Warranty

The information contained in this document is subject to change without notice.

Agilent Technologies makes no warranty of any kind with regard to this material, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose.

Agilent Technologies shall not be liable for errors contained herein or for incidental or consequential damages in connection with the furnishing, performance, or use of this material.

WARNING

For details of safety, see Safety Information on page 36.

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.
In This Book

This manual contains technical information about the Agilent 1100 Series HPLC Value System. The manual describes the following:

- system overview, specifications and limitations
- installing the system,
- setting up an analysis,
- diagnostics and troubleshooting,
- repairing and maintenance
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General information about your system

What you should know about your system
System Configuration

Manual - isocratic HPLC System G1380AA

standard configuration
- G1310A isocratic pump with solvent cabinet
- G1328A manual injector (MI)
- G1314A variable wavelength detector (VWD) with standard flow cell (10 mm path length, 14 µl volume, 40 bar maximum pressure)
- G2220AA 2D-Value Solution ChemStation

other modules that can be added
- G1316A thermostatted column compartment (TCC)
- G1321A fluorescence detector (FLD)
- G1362A refractive index detector (RID)
- G1323B local control module
System Restrictions

The system mentioned on page 10 has some restrictions compared to the standard 1100 system. These restrictions are listed in the table below:

<table>
<thead>
<tr>
<th>Module</th>
<th>Restrictions</th>
</tr>
</thead>
<tbody>
<tr>
<td>ChemStation</td>
<td>• single G2220AA 2D-Value Solution ChemStation only (one online and one offline session)</td>
</tr>
<tr>
<td></td>
<td>- not upgradeable to G2170AA 2D-ChemStation</td>
</tr>
<tr>
<td></td>
<td>• supports the following 1100 series HPLC modules as shown in “System Configuration” on page 10:</td>
</tr>
<tr>
<td></td>
<td>G1310A isocratic pump</td>
</tr>
<tr>
<td></td>
<td>G1314A variable wavelength detector</td>
</tr>
<tr>
<td></td>
<td>G1328A manual injector</td>
</tr>
<tr>
<td></td>
<td>G1316A thermostatted column compartment (may be added)</td>
</tr>
<tr>
<td></td>
<td>G1321A fluorescence detector (may be added), see note below.</td>
</tr>
<tr>
<td></td>
<td>G1362A refractive index detector (may be added)</td>
</tr>
<tr>
<td></td>
<td>• control via LAN (no HPIB or RS-232)</td>
</tr>
<tr>
<td></td>
<td>• No support of ChemStation add-on like Spectra Module, ChemAccess, ChemStore, GPC and CCMode</td>
</tr>
<tr>
<td>All 1100 modules</td>
<td>• operable by Control Module G1323B (may be added), see note below.</td>
</tr>
<tr>
<td></td>
<td>• firmware upgrade via control module G1323B and/or LAN (Value Solution ChemStation/portable PC).</td>
</tr>
</tbody>
</table>

**NOTE**

The G1321A fluorescence detector cannot be operated in spectra mode. This requires the spectra software module which is not support with the G2220AA 2D-Value Solution ChemStation. Wavelength verifications on the module require a Control Module G1323A or G1323A.
Site Requirements

A suitable environment is important to ensure optimum performance of the system.

**Power Consideration**

The modules’ power supply has wide-ranging capability (see Table 2 on page 14). It accepts any line voltage in the above mentioned range. Consequently there is no voltage selector in the rear of the modules. There are also no externally accessible fuses, because automatic electronic fuses are implemented in the power supply.

**WARNING**

To disconnect the modules from line, unplug the power cord. The power supply still uses some power, even if the power switch on the front panel is turned off.

**WARNING**

Shock hazard or damage of your instrumentation can result, if the devices are connected to a line voltage higher than specified.

**Power Cords**

Different power cords are offered as options with the modules. The female end of each of the power cords is identical. It plugs into the power-input socket at the rear of the instruments. The male end of each of the power cords is different and designed to match the wall socket of a particular country or region.

**WARNING**

Never operate your instrumentation from a power outlet that has no ground connection. Never use a power cord other than the power cord designed for your region.

**WARNING**

Never use cables other than the ones supplied with the instruments to ensure proper functionality and compliance with safety or EMC regulations.
General information about your system

**Site Requirements**

**Bench Space**

The modules’ dimensions and weight (see Table 2 on page 14) allow to place the modules on almost any desk or laboratory bench. It needs an additional 2.5 cm (1.0 inches) of space on either side and approximately 8 cm (3.1 inches) in the rear for the circulation of air and electric connections.

If the bench should carry a complete system, make sure that the bench is designed to carry the weight of all the modules.

The modules should be operated in a horizontal position.

**Environment**

Your modules will work within specifications at ambient temperatures and relative humidity as described in Table 2 on page 14.

**Detectors**

ASTM drift tests require a temperature change below 2 °C/hour (3.6 °F/hour) over one hour period. Our published drift specification (refer also to “Performance Specifications” in your detector’s reference manuals) is based on these conditions. Larger ambient temperature changes will result in larger drift. Better drift performance depends on better control of the temperature fluctuations. To realize the highest performance, minimize the frequency and the amplitude of the temperature changes to below 1 °C/hour (1.8 °F/hour). Turbulences around one minute or less can be ignored.

**CAUTION**

Do not store, ship or use your modules under conditions where temperature fluctuations could cause condensation within the modules. Condensation will damage the system electronics. If your modules were shipped in cold weather, leave them in their boxes and allow them to warm slowly to room temperature to avoid condensation.
General information about your system

**Physical Specifications**

<table>
<thead>
<tr>
<th>Type</th>
<th>Specification</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>11.0 kg (25.0 lbs)</td>
<td>G1310A ISO Pump</td>
</tr>
<tr>
<td></td>
<td>11.0 kg (25.0 lbs)</td>
<td>G1314A VWD</td>
</tr>
<tr>
<td></td>
<td>10.2 kg (22.5 lbs)</td>
<td>G1316A TCC</td>
</tr>
<tr>
<td></td>
<td>17.0 kg (38.0 lbs)</td>
<td>G1362A RID</td>
</tr>
<tr>
<td>Dimensions (width × depth × height)</td>
<td>345 × 435 × 140 mm (13.5 × 17 × 5.5 inches)</td>
<td>G1310A, G1314A, G1321A</td>
</tr>
<tr>
<td></td>
<td>345 × 435 × 180 mm (13.5 × 17 × 7.0 inches)</td>
<td>G1362A</td>
</tr>
<tr>
<td></td>
<td>410 × 435 × 140 mm (16.1 × 17 × 5.5 inches)</td>
<td>G1316A</td>
</tr>
<tr>
<td>Line Voltage</td>
<td>100 – 120 or 220 – 240 VAC, ± 10 %</td>
<td>Wide-ranging capability</td>
</tr>
<tr>
<td>Line frequency</td>
<td>50 or 60 Hz, ± 5 %</td>
<td></td>
</tr>
<tr>
<td>Power consumption</td>
<td>320 VA maximum</td>
<td>G1362A</td>
</tr>
<tr>
<td></td>
<td>160 VA maximum</td>
<td></td>
</tr>
<tr>
<td>Ambient operating temperature</td>
<td>0 – 55 °C (32 – 131 °F)</td>
<td></td>
</tr>
<tr>
<td>Ambient non-operating temperature</td>
<td>-40 – 70 °C (-4 – 158 °F)</td>
<td></td>
</tr>
<tr>
<td>Humidity</td>
<td>&lt;95 %, at 25 – 40 °C (77 – 104 °F)</td>
<td>Non-condensing</td>
</tr>
<tr>
<td>Operating altitude</td>
<td>Up to 2000 m (6500 ft.)</td>
<td></td>
</tr>
<tr>
<td>Non-operating altitude</td>
<td>Up to 4600 m (14950 ft.)</td>
<td>For storing the instrument</td>
</tr>
<tr>
<td>Safety standards: IEC, CSA, UL, EN</td>
<td>Installation Category II, Pollution Degree 2</td>
<td></td>
</tr>
</tbody>
</table>

For your PC specifications refer to its documentation.
Performance Specifications

The performance specifications can be derived from the modules’ performance specifications, described in each of the modules’ reference manuals (see “User Documentation” on page 16 available on your Value Solution ChemStation Software CD-ROM).

Maintenance, Repair and Parts Information

The information about these topics can be derived from the corresponding chapters in each of the modules’ reference manuals (see “User Documentation” on page 16 available on your Value Solution ChemStation Software CD-ROM).

Warranty and Legal Information

For warranty and legal information refer to the modules’ reference manuals, see “User Documentation” on page 16 available on your Value Solution ChemStation Software CD-ROM.
User Documentation

The user documentation (aside from this System Manual) is provided as Acrobat Reader documents (PDF) located on the Value Solution ChemStation Software CD-ROM. It can be viewed and printed when required.

### Table 3  1100 User Documentation

<table>
<thead>
<tr>
<th>Type</th>
<th>File name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1100 Isocratic Pump Reference Manual</td>
<td>G1310A_RM.PDF</td>
</tr>
<tr>
<td>1100 Variable Wavelength Detector Reference Manual</td>
<td>G1314A_RM.PDF</td>
</tr>
<tr>
<td>1100 Refractive Index Detector Reference Manual</td>
<td>G1362A_RM.PDF</td>
</tr>
<tr>
<td>1100 Fluorescence Detector Reference Manual</td>
<td>G1321A_RM.PDF</td>
</tr>
<tr>
<td>1100 Control Module User Guide (part number G1323-90004)</td>
<td>G1323_UG.PDF</td>
</tr>
<tr>
<td>1100 Control Module Quick Reference (part number G1323-90005)</td>
<td>G1323_QR.PDF</td>
</tr>
<tr>
<td>Installing your ChemStation (part number G2170-90004)</td>
<td>UNDER_2D.PDF</td>
</tr>
<tr>
<td>Understanding your ChemStation (part number G2070-9112)</td>
<td>INST_LC.PDF</td>
</tr>
</tbody>
</table>
Installing your System

How to install your system
Unpacking the Modules

Damaged Packaging

If the delivery packaging shows signs of external damage, please call your sales and service office immediately. Inform your service representative that something may have been damaged during shipment.

CAUTION
If there are signs of damage, please do not attempt to install the damaged module.

Delivery Checklist

Ensure all parts and materials have been delivered with the modules. The delivery checklist is shown in Table 4. Please report missing or damaged parts to your local sales and service office.

Table 4

<table>
<thead>
<tr>
<th>Description</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>PC, monitor, printer, software,...</td>
<td>as ordered</td>
</tr>
<tr>
<td>JetDirect card (LAN)</td>
<td>1</td>
</tr>
<tr>
<td>LAN cross-over cable (10 feet long, part number 5183-4649)</td>
<td>1</td>
</tr>
<tr>
<td>System Manual</td>
<td>1</td>
</tr>
<tr>
<td>1100 modules (G1310A Isocratic Pump with solvent container, G1314A VW Detector with standard flow cell, G1328A Manual Injector)</td>
<td>1 each</td>
</tr>
<tr>
<td>Power cable</td>
<td>1 per 1100 module</td>
</tr>
<tr>
<td>CAN cable (1 m long, part number 5181-1519 or 0.5 m long, part number 5181-1516)</td>
<td>1 per 1100 module</td>
</tr>
<tr>
<td>Module Reference Manuals and Accessory kit (refer to modules’ reference manual)</td>
<td>1 per 1100 module</td>
</tr>
<tr>
<td>additional 1100 series modules (G1316A TCC, G1321A FLD, G1362A RID, G1323B Control Module)</td>
<td>as ordered - not part of G1380AA</td>
</tr>
</tbody>
</table>

18
Installing your System

Installing the JetDirect card into the VW detector

The 1100 series VW detector should be the module that is connected via LAN to the Value Solution ChemStation PC. Therefore a JetDirect card must be installed into this module.

**CAUTION**

Electronic boards and components are sensitive to electronic discharge (ESD). In order to prevent damage always use an ESD protection (for example, the ESD wrist strap from the module’s accessory kit) when handling electronic boards and components, see “Using the ESD Strap” in the module’s Reference Manual.

1. Loosen the two screws that fix the metal cover at the rear of the module and remove it.
2. Slide the JetDirect card into the slot and fix the two screws.

**Figure 1** Location of the JetDirect card
Installing your System

Choose the optimal stack configuration

**Figure 2**
You can ensure optimum performance by installing the system in the following configuration. This configuration optimizes the system flow path and ensures minimum delay volume.

![Diagram](image)

**NOTE**
An additional thermostatted column compartment (G1316A) must be located between the pump and the detector.
An additional detector (G1321A FLD or G1362A RID) must be located under the VW detector to be the last in the flow path (pressure limit on those flow cells).
An additional local control module (G1323B) may be added to one of the modules.
Installing your System

Installing the Manual Injector and 1100 series HPLC modules

NOTE
Assure that all power switches on the 1100 HPLC modules are in OFF (out) position.

NOTE
The manual injector can be installed at the left- or right-hand side of the instrument stack.

1 Place the base plate on the bench.
2 Screw the mounting pole into one of the three holes in the base plate.
3 Ensure the two plugs are positioned at the rear of the base plate. If required, remove the plugs, and insert them in the correct position (see Figure 3).

Figure 3 Installing the Mounting Pole

4 Slide the manual injector onto the mounting pole (see Figure 6). Tighten the mounting screw.
Installing your System

Installing the Manual Injector and 1100 series HPLC modules

**Figure 4** Installing the Manual Injector

5 Install other system modules on top of the manual injector base plate (see Figure 5).

**Figure 5** Installing the System (front view of 1100 system)
Installing your System
Installing the Manual Injector and 1100 series HPLC modules

6 Connect the position-sensor cable to the start cable (see Figure 6).
7 Connect the start cable to an APG-remote connector at the rear of one of the modules.
8 Connect the CAN-bus cable for the inter-modular communication.
9 Connect the LAN cross-over cable to the detector’s interface board (JetDirect card).
10 Connect the power cords (AC) to the 1100 modules line input.

Figure 6 Installing the Start Cable (rear view of 1100 system)
Flow Connections at the Manual Injector

**WARNING**
When opening capillary or tube fittings, solvents may leak out. Please observe appropriate safety procedures (for example, goggles, safety gloves and protective clothing) as described in the material handling and safety data sheet supplied by the solvent vendor, especially when toxic or hazardous solvents are used (see also “Leak Drainage of the Manual Injector” on page 25).

1. Connect the pump outlet capillary to port 2.
2. Connect the column outlet capillary to port 3.
3. Connect the sample loop between ports 1 and 4.
4. Connect one vent capillary (supplied with valve) to port 5, and one to port 6.

**CAUTION**
The outlets of the two vent capillaries (ports 5 and 6) and the needle port must be at the same level to prevent siphoning (see Figure 8).

---

**Figure 7** Flow Connections

![Flow Connections Diagram](image-url)
Installing your System

Flow Connections at the Manual Injector

**Figure 8** Vent Capillaries

**Figure 9** Leak Drainage

**WARNING**
Check the manual injector fittings periodically for signs of leakage. In the event of a leak, solvent will drop into the leak channel in the base plate, from where it is channelled to the front and back of the base plate.
Flow Connections at the Isocratic Pump

Preparations
Pump is installed in the HPLC system.

Parts required
Other modules
Parts from accessory kit G1310-68705
Two wrenches 1/4–5/16 inch for capillary connections

WARNING
When opening capillary or tube fittings, solvents may leak out. Please observe appropriate safety procedures (for example, goggles, safety gloves and protective clothing) as described in the material handling and safety data sheet supplied by the solvent vendor, especially when toxic or hazardous solvents are used.

1. Remove the front cover by pressing the snap fasteners on both sides.
2. Place the solvent cabinet on top of the isocratic pump (Figure 10 on page 27).
3. Place the bottle containing your solvent into the solvent cabinet and place the bottle-head assembly into the bottle.
4. Connect the solvent tube from the bottle-head assembly to the inlet adapter of the active inlet valve. Fix the tube in the clips of solvent cabinet and isocratic pump.
5. Using a piece of sanding paper connect the waste tubing to the purge valve and place it into your waste system.
6. Connect the outlet capillary (isocratic pump to manual injection valve) to the outlet of the purge valve.
Installing your System

*Flow Connections at the Isocratic Pump*

**Figure 10** Flow Connections of the Isocratic Pump

- Bottle-head assembly
- Solvent tube
- Solvent cabinet
- Tube clip
- Outlet ball valve
- Pump head
- Purge valve
- Active inlet valve
- Outlet capillary to manual injector
- Waste
Flow Connections to the VW Detector

**Preparations**
Detector is installed in the HPLC system.

**Parts required**
- Other modules
- Parts from accessory kit G1314-68705
- Two wrenches 1/4–5/16 inch for capillary connections

**WARNING**
When opening capillary or tube fittings, solvents may leak out. Please observe appropriate safety procedures (for example, goggles, safety gloves and protective clothing) as described in the material handling and safety data sheet supplied by the solvent vendor, especially when toxic or hazardous solvents are used.

**NOTE**
The flow cell is shipped with a filling of isopropanol (also recommended when the instrument and/or flow cell is shipped to another location). This is to avoid breakage due to subambient conditions.

1. Press the release buttons and remove the front cover to have access to the flow cell area.
2. Remove the metal cover from the flow cell area and install the flow cell. Tighten the cell screws (see Figure 11 on page 29).
3. Connect the column-detector capillary to the flow cell inlet connector.
4. Connect the other end of the column-detector capillary to the column.
5. Connect the PEEK waste capillary to the flow cell outlet connector (the PEEK capillary introduces a small back pressure to the flow cell for better baseline stability).
6. Connect the corrugated waste tube to the waste outlet of the detector leak handling system.
7. Route the waste tubing to your waste container.
Figure 11  Flow connections to the VW detector

- Connect inlet capillary from column
- Connect waste capillary to waste or additional detector
- Thumb screws

**NOTE**
If you add a Thermostatted Column Compartment (G1316A TCC), place this module above the VW detector.

**NOTE**
If you add another detector (G1362A RID or G1321A FLD), place this detector below the VW detector and connect its flow cell after the VWD cell (lower pressure limit on these flow cells).
Installing the ChemStation Hardware

1. Place the Value Solution ChemStation PC next to 1100 system. Allow enough space between the 1100 modules and the PC for maintenance.
2. Place the Monitor on top of the PC.
3. Place a printer where needed.
4. Connect the LAN cross-over cable from the detector’s JetDirect card (see “Installing the JetDirect card into the VW detector” on page 19) and the PC’s LAN connector.
5. Connect the monitor cable between monitor and PC.
6. Connect mouse and keyboard to the PC.
7. Connect the printer cable between PC and printer (if available).
8. Connect power cords to the PC, monitor and printer (if available).

Figure 12 Installing the ChemStation PC (rear view)
Installing your System

Booting the PC for the First Time

The Value Solution ChemStation PC has been factory pre-configured. This means that
- the operating system Windows NT 4.0,
- the Value Solution ChemStation software inclusive its required utilities, and
- further application

are already loaded on the hard disk. This configuration has been optimized for running the Value Solution ChemStation.

1 Turn on the monitor and the PC.

2 The PC will boot and stop at the Login Information screen. The pre-configured user is 'Administrator' and requires the password provided with your PC.

Note your password here: ______________

3 Then press OK.

4 The next screen shows 'End User Licence Agreement' information. Read the information and select I Agree and the PC will complete the boot process.

NOTE
All activities necessary to change the user profile/logon under Windows NT are not subject of this manual. Refer to the Windows NT documentation.
Installing the LAN Communication

Your instrument HPLC system is operated via a standard LAN crossover connection between the Value Solution ChemStation PC and the 1100 detector (VWD). You must ensure proper communication between the PC and the analytical instruments. The communication uses the TCP/IP protocol. For the configuration of the JetDirect card, that is used to connect the analytical instrument to the LAN, the Boot Strap protocol is used, which requires a Bootp Server.

NOTE
The TCP/IP protocol and the Bootp Server program are already factory pre-installed.

Configuring the CAG Bootp Server Program

NOTE
Assure that the VW detector (with JetDirect card installed and connected to the PC) is powered off.

1 The CAG Bootp Server program is placed in the start-up group and automatically is started during the boot process of the PC. It's minimized and located in the task bar.

2 Open the Bootp Server window by clicking on it in the task bar.

3 Now turn on the VW detector on the LAN and view the Bootp Server window. After 2 - 10 seconds the Bootp Server will display the request from the JetDirect card with the hardware (MAC) address (this information is also stored in the file trace.txt in the bootp server directory, if Log to Disk is enabled), see Figure 13.

The MAC or hardware address of the JetDirect card is a world wide unique identifier. No other network device will have the same hardware address.
Installing your System

Installing the LAN Communication

**Figure 13**  
Bootp Server

4 Select **Configure -> Add Entry** to configure the Bootp Manager. The drop down box “MAC address” lists automatically the MAC address of the installed JetDirect card (Figure 14).

If no hardware address is found, select **Cancel** and repeat step 3 and step 4.

5 Specify the Host Name LC1100, the IP address 10.10.10.2, the Comment, e.g. LC1100 and the Subnet Mask 255.255.0.0.

**NOTE**  
If you are working in a network system, you may need other addresses.

**Figure 14**  
Add Bootp Entry

6 Exit with **OK**.

7 Select **Configure -> Bootp Manager**. All entries made above are shown in Figure 15.
Installing your System

Installing the LAN Communication

Figure 15 Bootp Manager

8 Press *Apply* to activate the changes. The Bootp Manager now shows the entries made above.

9 Press *OK* to exit the Bootp Manager and power cycle the VW detector, to force it to send a new bootp request again. This time, the MAC address will be recognized by the Bootp Server (Figure 16). It will send the configured IP address and subnet mask information which are necessary for communication to the JetDirect card.

Figure 16 Bootp Server - 1100 module found
Configuring the Analytical System

This chapter describes how to configure the communication of your Value Solution ChemStation software with your LC instruments using a LAN connection with the ChemStation Configuration Editor. For details refer to the Installing your ChemStation manual supplied with your system.

The following example describes how to configure an 1100 Series system with modules interconnected by the 1100 Series controller area network (CAN) that will automatically configure each module.

NOTE

Microsoft TCP/IP protocol must be installed and configured on the Value Solution ChemStation PC. In addition a Bootp Server must be running, which was configured for the instruments to be used.

1. Open the ChemStation start-up group or select Start -> Programs -> ChemStation.

Figure 17  ChemStation Program Folder

- See step 3 "Adding the licence number" on page 36
- See step 2 "Configuration Editor" on page 36
- See step 5 "Installation Qualification" on page 36
- See step 5 "Starting an Online Session" on page 37
Installing your System

Configuring the Analytical System

2 Start the ChemStation Configuration Editor (see Figure 17) and type in the IP address of the JetDirect card (10.10.10.2, see also “Configuring the CAG Bootp Server Program” on page 32) and press OK.

3 Start the ChemStation Add Licences Editor (see Figure 17). Add a valid 10-digit licence number (provided with your Value Solution ChemStation Software) and press the Add button.

Figure 18 Adding the licence number

4 Start the ChemStation Installation Qualification (see Figure 17). Now the ChemStation installation will be verified for completeness. You may save this report as Reference (File -> Save all as). For details refer to your Installing your ChemStation manual.

Figure 19 Installation Qualification
5 When you start the Instrument 1 Online Value Solution ChemStation for the first time (refer to Figure 17 on page 35), the “Configure 1100 System Access” dialog box displays the 1100 modules detected during instrument initialization (see Figure 20). 1100 modules that have been recognized are listed as “online” (indicated by a green icon) along with their serial numbers. 1100 modules that have not been detected are marked “offline”. You can selectively take certain modules out of the software configuration, e.g. if your 1100 system includes two 1100 detectors and your next analysis only requires one of them.

NOTE The section “System Restrictions” on page 11 describes the limitations on usable 1100 series modules.

The unneeded 1100 module may then remain turned off but still be connected. After modifying the configuration, you must restart the Value Solution ChemStation. The “Configure 1100 System Access” dialog is available from the Instrument menu in the “Method and Run-Control” view, when view Full Menu is displayed.

Figure 20 The Configure 1100 System Access dialog allows to selectively include detected 1100 modules into the configuration.

6 Press OK and the software continues the loading process.
Installing your System

Configuring the Analytical System

Figure 21 shows the initial Value Solution ChemStation screen.

Figure 21
ChemStation Online Entry Screen

1. Deselect Show on Start unless you want to see this Welcome screen at every ChemStation start.
2. Exit the Welcome box or read What's New or start the Tutorial session.
3. Select View -> Full Menu and System Diagram to have all menus and the system diagram available.
4. Your Value Solution ChemStation is now ready for operation.

NOTE
Detailed information about the use of the Value Solution ChemStation software can be found in the Value Solution ChemStation documentation.

38
Setting up an Analysis

How to analyze the isocratic standard sample using a single injection analysis
Setting up an Analysis

This chapter can be used for three purposes:

- preparing the system,
- to learn the set up of an HPLC analysis and
- to use it as an instrument check to demonstrate that all modules of the system are correctly installed and connected. It is not a test of the instrument performance.
Before Using the System

Solvent Information

Observe recommendations on the use of solvents in chapter “Solvents” in the pump’s reference manual.

Priming and Purging the System

When the solvents have been exchanged or the pumping system has been turned off for a certain time (for example, overnight) oxygen will re-diffuse into the solvent channel between the solvent reservoir, vacuum degasser (when available in the system) and the pump. Solvents containing volatile ingredients will slightly lose these. Therefore priming of the pumping system is required before starting an application.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Solvent</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>After an installation</td>
<td>Isopropanol</td>
<td>Best solvent to flush air out of the system</td>
</tr>
<tr>
<td>When switching between reverse phase and normal phase (both times)</td>
<td>Isopropanol</td>
<td>Best solvent to flush air out of the system</td>
</tr>
<tr>
<td>After an installation</td>
<td>Ethanol or Methanol</td>
<td>Alternative to Isopropanol (second choice) if no Isopropanol is available</td>
</tr>
<tr>
<td>To clean the system when using buffers</td>
<td>Bidistilled water</td>
<td>Best solvent to re-dissolve buffer crystals</td>
</tr>
<tr>
<td>After a solvent change</td>
<td>Bidistilled water</td>
<td>Best solvent to re-dissolve buffer crystals</td>
</tr>
<tr>
<td>After the installation of normal phase seals (P/N 0905-1420)</td>
<td>Hexane + 5% Isopropanol</td>
<td>Good wetting properties</td>
</tr>
</tbody>
</table>
Setting up an Analysis

Before Using the System

NOTE
The pump should never be used for priming empty tubings (never let the pump run dry). Use a syringe to draw enough solvent for completely filling the tubings to the pump inlet before continuing to prime with the pump.

1. Open the purge valve of your pump (by turning it counterclockwise) and set flow rate to 3-5 ml/min.
2. Flush all tubes with at least 30 ml of solvent.
3. Set flow to required value of your application and close the purge valve. Pump for approximately 10 minutes before starting your application.
Requirements and Conditions

What You Will Need
Table 6 lists the items you need to have for the set up of the analysis. Some of these are optional (not required for the basic system).

<table>
<thead>
<tr>
<th>Table 6 What you will need</th>
</tr>
</thead>
<tbody>
<tr>
<td>HP 1100 Instrument Isocratic pump</td>
</tr>
<tr>
<td>Manual Injector</td>
</tr>
<tr>
<td>Detector - VWD, Standard flow cell installed</td>
</tr>
<tr>
<td>ChemStation or Control Module (optional)</td>
</tr>
<tr>
<td>Column: Zorbax Eclipse XDB-C8 150 x 4.6 mm i.d.</td>
</tr>
<tr>
<td>Part No. 993967-902 or Part No. 5063-6600</td>
</tr>
<tr>
<td>Standard: Part No. 01080-68704</td>
</tr>
<tr>
<td>0.15 wt.% dimethylphthalate, 0.15 wt.% diethylphthalate, 0.01 wt.% biphenyl, 0.03 wt.% o-terphenyl in methanol</td>
</tr>
</tbody>
</table>

Conditions
A single injection of the isocratic test standard is made under the conditions given in Table 7:

<table>
<thead>
<tr>
<th>Table 7 Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow: 1.5 ml/minute</td>
</tr>
<tr>
<td>Stoptime: 6 minutes</td>
</tr>
<tr>
<td>Solvent: 100% (30% water/70% Acetonitrile)</td>
</tr>
<tr>
<td>Temperature Ambient</td>
</tr>
<tr>
<td>Wavelength VWD: 254 nm</td>
</tr>
<tr>
<td>Injection Volume 2 µl (VWD)</td>
</tr>
</tbody>
</table>
Setting up an Analysis

Requirements and Conditions

Typical Chromatogram

A typical chromatogram for this analysis is shown in Figure 22 on page 44. The exact profile of the chromatogram will depend on the chromatographic conditions. Variations in solvent quality, column packing, standard concentration and column temperature will all have a potential effect on peak retention and response.

Figure 22  Typical Chromatogram with UV-detector

Optimization of the System

The settings used for this analysis are specific for this purpose. For other applications the system can be optimized in various ways. Please refer to the section “Optimizing” in the your module’s Reference Manual.

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Preparing the HPLC System

1. Turn on the Value Solution ChemStation PC and the monitor.
2. Start the Bootp server.
3. Turn on the 1100 series HPLC modules.
4. Start the Value Solution ChemStation software. If the pump and VW detector are found the ChemStation screen should look like shown in Figure 23.
5. Turn on the detector lamp and pump by clicking the System On button or the buttons below the module icons on the graphical user interface (GUI).

Figure 23 Turning on the HPLC Modules
Setting up an Analysis

Preparing the HPLC System

6 Purge the pump. For more information see “Priming and Purging the System” on page 41.

7 Allow the detector at least 15 minutes to provide a stable baseline.

8 For the isocratic pump, fill the solvent bottle with the mixture of HPLC-grade bidistilled water (30 %) and acetonitrile (70 %).

9 Click on the Load Method button and select DEF_LC.M and press OK. The default LC method parameters are transferred into the 1100 modules.

Figure 24 Loading Default LC Method

Refer to step 10 “Setting Parameters” on page 47
Setting up an Analysis
Preparing the HPLC System

10 Click on the pump and VW detector icon (Figure 24 on page 46) to open the Setup of those modules. Enter the parameters mentioned under “Conditions” on page 43.

Figure 25 Setting Parameters

Enter:
Flow - 1.50 ml/min
Stop Time - 6 minutes
Solvent Description

Enter:
Wavelength - 254 nm
Peak width - 2 s
Stop Time - same as pump

11 Pump the water/acetonitrile (30/70 %) mobile phase through the column for 10 minutes for equilibration.
Setting up an Analysis

Preparing the HPLC System

12 Click the button \( \text{Add} \) and select Change... to open the Signal Plot information. Select the Isocratic Pump: Pressure and the VWD A: Absorbance at 254 nm as signals. Change the Y-range for the VWD to 1 mAU. The X-axis range should be 20 minutes. Press OK to exit this screen.

The Online Plot (Figure 27) shows both, the pump pressure and the VWD absorbance signals. Pressing Adjust the signals can be reset to the offset value and Balance would do a balance on the VWD.
Setting up an Analysis
Preparing the HPLC System

13 If both baselines are stable, set the Y-range for the VWD signal to 300 mAU.
14 Select the menu item RunControl -> Sample Info and enter information about this application (Figure 28). Press OK to leave this screen.

**Figure 28** Sample Information

Enter:
- Operator Name
- Filename
- Subdirectory
- Sample Name
- Comment

15 Fill the content of an isocratic standard sample ampoule into a vial and seal the vial with a cap.
16 Fill the injection syringe with the isocratic standard sample.
Running the Sample and Verifying the Results

1. At the Manual Injector move the handle into the load-position.
2. Take the injection syringe and insert its tip into the Manual Injector port.
3. Inject the sample into the injection port (loop).
4. Move the handle into the inject-position. This will start the 1100 modules and the online plot on the Value Solution ChemStation will show the resulting chromatogram.

Figure 29 Chromatogram with Isocratic Test Sample on VWD

NOTE
Information about using the Data Analysis functions can be obtained from the Using your ChemStation manual supplied with your system.
Troubleshooting your System

Introduction to the diagnostic features built into your system
This chapter will introduce you to the diagnostic features built into your system. It is an overview and more details can be found in the system component’s Reference Manuals.
Diagnostic Functions

Status Information on the 1100 Modules

LEDs

The 1100 modules provide two LEDs each.

- A green LED is built into the power switch and indicates that the power supply has been turned on. It does not indicate, whether all voltages are present or not.
- A multi-color LED at the top-right of the module, indicates the actual state of the module/system.

  **RED**: indicates an error condition in the module/system (e.g. leak).
  **YELLOW**: indicates a not-ready condition (e.g. lamp is off)
  **LED OFF**: the system is ready (ChemStation is GREEN)
  **GREEN**: the system is in run mode (ChemStation is BLUE)

In case of an error condition, check for corresponding error messages in the system log or instrument error log, see Figure 31 on page 56.

Analog Signals

The isocratic pump and the variable wavelength detector provide an analog output, where module specific analog signals (pump: pressure, pressure ripple; VWD: absorbance signals, board temperature, …) can be selected and plotted to a connected recording device or routed into a data system (via A/D converter).

**NOTE**

For detailed information on error messages, signals and tests refer to the user interface help system and the module’s *Reference Manual, section Diagnostics.*
Online System Information

Online Messages
The user interface (Value Solution ChemStation or Control Module) provides certain messages (errors or not-ready conditions) online.

Depending on the actual state of the modules/system the color of the system changes.

- **RED**: indicates an error condition in the module/system (e.g. leak).
- **YELLOW**: indicates a not-ready condition (e.g. lamp is off)
- **LED OFF**: the system is ready (ChemStation is GREEN)
- **BLUE**: the system is in run mode

Signals
The isocratic pump and the variable wavelength detector provide module specific signals (e.g. pump: pressure, pressure ripple; VWD: absorbance signals, board temperature, …) that can be monitored online (may vary depending on the user interface in use).

**NOTE**
For detailed information on error messages, signals and tests refer to the user interface help system and the module’s Reference Manual, section Diagnostics.
Troubleshooting your System

Online System Information

Figure 30 Online System Information

Not Ready Information  Instrument Actuals

Instrument Logbook
Troubleshooting your System

Instrument Logbook and Help Information

The user interface (Value Solution ChemStation or Control Module) provides an instrument logbook where errors, not-ready conditions and all activities are recorded. In case of an error condition, check for corresponding error messages in the system log. Just by double-clicking the error message opens another window with help-information on the problem, see Figure 31.

Figure 31 Online Error Information

The active-inlet valve in the pump is missing or defective. The processor checks the presence of the active-inlet valve connection every 2 seconds. If the connector is not detected by the processor, the error message is generated.

Probable Causes:
- Disconnected or defective cable.
- Defective connection cable (front panel to PFA board).
- Defective active-inlet valve.

Suggested Actions:
- Ensure the pin of the active-inlet valve connector is not damaged. Ensure the connector is seated securely.
- Exchange the connection cable.
- Exchange the active inlet valve.

Error Information

Instrument Actuals

Instrument Logbook

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Troubleshooting your System

Using Module Diagnosis

Select View Diagnosis. Figure 32 shows the VW detector detailed diagnostic screen (on the overall diagram select the VWD and select Show Module Details). Via Update Variables Display you have access to the module logbooks, module tests and maintenance entries. Clicking on an assembly (e.g. lamp) opens a sub-menu. Selecting Update Variables Display displays lamp related information (e.g. lamp on time, lamp ignitions, voltages, etc.).

Figure 32 Module Diagnosis
Troubleshooting your System

Using Module Tests

Select *Show Module Tests*. Figure 33 shows the VW detector module test screen. From the procedure list select a test (e.g. *Intensity Test*) and press *Start*. The tests runs and outputs an intensity spectrum and the test results. If a test fails (or part of it) you can select on the troubleshooting guide a symptom and you will get a possible cause. Use the module’s *Reference Manual* to correct the problem.

*Figure 33 Module Tests*
Problems during the Installation

In case of problems during the installation follow the hints in the table below:

<table>
<thead>
<tr>
<th>Symptom</th>
<th>What you can do</th>
</tr>
</thead>
</table>
| No communication between PC and 1100 modules | □ JetDirect card installed in the detector? (see page 19)  
□ LAN cable connected? (see page 30)  
□ Bootp Server running? (see page 32)  
□ IP addresses of JetDirect card set correctly? (see page 33)  
□ ChemStation Configuration Editor set correctly? (see page 35)  
□ 1100 System Access set correctly? (see page 37) |
Troubleshooting your System

Problems during the Installation
Repair and Maintenance

What you should know about your system
Repair and Maintenance

Repair and Parts Information for the 1100 series HPLC Modules

There is no specific repair and parts information other than that available in the Reference Manuals of the 1100 series HPLC modules, sections “Repairing the …” and “Identifying Parts and Materials”.

---

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Firmware Update on 1100 Modules

The installation of new firmware is required

- if a new version solves problems of the currently installed version.
- if the version of firmware on the new main board after an exchange of the board is older than the one previously installed.

To upgrade the module’s firmware follow the procedures and instructions given on the internet addresses:


http://www.chem.agilent.com section Technical Support

To download and install always the newest available version of firmware on
Deinstallation and Reinstallation of the ChemStation

The reinstallation of the Value Solution ChemStation software may be required in case of other problems during normal operation.

The steps below will give a quick overview on the actions:

1. Backup all the important data, specific methods and sequences located under \HPCHEM\...

2. Open the Add/Remove Programs Properties of the Windows NT Control Panel (Start -> Settings - Control Panel). Select the ChemStation application and press Add/Remove.

3. Rename the directory C:\HPCHEM to HPCHEM.OLD.

4. Open the C:\WINNT\WIN.INI file (e.g. with the SYSEDIT program) and delete the section [PCS] until the next [...] section.

5. Reboot the PC and delete the HPCHEM.OLD folder.

Recovering from an Operating System Crash

The re-installation of the complete operating system is required after a system crash or in case of other problems during normal operation.

**WARNING**

The procedure below will overwrite the complete system. This means all existing data on the PC will be lost. Any sensitive data must be backed on a different media prior to this process.

**What you need**

- Recovery CD
- Password for NT
- Value Solution ChemStation software CD
- Licence number

**Process steps**

1. Installation of Windows NT
2. Installation of TCP/IP protocol
3. Re-installation of Windows NT service pack
4. Installation of Value Solution ChemStation software
5. Installation of Bootp Server program
6. Configuring the CAG Bootp Server program

**Step 1: Installation of Windows NT**

1. Insert the recovery CD into the CD-ROM drive.
2. Turn on the PC.
3. Press Enter to start the installation of the Windows NT operating systems.
Repair and Maintenance

Recovering from an Operating System Crash

4 The PC will reboot and stop at the Login Information screen. The pre-configured user is ‘Administrator’ and requires the password provided with your PC.

5 Then press OK.

6 The next screen shows ‘End User Licence Agreement’ information. Read the information and select I Agree and the PC will complete the boot process.

**Figure 35** Licence Agreement

---

**Step 2: Installation of TCP/IP protocol**

1 From the Start menu in the Task Bar, select Start -> Settings -> Control Panel.

2 Select Network, to open the Network Properties dialog box.

3 Select the Adapters tab to check if a network card is configured on your system (Figure 36).

4 Select the Protocols tab and check if a TCP/IP protocol is already installed. If no TCP/IP protocol is installed (Figure 37), select Add to add a network protocol stack, select TCP/IP Protocol and press OK.
Repair and Maintenance

Recovering from an Operating System Crash

Figure 36  TCP/IP Configuration Screens - Adapters

Figure 37  TCP/IP Configuration Screen - adding TCP/IP Protocol
Repair and Maintenance

Recovering from an Operating System Crash

5 Select No to the usage of DHCP and use C:\I386 as the location of your Windows NT 4.0 installation files on your hard disk.

After the file copying is finished, select the Bindings tab, to allow NT to associate the TCP/IP protocol with your installed network adapter.

6 Open the Protocols tab again and select TCP/IP from the list of installed protocols. Press the Properties button to configure the TCP/IP, see Figure 38 on page 68.

![Figure 38: TCP/IP Configuration Screen - Changing Properties](image)

7 Specify as IP address 10.10.10.1 and for the subnet mask 255.255.0.0.

**NOTE**

If you are working in a network system, you may need other addresses.

8 Now select the bindings tab again, to allow the operating system to associate the configured protocols to the configured network adapters. Select OK and restart your PC to activate the changes.
Repair and Maintenance

Recovering from an Operating System Crash

**Step 3: Re-installation of Windows NT Service Pack**

*NOTE*

After the PC has been re-started it is necessary to re-install the Windows NT Service Pack to update older file versions.

1. Run the SP4I386.EXE from directory C:\I386\SP4.
2. Restart your PC to activate the changes.

**Step 4: Installation of Value Solution ChemStation**

1. Insert your Value Solution ChemStation software CD into the CD-ROM drive.
2. Select a path, usually C:\HPChem.
3. Choose a program folder, usually ChemStations.
4. Add the licence number of your Value Solution ChemStation software, see “Adding the licence number” on page 36.
5. Add the IP address of the JetDirect card, located in the VW detector. Type in /G20/G19/G17/G20/G19/G17/G20/G19/G17/G21, see “ChemStation Program Folder” on page 35.
6. At the end of the installation you are asked to reboot to make the changes active.

**Step 5: Installation of the Bootp Server Program**

1. Insert your Value Solution ChemStation software CD into the CD-ROM drive.
2. From the Windows Start menu in the Task Bar, select Start -> Run and browse for E:\Bootp\Setup.exe. Select it and run it. The Bootp Server program will be installed now.

**Step 6: Configuring the CAG Bootp Server Program**

*NOTE*

Assure that the VW detector (with JetDirect card installed and connected to the PC) is powered off.

The CAG Bootp Server program is placed in the start-up group and automatically is started during the boot process of the PC. It's minimized and located in the task bar.
Repair and Maintenance

Recovering from an Operating System Crash

1. Open the Bootp Server window by clicking on it in the task bar.

2. Now turn on the VW detector on the LAN and view the Bootp Server window. After 2 - 10 seconds the Bootp Server will display the request from the JetDirect card with the hardware (MAC) address (this information is also stored in the file trace.txt in the bootp server directory, if Log to Disk is enabled), see Figure 39.

The MAC or hardware address of the JetDirect card is a world wide unique identifier. No other network device will have the same hardware address.

Figure 39 Bootp Server

3. Select Configure -> Add Entry to configure the Bootp Manager. The drop down box “MAC address” lists automatically the MAC address of the installed JetDirect card (Figure 40 on page 71).

If no hardware address is found, select Cancel and repeat step 2 and step 3.

4. Specify the Host Name HP1100, the IP address 10.10.10.2, the Comment, e.g. LC1100 and the Subnet Mask 255.255.0.0.

NOTE If you are working in a network system, you may need other addresses.
Repair and Maintenance

Recovering from an Operating System Crash

5 Exit with OK.

6 Select Configure -> Bootp Manager. All entries made above are shown in Figure 41.

7 Press Apply to activate the changes. The Bootp Manager now shows the entries made above.

8 Press OK to exit the Bootp Manager and power cycle the VW detector, to force it to send a new bootp request again. This time, the MAC address will be recognized by the Bootp Server (Figure 42). It will send the configured IP address and subnet mask information which are necessary for communication to the JetDirect card.
Repair and Maintenance

Recovering from an Operating System Crash

**Figure 42**

**Bootp Server - 1100 module found**

```
10/2/99 13:10:13 PM
Status: BOOTP Request received at outer most layer
Status: BOOTP Request received from hardware address: 00:00:070:1360
Status: Source 10.10.10.11 LC1100
Status: Host IP Address is: 10.10.10.1
Status: Reply to BOOTP Request has been sent
Status: BOOTP Request finished processing at outer most layer
```

For Help, press F1
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In This Book

This manual contains technical reference information about the Agilent 1100 Series HPLC value system. The manual describes the following:

- system overview, specifications and limitations,
- installing the system,
- setting up an analysis,
- diagnostics and troubleshooting, and
- repairing and maintenance.