Graphical User Interface Explanation

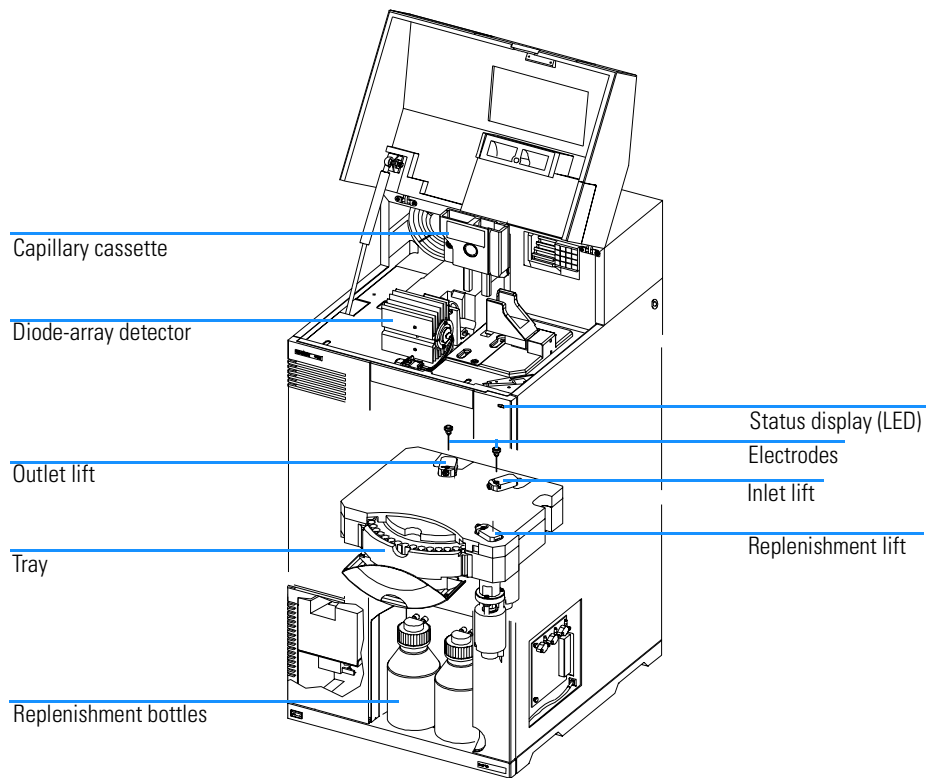
Figure 32

Components of the Agilent CE Instrument in the CE Diagram



- | | | |
|------------------------|------------------------|---------------------------------|
| 1 CE status | 7 Doors | 13 Internal pressure |
| 2 Tray | 8 On line windows | 14 Electrolyte bottle |
| 3 Injection | 9 Cassette temperature | 15 Status bar |
| 4 Diode array detector | 10 Inlet/outlet lift | 16 Energy values |
| 5 Timing | 11 Electrical values | 17 Detector wavelengths/spectra |
| 6 Analyses modes | 12 Waste bottle | |

Figure 33 Corresponding Hardware Components



Menus in the CE Diagram

To change values for a component, select the appropriate icon. A menu will appear. This menu comprises three sets of items:

- help menu,
- method parameters, and
- instrument control.

Help Menu

Each menu associated with an icon has a help option. Click on help for more information on the subject you are interested.

Method Parameters

Items that refer to method parameters are marked with a book icon. When you change settings using these items you change your current method. The changes are reflected in the CE diagram when the method is executed. You can access the same items from the instrument menu of the CE diagram, in which case the book icon will not be present.

Instrument Control

Items without the book icon are used for direct instrument control. The actions are performed immediately and the changes are reflected in the CE diagram. Such actions are, for example:

- switching the lamp on,
- controlling the sample tray,
- lowering the lift stations to remove the capillary cassette, or
- releasing pressure to change the replenishment bottles.

Working with these items does not change the method currently loaded.

Status Display and Simulation

The CE diagram can be used to monitor the progress of your analysis and the current status of the system. This is done in the CE diagram itself as well as in the status display on the bottom of the diagram. You can try this status monitoring using the Simulation function of the instrument menu. This will simulate the active method in the CE diagram and in the status display.

Simulation can also be used to check your active method for inconsistencies. The online help system provides information on this.

System Vial Table

The vial table is a graphical tool which facilitates the management of vials in the tray. It can be used as an intelligent notepad, which exchanges its information with methods, sequences and the graphical user interface.

Some features:

- If a vial is defined in the vial table this definition (name of vial) will be used

whenever the vial is referenced (Method editing, Method print).

- The vial information part used by the method is stored together with the method and will be reloaded if the method is loaded again.
- Consistency checks can be done in order to verify if there are vial conflicts between method and sequence usage of vials.
- Documentation of vial positions, contents.

Agilent CE Method Parameters

This section describes the parameters of an Agilent CE Method for data acquisition and their meaning. Example sets of parameters for a method to analyze the test sample are in the procedures part of the online help system. After you have completely set up the Agilent CE Method and supplied the sample information you can run your method. Choose Run Method from the Runcontrol Menu.

Overview

A convenient way to access the parameters of an Agilent CE method is the item Setup CE Method from the Instrument menu. This displays the CE Method screen. On this screen the parameters are grouped as follows:

- Home Values
- Conditioning
- Injection Parameters
- Electric Parameters
- Timetable
- Detector Parameters

Each of these groups is located on a separate screen which can be accessed via a button from the CE Method screen.

You can change parts of the method either using the dialog boxes from the menu or menus in the CE Diagram marked with a book icon. If you do not save the method to the hard disk this changed method is executed when choosing Run Method. When you refer to a method in a sequence the method is loaded from disk. So if you did not save your changes using Save Method the original method from the hard disk is used.

Home Values

You can program the following settings in the CE Home Values screen of the Agilent ChemStation software.

- Lift offsets
- Cassette Temperature
- External pressure (only in CEC mode shown)
- Inlet Home Vial
- Outlet Home Vial

The Home Values are activated at five points in your analysis:

- When a method is loaded
- When you activate Run Method or Run Sequence from the RunControl Menu
- After Injection is completed
- After the Stoptime has elapsed
- After the whole analysis (including Postconditioning) is completed

Lift Offsets

The lift offset is the distance between the bottom of the vial and the end of the capillary. You can use the lift offset to adjust the depth to which the capillary reaches into the vial. This lift offset setting is used for both the inlet and outlet lift. It does not affect replenishment. The lift offset also affects the level of liquid needed in the vials.

Cassette Temperature

The temperature set in the home value section is the default temperature of the capillary cassette.

External Pressure

In CEC mode the external pressure can be set which keeps the inlet AND the outlet of the capillary pressurized. This maybe necessary to supress bubble formation inside the capillary. Any value between 2 and 12 bar can be set.

Inlet Home Vial and Outlet Home Vial

The Inlet Home vial and Outlet Home vial define the default buffer vials that will be used for the separation. Inlet Home refers to the vial at the capillary inlet, where the voltage is applied. Outlet Home (GND) refers to the outlet vial, at the detector end of the capillary. Via the items InHomeVial and OutHomeVial you can refer to these settings in other screens; for example the Conditioning screen.

Conditioning

Replenishment

During multiple analyses the composition of the buffer can change. One way to refresh the buffer is to access different buffer vials in the tray. This is more useful for example in method development.

Another way to change the buffer is replenishment.

The replenishment system automatically empties and refills the buffer vials in the tray with new buffer from the electrolyte bottle. Typically replenishment is done after every 3 or 4 runs. Depending on the stability of the running buffer it is sometimes necessary to do it before each run.

Replenishment can be programmed via a table in the Replenish section of the Conditioning Screen. If you want to use the replenishment system prepare it as described in “Preparing the Replenishment System”.

You have a choice to perform the replenishment in serial or parallel mode. Using parallel replenishment, you can decrease the total time needed for your analysis as replenishment and preconditioning are done at the same time. When using this feature you have to make sure that vials used in conditioning are not replenished at the same time otherwise you will get a vial conflict. Use Simulation to check your method for this potential problem. Also note that the time for a replenishment step can vary from vial to vial.

When using detergent containing buffers (e.g. SDS) the replenishment may not fulfill your needs. The limit for SDS concentration is 70 mM. Do not exceed this concentration. Add some organic liquid to the waste bottle so that bubbles do not form.

Conditioning of the Capillary

In order to have stable conditions for your analysis conditioning of the capillary is important.

Depending on the separation mode used it can comprise:

- conditioning the capillary with conditioning agents, and
- equilibrating the capillary with buffer.

Conditioning

These conditioning steps can be programmed using a table in the Preconditioning or Postconditioning section of the Conditioning screen depending on whether they should be done before or after injection and run.

CE Injection

You have several choices for CE Injection:

- hydrodynamic injection (by pressure or vacuum),
- electrokinetic injection (applying a voltage, current or power), or
- using an injection program.

These modes and the corresponding parameters (time and unit corresponding to mode) can be set using the CE Injection screen of the Agilent ChemStation software. There you also have the choice to disable injection by choosing No Injection.

Hydrodynamic Injection

In hydrodynamic injection the inlet buffer reservoir is replaced with the sample vial. A pressure is applied for a certain time to introduce the sample in the capillary. The system constantly controls the pressure and corrects for the rise time effects of valves and the compressibility of air. When pressure is applied, the pressure to the sample vial is increased gradually to its setpoint after which the pressure decreases gradually to approximately a fifth. Then a correction time is inserted after which the pressure decreases gradually to atmospheric pressure. This results in accurate and reproducible injection as well as exceptional injection linearity.

Injection by pressure is the most frequently used injection technique. There are no differences in injection concentration for molecules with different mobilities as in electrokinetic injection.

Electrokinetic Injection

In electrokinetic injection the inlet buffer vial is replaced with the sample vial. A voltage, current or power is applied for a certain time that causes the sample to migrate into the capillary.

This injection technique is used for capillaries filled with fixed or cross-linked gels or other material of high viscosity, where injection by pressure is not applicable.

Difference between Hydrodynamic and Electrokinetic Injection

To do electrokinetic injection the electrode must touch the sample in the sample vial. Whereas in hydrodynamic injection the sample only needs to touch the capillary tips.

Using an Injection Program

The injection table is used for advanced injection tasks such as:

- injection from different vials, e.g. ITP,
- multiple injection modes, e.g. spiking, and
- injecting a buffer plug after the sample to prevent sample loss after applying voltage.

The online help system provides more information on this.

CE Electric

The following parameters of the power supply can be controlled using the CE Electric screen in the Agilent ChemStation software:

- Polarity
- Voltage
- Current
- Power

In addition you can set a Lower Alarm Limit for Current. Polarity

The standard polarity setting is positive polarity, that is the positive electrode is at the inlet vial.

You can reverse the polarity to negative. This means that the inlet vial becomes the negative electrode where a negative voltage is applied.

The outlet electrode is always grounded to ensure that the potential at the point of detection is close to ground. Even with negative polarity the inlet electrode is the point where the power is applied and the outlet electrode is close to ground.

Although the outlet electrode is always at the ground potential you should make sure that the electrode is not short-circuited to ground. The electrode is connected with the power supply to measure the current flowing through the capillary. If the ground electrode is short-circuited to ground all current flowing through the capillary is signaled as leakage current.

Voltage, Current and Power

Voltage, current and power are related to each other by the resistance of your capillary/buffer system. You can set values for each of these three parameters. The individual values are treated as limits. The limit that is reached first applies. For current and voltage you can only enter absolute values. The sign is determined by the polarity setting.

If you only want to control voltage and not current and power, you can set those two to syslimit and the system will allow the maximum value.

Lower Alarm Limit for Current

When using constant voltage mode, the current is normally the indicator of the stability of the system. A rapid current decrease or drop can indicate an instability of the system. By setting a lower alarm limit you can define when you want to be warned of such instable conditions during the run.

Instable conditions can be caused by:

- no buffer in the capillary,
- air bubble in the capillary,
- clogged capillary, or
- broken capillary.

Current values are dependent on the buffer concentration, the type of buffer used, the inner diameter and length of the capillary, and the temperature. When running the Example Method for the Test Sample normal current values are below 50 μA . If the lower alarm limit is not exceeded 30 seconds after start of the run, the run is stopped. When the lower Alarm Limit is reached during the Run part of the analysis (when the HV is applied) your current run is stopped. During a sequence the system continues with the next analysis.

Do not use the Lower Alarm Limit or time program it when changing the inlet or outlet vial during the run (for example for fraction collection). Otherwise the system will stop when changing the vial because the lower alarm limit is reached.

Timetable

In the CE Timetable you can choose to:

- specify the raw data that can be monitored and stored in the data file,
- define stoptime and posttime of your analysis, or
- time-program certain events.

Specifying the CE-specific Raw Data

In the Agilent CE system you can choose to monitor and store the following CE-specific raw data. If selected, they are stored in addition to the detector signals defined:

- voltage,
- current,
- power,
- pressure, and
- temperature.

These CE-specific raw data are acquired with an acquisition rate of one data point per 600 ms. The signal you want to store in the data file has a little camera attached.

Posttime and Stoptime

The stoptime defines the time for your separation, also referred to as *Run* part of the analysis. It does not include replenishment, preconditioning, injection and postconditioning. After the stoptime has elapsed, the system changes from the Run state to Postconditioning or Postrun (if defined) and then to the Ready state.

The posttime is normally used for equilibration. It defines the time after the analysis, that is after the stoptime has elapsed and data analysis is completed. During the posttime the instrument is in the *Postrun* state. After both stoptime and posttime have elapsed the instrument completes the PostConditioning and is then ready for the next analysis.

Time Programming Certain Events

The Timetable panel of the CE: Timetable can be used to set values for the following parameters at a certain time during the run.

- voltage,
- current,
- power,
- pressure,
- inlet,
- outlet,
- temperature,
- polarity, and
- lower alarm limit for current.
- Highpressure (only in CEC mode)

Time programming of these parameters can be useful for example :

- define gradients (for voltage or temperature),
- change the buffer during the analysis (inlet and outlet),
- apply pressure during the analysis,
- change the outlet vial during analysis,
- change the alarm limit for current for example when changing the buffer system during the analysis.

Please note that the time table is not executable when fraction collection has been activated.

Detector Parameters

The parameters for the detector are set in the DAD Signals screen of the Agilent ChemStation. You can define the following settings:

- stored signals, detection and reference wavelengths, bandwidths,
- spectra,
- peak width,
- autobalance,
- detector stoptime and posttime, and
- detector timetable.

The Detector Parameters are accessed via the Detector button from the CE Method screen.

Signals, Wavelengths and Bandwidths

Detector parameters allow you to define the detector signals you want to acquire during the analysis and store in the register file. For each signal the wavelengths and bandwidths of sample and reference wavelengths are defined.

It is recommended to do runs without using reference wavelengths to minimize baseline noise. Reference wavelengths can help to compensate for signal drifts. As reference wavelengths are measured at higher wavelengths, the baseline noise is increased when using reference wavelengths. Therefore it is recommended to record the two signals at the same wavelength; one using the reference wavelength and one without.

The signal you want to store in the data file has a little camera attached.

Spectra

You can define at which points on a signal, spectra will be taken and saved. You can choose to acquire them:

- at the upslope, apex and downslope of the peak,

Detector Parameters

- all in a peak,
- all spectra during analysis, or
- none.

You can combine this setting with a wavelength range. By restricting the wavelength range to the range of your interest you can save some disk space; the size of your data files will be smaller because the full spectrum is not stored.

A spectra icon is attached to the detector window in the graphical user interface.

Peakwidth

The peakwidth sets the optimum response time of your detector. If you have similar peak widths in your electropherogram, set it to the width of one of the peaks in your electropherogram. If the peak widths are very different you can use the detector timetable to adjust the peakwidth setting during the analysis. If your peakwidth setting is too narrow, no spectra for the wider peaks are acquired.

Autobalance

When selecting autobalance the baseline of the detector is set to zero after each analysis.

Detector Stoptime and Posttime

You can define a special stoptime and posttime for your detector. If you want to use the times set for the Agilent CE instrument set them to as CE.

Detector Timetable

Using the timetable for the detector you can time program the following parameters during your analysis:

- measuring wavelength for signal A to E,
- measuring bandwidth for signal A to E,
- reference wavelength for signal A to E,
- reference bandwidth for signal A to E,

Detector Parameters

- store spectrum,
- peakwidth, and
- threshold.

By time programming these parameters you can optimize the required disk space for your spectra by switching the spectra acquisition on and off. Thus you can acquire spectra for parts of the electropherogram only.

How to Prepare your Agilent CE Instrument for Analysis

What You Will Do

To prepare the Agilent CE instrument for the analysis you need to do the following tasks:

- start the Agilent CE instrument,
- start the computer,
- start the Agilent ChemStation software
- allow the lamp time to warm up (approximately 1 hour),
- prepare vials for sample and buffer,
- insert a capillary into the alignment interface,
- insert the capillary into the capillary cassette,
- insert the capillary cassette into the system, and
- prepare the Replenishment system (optional).

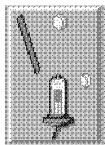
After you have completed all these tasks you can create a Agilent CE method.

Switching the Lamp On

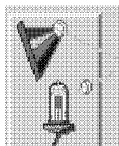
As part of the initialization the lamp is automatically switched on.

To switch the lamp on manually.

- 1 Click the DAD Lamp Off icon.



- 2 Select Lamp On from the menu. When you have switched on the lamp you can see the light beam from the lamp to the detector in the Graphical User Interface.



- 3 Allow the Lamp to warm up for about 1 hour.

If the warm up time of the lamp is too short, a baseline drift in the electropherogram can occur.

Preparing the Replenishment System if needed

During multiple analyses the composition of the buffer can change. One way to refresh the buffer is replenishment.

The replenishment system automatically empties and refills the buffer vials in the tray with new buffer from the electrolyte bottle. Typically replenishment is done before every or after every 3 to 4 runs depending on the stability and volume of the running buffer.

If you do **NOT** want to use the replenishment system you still have to put empty bottles (electrolyte and waste) into the replenishment system at the bottom of the instrument. The bottles are also used as pressure and vacuum reservoir. Missing bottles lead to pressure and/or vacuum error messages.

WARNING

Use only bottles with Part Number 9300-1748 with this instrument. There is pressure applied to the bottles. The bottles specified above have a protective coating. For translations, see page 243.

If you want to use the replenishment system, you have to fill the electrolyte bottle with buffer. Use about 100 ml to make sure the frit is submerged in buffer. Do not fill more than 400 ml buffer into the bottles to ensure the system can work properly. When using detergent containing buffers (e.g. SDS) the waste bottle should contain some liquid (e.g. a few ml of isopropyl alcohol) to destroy the detergent bubbles. Detailed information on buffers is given in the primer *High Performance Capillary Electrophoresis or the CE-Partner CD-ROM*, delivered together with the instrument.

Make sure the waste bottle is empty so it can hold the same amount of liquid as in the electrolyte bottle.

WARNING

Do not use sulfuric acid in the Agilent CE system. It may damage the instrument. For translations, see page 243.

Before Filling the Replenishment System

The replenishment system (bottles and tubing) should be cleaned when:

- using it for the first time,

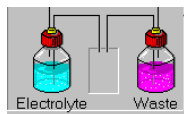
Preparing the Replenishment System if needed

- changing the replenishment buffer, or
- if the replenishment system will be idle for some time.

Filling the Replenishment System

To prepare the replenishment system.

- 1 Click on one of the replenishment bottles in the CE diagram.



- 2 Choose Change Bottles to release the pressure before you open the bottles.
- 3 Open the transparent door at the bottom of the front panel.

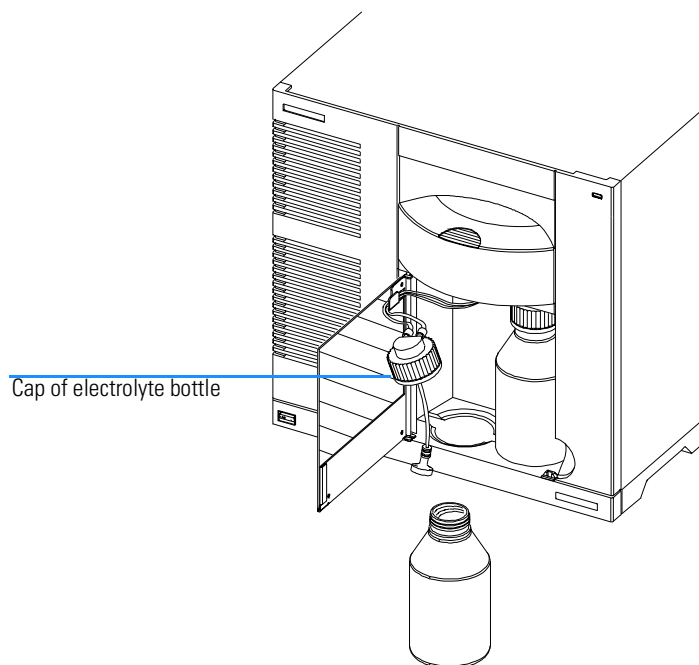
WARNING

The waste can contain organic solvents and residue of your sample. Wear rubber gloves and safety spectacles when handling electrolyte and deposit the waste in a safe waste container. For translations, see page 245.

- 4 Take out the electrolyte bottle and unscrew the cap. The electrolyte bottle has a frit and tubing inside. Avoid the frit becoming contaminated (see Figure 34).

Figure 34

Filling the Replenishment Bottles



Filling the Replenishment Bottles

- 1 Make sure the buffer is filtered (use a 0.25 μm filter. For buffers of high viscosity a bigger pore size, for example, 0.45 μm is also applicable.)
- 2 Fill the electrolyte bottle with buffer. Use a minimum of 100 ml to make sure the frit is submerged in buffer. Maximum 400 ml.
- 3 Tighten the cap. Make sure the cap is tightened firmly, as pressure will be applied to the bottle.
- 4 Choose Done in the Change Bottles dialog box. Wait until the pressure has built up again, i.e. the instrument reaches the ready state.

The right bottle is the waste bottle. It is used to store buffer emptied from vials of the tray. Empty the bottle whenever you refill the electrolyte bottle, following the same procedure as described above. Empty the bottle frequently. The error message **Waste Bottle Full** may be the result of a full waste bottle.

Preparing Vials for Buffer and Sample

Vial Handling

- Use only recommended vials (see Table 4) when working with the Agilent CE instrument.
- It is recommended to clean the vials prior to use them (flush them with water and some alcohol, use compressed air to dry them) otherwise it can happen that particles enter the capillary (current problems or blocked capillary).
- **All** vials must be capped. Use recommended caps only, see Table 4.

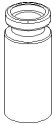

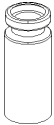
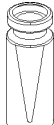
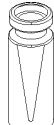


WARNING

Do not use crimp caps or any other metal caps when working with the Agilent CE instrument. For translations, see page 246.

- Make sure there are no air bubbles in the vials, especially when using microvials for sample. Current problems may occur or in worst case the capillary can break (heat generation or no conductance to the outlet buffer).
- Ensure an adequate liquid level for sample, buffer and waste vials. See Figure 35 on page 91.

Capillary Electrophoresis
Preparing Vials for Buffer and Sample

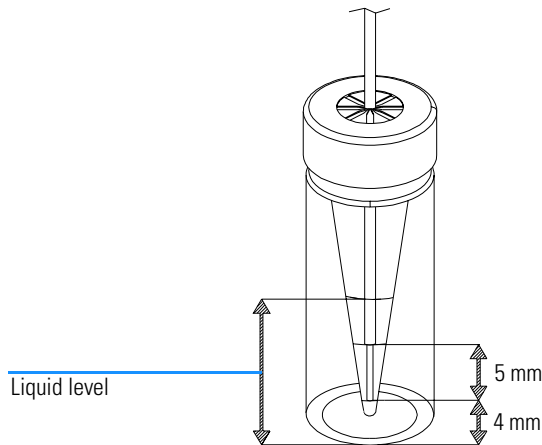
Table 4

Recommended Vials and Caps for Agilent CE Instrument			
Item	Description	Part Number	To Be Used For:
	Vial clear glass 2 ml pack of 100	5182-9697	Sample and buffer
	pack of 500	5183-4623	
	Vial amber glass 2 ml pack of 100	5183-4619	
	pack of 500	5183-4622	
	Vial polypropylene 1 ml pack of 100	5182-0567	Sample and buffer
	Vial polypropylene glass lined 100 µl pack of 100	9301-0977	Sample only
	Vial polypropylene 100 µl pack of 1000	9301-0978	Sample only
	Snapcap polyethylene olefin septum for chemical resistance ('white' color) pack of 100	5181-1507	Sample and buffer, but not for multiple use
	pack of 500	5181-1513	
	PUR polyurethane septum. Preferred standard caps ('clear' color) pack of 100	5181-1512	Sample and buffer

Preparing Vials for Buffer and Sample

The recommended maximum liquid level in the vials is 1.8 cm measured from the bottom of the vial (see Figure 35). The minimum level depends on the type of liquid the vial is used for (sample, buffer or waste).

Figure 35 **Liquid Level and Lift Offset**



NOTE The liquid level also depends on the lift offset and the type of vials used.

To touch the electrode the liquid level must follow the condition:

Liquid Level = L = Lift offset + 5 mm up to electrode + 1 mm guard band.
See Figure 35.

To touch the capillary the liquid level must follow the condition:

Liquid Level = L = Lift offset + 1 mm guard band

All values given below only hold when using the default lift offset of 4mm and the standard vials.

Sample Vials

The level of sample in the vials depends on the injection technique used.

Hydrodynamic injection

When using injection by pressure the sample level only needs to touch the capillary. The minimum liquid level in

Preparing Vials for Buffer and Sample

the sample vials for this technique is 5 mm.

Electrokinetic injection

When using injection by voltage or current the sample level needs to touch the electrodes. Therefore the minimum liquid level in the sample vial is 1 cm.

Buffer Vials

When the run is started the liquid level in the vial should touch the electrodes to enable a current to flow. Therefore the minimum liquid level in the buffer vials is 1 cm. A buffer level of 1.4 cm is recommended. You can use the replenishment system to fill the buffer vials.

Outlet Vials

Outlet vials (for example, waste vials) should also be filled with enough liquid to touch the capillaries. Thus the liquid flow through the capillary does not produce droplets at the capillary end, which can cause pressure. This can influence the injection amount. If the waste vial is filled with liquid, outgoing droplets cannot be drawn up the electrode by capillary effects but are flushed completely out of the outlet electrode. Therefore they cannot contaminate the lift head or the next outlet vial. Outlet vials that are used during analysis (for example, for fraction collection) need to be filled to a higher level (1 cm). The liquid must touch the electrode to enable a current to flow.

Vial in position 49 (replenishment lift)

Using the replenishment it is a good practice to have a vial filled with water in position 49 (= home position of the replenishment lift). The replenishment needle stays in the water and is prevented from buffer precipitation and the resulting blockage of the needle.

Inserting the Vials

The tray of the Agilent CE instrument is used for both buffer and samples. The CE diagram of the Agilent ChemStation controls the tray.

To operate the sample tray, choose the tray icon in the CE diagram. Select Tray control from the menu that displays the Direct Tray Control screen.



To access vials individually:

- 1 Close the tray door.
- 2 Enter the vial number.
- 3 Click Get Vial.
- 4 Wait until the tray has stopped motion.
- 5 Open the tray door.
- 6 Access the vial which is in front. The number is engraved in the sample tray.

NOTE

For safety reasons the tray can only be moved by the Agilent ChemStation when the tray door is closed. The tray door icon of the CE diagram displays the status of the tray door.

Click Done after you have accessed all the vial positions you needed.

Manual Operation

If you want to operate the tray manually or access segments of the tray, it is recommended to remove the vials from the lifts first. This avoids filling the positions of those vials in the tray again. Use the Unload button of the Direct Tray Control screen to remove the vials from the lifts.

During the run you can access the vial tray any time the software is not trying to access it. When accessing the tray during the run you cannot remove the vials from the inlet and outlet lifts. Therefore you have to be careful not to fill the positions of those vials in the tray again. Check in the CE diagram which vials are currently located in the lifts.

Positioning Vials for Sample and Buffer

- 1 Fill the sample into a sample vial and put the vial in the tray, for example into position 7.
- 2 Note the position. When you want to run the Agilent CE method you must enter the position of the sample vial in the Sample Information screen or the Sequence Table screen later. The Vial Table also helps.
- 3 Fill two vials with the buffer you want to use for your analysis.

- 4 Position those vials in the sample tray. For example, use positions 5 and 6. Write down the positions. When creating the Agilent CE method you must enter the positions of the buffer vials into the CE Home Values screen for inlet home and outlet home vial. After the sample has been injected those two vials are positioned at the two electrodes.
- 5 When using the replenishment system you can start off with empty buffer vials and use the replenishment system to fill them automatically with buffer.

Removing the Capillary Cassette from the Agilent CE Instrument

Your Agilent CE instrument comes with an empty capillary cassette installed.

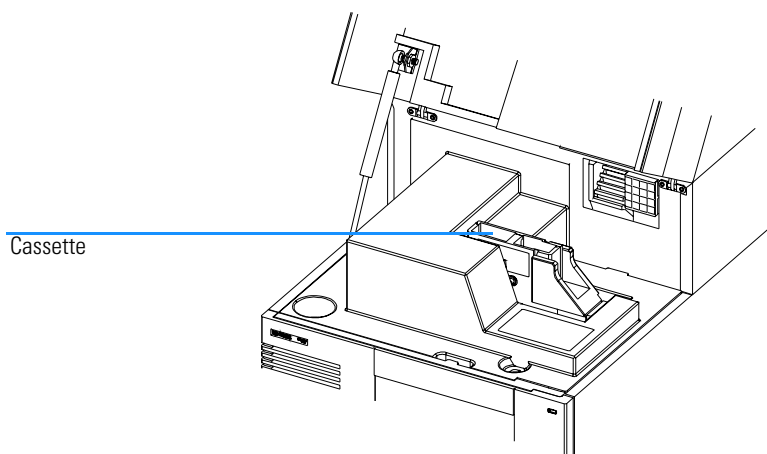
WARNING

Never apply pressure (start a run) when there is no capillary installed. For translations, see page 247.

To remove the capillary cassette from the Agilent CE instrument you have to do the following steps:

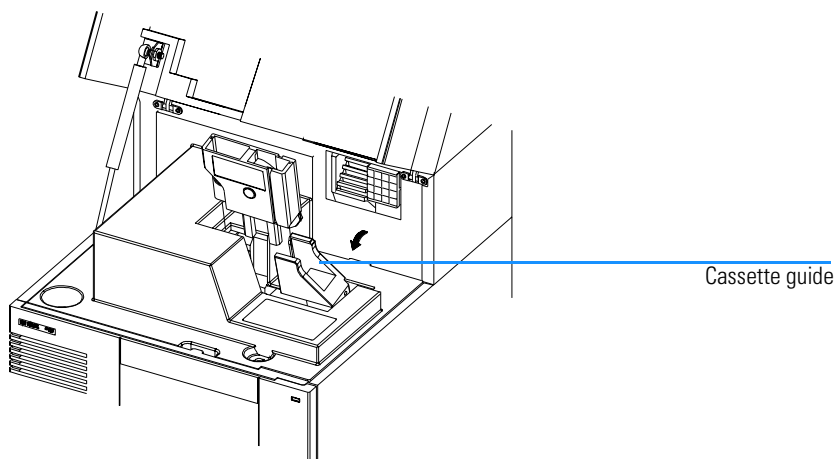
- 1 Choose the Cassette icon in the CE Diagram and select Change Cassette from the menu. This removes the buffer vials from the ends of the capillary. This will take approximately 5 seconds. If this is not done, buffer which may be transferred via the capillary into the electrode inserts, precipitates and may block the electrodes or damage the capillary. Refer to the instructions on how to clean blocked electrodes.
- 2 Open the top cover to access the cassette. Press the button in the middle of the lid front to release the latch. Figure 36 shows the position of an installed cassette.

Figure 36 Position of Installed Cassette



- 3 Move the cassette guide to the front.
- 4 Carefully pull the cassette out of the cassette guide. See Figure 37.

Figure 37 Removing the Cassette



Installing Capillary in the Alignment Interface

The following procedure describes how to install a capillary into an alignment interface. A capillary must have an alignment interface installed before it can be installed into the capillary cassette.

Material Needed to Install Capillary in Alignment Interface

- capillary
- corresponding alignment interface
- capillary insertion tool (separate item) or part incorporated in cassette
- safety glasses

Color Coding of Capillaries and Alignment Interfaces

The alignment interface must correspond to the type of capillary used. There are special alignment interfaces for straight capillaries and for extended light path capillaries. The alignment interface must also correspond to the inner diameter of the capillary. To facilitate matching of capillary and corresponding alignment interface we use the following color coding on both the sleeve of the alignment interface and the plastic stop on the capillary.

Table 5

Alignment Interfaces

Sleeve Color	Part Number	Used For *
Black	G1600-60150	25 μm id capillaries with extended light path
Green	G1600-60210	50 μm id straight capillaries
Red	G1600-60230	50 μm id capillaries with extended light path
Blue*	G1600-60310	75 μm id straight capillaries
Yellow	G1600-60330	75 μm id capillaries with extended light path

* For 100 or 150 μm od capillaries use the blue alignment interface

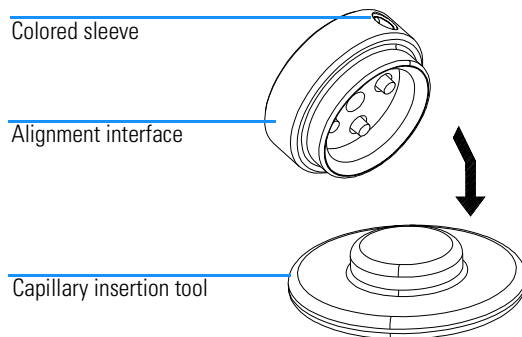
Installing Capillary in the Alignment Interface

- 1 Make sure the color of the sleeve in the alignment interface matches the color of the plastic stop on the capillary.
- 2 Remove the protective plastic cap which covers the detection window.

CAUTION

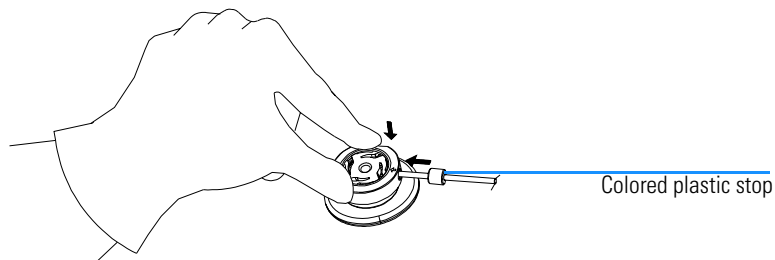
Do not touch the capillary at the detection window or the capillary tips, where the polyimide is burnt off. The capillary is very fragile at that point and it is important to keep the detection window clean. Clean the detection window and the capillary tips as described. Put the insertion tool on a flat surface for example, your lab bench. **For translations, see page 248.**

Figure 38 Alignment Interface and Insertion Tool



- 3 Put the alignment interface on the insertion tool and press down firmly. Press only on the outer ring to release the spring that secures the capillary in the alignment interface.

Figure 39 Installing Capillary in Alignment Interface



You can also use the insertion tool integrated into the capillary cassette. See Figure 43.

Installing Capillary in the Alignment Interface

- 4 Slide the capillary through the opening in the direction of the arrow printed on the interface.
- 5 The capillary has a plastic stop fitted. Pull the capillary through the alignment interface until the stop is reached.
- 6 While still slightly pulling the capillary stop against the alignment interface, release the alignment interface from the installation tool to secure the capillary in the alignment interface.

The detection window or the extended light path of the capillary must be visible through the detection interface. If aligned correctly, you can see the slit of the interface behind the detection window. See Figure 40.

Figure 40

Extended Light Path Aligned Correctly

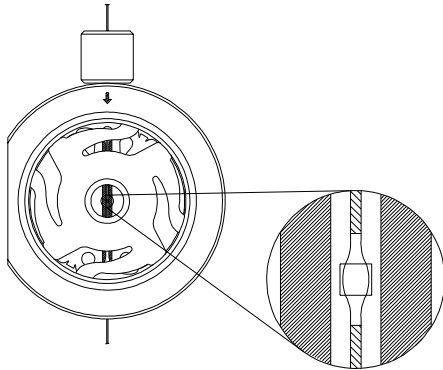
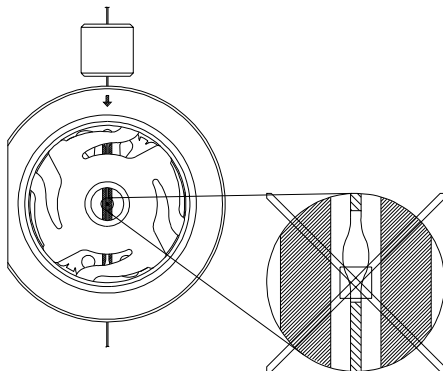


Figure 41

Extended Light Path Aligned Incorrectly



Installing Capillary in an Empty Capillary Cassette

This procedure describes how to install a capillary into an empty capillary cassette. If the cassette has already been installed into the Agilent CE instrument remove it as described.

What You Will Do

- open the capillary cassette,
- install the capillary into the empty cassette, and
- close the capillary cassette.

Material Needed for Installation of a Capillary

Table 6

Material Needed for Installation of a Capillary

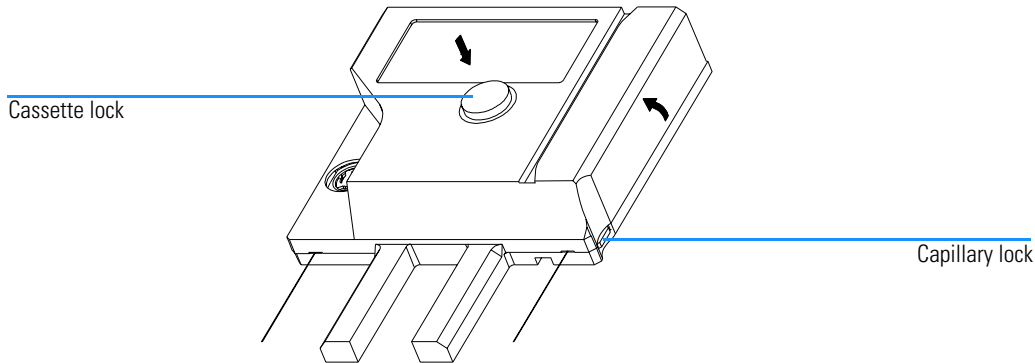
Description	Part Number
Capillary cassette	G1600-60002
Capillary with alignment interface installed	

Opening the Capillary Cassette

- 1 Use your finger to push down the cassette lock in the center of the cassette cover.

Figure 42

Opening the Cassette Lock

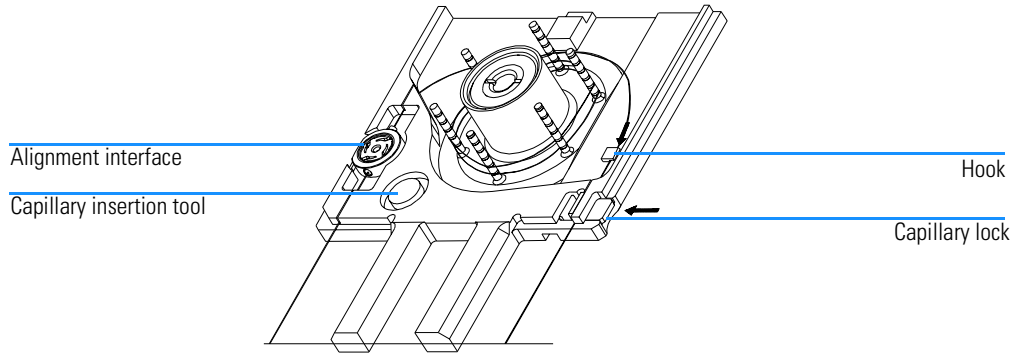


- 2 The cassette cover is hinged to the cassette body.
- 3 Lift the cover at the side opposite to the detection window and open the hinge.
- 4 Remove the cassette cover from the cassette body.

Installing the Capillary

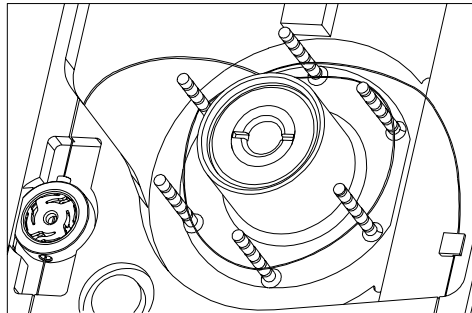
- 1 Hold the capillary at the alignment interface.
- 2 Insert the alignment interface into the alignment interface holder of the cassette. Make sure the flat side of the alignment interface is at the outer edge of the cassette, see Figure 43.
- 3 Make sure the capillary slides into the capillary guiding slit.
- 4 Wind the capillary around the reel in the center of the capillary cassette. The pins surrounding the reel have grooves to secure the capillary.
- 5 Start with the inside of the upper pin to avoid the capillary being squeezed when the cassette is closed.

Figure 43 **Installing the Capillary**



6 Alternate the sides of the pins when inserting the capillary. See Figure 44.

Figure 44 **Installing the Capillary Alternating the Pins**



NOTE Make sure the windings of the capillary do not come into contact with each other. As the heat cannot be led away at contact points they get hot and may cause separation and detection problems.

- 7** Insert the other end of the capillary into the guiding hook at the right.
- 8** Press the white capillary lock towards the center of the cassette and insert the capillary into the capillary lock. Release the capillary lock to secure the capillary.

Installing Capillary in an Empty Capillary Cassette

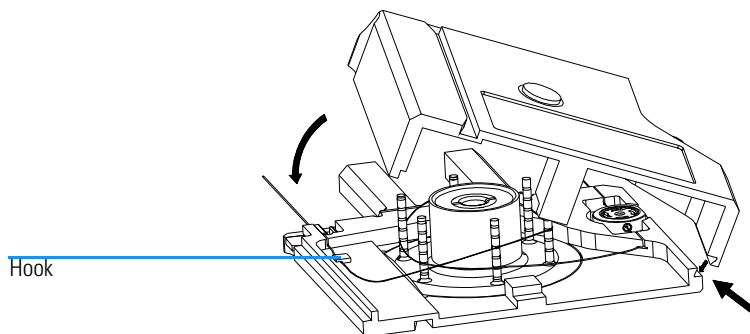
- 9 Make sure the two capillary ends outside the cassette are both the same length as the cassette guiding pins (see Figure 44) and are parallel to the pins as shown in Figure 45. Use a sheet of paper or another soft item with a straight line to check this. Use the capillary lock to make adjustments at the inlet side.

Closing the Capillary Cassette

- 1 Connect the hinge at the side of the cassette body, which has the detection interface installed, to the one of the cassette cover.

Figure 45

Closing the Capillary Cassette



- 2 Make sure the hinge is closed firmly at that side.
- 3 Connect the other sides and latch them together.
- 4 Make sure the cassette cover and body form one unit.
- 5 Make sure the two capillary ends outside the cassette are both the same length as the cassette guiding pins and are parallel to them. Use the capillary lock to make adjustments.

Inserting the Cassette

NOTE

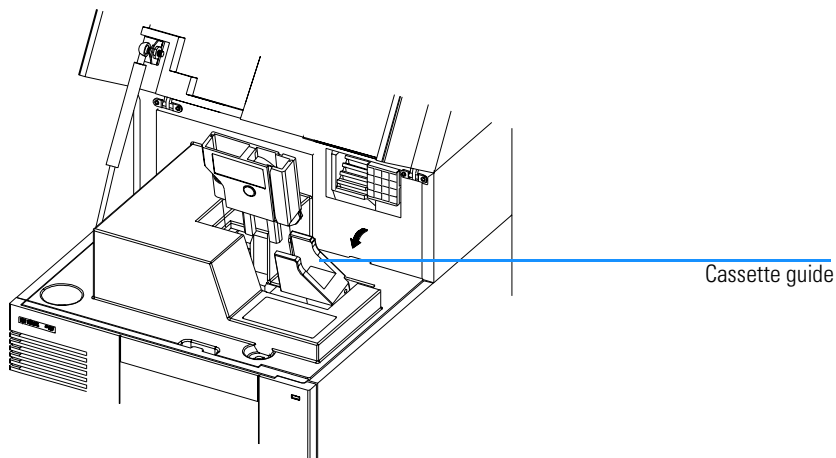
Use Change Cassette to access an already installed cassette.

To insert the capillary cassette into the system you have to perform the following steps.

- 1 Open the top cover to access the capillary cassette. Press the button in the middle of the lid front to release the latch.

Figure 46

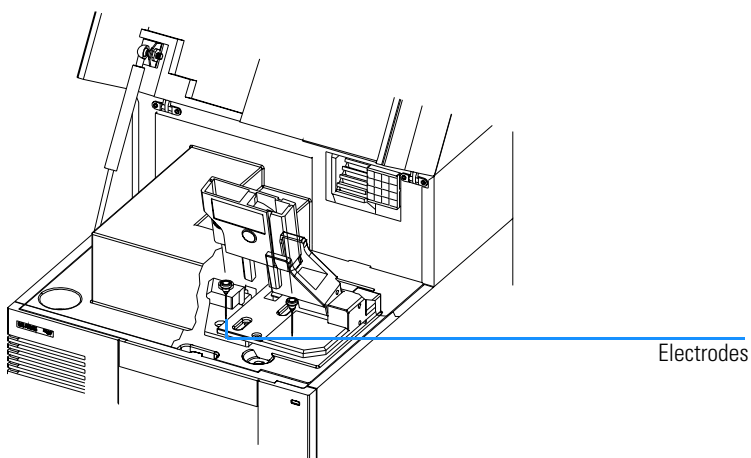
Insertion of Cassette



- 2 Move the cassette guide to the front.
- 3 Insert the cassette into the guiding slit of the cassette guide. Make sure the ends of the capillary are not bent.

Figure 47

Insertion of Cassette into Electrodes



- 4 Slowly lower the cassette until it reaches the insulation plate. While lowering the cassette, insert the capillary ends into the capillary seats of the electrodes.

WARNING

Make sure the ends of the capillary are not bent when lowering the capillary cassette. They should slide directly into the capillary seats. Otherwise they might break or be damaged. If you have problems inserting the capillary into the electrodes, check if they are blocked with salt crystals. For translations, see page 249.

- 5 Move the cassette guide back again while holding down the cassette. The alignment interface aligns the capillary automatically to the detector.

WARNING

Do not close the top cover, if the cassette is not properly installed. This may damage the cassette. For translations, see page 249.

- 6 Close the top cover and secure it by latching it onto the body of the case. Make sure the latch is tightened. For safety reasons no power is applied if the top cover is open. Check in upper right corner of the CE diagram whether the top cover is closed.

Because the cassette was changed, the Agilent ChemStation automatically displays the Wavelength Calibration screen. It tests the wavelength calibration of your detector and advises you to do adjustments if necessary. The cassette is recognized during the wavelength calibration means there is

Inserting the Cassette

no switch etc. If the lamp is off or the cassette is not inserted properly the wavelength can not be adjusted correctly. This may result in following safety functions:

- no voltage can be applied
- no pressure can be applied
- cassette temperature does not work

Following messages can be displayed:

Cassette not recognized or

Cassete fan switched off

Choose the Help button for more information on this feature.

After you have finished Wavelength Calibration, you can close the Change Cassette dialog box by choosing Done and proceed with setting up a method.

Problem Solving

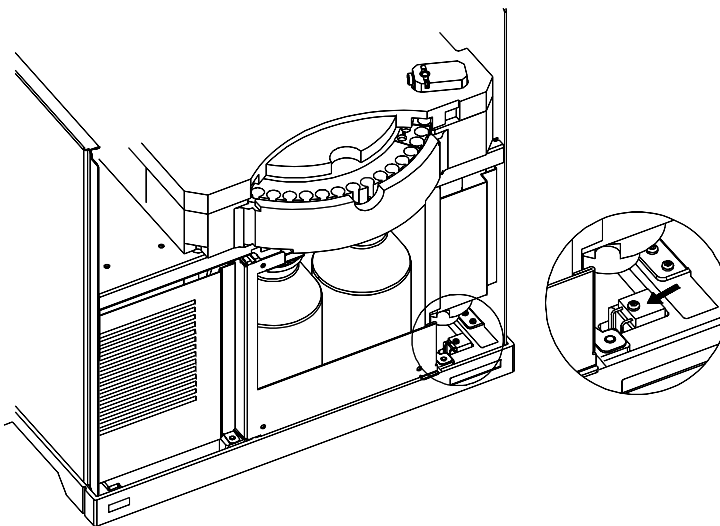
The problem solving section in the instrument online help system assists you in solving the most common failures. Nevertheless a short list of problems are featured here.

Leaks

The leak sensor of the Agilent CE instrument is located in the lower right part of the instrument, see Figure 48.

Figure 48

Position of Leak Sensor



When the leak sensor is activated:

- the error LED on the front of the instrument is illuminated,
- the CE Status displays an error,
- a logbook entry is created,
- the run is stopped, and
- pressure is released.

Problem Solving

If the leak sensor is activated or you think there is a leak in the instrument:

- 1 Switch off the Agilent CE instrument (and the external water bath, if connected) immediately.
- 2 Disconnect the line power cord.
- 3 Remove the detector cover as described.
- 4 Remove the front cover as described to diagnose the cause for the leakage.
- 5 Dry the leak sensor using tissue.

Possible Reasons for Leaks and Appropriate Action

Spilled Liquid From Other Sources

If you spilled some liquid into the Agilent CE instrument it is sufficient to thoroughly clean and dry the Agilent CE instrument and the leak sensor.

Leaking Water Bath Tubing Inside the Agilent CE Instrument

Call Agilent Technologies. Do not use the Agilent CE instrument until Agilent Technologies has repaired it.

Leaks of Replenishment Tubing or Valves

Call Agilent Technologies.

Reason Unknown

If you can not trace the reason for the leak, call Agilent Technologies. There may be an instrument problem.

Blocked Replenishment Needle

If you are using the replenishment function of the Agilent CE instrument, buffer may precipitate inside the replenishment needle. To avoid this, put a vial filled with water (to a height of 1.8 cm) in vial position 49. Vial position 49 is the home position of the replenishment lift. The vial will be picked up by the lift and brought to the replenishment needle. The needle will dip into the water and this prevents the buffer from precipitating.

Leakage Current

Leakage current is indicated by a yellow bar in the current part of the energy status display in the CE diagram. Leakage current means that the current at

Problem Solving

the inlet electrode is different from the one at the outlet electrode and thus a current flows outside the capillary.

It can be caused by:

- broken capillary,
- empty inject vial,
- air bubble in injection vial/or run buffer vials,
- air bubble in capillary,
- contaminated insulation plate,
- high humidity level, or
- conductive capillary surface.

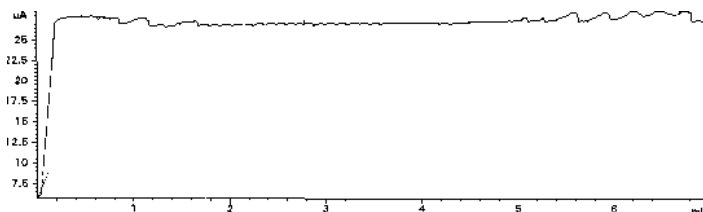
In case you found a broken capillary in the alignment interface use an ultrasonic bath to clean the interface to remove quartz residues.

Broken Capillary

To check for a broken capillary, remove the capillary cassette and open it as described in the *User's Guide*. The capillary is especially sensitive to breaking at the detection window and the capillary ends, therefore check these parts of the capillary. If the capillary is broken at the detection window, a leakage current of nearly the same value as the expected current can occur. Small instabilities in the current curves as shown in Figure 49 can also be a sign of a broken capillary.

Figure 49

Current Instabilities



If the capillary is broken at the ends, it may no longer reach into the liquid in the vial. In that case the analysis is stopped if lower alarm limit for current has been reached (must be set first). Sometimes the capillary has very small

Problem Solving

cracks which are hardly recognized under a microscope. Exchange the broken capillary.

Contaminated Insulation Plate

Salt crystals or other contamination of the insulation plate can cause leakage current. Clean the insulation plate as described.

Empty Injection Vial

Access the vial position specified in Sample info or Sequence table using the *Get vial* function in the Tray control screen. Check if the vial is filled.

Dirt in the vials

Clean all vials prior to use them. First flush them with water followed by e.g. some isopropyl alcohol. Use compressed air to dry the vials inside.

Air Bubble in Injection Vial/or Run Buffer Vials

When filling sample or buffers into the vial, an air bubble is sometimes formed. This happens very frequently when using microvials. Air bubbles can cause air to be injected instead of the sample. To avoid air bubbles, carefully fill vials starting from the bottom. If you can't avoid the formation of air bubbles, adjust the lift offset in the home values dialog box so that the capillary doesn't reach into the bubbles.

Air Bubble in Capillary

Small air bubbles in the capillary can cause spikes in your electropherogram. Larger air bubbles expand so much during analysis that the current drops below the lower alarm limit. Flush your capillary with buffer to remove air bubbles.

Problems with the Replenishment System and SDS Containing Buffers

When a vial is replenished the SDS foam may stick to the side of the vial. The empty function draws air around the foam into the replenishment needle. When filling this vial a set of new foam bubbles is introduced into the vial before the fresh buffer. The surface sensing system recognizes the first foam bubble as liquid. So the final liquid level is not at the height it should be. It may also happen that the vial contains no buffer liquid but only foam. The result could be seen as low current or even no current supplied.

Problem Solving

As a workaround we recommend programming a replenishment program in two steps.

- 1 Replenishment to a level about 0.2 cm higher than required.
- 2 Fill to the desired level.

If the fill finds a level higher than the desired, the vial is emptied to the level without using the sensing function and the foam has no influence.

As an example: the desired height is 1.4 cm

- 1 Replenish vial XX to 1.6 cm (0.2 cm more)
- 2 Fill vial XX to 1.4 cm

Alternative No replenishment necessary.

Fill several vials with buffer. Program methods which use these vials as the inhome and outhome vials (e.g. vials 4, 5, 6, 7).

Method 1:

inhome = 4, outhome = 5

Method 2:

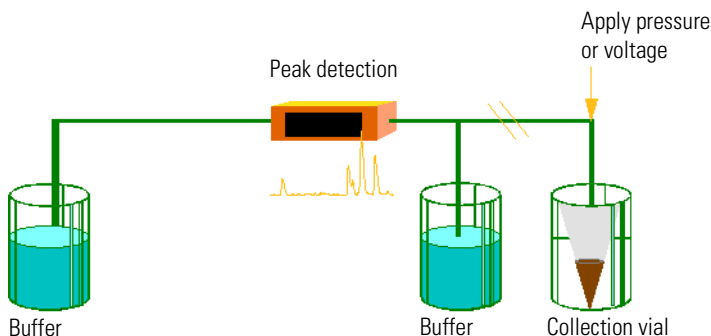
inhome = 6, outhome = 7

Fraction Collection

In the bioscience and pharmaceutical areas the capability of fraction collection is frequently required in order to characterize separated components by off-line analysis techniques such as MALDI/TOF-MS or protein sequencing. Figure 50 shows general principle of how fraction collection in CE works.

Figure 50

Fraction Collection



Fraction collection uses information from the built-in diode array detector to find the exact time when a peak appears at the outlet electrode. A peak is detected if the peak signal exceeds the threshold set in the diode array set up screen. Therefore some diode array settings have to be adjusted such as selecting spectra storing. When a new peak is detected, the time is calculated in which the peak will leave the capillary. The length of the capillary between the detection window and the outlet is fixed to 8.5 cm.

In addition some settings have to be entered, such as the inner diameter of the capillary, the correct total and effective capillary length in the Capillary Information screen, e.g. inner diameter is 100 μm , total length is 96.5 cm and effective length 88 cm as shown in Figure 51:

Figure 51

Capillary Information Screen

Edit Capillaries: Instrument 1									
Insert		Append		Delete		Print		OK	Cancel
#	Built-in	Product#	Batch#	Description	Length	Diameter	Bubble	eff. Length	
1	YES	G1600-61211		Barefused Silica	96.5	100.0	no	88.0	
2	no	G1600-62211		Barefused Silica	80.5	50.0	no	72.0	
3	no	G1600-61311		Barefused Silica	64.5	75.0	no	56.0	

Peaks may be collected either by using pressure or electrokinetic elution. Since peak volumes are generally in the size of nl volumes, peaks are collected into microvials containing about 10–15 μ l of an appropriate solution (for correct selection, see Table 7). The lift offset should be set to 3 mm in the CE Home Values menu. Applications include fraction collection from CZE, MECC, from CGE analyses using fixed gels and even from CIEF separations.

The instrument logbook shows the steps done during fraction collection e.g. when a peak has been detected, the vial in which the peak has been collected etc.

The Fraction Collection Screen

In order to use fraction collection you must have entered values for the effective capillary length in the Capillary Information screen.

Collection Mode

OFF: No fraction collection set up.

Pressure: Moves the peak into the collection vial by applying 50 mbar pressure.

HPCE: Fraction Collection

Collection Mode
 OFF Pressure Voltage IEF

Collect
 All Peaks from: 0 to: 60 min
 Selected Peaks at
[] [] [] [] min

First Vial: 40
Collection Width: 5 %
Migr. Time with 50 mbar: 10 min

Voltage Ramp for Separation: 0.1 min

OK Cancel Help

Voltage: Moves the peak into the collection vial by applying the voltage. The collection vial should be filled with run buffer

or other electrolyte to ensure conductance.

The screenshot shows the 'HPCE: Fraction Collection' dialog box. Under 'Collection Mode', the 'Voltage' radio button is selected. In the 'Collect' section, 'All Peaks' is selected with a range from 0 to 60 minutes. The 'First Vial' is set to 40 and 'Collection Width' is 5%. A 'Voltage Ramp for Separation' of 0.1 min is also indicated.

IEF: 50 mbar pressure is used to move the peak into the collection vial. In the IEF mode the peaks have no electrophoretic mobility so the algorithm to calculate the time when the peaks reach the outlet is different than in collection with pressure only.

The screenshot shows the 'HPCE: Fraction Collection' dialog box with 'IEF' selected in the 'Collection Mode'. The 'Collect' section is the same as the previous screenshot, but it includes an additional 'Migr. Time with Pressure' field set to 10 minutes.

Collect

Depending on the collection mode selected the items in the Collect panel change:

Select All Peaks if you want to have all detected peaks above a certain threshold collected. Select Selected Peaks and provide migration times into

the fields to collect up to 4 selected peaks expected within each time window specified by the migration time.

In First Vial the start vial where the first fraction is collected can be entered. The second fraction will be collected in the next vial.

An error message will be logged in the logbook if the actual vial number exceeds 48. No further peaks will be collected.

Collection Width

The collection width defines the peak collection time window around the peak apex. Depending on the collection mode, it is specified in percentage of the time the peak appears or an absolute time. This is the migration time plus the time the peak needs from the detector to the outlet vial. This is because slower peaks (will become broader and therefore) need a wider migration time window.

Example

If a collection width of 5% is used for a peak which has an expected migration time of 1 minutes (to capillary outlet-end) then the collected peak width will be 0.6 minutes. Therefore peak collection will begin at 11.7 minutes and continue until 12.3 minutes.

If peaks are being collected from an IEF separation, the peak width is not dependent upon migration time so the peak collection time can be defined and remains the same for all collected peaks.

Migr. Time with 50 mbar, Migr. Time With Pressure

If you use collection by Pressure or IEF the instrument needs to know at which velocity the peaks are moving. In other words, how long it would take for an injected sample plug to move from the capillary inlet to the detector if moved by pressure only. To find this value, create the following method:

- 1 switch electronic off (means no voltage applied)
- 2 in the timetable enter: At time 0.01 minutes 50 mbar and a stoptime of 'no limit'
- 3 inject your sample or any absorbing liquid (e.g. NaOH, isopropyl alcohol)

The Fraction Collection Screen

- 4 set a wavelength where your sample or the liquid absorbes (e.q. 200 nm for NaOH)
- 5 in Conditioning flush the capillary with your run buffer for 5 minutes
- 6 start the method
- 7 the time when your sample or NaOH appears in the detector window should be entered as 'Migr. Time with pressure'.

Voltage Ramp for Separation

Sometimes a method starts with a voltage ramp to prevent rapid heating of an injected sample. The conditions are set in the Set up CE Timetable screen.

NOTE

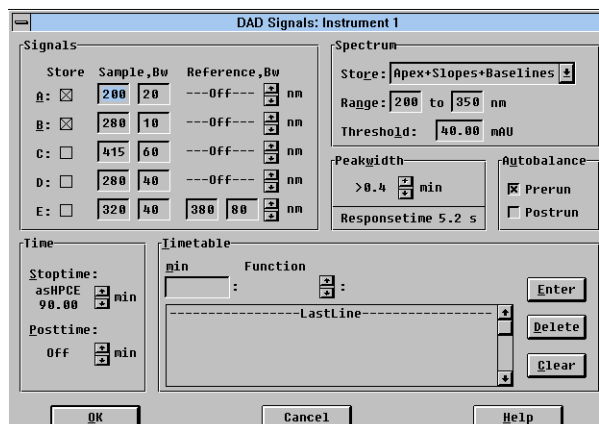
When using fraction collection all your timetable entries which use voltage, outlet vial or pressure settings will be deleted from the timetable. Therefore set the voltage you want to use in the electric screen and the time for the voltage ramp in the fraction collection screen. The voltage ramp must be completed before the first peak to be collected is expected.

Activating the Peak Detector of the Diode Array Detector

In order to run fraction collection you have to activate the peak detector in the DAD Signals screen

Figure 52

DAD Signals Screen



The Fraction Collection Screen

Go to the Spectrum section and activate store Apex+Slopes+Baselines. Set the range to 200–350 nm and set the threshold to a value below the expected mAU of the compound you want to collect.

Because threshold always refers to Signal A, in ‘Store Signals’ set the desired wavelength for Signal A (e.g. 200/20 nm). The setting for peak width has to be a value which is similar to the real peak width. The value can be found in the integration results report of a standard analysis.

Summary

Steps for Fraction Collection

- Fill microvials with 10–15 µl of appropriate solution (see Table 7).
- place microvials in sample tray (random choice)
- enter the correct capillary information in the ‘capillary information screen’
- set lift offset to 3 mm in the CE Home Values menu
- find the migr. time with pressure values
- set threshold accordingly, store Apex+Slope+ Baseline spectra and the signal wavelength A in the DAD settings
- set peak width similar to the real peak width
- run fraction collection method. Look into the logbook to see the fraction collection steps
- mix the collected fraction thoroughly when you want to re-analyse the collected fractions. Be aware that the result depends on many factors like sample concentration, injection time and pressure, capillary length and internal diameter

Recommended Collection Modes

Table 7 gives an overview of the recommended collection modes using the various CE separation techniques and proper fraction collection solutions.

Table 7

Collection Modes

Technique	Collection Mode Pressure	Collection Mode Voltage	Collection Liquid
CZE	Preferred	Yes	2-% acetic acid
ITP	Preferred	Yes	2-% acetic acid
CGE (using gels)	Do not use!	Yes	Electrolyte
MECC	Yes	Yes	Electrolyte
IEF	Yes	No	Carrier ampholyte

NOTE

In order to use fraction collection you must have specified values for the effective capillary length in the Capillary Information screen. An error message will be logged in the logbook if the actual vial number exceeds 48. No further peaks will be collected. When using fraction collection all timetable entries which require voltage, outlet vial or pressure settings will be removed from the timetable. The voltage ramp must be completed before the first peak to be collected is expected.

Capillary Electrophoresis

Summary

Capillary Electrophoresis plus High Pressure: CE+p

The Agilent CE instrument is capable of accepting an external gas pressure in addition to the internal pressure. The external high pressure source can be up to 15 bar, and is regulated within the instrument via GUI control between 2–12 bar. This pressure is applied to one or both vials at the capillary ends. The high pressure option may be required if using highly viscous replaceable gels in CGE.

Requirements

WARNING

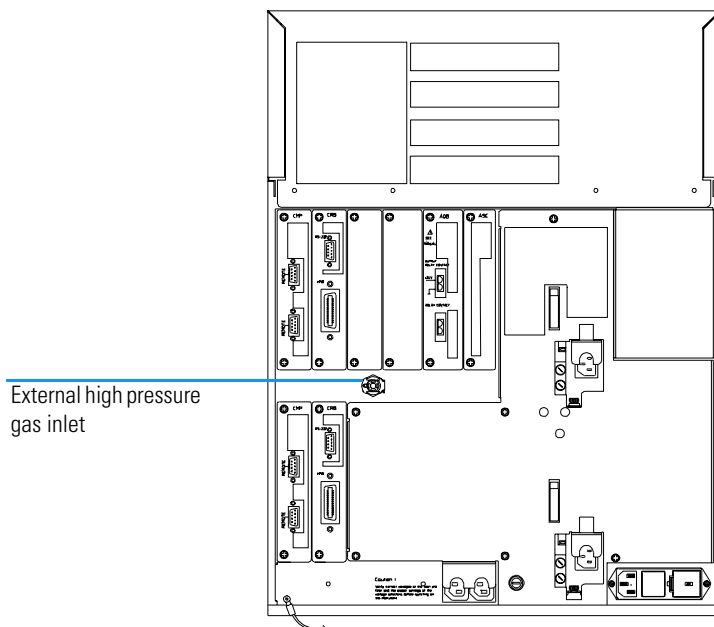
Use the new design of capillary cassette when your application or method requires organic solvents. The new design of capillary cassette conforms to the higher flammability class (CV01). For translations, see page 251.

- External pressure supply (< 15 bar) of oil-free air or nitrogen.
- Push-fit connector and gas line (supplied in startup kit).

The inlet for the external gas high pressure is situated at the back of the instrument (Figure 53).

Figure 53

External High Pressure Gas Inlet

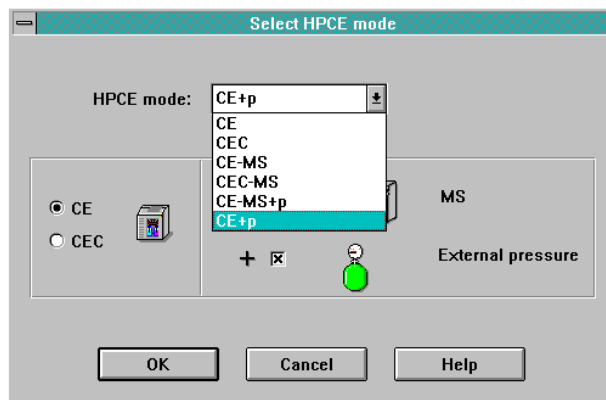


Preparing the Agilent CE Instrument for High-Pressure Use

- 1 Ensure gas source is switched off prior to connection.
- 2 Connect push-fit connector and gas line to the receptor at the rear of the Agilent CE instrument.
- 3 Connect the gas line to the source.
- 4 Switch on gas supply.
- 5 Select CE Mode from Instrument in the Method and Run Control screen.
- 6 Select CE+p from the CE mode selection menu (Figure 54).

Figure 54

Select CE Mode

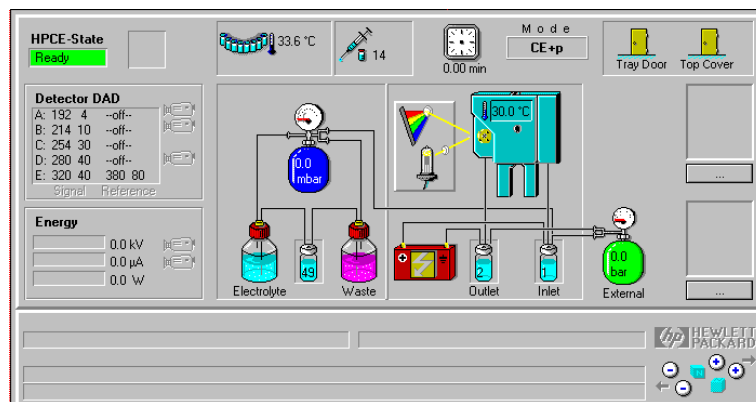


- 7 CE+p Mode can also be selected by clicking on the CE Mode icon on the GUI.
- 8 A new icon will appear on the GUI and the Mode field will indicate CE+p (Figure 55).

Capillary Electrophoresis
Preparing the Agilent CE Instrument for High-Pressure Use

Figure 55

GUI



Operation and Function in CE+p Mode

By selecting the CE+p mode some new functionality is available for control via the GUI which will assist in the operation of CGE with highly viscous buffers. This includes the ability to apply high pressure during preconditioning and postconditioning and the ability to use high pressure to introduce samples.

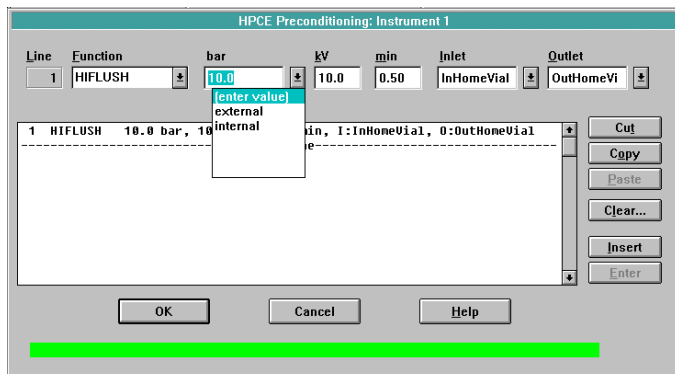
Preconditioning

When the instrument is operating in the CE+p mode the user can choose to apply HIFLUSH during preconditioning (Figure 56). This means that high pressure will be applied to the capillary inlet vial which may be:

- a set value (2–12 bar),
- raw external pressure (up to 15 bar),
- or it is still possible to use 'Flush' (= internal pressure up to 1 bar).

Figure 56

CE Preconditioning Menu



Other parameters which can be set in the HIFLUSH field include:

- applied voltage (kV),
- duration (min),
- inlet vial, and

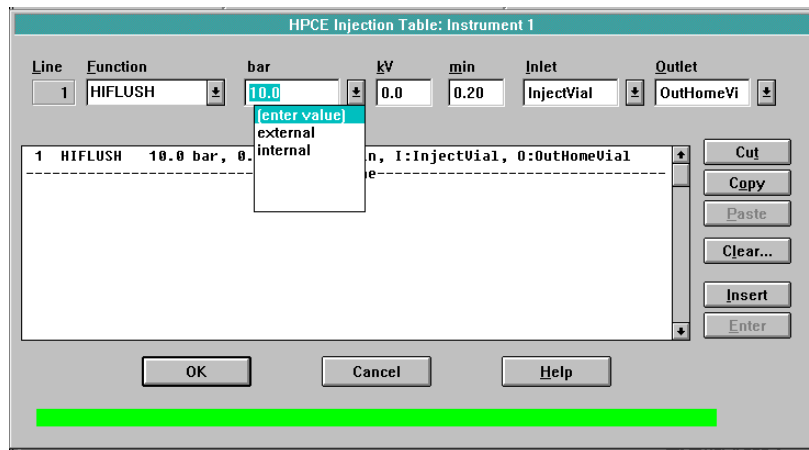
- outlet vial.

Injection Options with CE+p

High pressure may also be used for injection purposes using the timetable option in the Injection field (Figure 57).

Figure 57

CE Injection Table



From this menu you may select the HIFLUSH option during injection with the same parameter choices as are available during Preconditioning.

This may be used to apply a pressure injection while using a replaceable gel filled capillary.

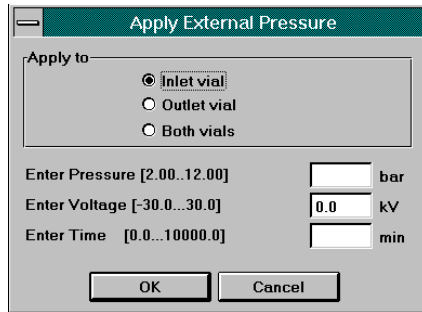
Please note that the external pressure is not as precise as the 50 mbar injection pressure!

CE+p Control Using the GUI

High pressure may be applied independently of the method for capillary conditioning or cleaning by clicking on the External pressure icon on the GUI (Figure 54). This will cause a parameter setting field to appear (Figure 58). From this field you may chose to apply pressure to the inlet, outlet or both vials, and also whether to apply a simultaneous voltage of -30 to 30 kV.

Figure 58

CE+p Control via GUI



Capillary Electrochromatography

How to use your Agilent CE instrument for
capillary electrochromatography

Capillary Electrochromatography

Capillary electrochromatography (CEC) is a fusion of capillary electrophoresis and capillary chromatography. In CEC, solvent is mobilized through a packed capillary column by electroosmotic flow instead of the hydraulic flow used in LC. Higher efficiencies are achievable because of the uniform flow velocity profile and the ability to use smaller particle sizes in longer columns than is possible with LC. Operation of CEC requires the equal application of high pressure to the inlet and outlet vials in order to suppress bubble formation while avoiding hydrodynamic flow due to a pressure differential.

Requirements

WARNING

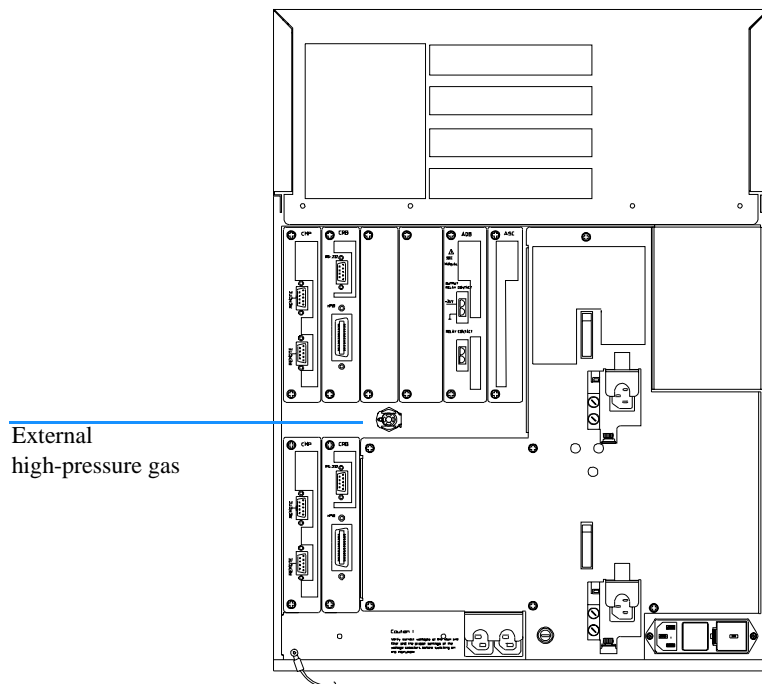
Use only the new design of capillary cassette. Never use the old design of cassette when organic solvents are required. This applies especially when performing CEC applications. For translations, see page 252.

- External pressure supply (≤ 15 bar) of oil-free air or nitrogen to get between 2 and 12 bar regulated.
- Push-fit connector and gas line (supplied in startup kit).

The inlet for the external high-pressure gas is situated at the back of the instrument (Figure 59).

Figure 59

External High-Pressure Gas Inlet

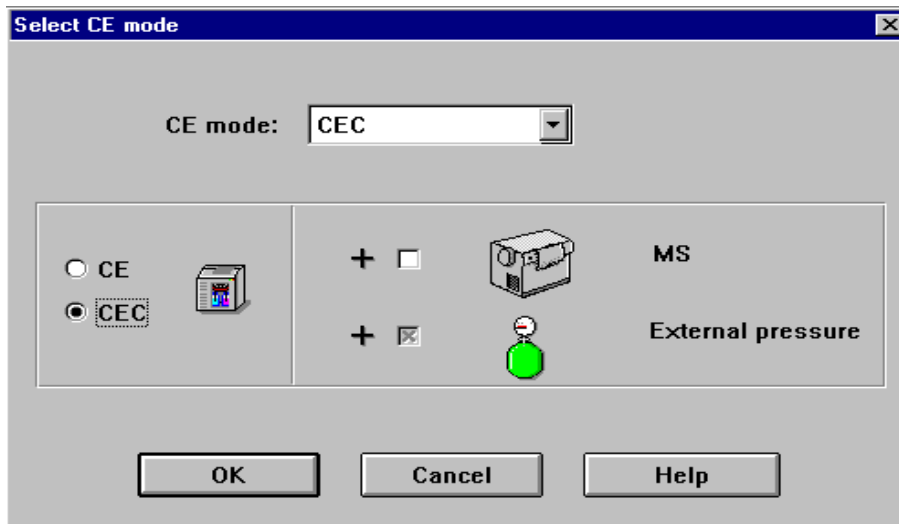


Preparing the Agilent CE Instrument for High-Pressure Use

- 1 Ensure gas source is switched off prior to connection.
- 2 Connect push-fit connector and gas line to the receptor at the rear of the Agilent CE instrument.
- 3 Connect the gas line to the source.
- 4 Switch on gas supply.
- 5 Select CEC from the CE mode selection menu or by clicking on the option button next to CEC (Figure 60).

Figure 60

CE Mode Selection Menu



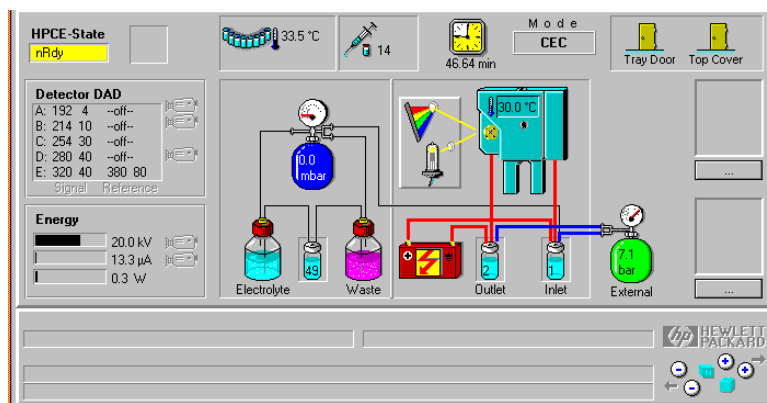
- 6 A new icon will appear on the GUI and the Mode field will indicate CEC (Figure 61).

Capillary Electrochromatography

Preparing the Agilent CE Instrument for High-Pressure Use

Figure 61

GUI



CEC-Specific GUI Explanation

When the CEC mode is selected a new icon in the form of a green gas bottle appears on the lower right side of the GUI (Figure 61). There are also a number of new parameters which may be set either from the Edit entire method option or from the Individual parameter settings within the Instrument menu selected from the Method & Run Control toolbar. The new parameter choices appear in the following menu selections.

Home Values

When the CEC Mode is selected a new parameter setting field appears in the Home Values menu from the method edit menu (Figure 62). In the Pressure field there is the option to select:

- pressure off,
- external, and
- set pressure from 2–12 bar.

Figure 62

Home Values Menu

The screenshot shows a dialog box titled "HPCE: Home Values". It contains several input fields and buttons:

- Lift Offset:** A text field labeled "Offset:" containing the value "4" followed by "mm". A "Default" button is to the right.
- Cassette:** A text field labeled "Temperature:" containing the value "30.0" followed by "°C". Up and down arrow buttons are to the right of the field.
- Pressure:** A text field labeled "High Pressure:" containing the value "7.0" followed by "bar". Up and down arrow buttons are to the right of the field.
- Vials:** Two text fields. The first is labeled "Inlet Home:" and contains the value "1". The second is labeled "Outlet Home:" and contains the value "2". Both fields have up and down arrow buttons to their right.

At the bottom of the dialog are three buttons: "OK", "Cancel", and "Help". A green horizontal bar is located at the very bottom of the dialog box.

Pressure off is self-explanatory as is the default setting. Selecting external applies the raw external pressure with no control through the internal valve

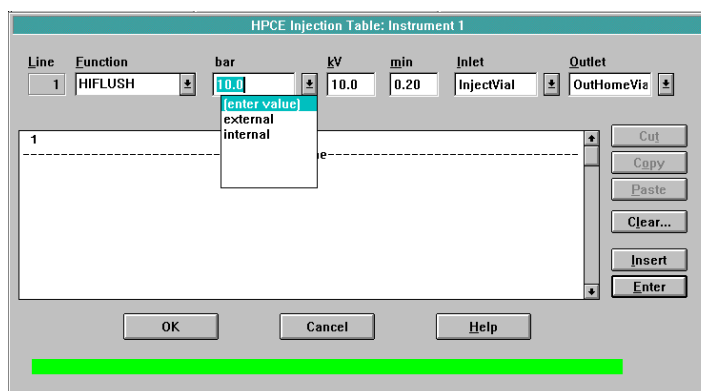
block. The pressure may be set to a value from 2–12 bar at increments of 0.1 bar.

Injection Options with CEC

High pressure may also be used for injection purposes using the Time Table option in the Injection field (Figure 63).

Figure 63

CE Injection Table Menu



From this menu the user may select the HIFLUSH option during injection with the same parameter choices as are available during preconditioning.

This may be used to apply a pressure injection while using a packed capillary. The internal pressure of up to 1 bar is generally insufficient to introduce sample onto a packed capillary.

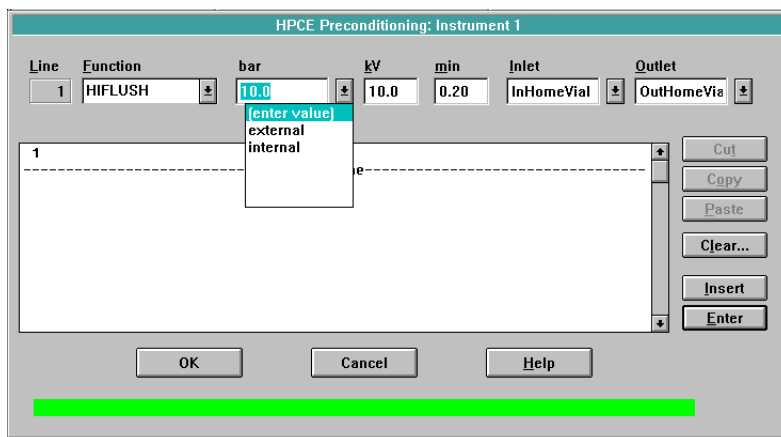
The external pressure is not as precisely delivered as the 50 mbar injection pressure. However electrokinetic injection can be readily used in CEC mode.

Preconditioning

In order to precondition a packed capillary an applied pressure of approximately 12 bar alone is usually insufficient to move mobile phase rapidly through the column. Therefore the applied high pressure may be assisted by the application of an electric field. This serves to augment the high pressure flow with an electroosmotic flow. In the Preconditioning menu HIFLUSH can be selected for this purpose (Figure 64). HIFLUSH applies pressure with or without voltage to the INLET vial only.

Figure 64

CE Preconditioning Menu



After selecting HIFLUSH, options appear for applying pressure without voltage (Figure 64). The applied pressure may be selected from:

- (enter value) which will allow you to apply pressure from 2–12 bar to the inlet vial,
- external applies raw external pressure (up to 15 bar) to the inlet vial,
- internal applies internal pressure (up to 1 bar) to the inlet vial, or
- simultaneously applied voltage can be set from -30 to 30 kV.

NOTE

When applying voltage simultaneously the OUTLET vial must contain electrolyte in order to maintain electrical contact.

Postconditioning

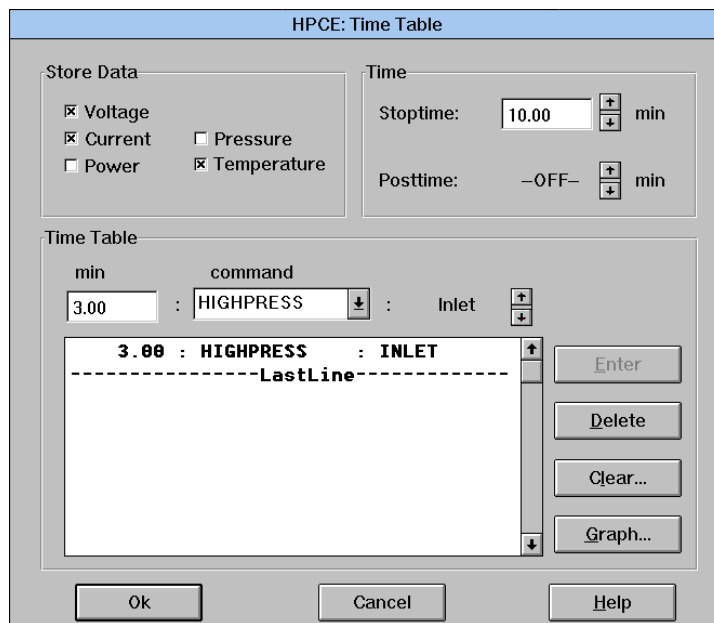
The available fields and setting parameters are identical to those in Preconditioning.

Time Table

In the Time Table field the option for applying high pressure is available from the command selection menu (Figure 65).

Figure 65

CE Timetable Menu



In this case by selecting HIGHPRESS, the pressure value which was set in HOMEVALUES is used. A further option is to apply this pressure to inlet, outlet or both vials.

CEC Control through the GUI

High pressure and voltage may be applied independently of the method for capillary conditioning or cleaning by clicking on the external pressure icon on the GUI (Figure 61). This will cause a parameter setting field to appear (Figure 66). From this field you may choose to apply pressure to the inlet, outlet or both vials, and a simultaneous voltage of -30 to 30 kV.

Figure 66

External Pressure Field

Apply External Pressure

Apply to

inlet vial

Outlet vial

Both vials

Enter Pressure [2.00..12.00] bar

Enter Voltage [-30.0...30.0] kV

Enter Time [0.0...10000.0] min

OK Cancel

Running the Analysis

After setting up the operational parameters you can initiate the run from the Method & Run Control menu by clicking on Run Method or by clicking on the Start button on the GUI. Some other operational aspects should be noted when running CEC separations.

- Capillaries** Packed capillaries are very fragile and must be handled with great care. Offline purging of the capillary using an LC pump may be necessary if air bubbles form within the capillary.
- Buffers** CEC buffers are generally of lower concentrations (4–20 mM) than conventional CE buffers. These may also contain a larger proportion of organic modifier than is found in CZE or MECC buffers. The currents generated are generally in the order of 2–10 μA for an applied field of approximately 600 V/cm.
- Injection** Because of the resistance of the packed bed the usual applied pressure of up to 50 mbar is insufficient to introduce sample onto the capillary. In this case high pressure and/or electrokinetic loading may be used, although the limitations of this technique should be noted.

Problem solving

- Offline purging** If air bubbles occur during an analysis the current will become unstable or very low ($< 0.3 \mu\text{A}$). If this occurs, remove the packed capillary and connect it to an LC pump capable of delivering a flow rate of 40 $\mu\text{L}/\text{min}$ to the capillary.

NOTE

Great care should be taken when removing and handling the capillary and when connecting and disconnecting the capillary to the pump. Fused silica packed capillaries are extremely fragile.

Instrument purging

If the capillary is filled with solvent then this may be replaced by inserting the capillary into the instrument and

Running the Analysis

applying a HIFLUSH through the external gas supply icon on the GUI. Generally 10–60 minutes are sufficient to replace the storage solvent with the operating mobile phase, depending on the velocity of EOF.

Online CE-ESI-MS with the Agilent CE System

How to use your Agilent CE instrument for online
CE-ESI-MS

Online CE-ESI-MS with the Agilent CE System

This chapter describes how to connect a Agilent CE capillary electrophoresis system to an G1946A or G1946B Agilent 1100 Series LC/MSD. Typical method parameters are given to analyze a simple test sample. Detailed information on how to set up the MSD can be found in the *System Installation Manual* for the Agilent 1100 LC/MSD. Information on how to configure the capillary electrophoresis with the Agilent G1946A/B can be found in the *Installing your ChemStation Manual*.

NOTE

All Accessories and documentation needed to interface the capillary electrophoresis system to a non-Agilent mass spectrometer are the responsibility of the respective vendor and will not be provided by Agilent. See information attached to this chapter.

Requirements

Equipment

- Agilent CE system with serial number greater than 3534G00644 or upgraded to CE-MS capability.
- Agilent G1603A CE-MS Adapter kit.
- Agilent G1946A or G1946B Agilent 1100 Series LC/MSD G1948A API-Electrospray source.
- Agilent 1100 Series pump with an optional Agilent 1100 Series vacuum degasser to add the sheath liquid or syringe pump which can deliver a precise flow rate of 1–5 $\mu\text{l}/\text{min}$.
- Agilent G1607A CE-ESI-MS sprayer kit

Setting up the Agilent CE Instrument

If your G1603A CE-MS adapter kit and the G1607A Sprayer kit is going to be installed by a Hewlett-Packard engineer, go to 'Method to analyse the test sample'.

WARNING

Make sure you have disconnected the line power cord of the Agilent CE instrument before you proceed. For translations, see page 264.

Leveling the CE-MSD

When setting-up the CE-MSD, the two instruments should be positioned close together to minimize the total capillary length. Placing the Agilent CE on a cart simplifies positional adjustment or changeover to a HPLC-system.

The capillary inlet should be at a similar height to that of the the capillary outlet to avoid siphoning. Placing the Agilent CE and the Agilent 1100 Series LC/MSD on the same bench results in the outlet being at nearly the same height as the inlet.

Installing the MS Cover

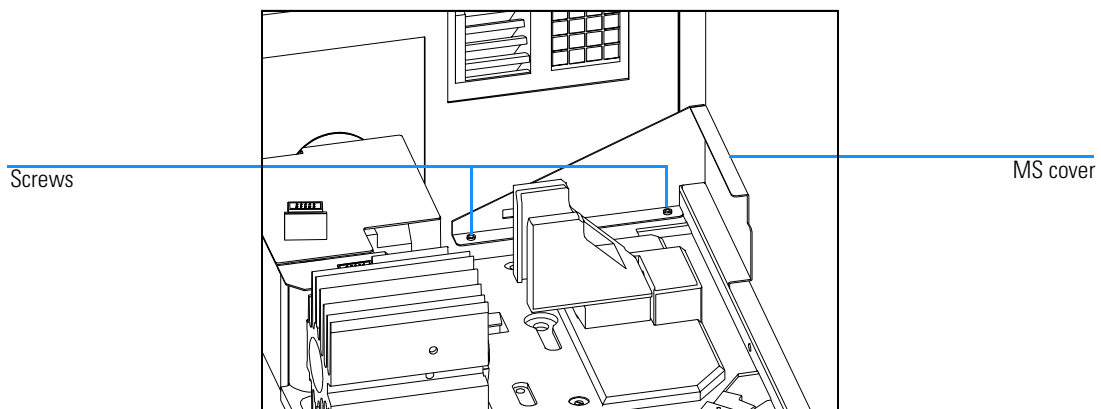
The new top cover insertion piece (MS-cover) must be installed to enable the use of the CE-MS capillary cassette. To install do the following:

- 1 Open the instrument lid.
- 2 Remove the black detector cover (quick lock mechanism).
- 3 unscrew the two screws behind the cassette which hold the sheet metal cover and exchange this for the new part and replace the screws.

Setting up the Agilent CE Instrument

Figure 67

Installing the MS Cover



Installing the Capillary and the CE-MS Cassette

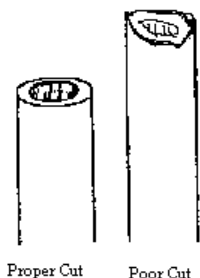
Preparing the Capillary

To have a short capillary connection to the Agilent mass selective detector, approximately 45 cm can be cut off from the long end of the CE-MS capillary. The remaining length is now about 80 cm.

The precision of the spray depends on the quality of the cut. Ordinary scoring devices gather and rip the coating of the capillary. Jagged edges are left that prevent a perfect spray and can act as adsorptive sites for sample components. A CE column cutter (5183-4620) can be used to reduce the capillary length. If not available, please follow the procedure described below.

Figure 68

Cutting the Capillary



- 1 Place the capillary over a large radius surface under slight tension.
- 2 Hold the scribe (delivered with the capillary) at an angle of approximately 30° to the capillary.
- 3 Draw the edge of the scribe across the capillary penetrating the polyimide.
- 4 Pull the capillary horizontal until it breaks. If the capillary will not break, the polyimide has not been cut. Repeat above steps.

Installing the Capillary and the CE-MS cassette

WARNING

Wear safety glasses when opening the cassette and handling the capillary to protect your eyes. For translations, see page 257.

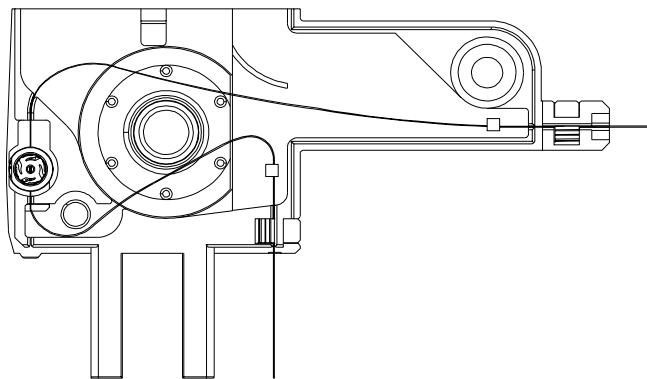
NOTE

Cover the exposed capillary section with the supplied external PTFE tube. The maximum stored energy in the CE power-supply is 200 mJ. Due to this and the fixed current limit of 50 μ A the high voltage applied is not defined as hazardous voltage. However, to avoid electrical shock always switch off the CE high voltage during capillary handling.

Should you set a current limit higher than 50 μ A in the Electric field of method set up, a warning will appear on the ChemStation screen. The non-metal alignment interface should be used only when operating in CE-MS mode.

Figure 69

Capillary Position in Cassette



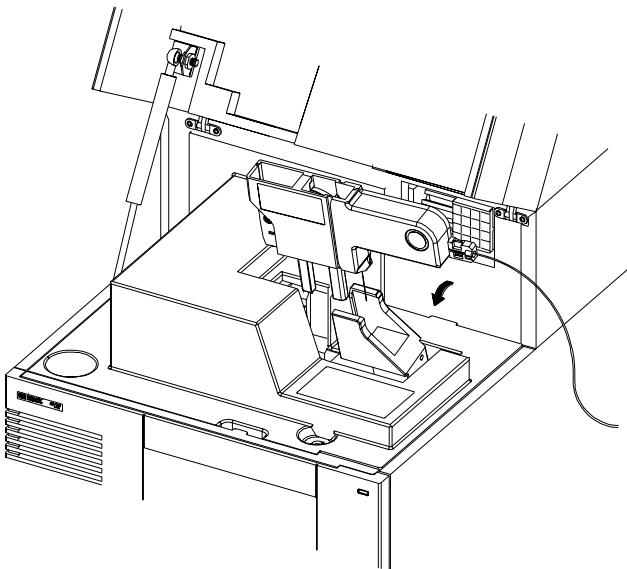
- 1 Procedures for inserting the capillary into the alignment interface, installing this in a cassette and inserting the cassette into the CE are described in Chapter 2. Figure 69 shows the position of the capillary in the CE-MS cassette. Note the following points:
 - In contrast to the regular CE-mode, the non-metal alignment interface is nearer to the inlet than to the outlet (inlet to detector = 21.6 cm.)
 - The long end of the capillary must be sufficient to reach the MS. For best results the shortest total length of capillary should be used (80 cm for use with the Agilent 1100 Series LC/MSD including UV detection).

Installing the Capillary and the CE-MS Cassette

- 2 Cut the PTFE tube to an appropriate length to cover the exposed capillary between the end of the CE-MS cassette and the inlet of the MS. Place the PTFE tube over the capillary and screw it on tightly at the CE-MS cassette.
- 3 Insert the CE-MS cassette in the same position as for the regular CE mode. Make sure that the long part of the capillary stays outside the instrument after closing the top cover.

Figure 70

Inserting the CE-MS Cassette



Configuring the Graphical User Interface for CE-MS Mode

- 1 Select Instrument from the Method & Run Control menu of the Agilent ChemStation.
- 2 From the Instrument menu choose Select CE mode.
- 3 Open the CE mode box and select CE-MS. The screen shown in the next figure will appear. The Select CE mode dialog box can also be opened by clicking on Mode in the Method & Run Control menu.

Figure 71 Select CE-MS Mode

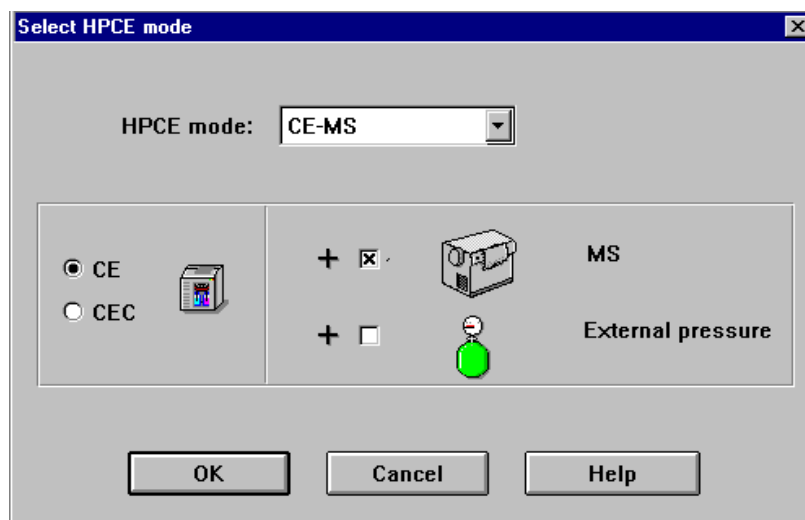
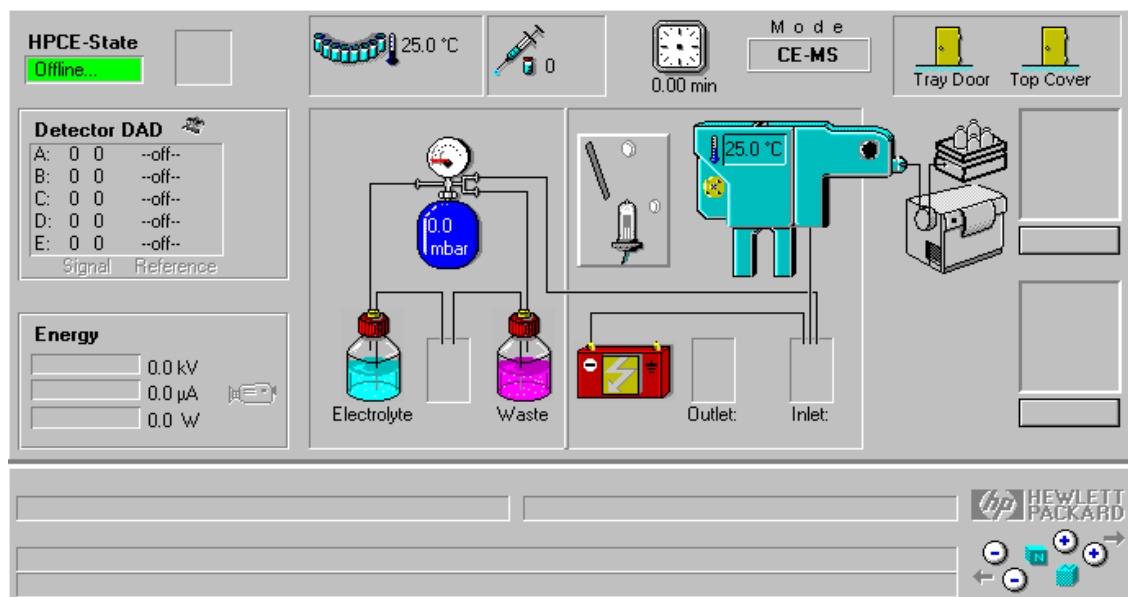


Figure 72 GUI for CE-MS Mode



Installing the G1607A Sprayer Kit

Table 8

Contents of Agilent G1607A CE-ESI-MS Sprayer Kit

Description	Quantity	Part Number
ES needle assembly	1	G1607-60041
CE-MS Neb. cover	1	G1607-60034
Hex key set II	1	8710-2164
DIN3115 screwdriver	1	5022-2142
CE-ESI sprayer	1	G1607-60001
Splitter assembly	1	G1607-60000
Ferrule 360 µm	1	5022-2141
Nut fingertight	2	0100-1543
Flex loc element	2	1520-0401
Screw M4 x 0.7	2	0515-0982
Gasket	2	G1607-20030
Fitting	2	0100-1544
Instructions	1	G1600-90106
Ion kit (ammonium acetate)	1	8500-4410
CE-MS test sample	1	5063-6590

Chemicals and Parts Needed

- 1 N sodium hydroxide (not supplied, for example, part number 5062-8576).
- CE grade water (not supplied, for example, part number 5062-8578).
- HPLC grade methanol (not supplied).
- 100 mM ammonium acetate (5 ml ampules containing 1.9 g ammonium acetate in 20/80 (v/v) methanol/water. part number 8500-4410,

Installing the G1607A Sprayer Kit

Thermospray Ionization Reagent. Included in the Agilent G1607A kit.

- Test sample quinine sulfate dihydrate (part number 5063-6590). Included in the Agilent G1607A kit.
- CE-MS capillary o.d. 360 μm , i.d. 50 μm (part number G1600-67311, one set is included in the Agilent G1603A CE-MS adapter kit).
- CE-MS alignment interface (part number G1600-60400, one interface is included in the Agilent G1603A CE-MS adapter kit).

Preparation of Buffers and Test Sample

The following solutions have to be prepared:

- 1 N sodium hydroxide (initial conditioning of the capillary).
- 1 ml water (initial conditioning of the capillary).
- 10 mM ammonium acetate pH 6.9 (running buffer).
- 5 mM ammonium acetate in 50% methanol (sheath liquid).
- 1 mg/ml quinine sulfate dihydrate in water (test sample).

NOTE

Solvents used for CE should be filtered through a 0.2 μm filter prior to use.

Test Sample

- 1 Weigh 1 mg of the test sample in a 2 ml Eppendorf cup.
- 2 Add 1 ml water.
- 3 Stir until the compound is completely dissolved (place the vial for 30 min in a mixer or for 15 min in an ultrasonic bath).
- 4 Prepare a CE vial with the test solution (1 ml in a glass vial or 500 μl in a polypropylene, PP, vial).

Solvents Used for Initial Conditioning

- 1 Prepare 1 vial with 1 N sodium hydroxide (300 μl in a PP vial).
- 2 Prepare 1 vial with water (1 ml in glass vial or 500 μl in PP vial).

Running Buffer

- 1 Dilute the content of one 5 ml ampule (containing 1.9 g ammonium acetate in 20/80 (v/v) methanol/water) in 245 ml water. This gives a stock solution of 100 mM ammonium acetate pH 6.9, 0.4% (v/v) methanol.
- 2 Dilute a certain amount of the stock solution to 1:10.
- 3 Prepare two vials (1 ml in glass vials or 500 μl in PP vials) with running buffer.

Sheath Liquid

- 1** Mix 225 ml of CE grade water with 250 ml of methanol.
- 2** Add 25 ml of the 100 mM ammonium acetate stock solution.
- 3** Stir thoroughly.
- 4** Fill the sheath liquid in solvent bottle A of the Agilent 1100 Series pumping system. In case a syringe pump is used to deliver the sheath liquid, fill a syringe.

NOTE

Prepare fresh sheath liquid at least once a week.

Prepare the test sample fresh prior to use.

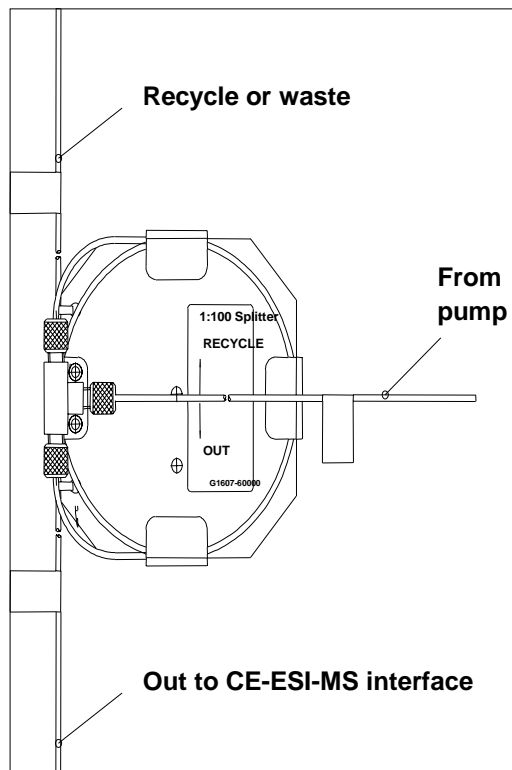
Preparing the Agilent 1100 Series Pump and Vacuum Degasser

The following steps have to be done if the pump and degasser are used.

- ❑ Install the pump and the degasser (optional) as described in their installation documentation. Otherwise an infusion pump has to be installed and connected.
- ❑ The sheath flow splitter (included in the Agilent G1607A CE-MS sprayer kit) has to be connected to the pump outlet. The following section describes the setup.

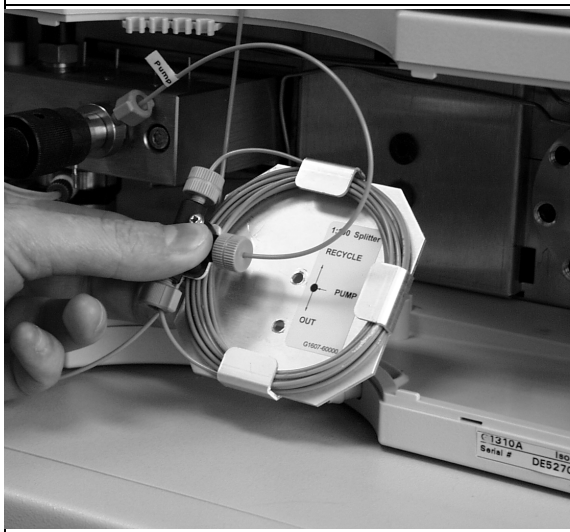
Figure 73

The Sheath Flow Splitter

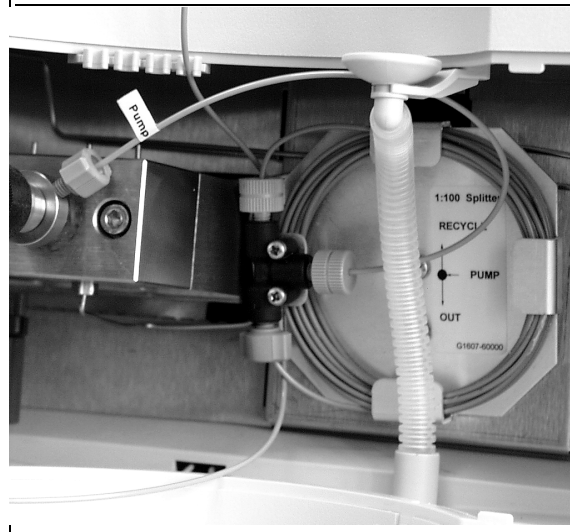


Online CE-ESI-MS with the Agilent CE System
Preparing the Agilent 1100 Series Pump and Vacuum Degasser

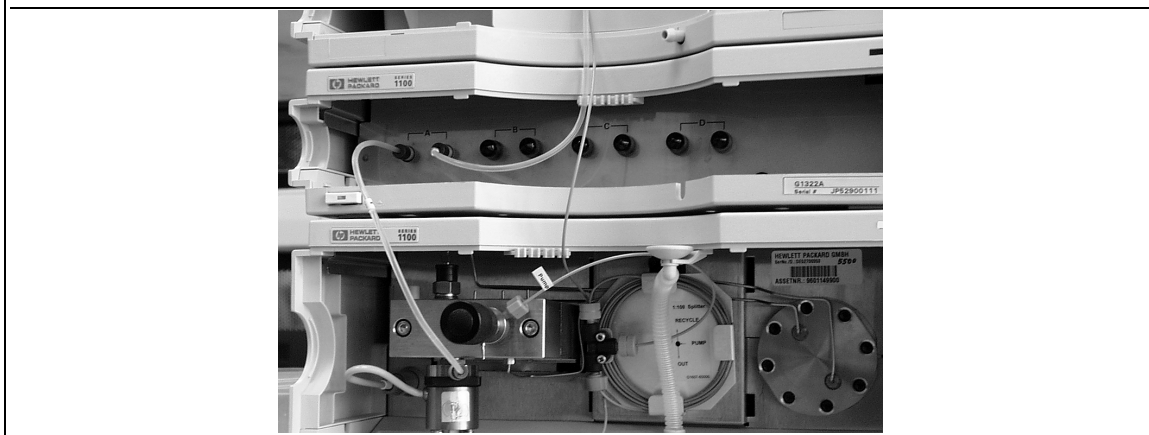
1 Install the flow splitter in the isocratic pump. Put the 2 rubber plugs from the Agilent G1607A kit into the sheet metal as shown below and use the two screws also included to mount the splitter.



2 Connect the tubing labeled *pump* to the pump outlet. The waste tubing may be drawn back into the sheath liquid bottle to reuse the solvent).



3 Still leave the tubing labeled *Out* disconnected from the sprayer but place its end in a beaker. It will be connected later.



Preparing the Agilent 1100 Series Pump and Vacuum Degasser

- 5 Fill the sheath liquid in solvent bottle A of the 1100 pumping system. Connect the tubing of bottle A to the degasser (optional). Open the purge valve and flush the pump at 2 ml/min (100% A) for 10 min. Reduce the flow rate to 0.4 ml/min and close the purge valve. The splitter splits the sheath liquid in the ratio 1:100, so the sheath liquid flow rate will be 4 μ l/min. If no degasser is in use the sheath liquid MUST be vacuum degassed prior use, and the flush time may be shorter.
- 6 The backpressure at 0.4 ml/min is approximately 40 bar.

Setup Pump Parameters

- Flow: 0.400 ml/min (1:100 flow splitter = 0.004 ml/min)
- %B: 0
- Active channel: A
- Max pressure/flow: 400 bar

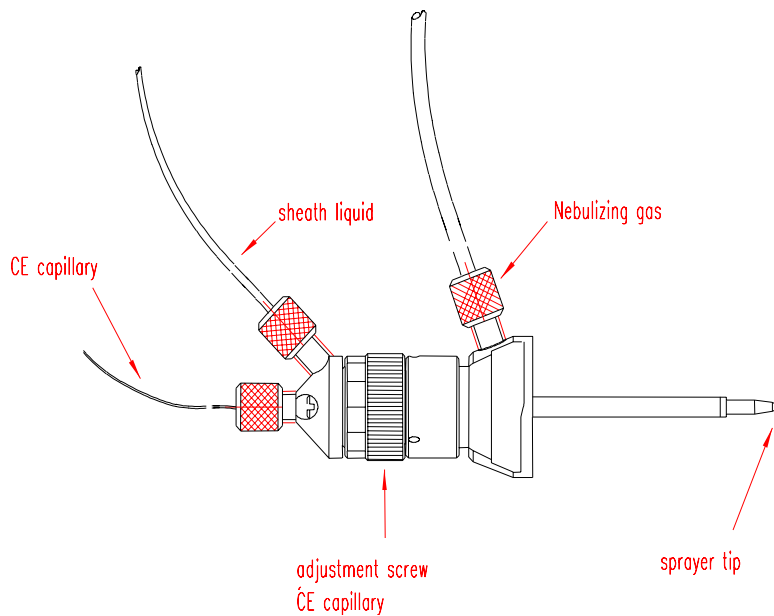
Preparing the Agilent Mass Selective Detector

The API-Electrospray source must be installed. Please refer to appropriate documentation. It is assumed that the MSD has been successfully tuned for single charged molecules (atunes.tun).

Inserting and Adjusting the CE Capillary in the CE-ESI-MS Sprayer

Figure 74

The CE-ESI-MS Sprayer



Preparing the Agilent Mass Selective Detector

1 Remove the protection plastic tube from the sprayer tip. Turn the adjustment screw counterclockwise (+ direction) until its mechanical stop. Then turn two complete turns clockwise (- direction).



2 Open the fitting for the CE and insert the capillary. Fix the capillary so that it still can be moved up or down. The capillary should be aligned flat with the sprayer tip. You can use your finger nail. Tighten the fitting screw tight enough to keep the capillary in place.



Preparing the Agilent Mass Selective Detector

3 Turn the adjustment screw 1/4 turn counter clockwise (2 marks in + direction). Finally the capillary should protrude approximately 0.1 mm out of the sprayer tip



Installing the CE-ESI-MS Sprayer

1 Connect the nebulizing gas and the sheath liquid to the CE sprayer.



2 Remove the cover of the ion source. Carefully insert the CE sprayer into the electrospray chamber of the MSD. Do not touch the electrospray chamber with the sprayer tip, because it can damage the sprayer tip easily. Do not hold the sprayer at the adjustment screw while inserting it into the ion source. This can misalign the sprayer.



Installing the CE-ESI-MS Sprayer

3 Mount the ion-source cover included in the Agilent G1607A sprayer kit.



Method to Analyze the Test Sample

The parameters given in this section are typical for the analyzed test sample. However, they might have to be adapted when other samples are analyzed.

Typical settings for the spray chamber parameters are:

Drying gas: 6–10 l/min

Drying gas temperature: 100–300 °C

Nebulizing gas: 10–20 psi

HV (positive mode): 3.5–4 kV

HV (negative mode): 3–3.5 kV

Prior to first use, a new capillary should be properly conditioned. A procedure including a 5 min 1N NaOH flush, followed by a 10 min flush with water and a 20 min flush with run buffer is appropriate for the analysis of the test sample. There is no need to remove the capillary from the system prior to this procedure provided the sheath liquid is running.

Vial table:

1 = 1 N NaOH,

2 = water

5 = run buffer (10 mM ammonium acetate, pH 6.9, 0.04% methanol),

6 = flush buffer (same as run buffer)

7 = 1 test sample (1 mg/ml quinine sulfate dihydrate).

Method to Analyze the Test Sample

The method described here is also stored in the Agilent ChemStation for CE-MS under C:\HPCHEM\1\methods\cems\quinine.m

HIGH PERFORMANCE CAPILLARY ELECTROPHORESIS

CE mode: CE-MS

Home values:

Lift Offset 4
Cassette Temperature 20 °C
Inlet Home Vial 5: buffer
Outlet Home Vial none

Replenishment and Preconditioning:

serial processing

Replenishment Entries:

No Replenishment used

Preconditioning Entries:

1 FLUSH 5.00 min, I:6, O:don't care

Postcondition Entries:

No Postcondition used

Electric:

Electric On
Polarity Positive
Voltage 0.00 kV
Current 50.00 µA
Power System Limit

Low Current Limit 0.00 µA

Injection Table Entries:

1 PRESSURE 50.0 mbar, 2.0 sec, I:InjectVial, O:don't care
2 PRESSURE 50.0 mbar, 2.0 sec, I:InHomeVial, O:don't care

Store Data:

Collect current: Yes

Method to Analyze the Test Sample

Time entries:

Stoptime 10.00 min

Posttime Off

Timetable:

Time [min]	Function	Parameter
------------	----------	-----------

0.3	VOLTAGE	27.00 kV
-----	---------	----------

DIODE ARRAY DETECTOR

settings:

Stop Time no Limit

Post Time Off

Response Time 0.2 sec

Peakwidth >0.01 min

Prerun Autobalance On

Postrun Autobalance Off

Spectrum:

Store All in peak

From 190 nm

To 450 nm

Treshold 2.00 mAU

Signals:

Store Signal,Bw Reference,Bw [nm]

A: Yes 254,16 450,80

Agilent 1100 ISOCRATIC PUMP 1

Control:

Flow 0.400 ml/min

Stoptime No Limit

Posttime Off

Method to Analyze the Test Sample

Solvents:

Solvent A 100.0% (5 mM Ammac pH 6.9 in 50% MeOH)

Pressure Limits:

Minimum Pressure 0 bar

Maximum Pressure 400 bar

Auxiliary:

Maximal Flow Ramp 100.00 ml/min²

Compressibility 75*10⁻⁶/bar

Minimal Stroke 100 µl

MASS SPECTROMETER DETECTOR Agilent G1946B

Use MSD : Enabled

Ionization Mode : API-ES

Tune File: atunes.tun

StopTime: asPump

Time Filter: Enabled

Data Storage: Condensed

Peakwidth: 0.12 min

Scan Speed Override: Disabled

signals:

Signal 1

Polarity: Positive

Method to Analyze the Test Sample

Fragmentor Ramp: Disabled

Scan Parameters:

Time (min)	Mass Range Low High	Fragmentor	Gain EMV	Thres- hold	Step- size
0.00	150.00 350.00	65	3.0		50 0.10

Spray Chamber:

MSZones:

Gas Temp : 130 C maximum 350 C
 DryingGas : 10.0 l/min maximum 13.0 l/min
 Neb Pres : 10 psig maximum 60 psig

VCap : 4000 V

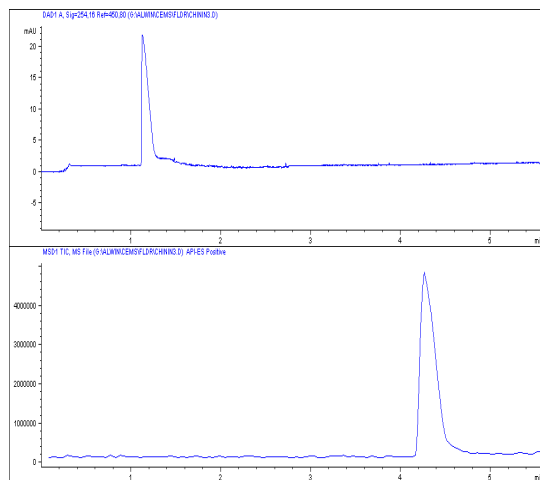
Establish and run a sequence with 5 consequent injections from the vial with the test sample.

Due to the equilibration of the system the first run of the sequence may not be successful and should be discarded. The following runs should result in UV and MS traces similar to those shown in Figure 75.

Method to Analyze the Test Sample

Figure 75

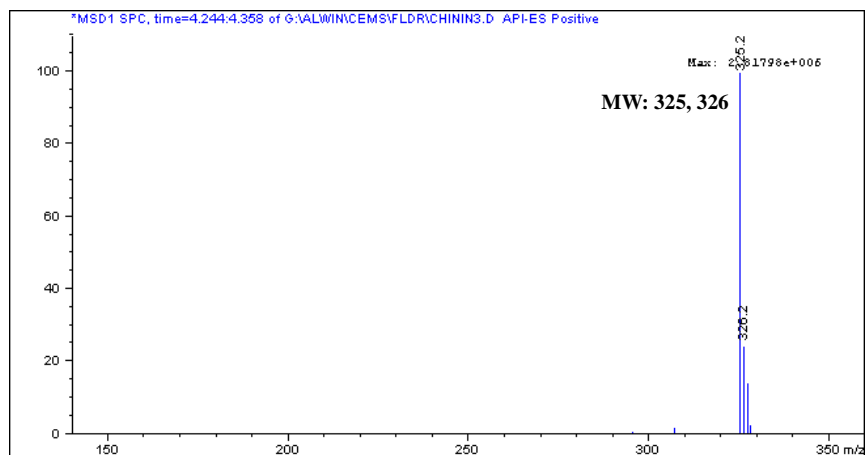
UV and MS Traces



MS spectra taken from the peak in the MS trace should be similar to the one shown in Figure 76. The current should be approximately 4 uA.

Figure 76

MS Spectra



Storing the CE-MS Capillary, the Sheath Flow Splitter and the CE-MSD Sprayer Needle After Usage

To avoid plugging of the capillary, the sheath flow splitter and the CE-MSD sprayer needle need to be cleaned if not in use.

Cleaning of the Sheath Flow Splitter and the CE-MSD Sprayer Needle

- 1** Replace the sheath liquid bottle with a bottle filled with water.
- 2** Leave the CE-MS capillary, the sheath flow splitter and the nebulizing gas connected.
- 3** Prime the pump and flush for 10 minutes pump water through the sheath flow splitter and CE-MSD sprayer needle.
- 4** Replace the water in the sheath liquid bottle with iso-propanol.
- 5** Prime the pump and flush for 10 minutes pump iso-propanol through the sheath flow splitter and CE-MSD sprayer needle.

Storing the CE-MS capillary

- 1** Flush the capillary with water for 10 minutes.
- 2** Insert an empty vial with a cap into the tray and flush the capillary with air for 10 minutes.
- 3** The capillary can now be removed and stored.

Maintenance

In general the CE-MSD sprayer needs little maintenance. But it may happen that from time-to-time or in case of a problem some parts need to be replaced. The parts shown in Table 9 can be exchanged:

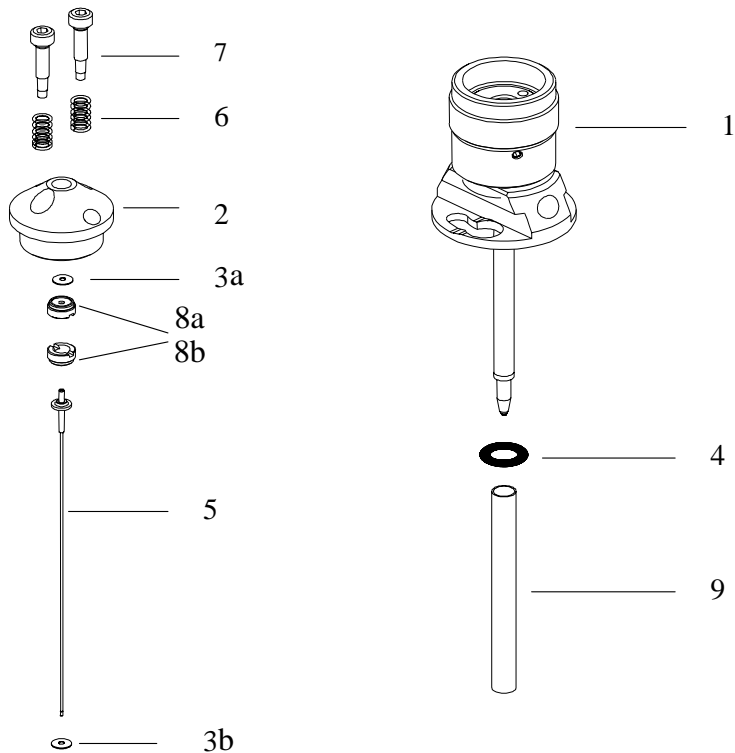
Table 9

Parts for Maintenance or Repair (see Figure 77)

Item Number	Description	Part number
1	Sprayer body	No part number
2	Sprayer head	No part number
3a, 3b	Gasket	G1607-20030
4	O-ring	0905-1022
5	Spray needle	G1607-60041
6	Spring	5022-2140
7	Screw body	G1607-20029
8a, 8b	Seal holding screw	G1607-20022
9	Protection tube for the sprayer	0890-0581
Not shown	PEEK screw capillary and nebulizing gas	0100-1543
Not shown	PEEK ferrule capillary	5022-2141
Not shown	PEEK ferrule nebulizing gas	0100-1544

Figure 77

The G1607A CE-MSD Sprayer



The Agilent G1607A CE-ESI-MS Sprayer needs in general little maintenance. Following parts can be exchanged if necessary.

Replacing the Sprayer Gasket (item 3a, 3b, part number G1607-20030)

A leaky gasket can generate an unstable MSD signal. The gasket can be damaged if the flow rate of the sheath liquid exceeds than 200 $\mu\text{l}/\text{min}$.

A set of gaskets is provided with the Agilent G1607A CE-ESI-MS sprayer kit.

Parts Needed

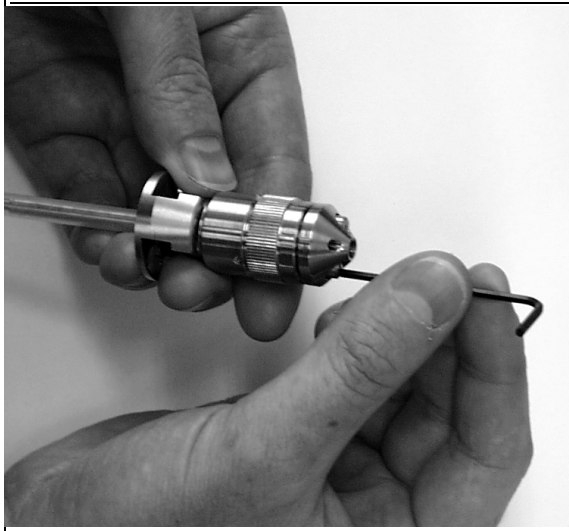
- Hex key 2 mm
- Hex key 1.3 mm
- Gasket (part number G1607-20030)

Maintenance

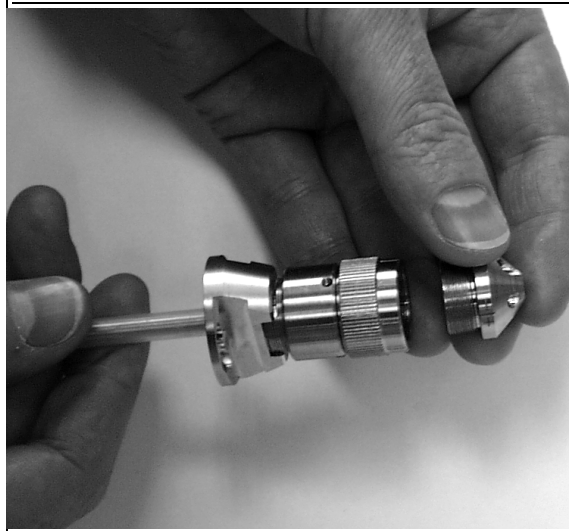
Steps to Exchange the Gasket

- 1 Disconnect the nebulizing gas, the sheath liquid tube and the CE-MS capillary from the sprayer.
- 2 Remove the CE-MS sprayer from the MSD.

3 Open the two body screws (7). Be careful not to lose the attached springs (6).



4 Unscrew the sprayer head (2) from the sprayer body (1).



- 5 Using the special screw driver open the seal holding screw (8a) in the bottom of the sprayer head. Replace the gasket (3a)



- 3 Carefully reassemble the G1607A CE-ESI-MS Sprayer.
- 4 Make the connections and reinstall it into the MSD.
- 5 Use the test sample to verify the proper function.

The Sprayer Needle (item 5, part number G1607-60041)

Periodically check the sprayer tip for erosion under a microscope (use the nebulizer adjustment fixture (part number G1946-20215) and the corresponding pocket microscope (part number G1946-80049) which are part of the accessories kit of the G1946A/B MSD).

You also can examine the sprayer tip by applying a sheath flow of 50 $\mu\text{l}/\text{min}$. At this flow it is possible to see the spray cone. The cone must be symmetrical.

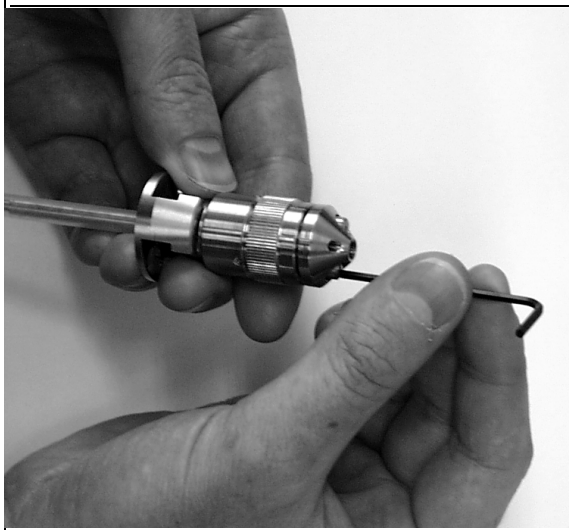
If the tip shows some erosion or the cone isn't symmetrical the sprayer needle (5) needs to be exchanged.

Maintenance

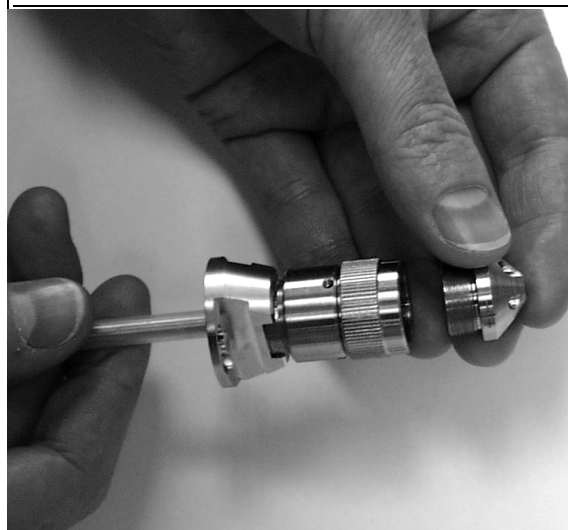
Steps to Exchange the Sprayer Capillary

- 1 Disconnect the nebulizing gas, the sheath liquid tube and the CE-MS capillary from the sprayer.
- 2 Remove the CE-MS sprayer from the MSD.

4 Open the two body screws (7). Be careful not to lose the attached springs (6).



5 Unscrew the sprayer head (2) from the sprayer body (1).

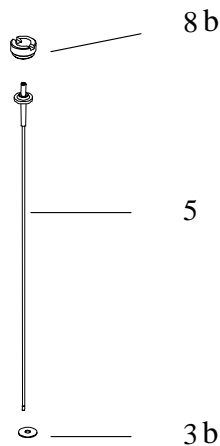


Maintenance

6 Open the seal holding screw (8b) of the sprayer body.



7 Remove the defective sprayer needle (5). Add a new gasket (3b) and carefully insert the new sprayer needle.



- 3** Carefully reassemble the Agilent G1607A CE-ESI-MS Sprayer.
- 4** Check, if the sprayer needle juts out about 0.1–0.2 mm (ca. 1/3 of its diameter) from the sprayer tip. Use the nebulizer adjustment fixture (part number G1946-20215) and the corresponding pocket microscope (part number G1946-80049) which are part of the accessories kit of the Agilent G1946A MSD. If necessary readjust the sprayer needle.
- 5** Make the connections and reinstall it into the MSD.
- 6** Use the test sample to verify the proper function.

NOTE

A new Agilent G1607A CE-ESI-MS Sprayer is already preadjusted. Therefore do not open the hex-key screws on the body part.

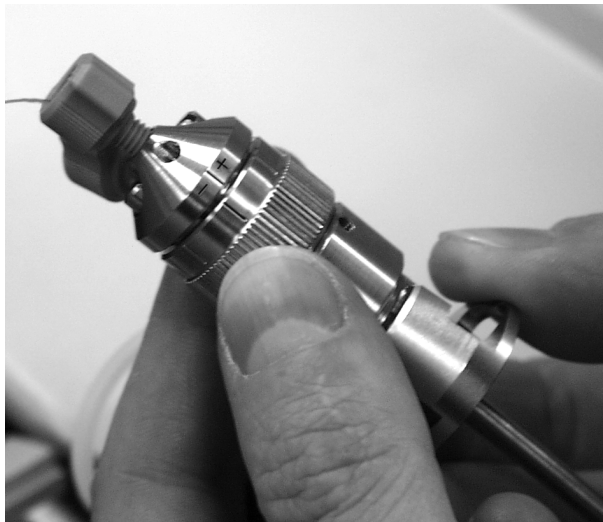
Check, if the sprayer needle protrudes about 0.1–0.2mm ($\sim 1/3 \times d$) from the sprayer tip. Use the nebulizer adjustment fixture (part number G1946-20215) and the corresponding pocket microscope (part number G1946-80049) which are part of the accessories kit of the Agilent G1946A MSD. If necessary readjust the sprayer needle.

Readjusting the Sprayer Needle

A new Agilent G1607A CE-ESI-MS Sprayer is already preadjusted. The sprayer needle should protrude from the sprayer tip about 0.1–0.2mm. This setting gives highest sensitivity and baseline stability. During normal operation there is no need to readjust the sprayer needle. Only readjust the CE-ESI-MS Sprayer if the sprayer needle position differs from the settings above.

Steps to Readjust the Sprayer Needle

- 1** Turn the adjustment screw counterclockwise (+ direction) until its mechanical stop.



Maintenance

- 2 Open the 3 hex-key screws on the lower adjustment ring by 1/2 turn.



- 3 During the following adjustment procedure press sprayer head and body part together to remove backlash (see picture above)
- 4 Turn the lower adjustment ring counterclockwise until the sprayer needle is flat with the sprayer tip.
- 5 Now turn the lower adjustment screw by 1/4 turn clockwise.
- 6 Tighten the 3 hex-key screws on the lower adjustment ring again.

Check that the sprayer needle now protrudes about 0.1–0.2mm ($\sim 1/3 \times d$) from the sprayer tip. This can be done by using the nebulizer adjustment fixture (part number G1946-20215) and the corresponding pocket microscope (part number G1946-80049) which are part of the accessories kit of the Agilent G1946A/B MSD.

If necessary readjust the sprayer needle.

Troubleshooting Matrix

Table 10 Troubleshooting Matrix

What Can Be Seen?	Cause	Solution
Test sample delayed or not shown in the UV signal	Pressure difference between inlet and outlet of the CE-MS capillary	Adjust the level of the inlet and outlet of the CE-MS capillary (e.g. height adjustable table). Check for a slight overpressure due to the parameters of the vent system (e.g. drying gas). If possible remove the overpressure situation otherwise apply 50 mbar during run (Timetable of the CE).
MSD signal not stable	Capillary not well cut	Cut the capillary again. Make sure the cut is flat and the capillary is not shattered at the end.
	Polyimide left at the end	Remove the polyimide by burning it off. Clean that area with iso-propanol.
	Capillary not well adjusted	The capillary should be 0.1 mm (2 marks) protrude of the sprayer capillary, if that is not the case readjust the CE-capillary. See "Inserting and Adjusting the CE Capillary in the CE-ESI-MS Sprayer" on page 157.
	Sprayer tip eroded	Exchange the sprayer tip. See "Steps to Exchange the Sprayer Capillary" on page 173.
	Sprayer capillary gasket is leaking	Replace the sprayer capillary gasket. See "Steps to Exchange the Gasket" on page 171.
	Sheath flow too low	The sheath flow splitter might be plugged. But be aware that 4 µl/min (about 1 droplet/8 minutes) leaving the restriction capillary is not much!. Backflush the different capillaries of the sheath flow splitter or exchange the flow splitter.

What else can you do with the G1603A CE-MS Adapter kit?

Connecting the Agilent CE system to a non Agilent MS

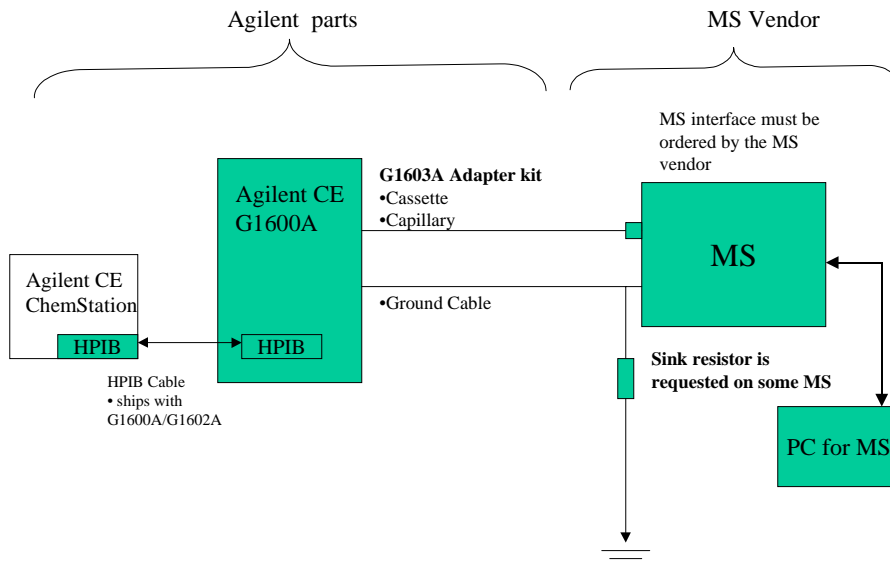
All accessories and documentation needed to interface the Agilent capillary electrophoresis system to a non-Agilent mass spectrometer are the responsibility of the respective vendor and will not be provided by Agilent Technologies.

The ground cable provided in the G1603A CE-MS Adapter kit should be connected between the two instruments to ensure that they both refer to the same ground.

For connection of the Agilent CE to any other MS where the electrospray needle is on high voltage, an additional resistor sink, which is the responsibility of the MS vendor, is required. This is mandatory to prevent the

What else can you do with the G1603A CE-MS Adapter kit?

power supply of the MS from being destroyed by the incoming CE current. In this case the maximum CE current should not exceed 50 μ A.



Connecting the Agilent capillary electrophoresis system to an external detector

The G1603A CE-MS Adapter kit makes it possible to get the capillary out of the instrument. This may be helpful to connect an external detector e.g. fluorescence detector or a laser induced fluorescence detector to the capillary electrophoresis system.

NOTE

Check with the vendor of the external detector to verify what the detector ships with. All accessories and documentation needed to interface the Agilent capillary electrophoresis system to an external detector are the responsibility of the respective vendor and will not be provided by Agilent.

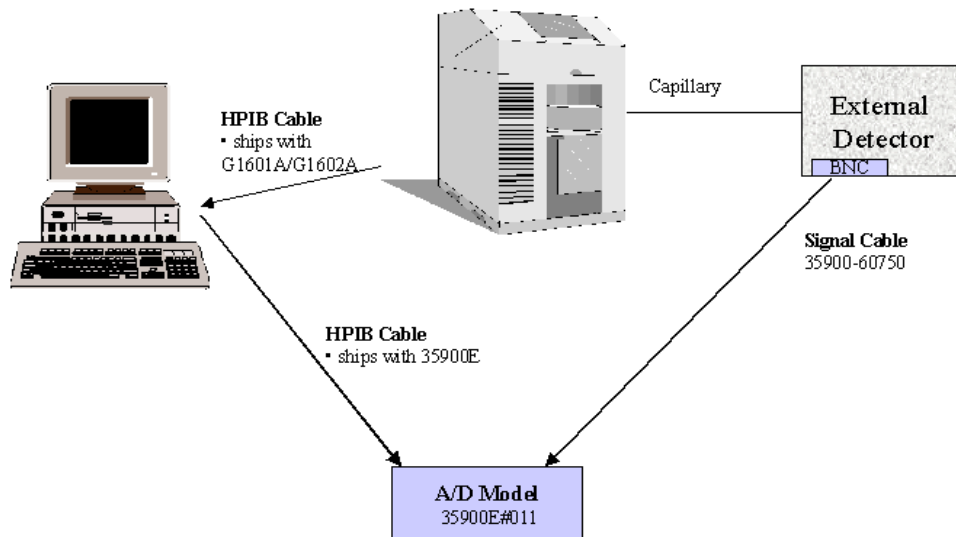
To connect to an external detector you typically need:

What else can you do with the G1603A CE-MS Adapter kit?

- G1603A CE-MS Adapter kit
- A/D Converter 35900E#011 (GPIB)
- Signal Cable 35900-60750
- Remote Cable G1530-60930

Figure 78

AGILENT CE Connected to an External Detector



Maintaining Your Agilent CE Instrument

Standard operating procedures for maintenance
of your Agilent CE instrument

Maintaining Your Agilent CE Instrument

This chapter describes standard operating procedures (SOPs) which should be used to do maintenance on your instrument at regular intervals. Do only maintenance on the Agilent CE instrument specified in this chapter. Other maintenance or repairs must be done by Agilent Technologies trained personnel. Unauthorized maintenance can be dangerous and damages are not covered by warranty.

Quick overview about maintenance

Injection System

- Electrodes
 - do not open top cover or remove cartridge without lowering lifts -> electrodes filled with buffer -> carry over
 - clean frequently (e.g. weekly)
 - inspect for salt deposits, o-ring integrity, bending
- Prepunchers
 - clean frequently (e.g. weekly)
 - inspect for salt deposits, bent tip, deposits in top funnel
- Replace if either electrodes or prepunchers are bent or cannot be cleaned.

Replenishment System

- System cleaning
 - should be performed when new buffer is added to the electrolyte reservoir.
 - Clean with isopropanol/water
 - filter all solutions prior to use (0.2 or 0.45 μm)
- Replenishment Needle
 - keep water-filled vial in carousel position 49
 - inspect for bending if clogged, remove and syringe flush with water/isopropanol or use ultrasonic device
- O-ring in buffer reservoir cap
 - inspect for damage
 - remove salt deposits
- Inlet frit
 - inspect and clean (especially if absorbing buffers have been used)

replace when dirty

- Vial caps

do not overuse them (especially the PEO-caps)

inspect for damage

- Do not use buffer reservoir for long-term storage (prevents oxygen saturation and bacteria growing)

Detection System

- Optical alignment interface

inspect for occlusion under microscope or magnifier (dust or shards of polyimide)

if capillary is broken while in the interface, inspect and remove fragments (ultrasonic device and air burst)

- Lamp

perform DAD test regularly (e.g. weekly) and monitor lamp counts using the red labeled alignment interface without capillary

replace lamp when lamp counts are low and signal to noise increases

- Capillary window

gently clean with isopropanol and lint-free wipe

Cleaning the Electrodes, Prepunchers and Insulation Plate

Objective

Buffer precipitates, dust or other solid material in the electrodes and prepunchers or under the insulation plate can cause arcing or current leakage, buffer contamination or carryover. Cleaning these parts will prevent these from occurring.

Frequency

The electrodes, prepunchers and the insulation plate must be cleaned regularly, about once a week, or if peaks show an unusual tailing or unusual peak shoulders or if arcing or current leakage can be observed or if *creeping* buffers such as urea are used.

What You Will Do

- prepare the Agilent CE instrument for this task,
- remove the detector cover,
- access the electrodes,
- remove the front cover,
- access the prepunchers,
- clean the electrodes,
- clean the prepunchers,
- clean the insulation plate,
- reinstall the prepunchers, and
- reinstall the electrodes.

Instrumentation

- This SOP is applicable to the Agilent CE instrument with firmware revision 1.4 or higher, built-in diode array detector with firmware revision 1.0 or higher.

Cleaning the Electrodes, Prepunchers and Insulation Plate

- Agilent ChemStation for control and data evaluation.
- Check revision numbers: Under INSTRUMENT menu click on Revision & Serial Numbers.

Parts Required

- 12 mm hexagonal socket screwdriver (included in the startup kit).
- Pozidriv screwdriver (included in the startup kit).
- Wash bottle with isopropanol.
- Wash bottle with water.
- Compressed inert gas, oil-free.

WARNING

Follow the common safety regulations for laboratories when doing this task. Wear safety spectacles and rubber gloves. For translations, see page 255.

Preparing the Agilent CE Instrument

Prior to maintenance do the following:

- 1 Select the Detector icon in the CE Diagram screen.
- 2 Select Lamp Off from the menu to switch the lamp off.
- 3 Select Maintenance from the Instrument menu to lower all lifts.
- 4 Select Exit from the File menu to exit the Agilent ChemStation. Exit both the online and offline copy.
- 5 Turn off line power to the Agilent CE instrument.
- 6 Disconnect the line power cord from the Agilent CE instrument.

Removing the Detector Cover

- 1 Open the top cover.
- 2 Remove the capillary cassette.

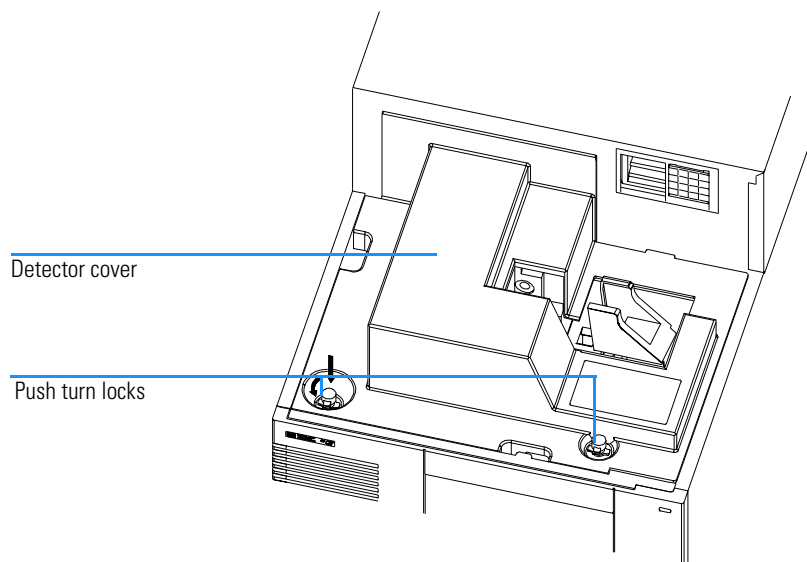
WARNING

Make sure you have disconnected the line power cord of the Agilent CE instrument before you proceed. For translations, see page 255.

- 3 Take off the detector cover by opening the two push turn locks. To open press down and turn them counterclockwise.

Figure 79

Push Turn Locks Securing the Detector Cover

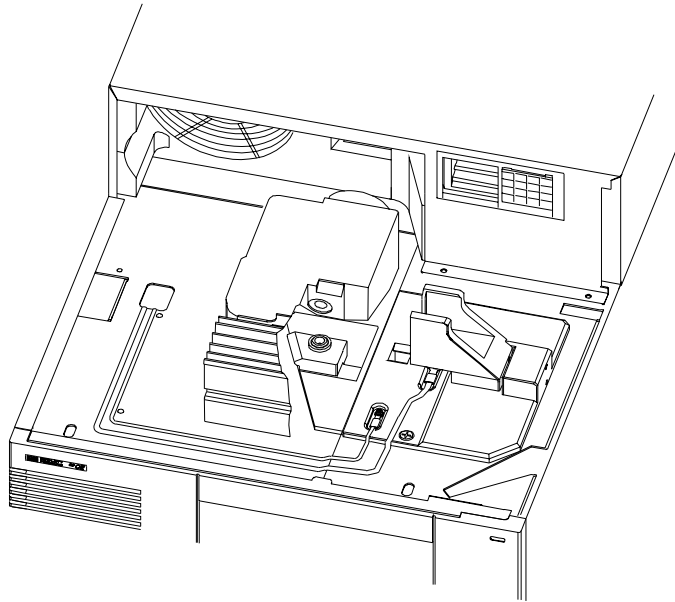


WARNING

If you were using the Agilent CE instrument shortly before, the lamp may be very hot. Avoid touching the lamp or wear protective gloves. For translations, see page 257.

Figure 80

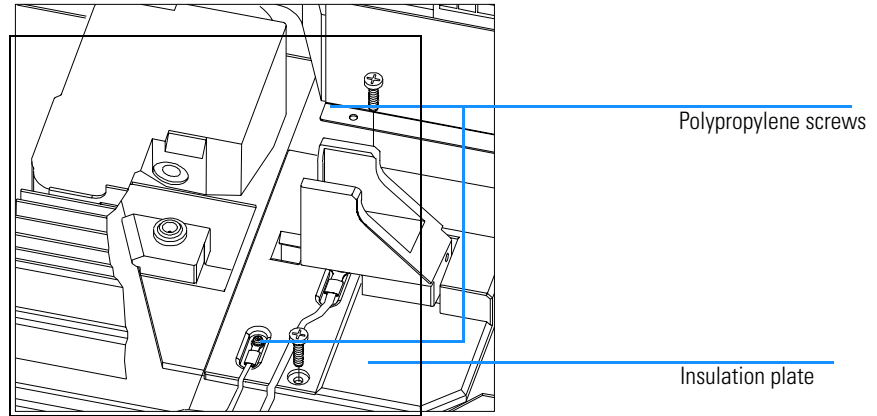
After Removing the Detector Cover



Accessing the Electrodes

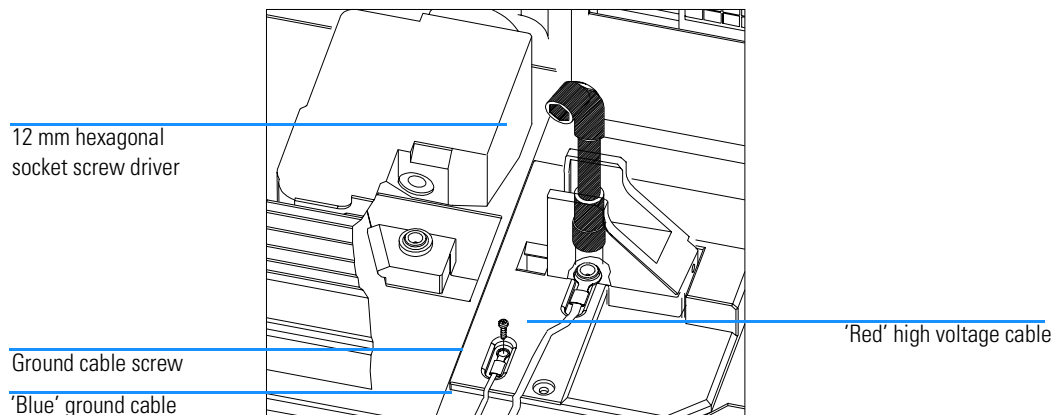
- 1 Use a Pozidriv screwdriver to unscrew the two polypropylene screws which secure the insulation plate.

Figure 81 **Screws Securing the Insulation Plate**



- 2 Use a Pozidriv screwdriver to remove the screw that secures the blue ground cable.

Figure 82 **Removing the Inlet Electrode**

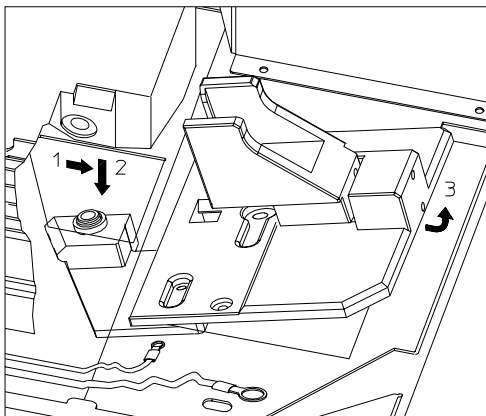


Cleaning the Electrodes, Prepunchers and Insulation Plate

- 3 Use the 12 mm hexagonal socket screwdriver to unscrew the inlet electrode.
- 4 Carefully lift the red high voltage wire. The inlet electrode will come out.
- 5 Slowly slide the insulation plate to the right (1), tilt it up (2 and 3) and take it out. Make sure that the outlet electrode is not touching the foam of the tray cooling or the lift station.

Figure 83

Removing the Insulation Plate



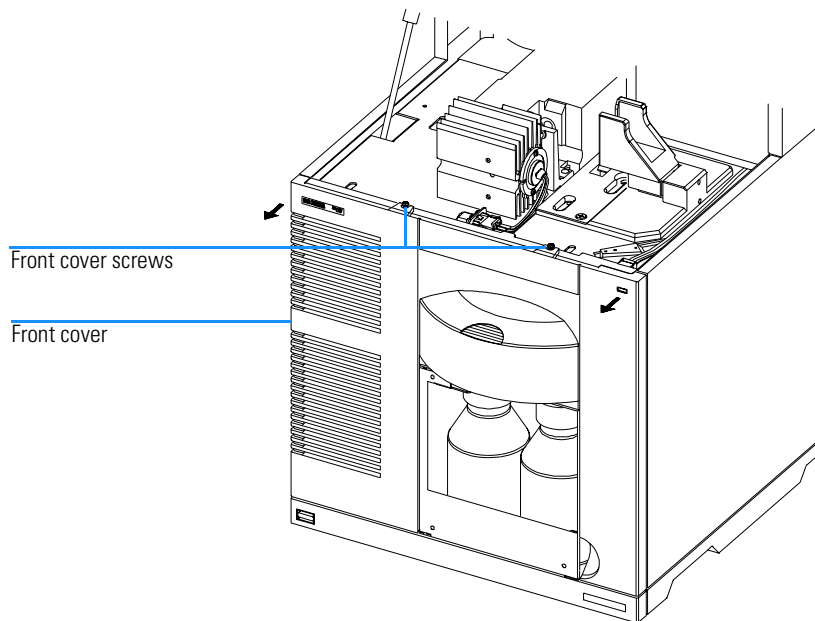
- 6 Remove the outlet electrode from the insulation plate using the 12 mm hexagonal socket screwdriver.

Removing the Front Cover

- 1 Loosen the two screws that secure the front cover. It is not necessary to remove the screws completely.

Figure 84

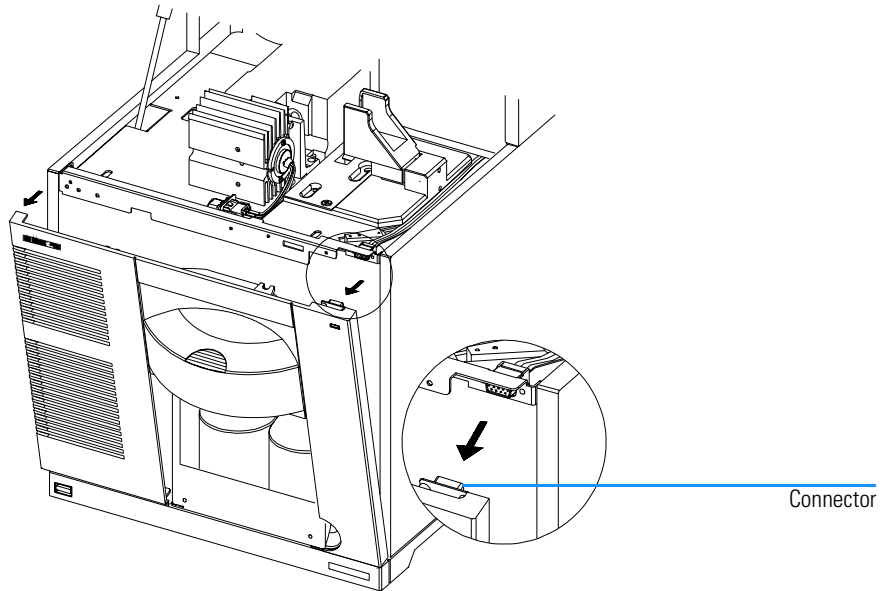
Removing the Front Cover



- 2 Carefully pull the front cover away from the mainframe. Pull steadily at both sides. You need slightly more force to remove the right side due to a connector.

Figure 85

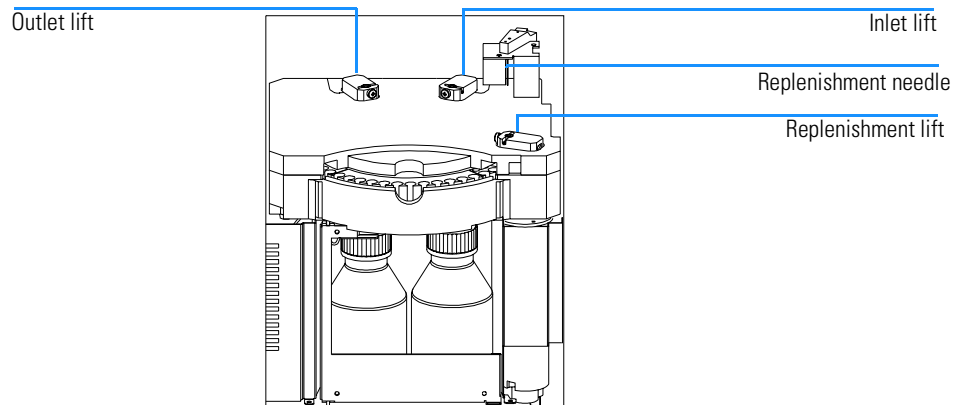
Connector



Accessing and removing the Prepunchers

- 1 Inlet and outlet lifts are located behind the sample tray. The replenishment lift is located at the right side under the replenishment needle.

Figure 86



CAUTION

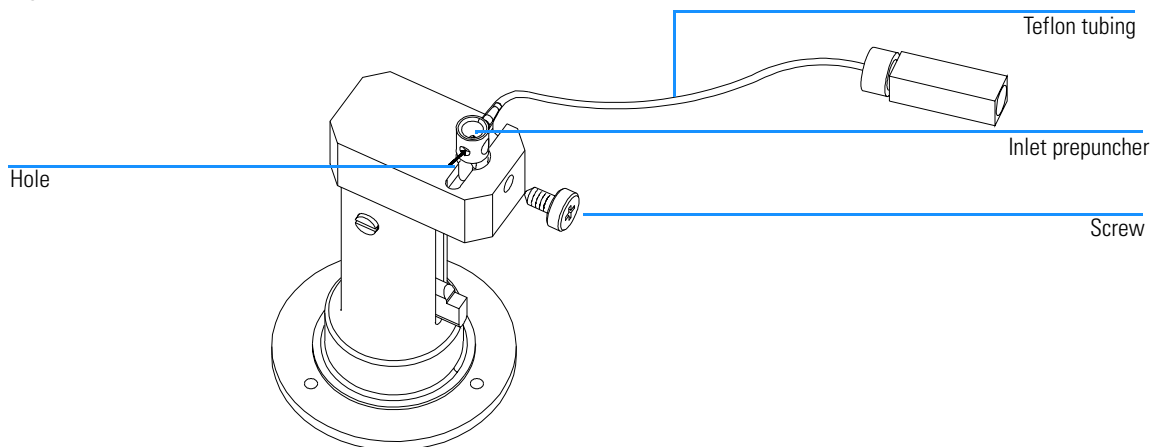
Do not touch or bend the replenishment needle. For translations, see page 258.

WARNING

The prepunchers have very sharp tips. Be careful when touching them. For translations, see page 259.

- 2 Remove the plastic screw which secures the inlet prepuncher using a Pozidriv screwdriver.

Figure 87



- 3 Unscrew the teflon inlet prepuncher tubing which is labeled 7.
- 4 The prepuncher has a hole which can be used to gently lever it out using a paper clip. Carefully pull the prepuncher out of the lift.

CAUTION

Do not damage the funnel surface of the prepuncher or the teflon air pressure tube connection. For translations, see page 260.

- 5 Unscrew the teflon outlet prepuncher tubing labelled 8. Carefully pull the prepuncher out of the lift.

NOTE

For cleaning it is NOT necessary to remove the teflon tube from the prepunchers.

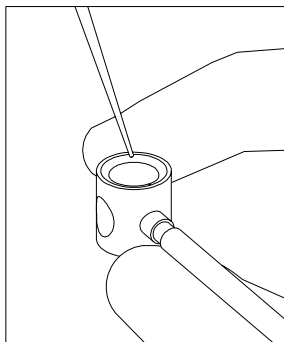
- 6 Remove the prepuncher from replenishment lift.

Cleaning the prepuncher

Check for damaged tips before cleaning the prepunchers. If the tips are damaged replace the prepunchers.

- 1 Flush the prepunchers with water. Watch for salt crystals. All salt crystals must be removed. Take particular care with the teflon tube connector.

Figure 88



- 2 Flush the prepunchers with isopropanol.
- 3 Use compressed air to dry the prepunchers and remove all traces of liquid. Do not forget to dry the connected tubes as well.

If dirt is still accumulated in the prepuncher funnel, put the prepuncher with connecting tubing in a beaker with water and place it in an ultrasonic bath for five minutes followed by steps 2 and 3 of this section.

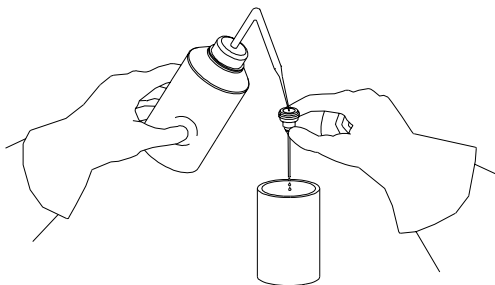
CAUTION

To avoid contamination the prepunchers and connected tubes must be completely dry before reinstallation. For translations, see page 261.

Cleaning the Electrodes

- 1 Flush the electrodes with water. Watch for salt crystals. All salt crystals must be removed.

Figure 89



- 2 Flush the electrodes with isopropanol.
- 3 Use compressed air to dry the electrodes and remove all traces of liquid.

CAUTION

To avoid contamination, the inside of the electrodes must be completely dry before reinstallation. For translations, see page 262.

If there is still an accumulation of dirt in the upper funnel start the cleaning procedure again or place it in a beaker of iso-propanol and place this in an ultrasonic bath for five minutes followed by steps 2 and 3 of this section. If this fails then replace the electrode.

Cleaning the Insulation Plate

- 1 Moisten a tissue with water and use it to clean the insulation plate.
- 2 Moisten a tissue with isopropanol and use it to clean the insulation plate.
- 3 Dry the insulation plate with tissue and compressed air.

The insulation plate can also be cleaned in a dishwasher at a maximum temperature of 60 °C.

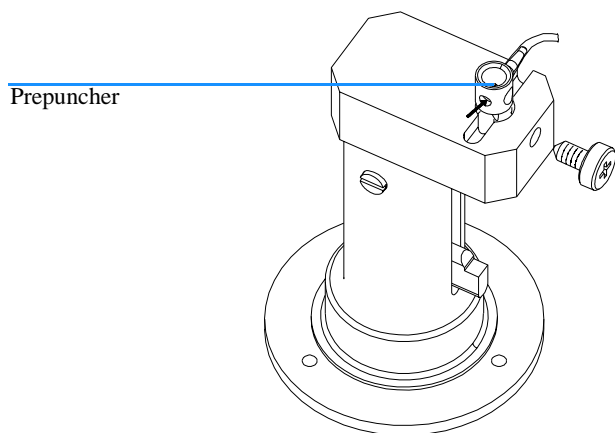
Cleaning the Electrodes

To avoid arcing the insulation plate must be completely dry before reinstallation.

Reinstalling the Prepunchers

- 1 Carefully insert the prepuncher labeled 8 into the outlet lift. Connect the tube to its connector (labeled 8).

Figure 90



The fitting of the outlet prepuncher must be tight. Otherwise problems during CEC mode may occur.

- 2 Carefully insert and tighten the plastic screw to secure the prepuncher. The prepuncher will assume its correct position as the screw is tightened.
- 3 Carefully connect the inlet prepuncher with the air pressure tube (labeled 7) connected into the inlet lift. Connect the tube to its connector (labeled 7).

The fitting of the inlet prepuncher must be tight. Otherwise pressure or injection problems may result.

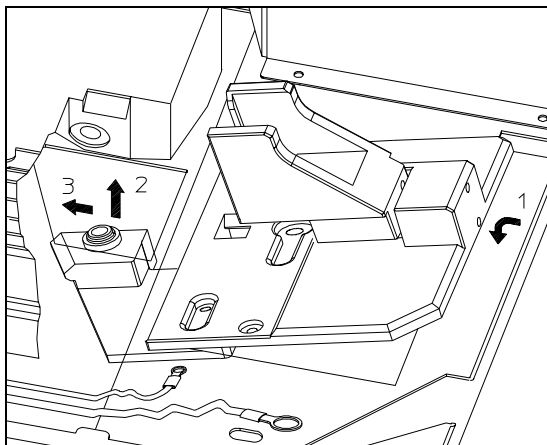
- 4 Carefully insert and tighten the plastic screw to secure the prepuncher. The prepuncher will assume its correct position as the screw is tightened.

Reinstalling the Electrodes and the Insulation Plate

- 1** Reinstall one electrode into the outlet electrode position of the insulation . plate.
- 2** Thread the electrode into place by hand . first.
- 3** Tighten the electrode with the 12 mm hexagonal socket screw driver. Do not overtighten. Do not bend the . electrodes.
- 4** Holding the insulation plate by the cassette holder, slide the base plate under the detector (1) then tilt it up into place (2) and push it completely to the left (3).

Figure 91

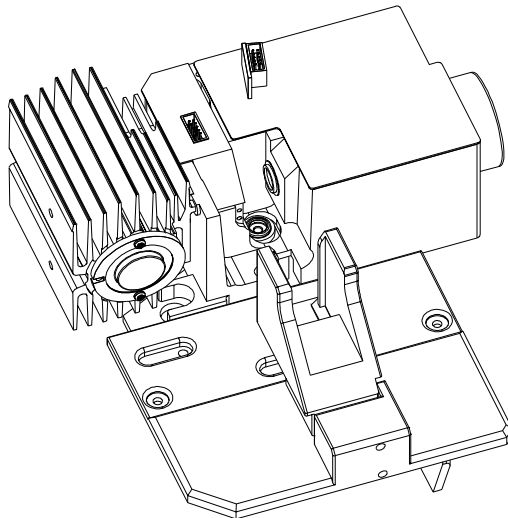
Installation of the Base Plate



- 5** The insulation base plate should be laying flat in position. The outlet electrode should be positioned correctly under the detector.

Figure 92

Alignment to the Detector



- 6** Secure the base plate by reinstalling the two plastic screws.
- 7** Reconnect the blue ground wire and fasten the screw.
- 8** Insert the inlet electrode into the ring connector of the red high voltage wire. Thread the inlet electrode (and the ring connector) into the base plate by hand then tighten the inlet electrode with the 12 mm hexagonal socket screwdriver. Do not overtighten.
- 9** Reinstall the front cover and fasten the two screws.
- 10** Reinstall the detector cover and fasten the two push turn locks by pushing down and turning them clockwise.
- 11** Reinstall the capillary cassette.
- 12** Close the top cover.
- 13** Connect the power cord and turn on line power to the Agilent CE instrument.
- 14** Start your computer and Agilent ChemStation.

Cleaning the Detection Window and the Alignment Interface

The following procedures describes how to clean the detection window of the capillary and the slit of the alignment interface. An occluded interface may result in increased noise or instrument error.

Frequency

As necessary, especially if the signal-to-noise ratio isn't within specification or if the slit of the alignment interface is contaminated (e.g. a capillary was broken or polyimide fragments or dust deposits).

Instrumentation

- This SOP is applicable for the Agilent CE instrument with firmware revision 1.4 or higher, built-in diode array detector with firmware revision 1.0 or higher.
- Agilent ChemStation for control and data evaluation.
- Check revision numbers: Click on Serial Numbers in Instrument menu.

Parts/Material Required

- Cotton swab or a soft tissue.
- Isopropanol.
- Capillary insertion tool.
- Compressed inert gas, oil-free.
- Ultrasonic bath.
- 100 ml beaker.
- Safety glasses.

What You Will Do

- remove the capillary cassette,

Cleaning the Detection Window and the Alignment Interface

- remove the capillary from the cassette,
- remove the alignment interface from the capillary,
- clean the detection window, and
- clean the alignment interface.

Removing the Capillary Cassette

- 1 Select Change Cassette from the CE Diagram.
- 2 Open the top cover.
- 3 Remove the cassette from the Agilent CE instrument.

Removing the Capillary from the Cassette

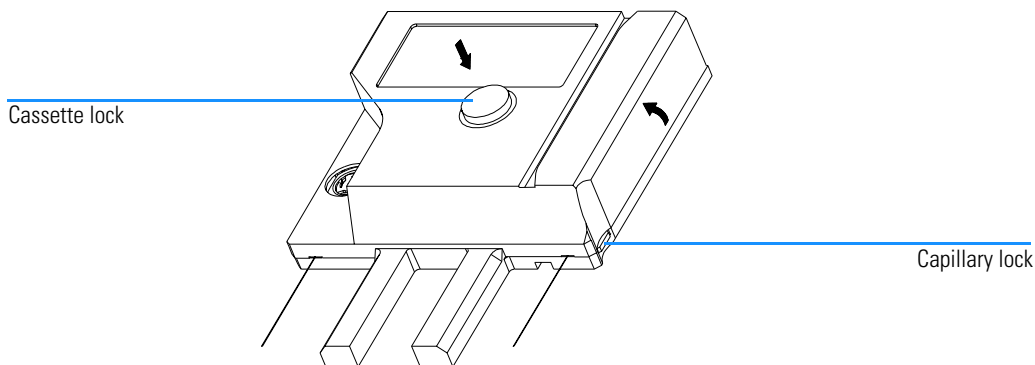
WARNING

Wear safety glasses when opening the cassette and handling the capillary to protect your eyes. For translations, see page 263.

- 1 Open the capillary cassette by pushing the cassette lock.

Figure 93

Removing the Capillary from the Cassette



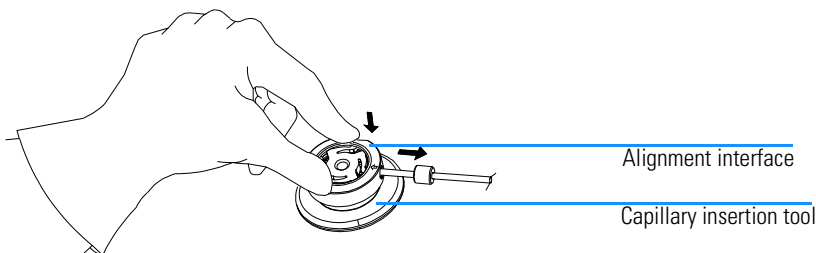
- 2 Carefully remove the capillary by pushing the white capillary lock.
- 3 Remove the alignment interface.

Removing the Alignment Interface from the Capillary

- 1** Put the insertion tool on a flat surface. You can also use the tool integrated into the capillary cassette.
- 2** Put the alignment interface on the insertion tool and press down firmly. Press only on the outer ring to release the black plastic spring.
- 3** Hold the capillary at the colored stopper. Pull the capillary out of the alignment interface.

Figure 94

Removing the Alignment Interface



Do not release the alignment interface while the capillary is moving. The capillary may break.

Cleaning the Detection Window

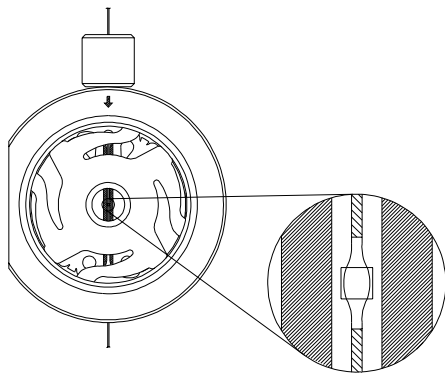
- 1** Dip a cotton swab or a soft tissue into isopropanol and wipe the detection window of the capillary carefully.

Cleaning the Alignment Interface

- 1** Put the alignment interface into the beaker filled with isopropanol. Place the beaker in an ultrasonic bath for 5 minutes.
- 2** Use compressed inert gas to dry the alignment interface.
The gas should have a maximum pressure of two bar. Make sure it is free of oil residues.
- 3** View slit interface under a microscope or magnifier to verify cleanliness.

Figure 95

Detection Interface and Alignment of Extended Light Path



Reinstalling the Capillary

Install the capillary as described in “Installing the Capillary in the Alignment Interface”.

Preparing/Cleaning the Replenishment System

Objective

The Replenishment System is used to automatically empty and refill vials with buffer. This is used to prevent changes in the composition of the buffer during multiple analyses. Preventive maintenance is required to keep the system functioning properly.

Frequency

The replenishment system (bottles and tubing) should be cleaned when:

- using it for the first time,
- changing the buffer, or
- the replenishment system will be idle for some time.

Instrumentation

- This SOP is applicable for the Agilent CE instrument with firmware revision 1.4 or higher, built-in diode array detector with firmware revision 1.0 or higher.
- Agilent ChemStation for control and data evaluation.
- Check revision numbers: Click on Serial Numbers in the Instrument menu.

Parts required

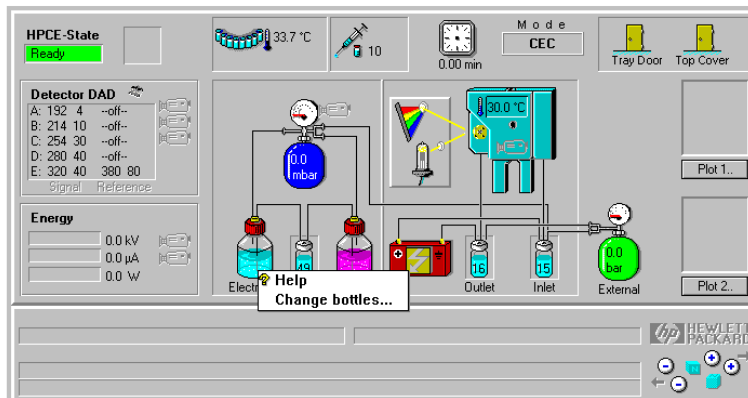
- Vials and caps:
 - Plastic vials, part number 5182-0567
 - Vial caps, part number 5181-1507
 - Vials are part of the Agilent CE test kit G1600-68703.
- Replenishment bottles.
- Water and/or buffer and isopropanol (depending on the protocol selected).

Preparing the Replenishment System for Initial Use

- 1 Click on one of the replenishment bottles in the CE diagram.
- 2 Choose Change Bottles to release the pressure before you open the bottles.

Figure 96

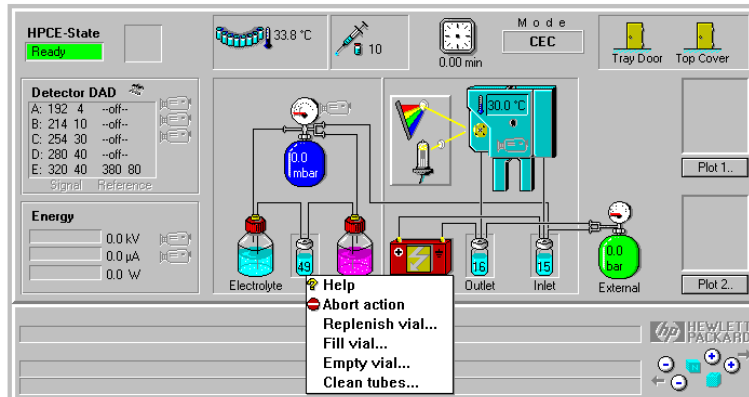
CE-Diagram—Change Bottles



- 3 Open the transparent door at the bottom of the front panel.
- 4 Take out the electrolyte bottle and unscrew the cap. The electrolyte bottle has a frit and tubing inside. The frit should not get dirty.
- 5 Fill 200 ml of the water in the electrolyte bottle. Make sure the water is filtered by using a 0.45 µm filter.
- 6 Make sure the waste bottle is empty.
- 7 Cap the bottles tightly.
- 8 Choose *Done* in the Change Bottles Dialog box. Wait until the pressure has built up again, i.e. the instrument reaches the Ready state.
- 9 Put a capped empty vial into tray position number 46.
- 10 Click on the vial between the electrolyte and waste bottle in the CE diagram.
- 11 Choose Clean Tubes to flush the tubing which is involved in the replenishment function.

Figure 97

CE Diagram—Clean Tubes



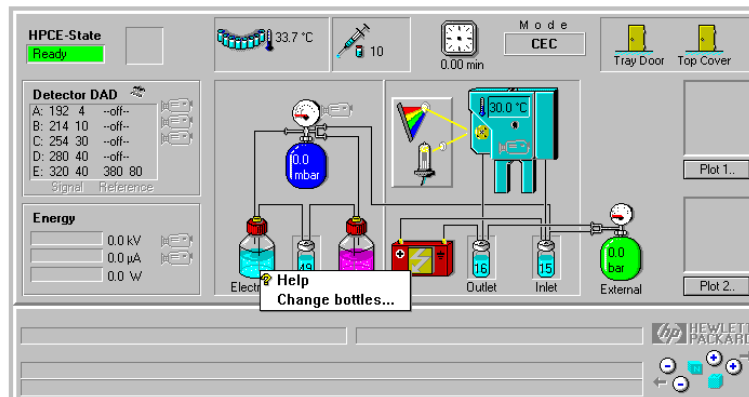
- 12 Enter the vial number of the empty vial when prompted and set a flushing time of 2 minutes.
- 13 Start the program.

Changing the Buffer Composition

- 1 Click on one of the replenishment bottles in the CE diagram.
- 2 Choose Change Bottles to release the pressure before you open the bottles.

Figure 98

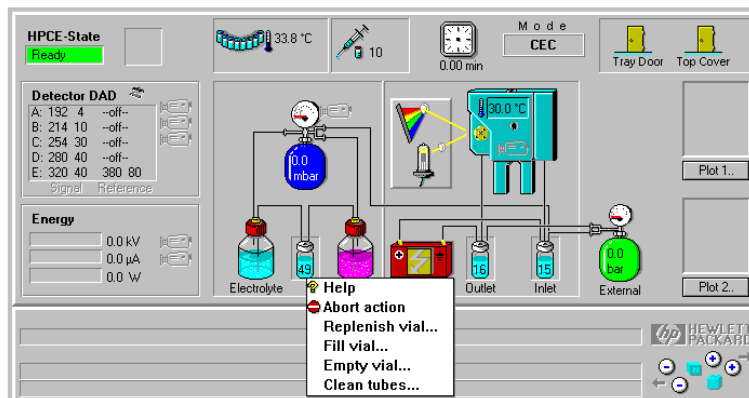
CE Diagram—Change Bottles



- 3 Open the transparent door at the bottom of the front panel.
- 4 Take out the electrolyte bottle and unscrew the cap. The electrolyte bottle has a frit and tubing inside. The frit should not get dirty.
- 5 Fill minimum 200 ml of buffer in the electrolyte bottle. Make sure the buffer is filtered by using a 0.45 µm filter.
- 6 Make sure the waste bottle is empty.
- 7 Cap the bottles tightly.
- 8 Choose Done in the Change Bottles Dialog box. Wait until the pressure has built up again, i.e. the instrument reaches the Ready state.
- 9 Put a capped empty vial into a tray position number 46.
- 10 Click on the vial between the electrolyte and waste bottle in the CE diagram.
- 11 Choose Clean Tubes to flush the tubing which is involved in the replenishment function.

Figure 99

CE Diagram—Clean Tubes



- 12 Enter the vial number of the empty vial when prompted and set a flushing time of 0.5 minutes.
- 13 Start the program.

The involved volume of the replenishment system is about 5 ml. A 10-time flush is sufficient. The flush time depends strongly on the viscosity of your buffer. Therefore choose a short time and repeat Clean Tubes if necessary, otherwise it may happen that the buffer is flushed completely into the waste bottle.

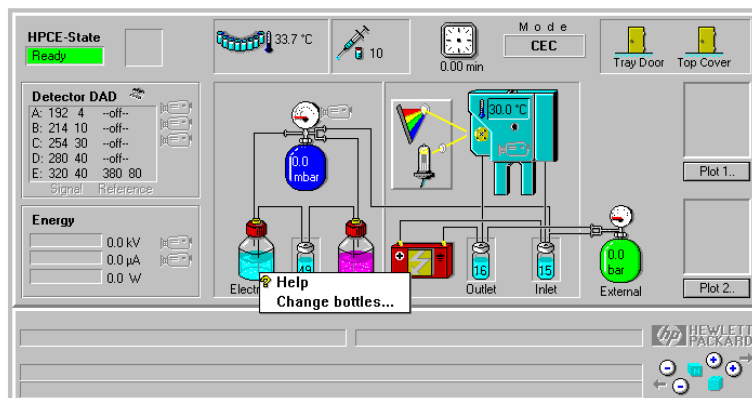
The Replenishment System will not be used some time

The replenishment system should be flushed first with water and then with isopropanol.

- 1 Click on one of the replenishment bottles in the CE diagram.
- 2 Choose Change Bottles to release the pressure before you open the bottles.

Figure 100

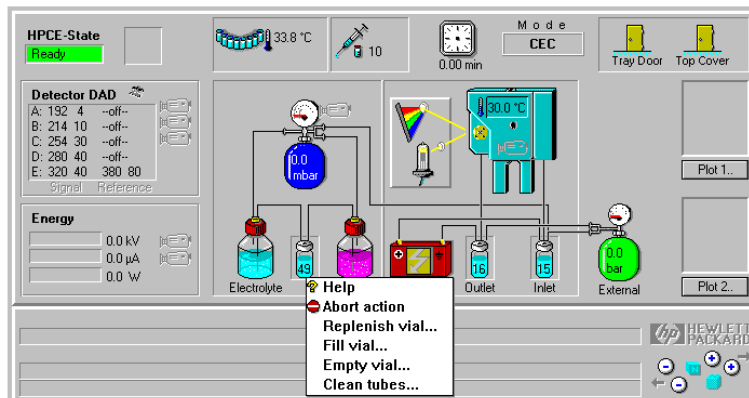
CE Diagram—Change Bottles



- 3 Open the transparent door at the bottom of the front panel.
- 4 Take out the electrolyte bottle and unscrew the cap. The electrolyte bottle has a frit and tubing inside. The frit should not get dirty.
- 5 Fill 200 ml of the water in the electrolyte bottle. Make sure the water is filtered by using a 0.45 μm filter.
- 6 Make sure the waste bottle is empty.
- 7 Cap the bottles tightly.
- 8 Choose Done in the Change Bottles Dialog box. Wait until the pressure has built up again, i.e. the instrument reaches the Ready state.
- 9 Put a capped empty vial into a tray position number 46.
- 10 Click on the vial between the electrolyte and waste bottle in the CE diagram.
- 11 Choose Clean Tubes to flush the tubing which is involved in the replenishment function.

Figure 101

CE Diagram—Clean Tubes



- 12 Enter the vial number of the empty vial when prompted and insert a flushing time of 2 minutes.
- 13 Start the program.
- 14 Repeat the action by using isopropanol instead of water. Empty the waste bottle whenever you fill or refill the electrolyte bottle.

Acceptance

- The air pressure and vacuum must come up without showing an Error message.
- The vial in position 46 must appear in the replenishment lift.
- The pressure inside the electrolyte bottle must be reduced to approximately 400 mbars.
- Liquid inside the electrolyte bottle must be flushed to the waste bottle (volume depends on the procedure you choose).
- Vial 46 must be filled with the liquid of the electrolyte bottle and emptied afterwards without any Error message.

Further Action

If the instrument can't build-up pressure or vacuum, check the following:

- proper seal of the electrolyte bottle, and
- proper seal of the waste bottle
- tight fittings

If none of these reasons apply, call Agilent Technologies.

Maintaining the Functionality

This section describes how to exchange parts which may alter during the operation, such as the air inlet filter and the detector lamp.

Changing the Air Inlet Filter

Objective

The following procedure is used to replace the air inlet filter. The installed air pump uses air from the environment (through this filter) to create pressure inside the electrolyte bottle. The compressed air is needed to flush a capillary and to inject the sample.

Frequency

Air filter replacement should be considered if the environment is very dusty or if the system can't generate enough pressure (a typical Error message is: ER 5207: Airpump failed to generate pressure). We suggest you should change the air filter at least every three months.

Material Needed

- Pozidriv screwdriver (part of the accessory kit)
- air filter (a spare filter is supplied with the standard accessory kit)

Accessing the Air Filter

The air filter is located inside the electrolyte and waste bottle compartment. Therefore it is very easy to replace the air filter frequently.

If the instrument can't build-up either pressure or vacuum, check the following:

- proper seal of the pressure bottle,
- proper seal of the vacuum bottle, and
- loose fittings on the bottles

If none of these reasons apply, call Agilent Technologies.

Changing the Lamp

Objective

The following procedure is used to replace the lamp. Loss of light intensity over time increases baseline noise.

Frequency

Exchange of the lamp should be considered if a drastic increase of the noise level is encountered which is not caused by any other reason (for example a contaminated slit, something absorbing inside the capillary, etc.) or the lamp refuses to ignite. Generally the light intensity drops 50 % (measured at 230 nm) of its original value after approximately 700 hours of operation. We suggest you check the lamp intensity before you change the lamp to be sure the noise increase is not due to other reasons (air bubbles inside the capillary, alignment interface or detection window contaminated).

It may happen that a *hot* lamp refuses to ignite at the first attempt. Please wait until the lamp has cooled down.

Material Needed

- Pozidriv screwdriver (part of the accessory kit).
- Deuterium lamp for Agilent CE instrument.

Removing the Existing Lamp

- 1 Select Exit from the File menu to exit the Agilent ChemStation. Exit both online and offline copy.
- 2 Turn off the line power to the Agilent CE instrument.

WARNING

If the lamp is still on after you removed the detector cover the UV radiation can be harmful to your eyes. For translations, see page 264.

- 3 Open the top cover.
- 4 Open the push turn locks fastening the detector cover by pushing them down and turning them counterclockwise.

Changing the Lamp

- 5 Remove the detector cover.
- 6 Disconnect the lamp cable connector. Pull at the connector, not at the cable.

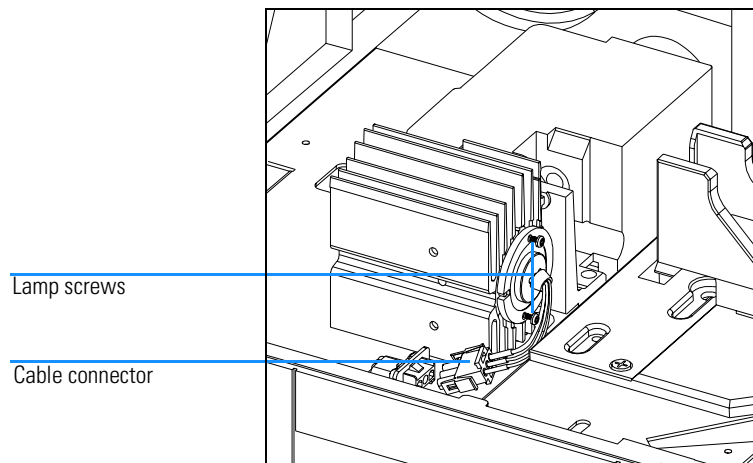
WARNING

If you were using the Agilent CE instrument shortly before, the lamp may be very hot. For translations, see page 265.

- 7 Loosen the two lamp screws using the #1 Pozidriv screwdriver.

Figure 102

Position of Cable Connector and Lamp Screws



- 8 Remove the used lamp.

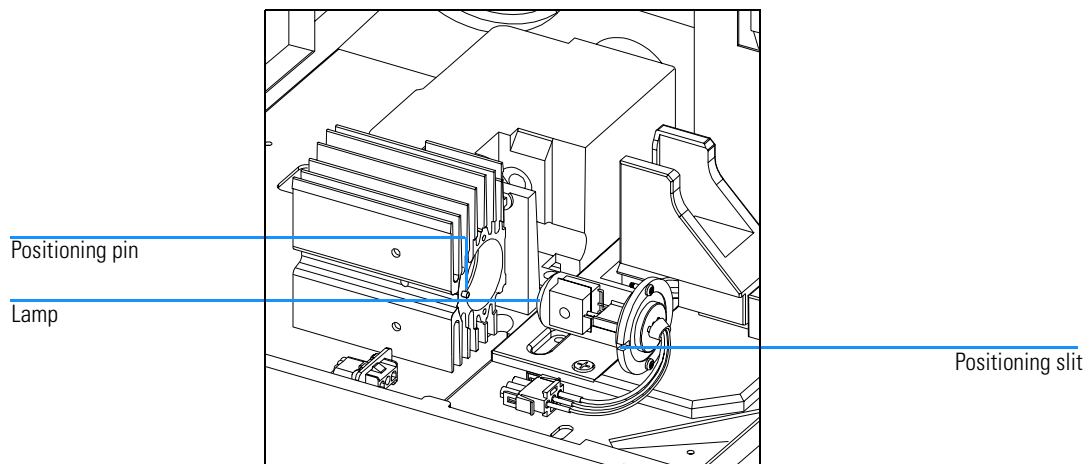
Changing the Lamp

Inserting the New Lamp

- 1 Hold the new lamp at the metal ring to avoid touching the glass surface. Fingerprints absorb light and can reduce light intensity.
- 2 Insert the lamp into the lamp compartment. Position the lamp such that the notch in the lamp ring matches with the pin on the detector housing.

Figure 103

Inserting the Lamp



- 3 Tighten the two lamp screws.
- 4 Connect the lamp cable connector.
- 5 Reinstall the detector cover and close the push turn locks. Close the top cover.
- 6 Turn line power on.
- 7 Boot the Agilent ChemStation.
- 8 Do an Initialization in the Instrument menu. The lamp will be automatically switched on. Allow the lamp about 1 hour to warm up.
- 9 Select More DAD from the Instrument menu and reset the lamp life counter.

Acceptance

Check sensitivity, noise and drift of the detector.

Further Action

If the instrument fails this test, check the following:

- correct seating of the lamp,
- correct seating of the cassette, and
- if the red alignment interface without capillary is used, check for contamination of the interface.

If none of these reasons apply, call Agilent Technologies.

Practical Considerations

- Capillary
 - one capillary per method
 - re-cut end if broken or replace it
 - keep detection window clean as well as the alignment interface
 - storage: flush with water and air (if possible)
 - when in doubt, throw it out
- Sample
 - remove particles (filter, centrifuge)
 - thermostate carousel if temperature sensitive or small volume
 - let the temperature stabilize when taking the sample from the refrigerator -> reproducibility problems
 - use clean and dust-free vials at all time
- Buffers
 - do not overuse (e.g. use replenishment) -> migration time drift or spurious peaks
 - try to use buffers not just electrolytes -> migration time drift
 - use CE quality water (18 Mohm and organics removed)
 - use highest quality buffer components available
 - remove particles with 0.2 um or 0.45 um filter
 - use clean and dust-free vials at all time
 - use good, calibrated pH meter or purchase pre-made buffers
 - prepare fresh buffer often -> phosphate and organic buffers susceptible to microbial growth
 - let the temperature stabilize when taking the buffer from the refrigerator -> reproducibility problems

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Warranty Statements

All Analytical Products

Agilent Technologies (Agilent) warrants its chemical analysis products against defects in materials and workmanship. For details of the warranty period in your country, call Agilent. During the warranty period, Agilent will, at its option, repair or replace products which prove to be defective. Products that are installed by Agilent are warranted from the installation date, all others from the ship date.

If Buyer schedules or delays installation more than 30 days after delivery, then warranty period starts on 31st day from date of shipment (60 and 61 days, respectively for products shipped internationally).

Agilent warrants that its software and firmware designed by Agilent for use with a CPU will execute its programming instructions when properly installed on that CPU. Agilent does not warrant that the operation of the CPU, or software, or firmware will be uninterrupted or error-free.

Limitation of Warranty

On-site warranty services are provided at the initial installation point. Installation and on-site warranty services are available only in Agilent service travel areas, and only in the country of initial purchase unless Buyer pays Agilent international prices for the product and services. Warranties requiring return to Agilent are not limited to the country of purchase.

For installation and warranty services outside of Agilent's service travel area, Agilent will provide a quotation for the applicable additional services.

If products eligible for installation and on-site warranty services are moved from the initial installation point, the warranty will remain in effect only if the customer purchases additional inspection or installation services, at the new site.

The foregoing warranty shall not apply to defects resulting from:

- 1 Improper or inadequate maintenance, adjustment, calibration or operation by Buyer;
- 2 Buyer-supplied software, hardware, interfacing or consumables;
- 3 Unauthorized modification or misuse;

Warranty Statements

- 4 Operation outside of the environmental and electrical specifications for the product;
- 5 Improper site preparation and maintenance; or
- 6 Customer induced contamination or leaks.

THE WARRANTY SET FORTH IS EXCLUSIVE AND NO OTHER WARRANTY, WHETHER WRITTEN OR ORAL, IS EXPRESSED OR IMPLIED. AGILENT SPECIFICALLY DISCLAIMS THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

Limitation of Remedies and Liability

THE REMEDIES PROVIDED HEREIN ARE BUYER'S SOLE AND EXCLUSIVE REMEDIES. IN NO EVENT SHALL AGILENT BE LIABLE FOR DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES (INCLUDING LOSS OF PROFITS) WHETHER BASED ON CONTRACT, TORT OR ANY OTHER LEGAL THEORY.

Responsibilities of the Customer

The customer shall provide:

- 1 Access to the products during the specified periods of coverage to perform maintenance.
- 2 Adequate working space around the products for servicing by Agilent Technologies personnel.
- 3 Access to and use of all information and facilities determined necessary by Agilent Technologies to service and/or maintain the products. (Insofar as these items may contain proprietary or classified information, the customer shall assume full responsibility for safeguarding and protection from wrongful use.)
- 4 Routine operator maintenance and cleaning as specified in the Agilent Technologies operating and service manuals.
- 5 Consumables such as paper, disks, magnetic tapes, ribbons, inks, pens, gases, solvents, columns, syringes, lamps, septa, needles, filters, frits, fuses, seals, detector flow cell windows, etc.

Safety Information

The following general safety precautions must be observed during all phases of operation, service, and repair of this instrument. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the instrument. Agilent Technologies Company assumes no liability for the customer's failure to comply with these requirements.

General

This is a Safety Class I instrument (provided with terminal for protective earthing) and has been manufactured and tested according to international safety standards.

Operation

Before applying power, comply with the installation section. Additionally the following must be observed:

Do not remove instrument covers when operating. Before the instrument is switched on, all protective earth terminals, extension cords, auto-transformers, and devices connected to it must be connected to a protective earth via a ground socket. Any interruption of the protective earth grounding will cause a potential shock hazard that could result in serious personal injury. Whenever it is likely that the protection has been impaired, the instrument must be made inoperative and be secured against any intended operation.

Make sure that only fuses with the required rated current and of the specified type (normal blow, time delay, etc.) are used for replacement. The use of repaired fuses and the short-circuiting of fuse holders must be avoided.

Some adjustments described in the manual, are made with power supplied to the instrument, and protective covers removed. Energy available at many points may, if contacted, result in personal injury.

Do not operate the instrument in the presence of flammable gases or fumes. Operation of any electrical instrument in such an environment constitutes a definite safety hazard.

Safety Information

Do not install substitute parts or make any unauthorized modification to the instrument.




Capacitors inside the instrument may still be charged, even though the instrument has been disconnected from its source of supply. Dangerous voltages, capable of causing serious personal injury, are present in this instrument. Use extreme caution when handling, testing and adjusting.

Safety Symbols

Table 11 shows safety symbols that are used on the instrument and throughout the documentation.

Table 11

Safety Symbols

Symbol	Description
	The apparatus is marked with this symbol when the user should refer to the instruction manual in order to protect the apparatus against damage.
	Indicates dangerous voltages.
	Indicates a protected ground terminal.

Warnings and Cautions

WARNING

A warning alerts you to situations that could cause physical injury or damage to the equipment. Do not proceed beyond a warning until you have fully understood and met the indicated conditions. For translations, see page 266.

CAUTION

A caution alerts you to situations that could cause a possible loss of data. Do not proceed beyond a caution until you have fully understood and met the indicated conditions. For translations, see page 267.

Safety Information

Translations of the WARNING on page 16.

WARNUNG

Während der Installation Ihres Agilent Capillary Electrophoresis Systems darf das Netzkabel nicht angeschlossen sein.

CUIDADO

Asegúrese que el cable de red está desconectado antes de instalar su Agilent Capillary Electrophoresis System.

ATTENTION

Assurez vous que le cable secteur n'est pas connecté avant d'installer votre Agilent Capillary Electrophoresis System.

ATTENZIONE

Assicuratevi che il cavo di alimentazione sia scollegato prima di installare il Agilent Capillary Electrophoresis System.

WAARSCHUWING

Zorg dat het netsnoer is losgekoppeld, voordat de Agilent Capillary Electrophoresis System wordt geïnstalleerd.

Safety Information

Translations of the WARNING on page 18.

WARNUNG

Mit diesem Instrument sind ausschließlich Flaschen mit der Teilenummer 9300-1748 zu benutzen. Die Flaschen stehen unter Druck. Die oben genannten Flaschen weisen eine Schutzbeschichtung auf.

CUIDADO

Con este instrumento utilizar sólo botellas con el Número de Pieza 9300-1748. Se ha aplicado presión a las botellas. Las botellas arriba especificadas tienen un revestimiento de protección.

ATTENTION

Avec cet instrument, utilisez exclusivement les bouteilles portant le numéro de pièce 9300-1748. Ces bouteilles sont soumises à une pression. Les bouteilles mentionnées ci-dessus portent un revêtement protecteur.

ATTENZIONE

Con questo strumento usare esclusivamente bombole Num.Art. 9300-1748. Nelle bombole è contenuta pressione. Le bombole sopra citate sono dotate di rivestimento di protezione.

WAARSCHUWING

Gebruik voor dit instrument alleen flesjes met het onderdeelnummer 9300-1748. De voornoemde flesjes zijn voorzien van een beschermende laag.

Safety Information

Translations of the WARNING on page 19.

WARNUNG

Vergewissern Sie sich, daß die Spannungseinstellung Ihres Instruments mit der Netzspannung Ihres Landes übereinstimmt, bevor Sie das Netzkabel in die Steckdose stecken. Die Spannungseinstellung kann durch den Schlitz im Sicherungsschalter hinten im Instrument überprüft werden. Siehe Figure 2. Anweisungen zum Einstellen der Spannung siehe “Setting the Line Power Switch” on page 20.

CUIDADO

Asegurarse de que el reglaje de la línea de corriente del instrumento se ajusta a las especificaciones del país, antes de conectar el cable de la línea de corriente. El reglaje de la línea de corriente puede ser comprobado a través de la rendija del portador de fusibles, en la parte posterior del instrumento. Véase Figure 2. Véase “Setting the Line Power Switch” on page 20 para las instrucciones sobre cómo fijar el reglaje de la línea de corriente.

ATTENTION

Vérifiez que le réglage de l'alimentation secteur de l'instrument est conforme aux spécifications de votre pays avant de brancher le fil d'alimentation secteur. Vous pouvez contrôler le réglage de l'alimentation secteur à travers la fente ménagée dans le porte-fusible à l'arrière de l'instrument. Voir Figure 2. Pour les instructions sur la façon de régler l'alimentation secteur, voir “Setting the Line Power Switch” on page 20.

ATTENZIONE

Assicurarsi che l'impostazione del voltaggio corrente corrisponda alle caratteristiche nazionali prima di connettere il cavo di alimentazione. La giusta impostazione del voltaggio corrente può essere controllata attraverso la fessura del portafusibile sulla parte posteriore dello strumento. Si veda Figure 2 e “Setting the Line Power Switch” on page 20 riguardo alle istruzioni sulla selezione della corrente di rete.

WAARSCHUWING

Wees ervan overtuigd dat de netspanningsafstelling van het instrument voldoet aan de specificaties van uw land voordat het netsnoer wordt aangesloten. De netspanningsafstelling kan worden gecontroleerd via de gleuf van de zekeringhouder aan de achterkant van het instrument. Zie Figure 2. Zie “Setting the Line Power Switch” on page 20 voor instructies betreffende het afstellen van de netspanningsafstelling.

Safety Information

Translations of the WARNING on page 19.

WARNUNG

Vergewissern Sie sich, daß die im Gerät eingesetzten Sicherungen den Vorschriften entsprechen, bevor das Netzkabel in die Steckdose gesteckt wird. Anweisungen zum Auswechseln der Sicherungen siehe "Changing the Line Fuses of the Instrument" on page 23 und "Changing the Fuses for the Power Supplies" on page 25.

CUIDADO

Asegurarse de que los fusibles instalados en el instrumento se ajustan con las especificaciones, antes de conectar el cable de la línea de corriente. Véanse las "Changing the Line Fuses of the Instrument" on page 23 y "Changing the Fuses for the Power Supplies" on page 25 para las instrucciones sobre cómo introducir los fusibles.

ATTENTION

Avant de brancher le fil d'alimentation secteur, assurez-vous que les fusibles installés dans l'instrument respectent les spécifications. Pour les instructions sur la façon d'accéder aux fusibles, voir "Changing the Line Fuses of the Instrument" on page 23 et "Changing the Fuses for the Power Supplies" on page 25.

ATTENZIONE

Assicurarsi che i fusibili installati sullo strumento rispondano alle sopra citate caratteristiche prima di connettere il cavo di alimentazione. Si veda "Changing the Line Fuses of the Instrument" on page 23 e "Changing the Fuses for the Power Supplies" on page 25 sul modo di accedere ai fusibili.

WAARSCHUWING

Wees ervan overtuigd dat de geïnstalleerde zekeringen in het instrument voldoen aan de specificaties, voordat het netsnoer wordt aangesloten. Zie "Changing the Line Fuses of the Instrument" on page 23 en "Changing the Fuses for the Power Supplies" on page 25 voor instructies betreffende de toegang tot de zekeringen.

Safety Information

Translations of the WARNING on page 19.

WARNUNG

Um den Benutzer zu schützen, muß das Agilent Capillary Electrophoresis System geerdet sein. Ihr Agilent Capillary Electrophoresis System ist mit einem 3-adrigen Netzkabel und einem 3-poligen Stecker ausgestattet, der Ihr Agilent Capillary Electrophoresis System mit der Schutzterde verbindet, sobald der Stecker in eine passende Steckdose gesteckt wird.

CAUIDADO

El Agilent Capillary Electrophoresis System debe ser conectada a una toma de tierra para protegerle durante su operación. El Agilent Capillary Electrophoresis System y cualquier otro instrumento conectado a ella deben operar desde una fuente de energía de tres contactos, con el contacto de tierra conectado con certeza a tierra. Pídale a un electricista que compruebe la tierra de la fuente.

ATTENTION

Le Agilent Capillary Electrophoresis System doivent avoir leurs panneaux et chassis mis à la terre pour votre protection pendant l'utilisation. Le Agilent Capillary Electrophoresis System et tous les instruments qui lui sont connectés doivent être alimentés à l'aide d'un cable à trois fils avec les contacts terre fermement reliés à la terre. Demandez à un électricien de vérifier la mise à la terre.

ATTENZIONE

Per proteggere l'operatore i pannelli dello strumento e la struttura esterna devono essere collegati a terra. Il sistema il rivelatore ed ogni alto strumento connesso ad essa deve lavorare con un cavo di alimentazione a tre conduttori, con il filo di terra adeguatamente collegato a terra. Verificate la vostra linea di terra prima di installare lo strumento.

WAARSCHUWING

De panelen en de behuizing van de Agilent Capillary Electrophoresis System moeten gedurende de werking geaard zijn. De Agilent Capillary Electrophoresis System en alle andere instrumenten die hierop zijn aangesloten, moeten worden gevoed door een drie-aderige voeding, waarvan de aardleiding op de juiste manier is aangesloten. Schakel een elekticien in om te controleren of de voeding op de juiste wijze geaard is.

Safety Information

Translations of the WARNING on page 20.

WARNUNG

Bei einer anderen Netzspannung muß der Wahlschalter entsprechend eingestellt werden. Die Sicherungen am Hauptnetzteil und den internen Netzteilen müssen gegen Sicherungen ausgetauscht werden, die der neuen Netzspannung entsprechen, bevor das Instrument wieder eingeschaltet werden darf. Anweisungen siehe “Changing the Line Fuses of the Instrument” on page 23 und “Changing the Fuses for the Power Supplies” on page 25.

CUIDADO

Al cambiar el reglaje del conmutador selector de la línea de corriente, los fusibles de línea y los fusibles del suministro de corriente tienen que ser reemplazados por fusibles ajustados al nuevo reglaje, antes de conectar de nuevo el instrumento. Se remite a las “Changing the Line Fuses of the Instrument” on page 23 y “Changing the Fuses for the Power Supplies” on page 25 para instrucciones.

ATTENTION

Quand vous modifiez le réglage du sélecteur d'alimentation de secteur, vous devez, avant de remettre l'instrument en circuit, remplacer les fusibles de secteur et les fusibles des blocs d'alimentation par des fusibles correspondant au nouveau réglage. Voir les instructions dans “Changing the Line Fuses of the Instrument” on page 23 et “Changing the Fuses for the Power Supplies” on page 25.

ATTENZIONE

Nel variare l'impostazione dell'interruttore di selezione voltaggio corrente bisogna sostituire i fusibili di linea e i fusibili di alimentazione con fusibili corrispondenti alla nuova impostazione prima che lo strumento sia messo di nuovo in funzione. Fare riferimento a “Changing the Line Fuses of the Instrument” on page 23 e “Changing the Fuses for the Power Supplies” on page 25 per quanto riguarda le istruzioni.

WAARSCHUWING

Wanneer de afstelling van de netspanningskeuzeschakelaar wordt veranderd, dan moeten de netzekeringen en de zekeringen van de voedingen worden vervangen door zekeringen die overeenkomen met de nieuwe afstelling voordat het instrument opnieuw wordt ingeschakeld.

Safety Information

Translations of the WARNING on page 20.

WARNUNG	Wenn der Netzspannungswahlschalter betätigt wird, darf das Netzkabel nicht angeschlossen sein.
CUIDADO	Asegúrese que el cable de red está desconectado antes de cambiar el selector de voltaje.
ATTENTION	Assurez-vous que le câble secteur n'est pas connecté avant de changer la tension d'alimentation.
ATTENZIONE	Assicuratevi che il cavo di alimentazione sia scollegato prima di spostare il selettore di voltaggio.
WAARSCHUWING	Zorg dat de voedingskabel losgekoppeld is, voordat de voedingsspanning wordt veranderd.

Safety Information

Translations of the WARNING on page 24.

WARNUNG

Sicherungen dürfen nur bei nicht angeschlossenem Netzkabel installiert oder gewechselt werden. Zum Schutz gegen Feuergefahr dürfen nur Sicherungen von angegebenem Typ und Stärke verwendet werden.

CAUIDADO

Asegúrese que el cable de red está desconectado antes de instalar o cambiar un fusible. Para una protección continuada frente a riesgo de fuego, reponer sólo fusibles de tipo y régimen de corriente especificados.

ATTENTION

Assurez-vous que le câble secteur n'est pas connecté avant de changer un fusible. Pour assurer une protection permanente contre les risques d'incendie, n'utilisez que des fusibles du type et de l'intensité nominale spécifiés.

ATTENZIONE

Assicuratevi che il cavo di alimentazione sia scollegato prima di installare o sostituire un fusibile. Per garantire efficace protezione contro rischi di incendio usare solo fusibili di ricambio del tipo specificato e della potenza prestabilita.

WAARSCHUWING

Zorg dat de voedingskabel losgekoppeld is, voordat een zekering wordt geplaatst of vervangen. Voor een permanente bescherming tegen brand adviseren wij bij vervanging alleen zekeringen van het gespecificeerde type en de juiste stroomsterkte te gebruiken.

Safety Information

Translations of the WARNING on page 25.

WARNUNG	Sicherungen dürfen nur bei nicht angeschlossenem Netzkabel installiert oder gewechselt werden.
CUIDADO	Asegúrese que el cable de red está desconectado antes de instalar o cambiar un fusible.
ATTENTION	Assurez-vous que le câble secteur n'est pas connecté avant de changer un fusible.
ATTENZIONE	Assicuratevi che il cavo di alimentazione sia scollegato prima di installare o sostituire un fusibile.
WAARSCHUWING	Zorg dat de voedingskabel losgekoppeld is, voordat een zekering wordt geplaatst of vervangen.

Safety Information

Translations of the WARNING on page 32.

WARNUNG

Stellen Sie sicher, daß Wasserbad und Agilent CE Instrument abgeschaltet sind, bevor Sie das Wasserbad installieren.

CUIDADO

Asegúrese de que el baño y el Agilent CE Instrument están desenchufados cuando instale el baño de agua externo.

ATTENTION

Assurez-vous que vous avez bien éteint le thermostat à circulation ET le Agilent CE Instrument avant de procéder à l'installation du thermostat à circulation.

ATTENZIONE

Fate attenzione che, sia il bagno refrigerante che le Agilent CE Instrument siano spenti quando installate il bagno refrigerante.

WAARSCHUWING

Schakel het Agilent CE Instrument en het waterbad uit wanneer u het waterbad installeerd.

Safety Information

Translations of the WARNING on page 39.

WARNUNG

Vergewissern Sie sich, daß das elektrische Netzanschlußkabel des Agilent CE Instruments aus der Steckdose gezogen ist, bevor Sie mit Ihrer Arbeit fortfahren.

CUIDADO

Asegurarse de que se ha desconectado el cable de la línea de corriente del instrumento Agilent CE, antes de seguir adelante.

ATTENTION

Assurez-vous que vous avez débranché le fil d'alimentation secteur de l'instrument Agilent CE avant de poursuivre les opérations.

ATTENZIONE

Prima di procedere assicurarsi di avere staccato il cavo di alimentazione dello strumento Agilent CE.

WAARSCHUWING

Wees ervan overtuigd dat het netsnoer van het Agilent CE instrument uit het stopcontact is getrokken voordat u begint.

Safety Information

Translations of the WARNING on page 40.

WARNUNG

Das Lampengehäuse des Agilent CE kann bei Gebrauch sehr heiß werden. Bitte nicht berühren.

CUIDADO

La lámpara del detector puede estar muy caliente si hace poco que el instrumento ha sido utilizado. Evite tocar la lámpara.

ATTENTION

Si vous avez utilisé votre Agilent CE juste avant de suivre la procédure, la lampe peut être brûlante, ne pas la toucher.

ATTENZIONE

Se si esegue questa operazione dopo un utilizzo recente dello strumento la lampada potrebbe essere ad una temperatura elevata. Evitare il contatto diretto con la lampada.

WAARSCHUWING

Als u kort voor deze procedure het Agilent CE instrument gebruikt heeft, kan de lamp nog zeer heet zijn. Vermijd het de lamp aan te raken.

Safety Information

Translations of the CAUTION on page 48.

ACHTUNG

Reinigen Sie die Arbeitsfläche gründlich, bevor Sie mit der folgenden Prozedur beginnen. Wenn Staub- oder Schmutzpartikel in die Kapillare oder die Hochempfindlichkeits-Detektorzelle geraten, kann dies zu erheblichen Empfindlichkeitseinbußen der Zelle führen. Druckluft eignet sich gut zum Reinigen der Teile, bevor sie zusammengesetzt werden.

PRECAUCION

Preparar un banco limpio para la realización del siguiente procedimiento. Si entrasen partículas de polvo al capilar o a la celda de detección de alta sensibilidad, podría producirse un bajo rendimiento de la celda. El aire comprimido resulta de gran utilidad para la limpieza de las piezas antes de su ensamblaje.

ATTENTION

Pour exécuter la procédure suivante, veillez à ce que votre espace de travail sur la paillasse soit bien propre. Si des particules de poussière devaient pénétrer dans le capillaire ou dans la cellule de détection haute sensibilité, ceci aurait pour conséquence de détériorer les performances de la cellule. L'air comprimé s'avère très utile pour nettoyer les pièces avant leur assemblage.

PRECAUZIONE

Assicurarsi di predisporre una zona pulita sul banco di lavoro per effettuare la procedura seguente. Se nel capillare o nella cella di rivelazione ad elevata sensibilità dovessero entrare particelle di polvere, questo potrebbe ridurre le prestazioni della cella. L'aria compressa si rivela molto utile per la pulizia delle parti prima del loro riasssemblaggio.

VOORZICHTIG

Voor de volgende procedure moet er op een schone ondergrond worden gewerkt. Wanneer er stofdeeltjes in de capillair of in de zeer gevoelige detectiecel komen kan dit leiden tot slechte resultaten. Perslucht is goed bruikbaar voor het schoonmaken van de onderdelen voordat ze in elkaar worden gezet.

Safety Information

Translations of the CAUTION on page 56.

ACHTUNG

Beim Zusammensetzen/Auseinanderbauen der Hochempfindlichkeits-Detektorzellen-Einheit muß der Arbeitstisch sehr sauber sein. Lagern Sie die Zelle und die Kapillaren mit aufgesetzter Schutzkappe im Staubschutzbehälter.

PRECAUCION

Asegurarse de que el banco de trabajo esté limpio cuando se vaya a acoplar/desacoplar el conjunto de la celda de detección de elevada sensibilidad. Guardar los capilares con la protección adecuada y la celda en una caja protegida contra el polvo.

ATTENTION

Assurez-vous de la propreté de votre paillasse avant d'assembler/de désassembler l'ensemble cellule de détection haute sensibilité. Rangez les capillaires munis de leur capuchon de protection ainsi que les cellules dans la boîte hermétique étanche à la poussière.

PRECAUZIONE

Quando si accoppia/disaccoppia il gruppo della la cella di rivelazione ad elevata sensibilità, assicurarsi di operare in una zona pulita del banco di lavoro. Riporre nel contenitore antipolvere i capillari, chiusi con i tappi di protezione, e la cella.

VOORZICHTIG

Zorg voor een schone ondergrond als u de onderdelen van de zeer gevoelige detectiecel uit elkaar haalt of in elkaar zet. Bewaar de capillairen met bijgevoegde beschermingskap en de cel in het stofbeschermdoosje.

Safety Information

Translations of the CAUTION on page 57.

ACHTUNG

Führen Sie Schritt 5 nicht durch, wenn Sie beschichtete Kapillaren, gepackte Kapillaren oder andere Kapillaren verwenden, bei denen die Verwendung von NaOH problematisch ist.

PRECAUCION

No utilizar el paso 5 con capilares recubiertos, columnas empaquetadas o con cualquier otro capilar donde el hidróxido sódico, NaOH, resulte problemático.

ATTENTION

Ne procédez pas à l'étape 5 si vous utilisez des capillaires revêtus, des colonnes remplies ou tout autre capillaire avec lequel NaOH peut être source de problème.

PRECAUZIONE

Non effettuare il passaggio 5 con i capillari ricoperti, le colonne impaccate o con qualsiasi altro capillare per il quale l'uso di NaOH potrebbe risultare dannoso.

VOORZICHTIG

Stap 5 is NIET van toepassing bij: gecoate capillairen, gepakte kolommen of andere capillairen die problemen kunnen geven met NaOH.

Safety Information

Translations of the CAUTION on page 57.

ACHTUNG

Die Hochempfindlichkeits-Detektorzelle und die Anschlüsse bestehen aus verschiedenen Materialien: Fused Silika, PEEK (Polyetheretherketon) und FVMQ (Fluorsilikonkautschuk). Verwenden Sie keine Lösungsmittel, die diesen Materialien schaden.

PRECAUCION

La celda de detección de alta sensibilidad y las conexiones están hechas de diferentes materiales: sílice fundida, PEEK (polieteretercetona) y FVMQ (goma de fluorosilicona). No utilizar disolventes que puedan degradar estos materiales.

ATTENTION

La cellule de détection haute sensibilité et les raccords sont fabriqués à partir de matériaux divers: silice fondue, PEEK (polyéthéréthercétone), et FVMQ (silicone fluoré). N'utilisez pas de solvants susceptibles de les détériorer.

PRECAUZIONE

La cella di rivelazione ad elevata sensibilità ed i connettori sono costituiti da materiali diversi: silice fusa, PEEK (polietere chetonetere) e FVMQ (gomma fluorosiliconica). Non utilizzare solventi che possano degradare tali materiali.

VOORZICHTIG

De zeer gevoelige detectiecel en toebehoren bestaan uit verschillende materialen: fused silica, PEEK (polyetheretherketone) en FVMQ (fluorosilicone rubber). Gebruik geen oplosmiddelen die deze materialen kunnen afbreken.

Safety Information

Translations of the WARNING on page 86.

WARNUNG

Mit diesem Instrument sind ausschließlich Flaschen mit der Teilenummer 9300-1748 zu benutzen. Die Flaschen stehen unter Druck. Die oben genannten Flaschen weisen eine Schutzbeschichtung auf.

CUIDADO

Con este instrumento utilizar sólo botellas con el Número de Pieza 9300-1748. Se ha aplicado presión a las botellas. Las botellas arriba especificadas tienen un revestimiento de protección.

ATTENTION

Avec cet instrument, utilisez exclusivement les bouteilles portant le numéro de pièce 9300-1748. Ces bouteilles sont soumises à une pression. Les bouteilles mentionnées ci-dessus portent un revêtement protecteur.

ATTENZIONE

Con questo strumento usare esclusivamente bombole Num. Art. 9300-1748. Nelle bombole è contenuta pressione. Le bombole sopra citate sono dotate di rivestimento di protezione.

WAARSCHUWING

Gebruik voor dit instrument alleen flesjes met het onderdeelnummer 9300-1748. De voornoemde flesjes zijn voorzien van een beschermende laag.

Safety Information

Translations of the WARNING on page 86.

WARNUNG

Sie sollten keine Schwefelsäure mit dem Agilent CE System verwenden. Das Gerät könnte dadurch beschädigt werden.

CUIDADO

No usar ácido sulfúrico en el Sistema Agilent CE. Esto puede dañar el instrumento.

ATTENTION

N'utilisez pas d'acide sulfurique dans le système Agilent CE. Cela pourrait endommager l'instrument.

ATTENZIONE

Nel sistema Agilent CE non è ammesso l'uso di acido solforico. Ciò potrebbe danneggiare lo strumento.

WAARSCHUWING

Gebruik geen zwavelzuur in het Agilent CE systeem. Hierdoor kan het instrument worden beschadigd.

Safety Information

Translations of the WARNING on page 87.

WARNUNG

Im Abfall können organische Lösungsmittel und Rückstände Ihrer Proben enthalten sein. Beim Umgang mit Elektrolyt unbedingt Gummihandschuhe und Schutzbrille tragen, Rückstände in einen dafür vorgesehenen Abfallbehälter verbringen.

CAIDADO

El desechado puede contener disolventes orgánicos y residuos de la muestra. Utilizar guantes de goma y gafas de seguridad al manejar el electrolito y depositar el desechado en un recipiente de residuos seguro.

ATTENTION

Le résidu peut comporter des solvants organiques et des restes de votre échantillon. Lors de la manipulation de l'électrolyte, portez des gants en caoutchouc et des lunettes de sécurité; déposez le résidu dans un conteneur de résidu assurant une bonne sécurité.

ATTENZIONE

Le bombole vuote possono contenere solventi organici o residui del provino in esame. Nel fare uso di elettroliti munirsi di guanti di gomma e di occhiali protettivi. Depositare i vuoti in un contenitore di sicurezza.

WAARSCHUWING

Het afval kan organische oplosmiddelen en restanten van uw monster bevatten. Draag rubber handschoenen en een veiligheidsbril wanneer met het elektrolyt wordt gewerkt en deponeer het afval in een speciale, beveiligde container.

Safety Information

Translations of the WARNING on page 89.

WARNUNG

Bördelkappen oder sonstige Metallkappen dürfen beim Arbeiten mit dem Agilent CE Instrument nicht benutzt werden.

CUIDADO

No utilizar casquetes ondulados o casquetes de cualquier otro metal, cuando se trabaja con el instrumento.

ATTENTION

Lors que vous travaillez avec l'instrument, n'utilisez pas de capuchons sertis ni d'autres capuchons métalliques.

ATTENZIONE

Durante l'uso dello strumento Agilent CE non deve essere fatto uso di tappi a pressione né di alcun altro tipo di tappi metallici.

WAARSCHUWING

Maak geen gebruik van krimp kappen of andere metalen kappen wanneer met het Agilent CE Instrument wordt gewerkt.

Safety Information

Translations of the WARNING on page 94.

WARNUNG

Auf keinen Fall Druck geben (Arbeitsgang anlaufen lassen), wenn keine Kapillare eingesetzt ist.

CUIDADO

Nunca aplicar presión (iniciar una serie), si no hay capilar instalado.

ATTENTION

N'appliquez jamais la pression (Lancement d'un cycle) quand le capillaire n'est pas installé.

ATTENZIONE

Non azionare mai Pressione (Inizio corsa) se non è stato prima installato il capillare.

WAARSCHUWING

Gebruik nooit druk (omloop opstarten) wanneer geen buisje is geïnstalleerd.

Safety Information

Translations of the CAUTION on page 97.

ACHTUNG

Die Kapillare am Detektionsfenster oder die Kapillarspitzen, wo das Polyimid abgebrannt ist, nicht berühren. Die Kapillare ist an dieser Stelle sehr zerbrechlich und das Detektionsfenster muß unbedingt sauber gehalten werden. Detektionsfenster und Kapillarspitzen gemäß Beschreibung in “Cleaning the Detection Window and the Alignment Interface” on page 200 reinigen, wenn Sie sie berührt haben.

PRECAUCION

No tocar el capilar en la ventana de detección o las puntas del capilar, donde se ha quemado la poliimida. El capilar es muy fragil en este punto y es importante el mantener limpia la ventana de detección. Limpiar la ventana de detección y las puntas del capilar, tal como se describe en “Cleaning the Detection Window and the Alignment Interface” on page 200, si estas han sido tocadas.

ATTENTION

Ne touchez pas le capillaire au niveau de la fenêtre de détection ni les extrémités du capillaire, là où le polyimide est brûlé . Le capillaire est très fragile à cet endroit et il est important que la fenêtre de détection demeure propre. S'il vous arrive de toucher la fenêtre de détection et les extrémités du capillaire, nettoyez-les selon la description donnée dans “Cleaning the Detection Window and the Alignment Interface” on page 200.

PRECAUZIONE

Non toccare il capillare, nel punto in cui è situata la cellula di rivelazione, o le sue estremità, dove è bruciato il poliammide, perchè in questo punto esso è molto fragile; è inoltre importante che la cellula di rivelazione sia mantenuta pulita. La cellula di rivelazione e le estremità del capillare devono essere ripulite, se sono state toccate, seguendo la descrizione in “Cleaning the Detection Window and the Alignment Interface” on page 200.

VOORZICHTIG

Raak het buisje niet aan bij het kijkglas en bij de uiteinden waar het polyamide is weggebrand. Het buisje is bij deze punten uiterst breekbaar en bovendien is het belangrijk dat het kijkglas schoon blijft. Maak het kijkglas en de uiteinden van het buisje schoon zoals omschreven in “Cleaning the Detection Window and the Alignment Interface” on page 200 wanneer u deze toch heeft aangeraakt.

Safety Information

Translations of the WARNING on page 104.

WARNUNG

Vergewissern Sie sich, daß die Kapillarenden nicht gebogen sind, wenn die Kapillarkassette nach unten gefahren wird. Sie müssen direkt in die Kapillarsitze gleiten. Sonst können sie brechen oder beschädigt werden. Wenn es beim Einsetzen der Kapillare in die Elektroden zu Problemen kommt, überprüfen, ob diese durch Salzkristalle verstopft sind. Anweisungen zum Reinigen der Elektroden siehe “Cleaning the Electrodes, Prepunchers and Insulation Plate” on page 185.

CAUIDADO

Asegurarse de que los extremos del capilar no están doblados, al bajar el porta capilares. Estos deberán deslizarse directamente en los asientos para capilares. De otra forma estos pueden romperse o ser deteriorados. Si se tiene problemas al insertar el capilar dentro de los electrodos, comprobar si estos están bloqueados por cristalitos salinos. Se remite a la “Cleaning the Electrodes, Prepunchers and Insulation Plate” on page 185 para instrucciones sobre la limpieza de electrodos.

ATTENTION

Assurez-vous que les extrémités du capillaires ne sont pas courbées quand vous abaissez la cassette du capillaire. Ces extrémités doivent aller se loger directement dans les sièges du capillaire. Sinon, elles pourraient se rompre ou être endommagées. Si vous avez du mal à insérer le capillaire dans les électrodes, vérifiez si ces dernières ne sont pas obturés par des cristaux de sel. Voir “Cleaning the Electrodes, Prepunchers and Insulation Plate” on page 185 pour les instructions de nettoyage des électrodes.

ATTENZIONE

Assicurarsi che le estremità del capillare non siano inclinate quando la cassetta si posiziona verso il basso: esse dovrebbero scivolare inserendosi direttamente all'interno del capillare; in caso contrario potrebbero rompersi o venire danneggiate. Se si presentassero dei problemi nell'inserimento del capillare negli elettrodi, controllare che questi non siano otturati da cristalli di sale. Fare riferimento a “Cleaning the Electrodes, Prepunchers and Insulation Plate” on page 185 per quanto riguarda istruzioni su come pulire gli elettrodi.

WAARSCHUWING

Wees er van overtuigd dat de uiteinden van het buisje niet krom zijn, wanneer de buiscassette naar beneden wordt gebracht. Deze moeten rechtstreeks in de buis zittingen glijden, anders kunnen ze breken of worden beschadigd. Indien het inbrengen van de buisjes in de elektroden problemen oplevert, controleer dan of deze worden gehinderd door zoutkristallen. Zie “Cleaning the Electrodes, Prepunchers and Insulation Plate” on page 185 betreffende de instructies voor het schoonmaken van de elektroden.

Safety Information

Translations of the WARNING on page 104.

WARNUNG

Deckel nicht schließen, wenn die Kassette nicht ordnungsgemäß eingesetzt ist. Die Kassette könnte beschädigt werden.

CUIDADO

No cerrar la cubierta superior, si el porta capilares no está instalado adecuadamente. Esto podría deteriorar el porta capilares.

ATTENTION

Ne fermez pas le couvercle supérieur si la cassette n'est pas installée correctement. Cela pourrait endommager la cassette.

ATTENZIONE

Non richiudere il coperchio superiore se la cassetta non è stata correttamente inserita. Ciò potrebbe danneggiarla.

WAARSCHUWING

Indien de cassette onjuist is geïnstalleerd mag het deksel niet worden gesloten. Hierdoor kan de cassette worden beschadigd.

Safety Information

Translations of the WARNING on page 123.

WARNUNG

Bitte beachten Sie, dass Sie die neue Kapillarkassette nehmen müssen, wenn Ihre Applikation oder Methode organische Lösungsmittel enthält. Der Grund dafür ist, dass die neue Kapillarkassette einer höheren Flammenschutzklasse (CV01) entspricht. Sie sollten die alte Kassette auf keinen Fall benutzen, wenn organische Lösungsmittel benutzt werden.

CUIDADO

Utilice el nuevo cassette de capilares siempre que trabaje con un método o aplicación que haga uso de disolventes orgánicos. El diseño de este cassette cumple el estándar de inflamabilidad (CV01). No use nunca el cassette de antiguo diseño cuando trabaje con disolventes orgánicos.

ATTENTION

Veuillez noter que vous devez utiliser la nouvelle cassette si une application ou une méthode nécessite des solvants organiques. Cette nouvelle cassette répond à la plus haute norme d'inflamabilité (CV01). Vous ne devez pas utiliser l'ancienne cassette des que des solvants organiques sont utilisés.

ATTENZIONE

É obbligatorio usare sempre il nuovo tipo di cassette capillare qualora l'applicazione o il metodo usati prevedano l'impiego di solventi organici. Questo perché il nuovo tipo di cassetta capillare é in conformità alle norme di alta infiammabilità (CV01). Lei non deve assolutamente usare la cassetta capillare vecchio modello quando vengono utilizzati solventi organici.

WAARSCHUWING

Gelieve uitsluitend de nieuw ontworpen capillaire cassette te gebruiken wanneer U een applicatie of methode met organische oplosmiddelen toepast. Dit is omdat dit nieuw type capillaire cassette voldoet aan de eisen van de hogere ontvlambaarheidsklasse (CV01). Het oude type capillaire cassette dient U niet te gebruiken met organische oplosmiddelen.

Safety Information

Translations of the WARNING on page 131.

WARNUNG

Bitte benutzen Sie nur die neue Kapillarkassette. Für weitere Hinweise lesen Sie die Warnung auf der Seite 226. Bitte niemals die alte Kapillarkassette benutzen, wenn Ihre Applikation organische Lösungsmittel enthält. Dies gilt besonders für CEC Applikationen.

CAUIDADO

Utilice solamente el nuevo cassette de capilares. Ver anotación de seguridad en página 226. No use nunca el antiguo cassette cuando utilice disolventes orgánicos, especialmente si trabaja con un método de CEC.

ATTENTION

Utilisez la nouvelle cassette seulement. Voir la note de securite sur page 226. Ne jamais utiliser l'ancienne cassette quand des solvants organiques sont utilises. Cela s'applique essentiellement lors des applications CEC.

ATTENZIONE

Usare solo il nuovo tipo di casstta capillare. Leggere la nota di sicurezza a pagina 226. Mai usare la cassetta capillare vecchio modello quando vengono utilizzati solventi organici. E questo particolarmente quando si eseguono applicazioni CEC.

WAARSCHUWING

Gelieve uitsluitend het nieuw type capillaire cassette te gebruiken. Zie de waarschuwing met betrekking tot de veiligheid op bladzijde 226. Gebruik nooit het oude type capillaire cassette wanneer organische oplosmiddelen gebruikt worden. Dit is in het bijzonder van belang bij het uitvoeren van CEC applicaties.

Safety Information

Translations of the WARNING on page 144.

WARNUNG

Vergewissern Sie sich, daß das elektrische Netzanschlußkabel des Agilent CE Instruments aus der Steckdose gezogen ist, bevor Sie mit Ihrer Arbeit fortfahren.

CUIDADO

Asegurarse de que se ha desconectado el cable de la línea de corriente del instrumento Agilent CE, antes de seguir adelante.

ATTENTION

Assurez-vous que vous avez débranché le fil d'alimentation secteur de l'instrument Agilent CE avant de poursuivre les opérations.

ATTENZIONE

Prima di procedere assicurarsi di avere staccato il cavo di alimentazione dello strumento Agilent CE.

WAARSCHUWING

Wees ervan overtuigd dat het netsnoer van het Agilent CE instrument uit het stopcontact is getrokken voordat u begint.

Safety Information

Translations of the WARNING on page 147.

WARNUNG

Beim öffnen der Kasette und berühren des Kapillars eine Sicherheitsbrille zum Schutz der Augen tragen.

CUIDADO

Protégase los ojos con gafas de seguridad cuando abra el cassette y manipule el capilar.

ATTENTION

Mettre des lunettes de sécurité lors de l'ouverture de la cassette et du changement du capillaire, afin de protéger vos yeux.

ATTENZIONE

Al fine di evitare rischi, proteggere gli occhi utilizzando occhiali di sicurezza quando si apre la cassetta portacapillari o si manipolano i capillari stessi.

WAARSCHUWING

Draag een veiligheidsbril om uw ogen te beschermen als u de cassette opent en het capillair hanteert.

Safety Information

Translations of the WARNING on page 186.

WARNUNG

Bei der Durchführung dieser Aufgabe allgemeine Sicherheitsvorschriften für Laboratorien beachten. Schutzbrille und Gummihandschuhe tragen.

CUIDADO

Observar las regulaciones usuales de seguridad para los laboratorios, cuando se realiza esta labor. Utilizar gafas de seguridad y guantes de goma.

ATTENTION

Respectez les règles de sécurité usuelles applicables aux laboratoires lors de la réalisation de cette opération. Portez des lunettes de sécurité et des gants en caoutchouc.

ATTENZIONE

Nel procedere a tale scopo osservare le disposizioni di sicurezza in uso comune nei laboratori. Munirsi di guanti di gomma e di occhiali protettivi.

WAARSCHUWING

Neem de algemene veiligheidsvoorschriften voor laboratoria in acht wanneer een opdracht wordt uitgevoerd. Draag een veiligheidsbril en rubber handschoenen.

Safety Information

Translations of the WARNING on page 186.

WARNUNG

Vergewissern Sie sich, daß das elektrische Netzanschlußkabel des Agilent CE Instruments aus der Steckdose gezogen ist, bevor Sie mit Ihrer Arbeit fortfahren.

CUIDADO

Asegurarse de que se ha desconectado el cable de la línea de corriente del instrumento Agilent CE, antes de seguir adelante.

ATTENTION

Assurez-vous que vous avez débranché le fil d'alimentation secteur de l'instrument Agilent CE avant de poursuivre les opérations.

ATTENZIONE

Prima di procedere assicurarsi di avere staccato il cavo di alimentazione dello strumento Agilent CE.

WAARSCHUWING

Wees ervan overtuigd dat het netsnoer van het Agilent CE instrument uit het stopcontact is getrokken voordat u begint.

Safety Information

Translations of the WARNING on page 187.

WARNUNG

Wenn Sie das Agilent CE Instrument erst vor kurzem benutzt haben, ist die Lampe möglicherweise noch sehr heiß. Lampe nicht berühren bzw. Schutzhandschuhe tragen.

CUIDADO

Si se ha utilizado el instrumento, inmediatamente después la lámpara puede estar muy caliente. Evitar el tocar la lámpara, o usar guantes de protección.

ATTENTION

Si vous avez utilisé l'instrument peu de temps auparavant, il est possible que la lampe soit très chaude. Evitez de toucher la lampe ou bien portez des gants protecteurs.

ATTENZIONE

Se si è fatto uso dello strumento poco prima la lampada può avere raggiunto un'alta temperatura. Evitarne il contatto oppure munirsi di guanti di protezione.

WAARSCHUWING

Indien het instrument kort tevoren nog werd gebruikt, dan kan de lamp nog zeer heet zijn. Raak de lamp niet aan of gebruik hiervoor speciale handschoenen.

Safety Information

Translations of the CAUTION on page 193.

ACHTUNG

Nachfüllnadel nicht berühren oder verbiegen.

PRECAUCION

No tocar o doblar la aguja de reaprovisionamiento.

ATTENTION

Il ne faut ni toucher ni courber l'aiguille de remplissage.

PRECAUZIONE

Non toccare o piegare l'ago di riempimento.

VOORZICHTIG

De vulnaald mag niet worden aangeraakt of gebogen.

Safety Information

Translations of the WARNING on page 194.

WARNUNG

Der Vorlocher hat eine sehr scharfe Spitze. Vorsicht beim Berühren des Vorlochers, Schutzhandschuhe tragen, um Verletzungen zu vermeiden.

CUIDADO

La preperforadora tiene una punta muy aguda. Tener precaución al tocar la preperforadora y usar guantes de protección, para evitar lesiones.

ATTENTION

L'outil de pré-poinçonnage possède une extrémité très acérée. Soyez prudent lorsque vous le touchez et portez des gants protecteurs pour éviter les accidents.

ATTENZIONE

Il punzone è dotato di estremità estremamente appuntita. Prestare particolare attenzione nel maneggiarlo e munirsi di guanti di protezione per evitare di ferirsi.

WAARSCHUWING

De voorperforator heeft een zeer scherpe punt. Wees voorzichtig bij het aanraken van de voorperforator en draag speciale handschoenen om verwondingen te voorkomen.

Safety Information

Translations of the CAUTION on page 194.

ACHTUNG

Trichterfläche des Vorlochlers nicht beschädigen.

PRECAUCION

No deteriorar la superficie del embudo de la preperforadora.

ATTENTION

N'endommagez pas la surface en forme d'entonnoir de l'outil de pré-poinçonnage.

PRECAUZIONE

Non danneggiare la superficie a imbuto del punzone.

VOORZICHTIG

Voorkom beschadiging van het trechteroppervlak van de voorperforator.

Safety Information

Translations of the CAUTION on page 195.

ACHTUNG

Die Vorlocher müssen vor dem Wiedereinbau völlig trocken sein, um Kontamination zu vermeiden.

PRECAUCION

Para evitar contaminación, las preperforadoras tienen que estar completamente secas, antes de su inserción.

ATTENTION

Pour éviter la contamination, les outils de pré-poinçonnage doivent être complètement secs avant le remontage.

PRECAUZIONE

Allo scopo di evitare contaminazione i punzoni devono essere completamente asciutti prima della installazione.

VOORZICHTIG

Om vervuiling van de voorperforators te voorkomen moeten deze absoluut droog zijn voordat deze opnieuw worden geïnstalleerd.

Safety Information

Translations of the CAUTION on page 196.

ACHTUNG

Das Innere der Elektroden muß vor dem Wiedereinbau völlig trocken sein, um Kontamination zu vermeiden.

PRECAUCION

Para evitar contaminación, el interior de los electrodos tiene que estar completamente seco, antes de su inserción.

ATTENTION

Pour éviter la contamination, l'intérieur des électrodes doit être complètement sec avant le remontage.

PRECAUZIONE

Allo scopo di evitare contaminazione la parte interna degli elettrodi deve essere completamente asciutta prima della reinstallazione.

VOORZICHTIG

Om vervuiling te voorkomen moet de binnenzijde van de elektrodes absoluut droog zijn voordat deze opnieuw worden geïnstalleerd.

Safety Information

Translations of the WARNING on page 201.

WARNUNG

Beim öffnen der Kasette und berühren des Kapillars eine Sicherheitsbrille zum Schutz der Augen tragen.

CUIDADO

Protégase los ojos con gafas de seguridad cuando abra el cassette y manipule el capilar.

ATTENTION

Mettre des lunettes de sécurité lors de l'ouverture de la cassette et du changement du capillaire, afin de protéger vos yeux.

ATTENZIONE

Al fine di evitare rischi, proteggere gli occhi utilizzando occhiali di sicurezza quando si apre la cassetta portacapillari o si manipolano i capillari stessi.

WAARSCHUWING

Draag een veiligheidsbril om uw ogen te beschermen als u de cassette opent en het capillair hanteert.

Safety Information

Translations of the WARNING on page 214.

WARNUNG

Vergewissern Sie sich, daß das Netzanschlußkabel aus der Steckdose gezogen ist, bevor der Detektordeckel abgenommen wird. Wenn die Lampe noch an ist, wenn der Deckel abgenommen wird, kann die UV-Strahlung sehr schädlich für die Augen sein.

CAUIDADO

Asegurarse de que el cable de la línea de corriente está desconectado, antes de retirar la cubierta detectora. Si la lámpara está todavía encendida, cuando se retira la cubierta, la radiación UV puede ser nociva para los ojos.

ATTENTION

Assurez-vous que le fil électrique est débranché avant de retirer le couvercle du détecteur. Si la lampe demeure allumée après que vous avez ôté le couvercle, le rayonnement UV peut être dangereux pour vos yeux.

ATTENZIONE

Assicurarsi che il cavo di alimentazione sia stato disinserito prima di rimuovere il coperchio del rivelatore. Se la lampada fosse ancora accesa dopo la rimozione del coperchio le radiazioni ai raggi ultravioletti potrebbero essere dannose agli occhi.

WAARSCHUWING

Wees ervan overtuigd dat het netsnoer uit het stopcontact is getrokken voordat de het deksel wordt verwijderd. Wanneer de lamp nog steeds brandt terwijl u het deksel verwijderd, dan kan de UV-straling schadelijk voor uw ogen zijn.

Safety Information

Translations of the WARNING on page 215.

WARNUNG

Wenn Sie das Agilent CE Instrument erst vor kurzem benutzt haben, ist die Lampe möglicherweise noch sehr heiß. Lampe nicht berühren bzw. Schutzhandschuhe tragen.

CUIDADO

Si se ha utilizado el instrumento, inmediatamente después la lámpara puede estar muy caliente. Evitar el tocar la lámpara, o usar guantes de protección.

ATTENTION

Si vous avez utilisé l'instrument peu de temps auparavant, il est possible que la lampe soit très chaude. Evitez de toucher la lampe ou bien portez des gants protecteurs.

ATTENZIONE

Se si è fatto uso dello strumento poco prima la lampada può avere raggiunto un'alta temperatura. Evitarne il contatto oppure munirsi di guanti di protezione.

WAARSCHUWING

Indien het instrument kort tevoren nog werd gebruikt, dan kan de lamp nog zeer heet zijn. Raak de lamp niet aan of gebruik hiervoor speciale handschoenen.

Safety Information

Translations of the WARNING on page 226.

WARNUNG

Das WARNUNG Zeichen weist auf eine Gefahr für den Menschen hin. Wenn die Anweisungen und Verfahrensweisen oder ähnliches nicht befolgt und korrekt ausgeführt werden, könnte das eine erhebliche Verletzungsgefahr oder Lebensgefahr zur Folge haben. Solange die neben dem Warnungzeichen angegebenen Anweisungen nicht vollständig verstanden und ausgeführt sind, sollten keine weiteren Schritte unternommen werden.

CUIDADO

El signo de CUIDADO denota un riesgo. Remite a un procedimiento o práctica que de no ser llevada a cabo correctamente, podría resultar en un daño o pérdida de vida. No continúe cuando exista un signo de advertencia hasta que las condiciones indicadas hayan sido completamente entendidas y satisfechas.

ATTENTION

Le signe ATTENTION dénote un risque. Il appelle une précaution quant à une procédure ou une pratique qui, si elle n'est pas correctement suivie, peut résulter en une blessure ou même en un risque pour la vie. S'assurer d'avoir rempli toutes les conditions indiquées avant de continuer.

ATTENZIONE

La scritta ATTENZIONE indica un pericolo. Essa richiama l'attenzione su una situazione che può portare a danni anche gravi per le persone. Non proseguire oltre tale indicazione senza aver ben compreso il rischio ed aver seguito le istruzioni per evitarlo.

WAARSCHUWING

Het teken WAARSCHUWING wijst op gevaar. Indien de aanwijzingen, procedures etc. niet opgevolgd en korrekt uitgevoerd worden, kan dat een aanzienlijk risico en zelfs levensgevaar met zich mee brengen. Zolang de naast het waarschuwingsteken aangegeven aanwijzingen niet volledig begrepen en opgevolgd zijn, dienen geen verdere stappen ondernomen te worden.

Safety Information

Translations of the CAUTION on page 226.

ACHTUNG

Das ACHTUNG-Zeichen weist auf eine mögliche Beschädigung der Geräte hin. Wenn Anweisungen und Verfahrensweisen oder ähnliches nicht befolgt und korrekt ausgeführt werden, könnte das eine Beschädigung oder Zerstörung eines Teils oder des gesamten Gerätes zur Folge haben. Solange die neben dem ACHTUNG-Zeichen angegebenen Anweisungen nicht vollständig verstanden und ausgeführt sind, sollten keine weiteren Schritte unternommen werden.

PRECAUCION

El signo de PRECAUCION denota un riesgo. Remite a un procedimiento o práctica que de no ser llevada a cabo correctamente podría resultar en un daño o destrucción parcial o total del equipo. No continúe cuando exista un signo de precaución hasta que las condiciones indicadas hayan sido completamente entendidas y satisfechas.

ATTENTION

Le signe AVERTISSEMENT dénote un risque. Il appelle une précaution quant à une procédure ou une pratique qui, si elle n'est pas correctement suivie, peut résulter en un dommage ou même une destruction du matériel. S'assurer d'avoir rempli toutes les conditions indiquées avant de continuer.

PRECAUZIONE

La scritta PRECAUZIONE indica un pericolo. Essa richiama l'attenzione su una situazione che può portare a danni anche permanenti allo strumento. Non proseguire oltre tale indicazione senza aver ben compreso il rischio ed aver seguito le istruzioni per evitarlo.

VOORZICHTIG

Het teken VOORZICHTIG wijst op gevaar voor een mogelijke beschadiging van de instrumentatie. Het vraagt de aandacht voor een praktijk, werkwijze etc. welke, indien niet opgevolgd en korrekt uitgevoerd, kan leiden tot beschadiging of vernieling van de apparatuur of een deel ervan. Zolang de naast het teken voorzichtig aangegeven aanwijzingen niet volledig begrepen en opgevolgd zijn, dienen geen verdere stappen ondernomen te worden.

Sound Emission

Manufacturer's Declaration

This statement is provided to comply with the requirements of the German Sound Emission Directive, from 18 January 1991.

This product has a sound pressure emission (at the operator position) < 70 dB.

- Sound Pressure $L_p < 70$ dB (A).
- At Operator Position.
- Normal Operation.
- According to ISO 7779:1988/EN 27779/1991 (Type Test).

Herstellerbescheinigung

Diese Information steht im Zusammenhang mit dem Anforderungen der Maschinenlärminformationsverordnung vom 18 Januar 1991.

- Schalldruckpegel $L_p < 70$ dB (A).
- Am Arbeitsplatz.
- Normaler Betrieb.
- Nach ISO 7779:1988/EN 27779/1991 (Typprüfung).

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In This Book

Chapter 1 “The Core Agilent CE Instrument” describes the installation of the Agilent CE system, external water bath for tray cooling, detector filter assembly, changing fuses and the core CE diagram screen, which is used for instrument control.

Chapter 2 “Capillary Electrophoresis” with user interface explanation describes the tasks that need to be performed on the Agilent CE system when preparing an analysis. In addition some new functions are described such as fraction collection and capillary electrophoresis plus high pressure.

Chapter 3 “Capillary Electrochromatography”, a new separation technique, lists parameters that make up a CEC method and describes their meaning.

Chapter 4 “Online CE-ESI-MS with the Agilent CE System” describes the online CE coupling to the Agilent 1100 Series LC/MSD.

Chapter 5 “Maintaining Your Agilent CE Instrument” describes standard operating procedures which should be used to maintain the functionality of your system.

