



Agilent 1260 Infinity High Performance Degasser

User Manual



Agilent Technologies

Notices

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Hewlett-Packard-Strasse 8
76337 Waldbronn

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A **WARNING** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a **WARNING** notice until the indicated conditions are fully understood and met.

In This Guide

This manual covers the Agilent 1260 Infinity High Performance Degasser (G4225A).

1 Introduction

This chapter gives an introduction to the module, instrument overview and internal connectors.

2 Site Requirements and Specifications

This chapter provides information on environmental requirements, physical and performance specifications.

3 Installing the Degasser

This chapter gives information about the preferred stack setup for your system and the installation of your module.

4 Using the Degasser

This chapter explains how to use the module.

5 Optimizing Performance

This chapter gives hints on how to optimize the performance or use additional devices.

6 Troubleshooting and Diagnostics

This chapter gives an overview about the troubleshooting and diagnostic features and the different user interfaces.

7 Maintenance

This chapter describes the maintenance of the module.

In This Guide

8 Parts for Maintenance

This chapter provides information on parts for maintenance.

9 Identifying Cables

This chapter provides information on cables used with the Agilent 1200 Infinity Series modules.

10 Hardware Information

This chapter describes the degasser in more detail on hardware and electronics.

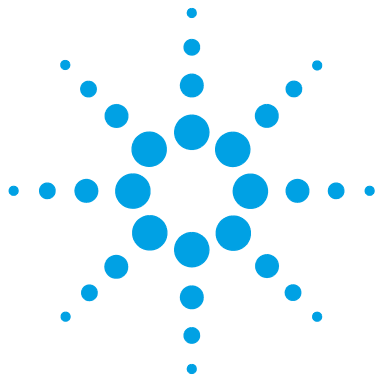
11 Appendix

This chapter provides addition information on safety, legal and web.

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1 Introduction

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This chapter gives an introduction to the module, instrument overview and internal connectors.



Introduction to the Vacuum Degasser

The Agilent 1260 Infinity High Performance Degasser, model G4225A, comprises four separate vacuum chambers with semipermeable tubings, a vacuum pump and control assembly. When the vacuum degasser is switched on, the control assembly turns on the vacuum pump, which generates a low pressure in the vacuum chambers. The pressure is measured by a pressure sensor. The vacuum degasser maintains the low pressure by a controlled leak in the air inlet filter and a regulation of the vacuum pump using the pressure sensor.

The LC pump draws the solvents from their bottles through the semipermeable tubes of the vacuum chambers. When solvents pass through the vacuum chambers any dissolved gas in the solvents permeates through the tubings into the vacuum chambers. The solvents will be degassed when leaving the outlets of the vacuum degasser.

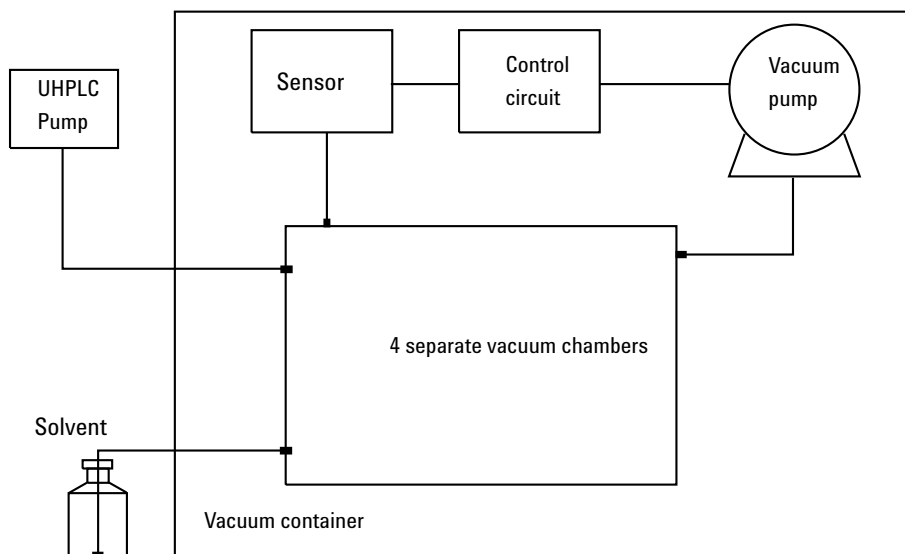


Figure 1 Overview (only one of the four solvent channels is shown)

System Overview

Leak and Waste Handling

The 1200 Infinity Series has been designed for safe leak and waste handling. It is important that all security concepts are understood and instructions are carefully followed.

1 Introduction

System Overview

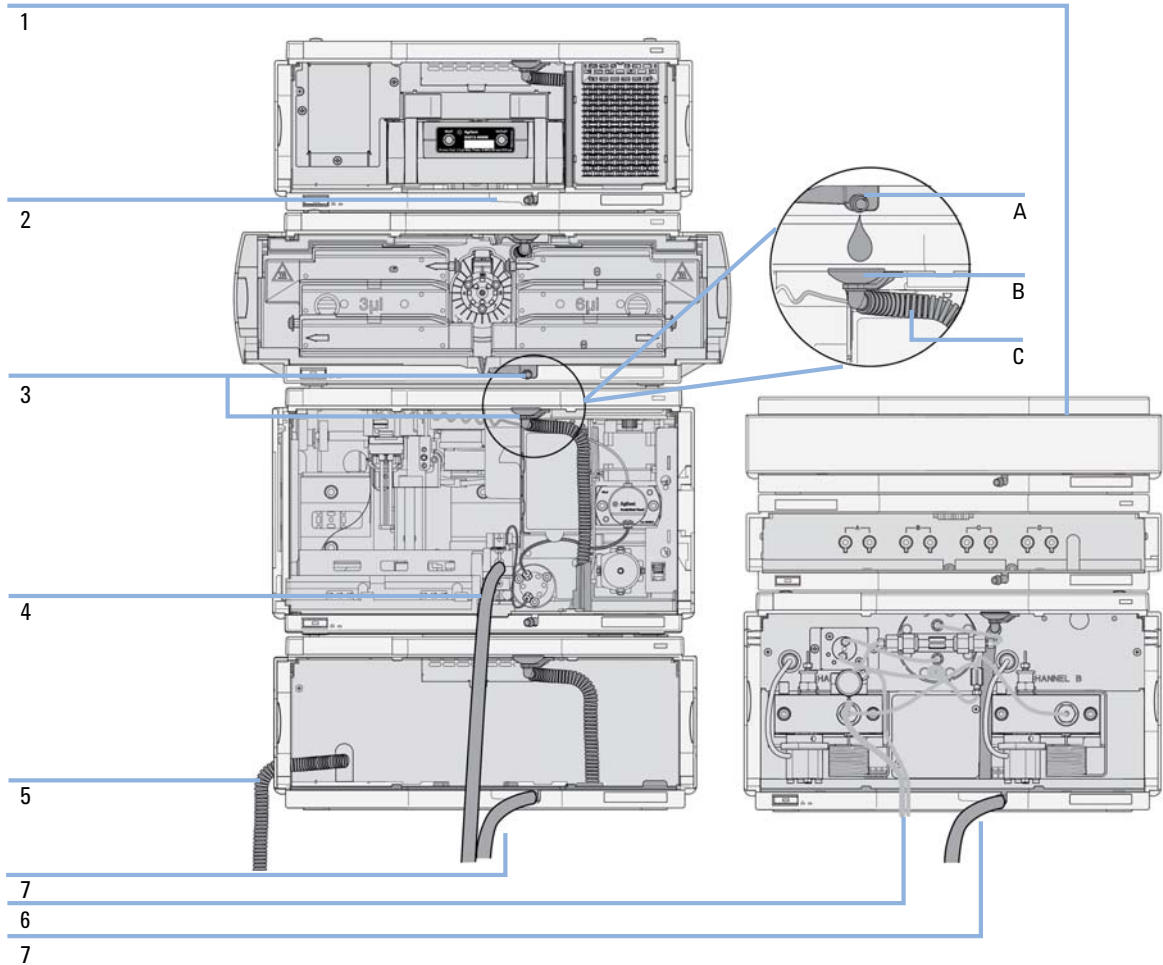


Figure 2 Leak and waste handling concept (overview - typical stack configuration as an example)

The solvent cabinet (1) is designed to store a maximum volume of 6 L solvent. The maximum volume for an individual bottle stored in the solvent cabinet should not exceed 2.5 L. For details, see the usage guideline for the Agilent 1200 Infinity Series Solvent Cabinets (a printed copy of the guideline has been shipped with the solvent cabinet, electronic copies are available on the Internet).

The leak pan (2) (individually designed in each module) guides solvents to the front of the module. The concept covers also leakages on internal parts (e.g. the detector's flow cell). The leak sensor in the leak pan stops the running system as soon as the leak detection level is reached.

The leak pan's outlet port (3, A) guides excessive overflow from one module to the next, as the solvent flows into the next module's leak funnel (3, B) and the connected corrugated waste tube (3, C). The corrugated waste tube guides the solvent to the next lower positioned module's leak tray and sensor.

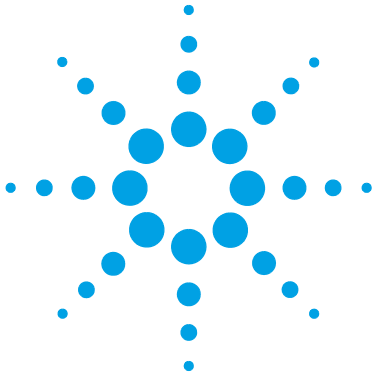
The waste tube of the sampler's needle wash port (4) guides solvents to waste.

The condense drain outlet of the autosampler cooler (5) guides condensate to waste.

The waste tube of the purge valve (6) guides solvents to waste.

The waste tube connected to the leak pan outlet on each of the bottom instruments (7) guides the solvent to a suitable waste container.

1 Introduction
System Overview



2 Site Requirements and Specifications

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This chapter provides information on environmental requirements, physical and performance specifications.



Site Requirements

A suitable environment is important to ensure optimal performance of the instrument.

Power Considerations

The module power supply has wide ranging capability. It accepts any line voltage in the range described in [Table 1](#) on page 17. Consequently there is no voltage selector in the rear of the module.

WARNING

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

→ Connect your instrument to the specified line voltage only.

WARNING

The module is partially energized when switched off, as long as the power cord is plugged in.

Repair work at the module can lead to personal injuries, e.g. electrical shock, when the cover is opened and the module is connected to power.

→ Always unplug the power cable before opening the cover.

→ Do not connect the power cable to the instrument while the covers are removed.

CAUTION

Inaccessible power plug.

In case of emergency it must be possible to disconnect the instrument from the power line at any time.

→ Make sure the power connector of the instrument can be easily reached and unplugged.

→ Provide sufficient space behind the power socket of the instrument to unplug the cable.

Power Cords

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

WARNING

Absence of ground connection or use of unspecified power cord

The absence of ground connection or the use of unspecified power cord can lead to electric shock or short circuit.

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

WARNING

Use of unsupplied cables

Using cables not supplied by Agilent Technologies can lead to damage of the electronic components or personal injury.

- Never use cables other than the ones supplied by Agilent Technologies to ensure proper functionality and compliance with safety or EMC regulations.
-

WARNING

Unintended use of supplied power cords

Using power cords for unintended purposes can lead to personal injury or damage of electronic equipment.

- Never use the power cords that Agilent Technologies supplies with this instrument for any other equipment.
-

Bench Space

The module dimensions and weight (see [Table 1](#) on page 17) allow you to place the module 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 air circulation and electric connections.

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

The module should be operated in a horizontal position.

Condensation

CAUTION

Condensation within the module

Condensation will damage the system electronics.

- Do not store, ship or use your module under conditions where temperature fluctuations could cause condensation within the module.
 - If your module was shipped in cold weather, leave it in its box and allow it to warm slowly to room temperature to avoid condensation.
-

Physical Specifications

Table 1 Physical Specifications

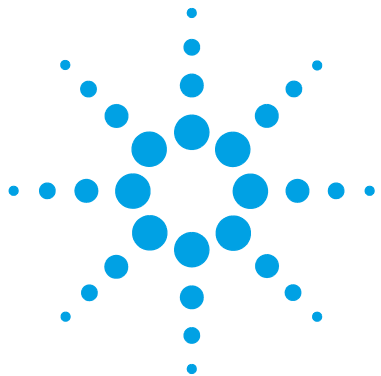
Type	Specification	Comments
Weight	5 kg (11 lbs)	
Dimensions (height × width × depth)	80 × 345 × 435 mm (3.1 × 13.5 × 17 inches)	
Line voltage	100 – 240 V~, ± 10 %	Wide-ranging capability
Line frequency	50 or 60 Hz, ± 5 %	
Power consumption	30 VA / 30 W / 102 BTU	Maximum
Ambient operating temperature	0 – 55 °C (32 – 131 °F) ¹	
Ambient non-operating temperature	-40 – 70 °C (-40 – 158 °F)	
Humidity	< 95 % r.h. at 40 °C (104 °F)	Non-condensing
Operating altitude	Up to 2000 m (6562 ft)	
Non-operating altitude	Up to 4600 m (15091 ft)	For storing the module
Safety standards: IEC, CSA, UL	Installation category II, Pollution degree 2	For indoor use only.

¹ This temperature range represents the technical specifications for this instrument. The temperatures mentioned may not be suitable for all applications and all types of solvent.

Performance Specifications

Table 2 Performance Specifications Agilent 1260 Infinity High Performance Degasser

Type	Specification
Number of solvent channels	4
Flow range	0 – 10 mL/min per channel
Internal volume per channel	0.45 mL per channel
Materials in contact with solvent	TFE/PDD Copolymer, FEP, PEEK
pH range	1 – 14



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This chapter gives information about the preferred stack setup for your system and the installation of your module.



Unpacking the Vacuum Degasser

Damaged Packaging

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

CAUTION

"Defective on arrival" problems

If there are signs of damage, please do not attempt to install the module. Inspection by Agilent is required to evaluate if the instrument is in good condition or damaged.

- Notify your Agilent sales and service office about the damage.
- An Agilent service representative will inspect the instrument at your site and initiate appropriate actions.

Delivery Checklist

Ensure all parts and materials have been delivered with your module. The delivery checklist is shown below. For parts identification please check the illustrated parts breakdown in “[Parts for Maintenance](#)” on page 65. Please report any missing or damaged parts to your local Agilent Technologies sales and service office.

Vacuum Degasser Delivery Checklist

p/n	Description
	Vacuum Degasser
	Power cord
G4800-64005	LC HW User Information + Utilities DVD
G1379-68705	Accessory Kit for 1260 Infinity High Performance Degasser

Optimizing the Stack Configuration

If your module is part of a complete Agilent Liquid Chromatograph, you can ensure optimum performance by installing the following configurations. These configurations optimize the system flow path, ensuring minimum delay volume.

One Stack Configuration

Ensure optimum performance by installing the modules of the Agilent 1260 Infinity LC System in the following configuration (See [Figure 3](#) on page 22 and [Figure 4](#) on page 23). This configuration optimizes the flow path for minimum delay volume and minimizes the bench space required.

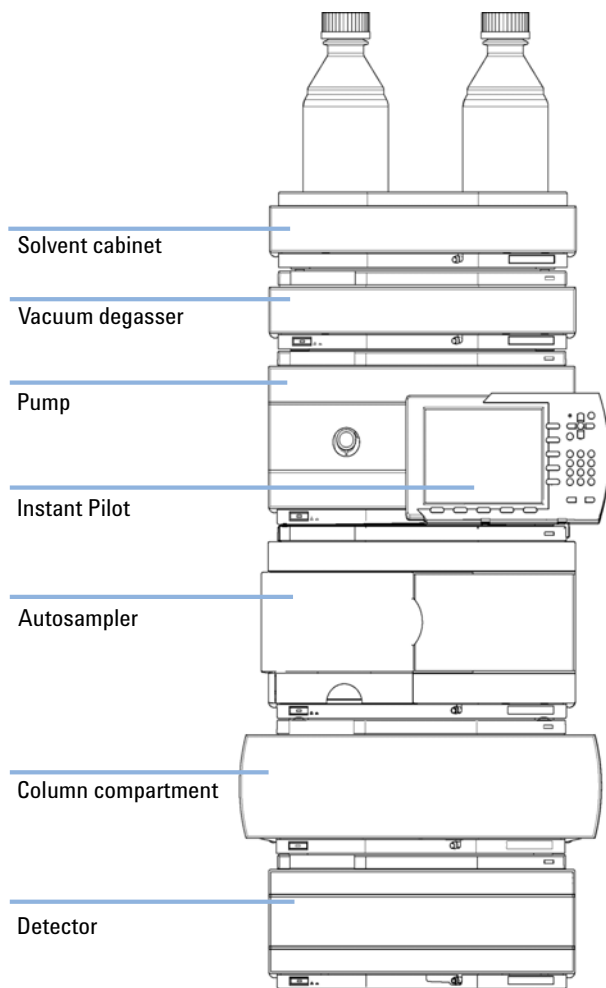


Figure 3 Recommended Stack Configuration for 1260 Infinity (Front View)

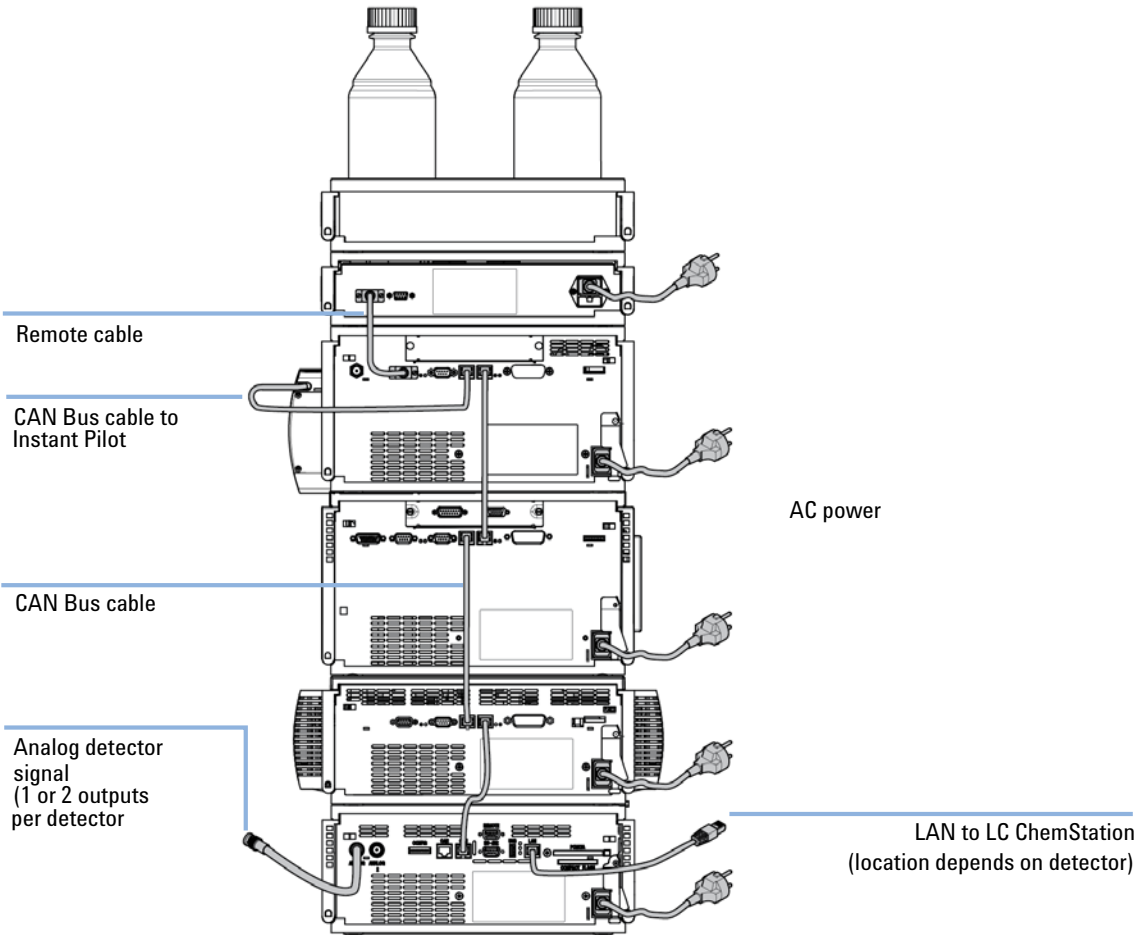


Figure 4 Recommended Stack Configuration for 1260 Infinity (Rear View)

Installation Information on Leak and Waste Handling

The Agilent 1200 Infinity Series has been designed for safe leak and waste handling. It is important that all security concepts are understood and instructions are carefully followed.

WARNING

Toxic, flammable and hazardous solvents, samples and reagents

The handling of solvents, samples and reagents can hold health and safety risks.

- When working with these substances observe appropriate safety procedures (for example by wearing goggles, safety gloves and protective clothing) as described in the material handling and safety data sheet supplied by the vendor, and follow good laboratory practice.
- The volume of substances should be reduced to the minimum required for the analysis.
- Never exceed the maximal permissible volume of solvents (6 L) in the solvent cabinet.
- Do not use bottles that exceed the maximum permissible volume as specified in the usage guideline for the Agilent 1200 Infinity Series Solvent Cabinets.
- Arrange the bottles as specified in the usage guideline for the solvent cabinet.
- A printed copy of the guideline has been shipped with the solvent cabinet, electronic copies are available on the Internet.

NOTE

Recommendations for Solvent Cabinet

For details, see the usage guideline for the Agilent 1200 Infinity Series Solvent Cabinets.

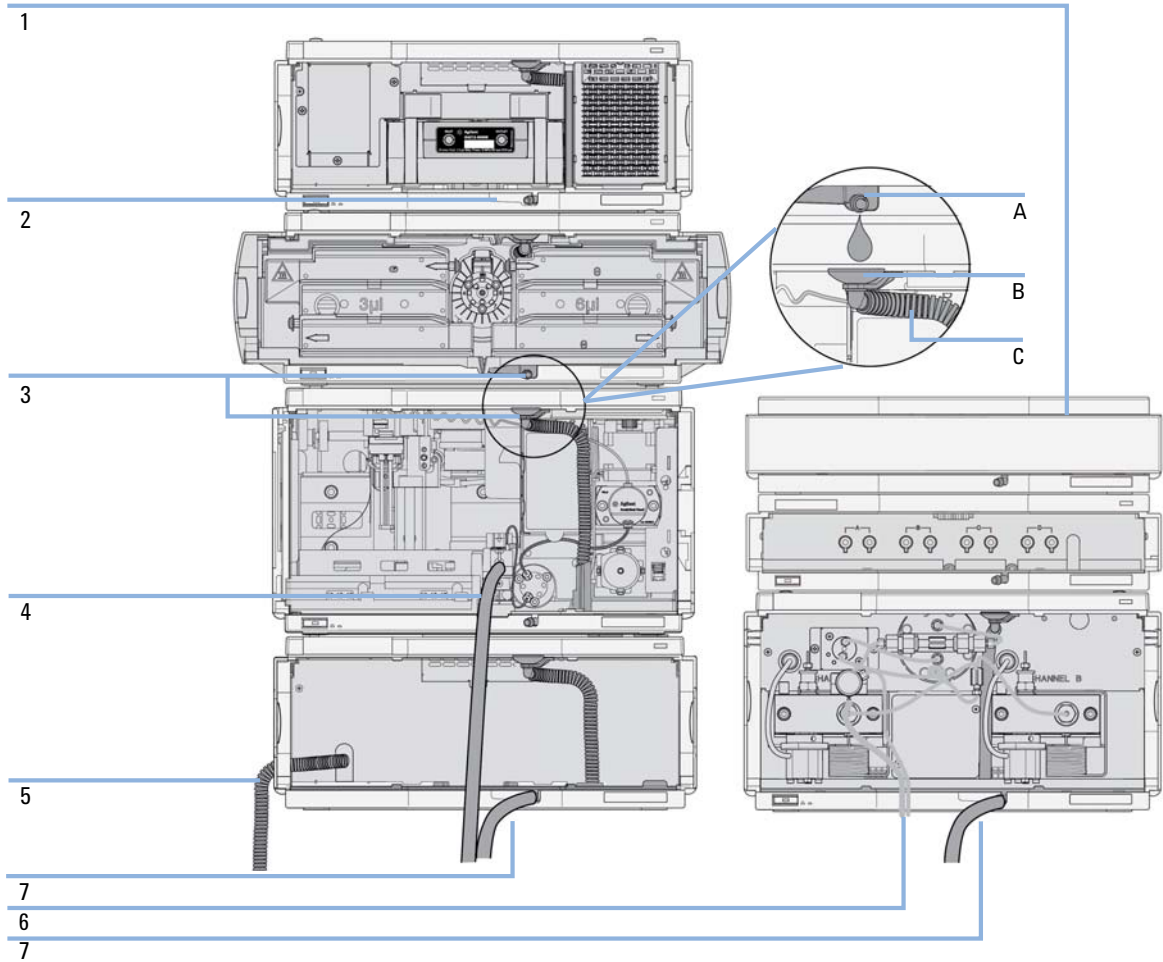


Figure 5 Leak and waste handling (overview - typical stack configuration as an example)

3 Installing the Degasser

Installation Information on Leak and Waste Handling

1	Solvent cabinet
2	Leak pan
3	Leak pan's outlet port (A), leak funnel (B) and corrugated waste tube (C)
4	Waste tube of the sampler's needle wash
5	Condense drain outlet of the autosampler cooler
6	Waste tube of the purge valve
7	Waste tube

- 1 Stack the modules according to the adequate stack configuration.
The leak pan outlet of the upper module must be vertically positioned above the leak tray of the lower module, see [Figure 5](#) on page 25.
- 2 Connect data and power cables to the modules, see section *Installing the Module* below.
- 3 Connect capillaries and tubes to the modules, see section *Flow Connections to the module* below or the relevant system manual.

WARNING

Toxic, flammable and hazardous solvents, samples and reagents

- Keep solvent path free from blockages.
 - Keep the flow path closed (in case the pump in the system is equipped with a passive inlet valve, solvent may leak out due to hydrostatic pressure, even if your instrument is off).
 - Avoid loops.
 - Tubes must not sag.
 - Do not bend tubes.
 - Do not immerse tube end in waste liquid.
 - Do not intubate tubes in other tubes.
 - For correct tubing follow instructions on label attached to the module.
-



Figure 6 Warning label (illustration for correct waste tubing)

Installing the Vacuum Degasser

Parts required	Description Power cord Remote Cable, see “ Cable Overview ” on page 70
Hardware required	Degasser
Preparations	Locate bench space Provide power connections Unpack the vacuum degasser module

WARNING

Abnormal conditions

In case of abnormal conditions during operation, the instrument must be disconnected from line.

→ To disconnect the instrument from line, unplug the power cord.

CAUTION

"Defective on arrival" problems

If there are signs of damage, please do not attempt to install the module. Inspection by Agilent is required to evaluate if the instrument is in good condition or damaged.

→ Notify your Agilent sales and service office about the damage.

→ An Agilent service representative will inspect the instrument at your site and initiate appropriate actions.

- 1 Place the vacuum degasser on the bench.
- 2 Ensure the power switch on the front of the vacuum degasser is OFF (switch stands out).
- 3 Connect the power cable to the power connector at the rear of the vacuum degasser.
- 4 Connect the interface cable to the vacuum degasser. The remote cable is a one way connection to send a not-ready signal from the degasser to the other modules or to shut down the whole system after an error condition of the degasser.

NOTE

In an Agilent 1260 Infinity stack, the individual modules are connected through a CAN cable. The Agilent 1260 Infinity High Performance Degasser is an exception. The degasser can optionally be connected via the remote cable to the other modules of the stack. An Agilent 1260 Infinity Instant Pilot can be connected to the CAN bus at any of the modules in the system except for the degasser. The control software can be connected to the system through a LAN cable (via LAN-Card) to the detector or any other module except the degasser, if no detector is present.

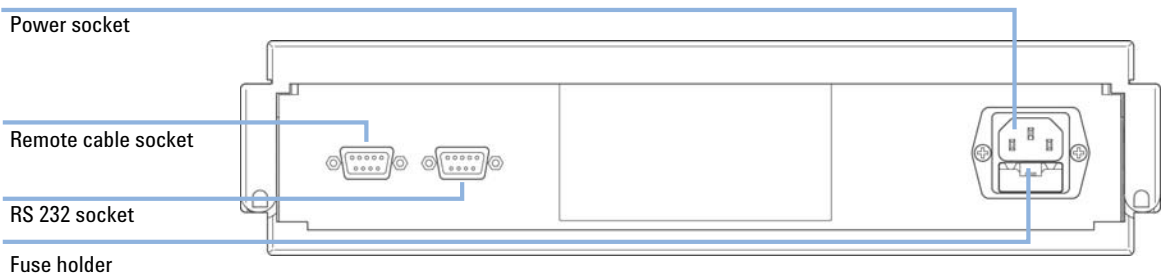


Figure 7 Rear of the Vacuum Degasser

3 Installing the Degasser

Installing the Vacuum Degasser

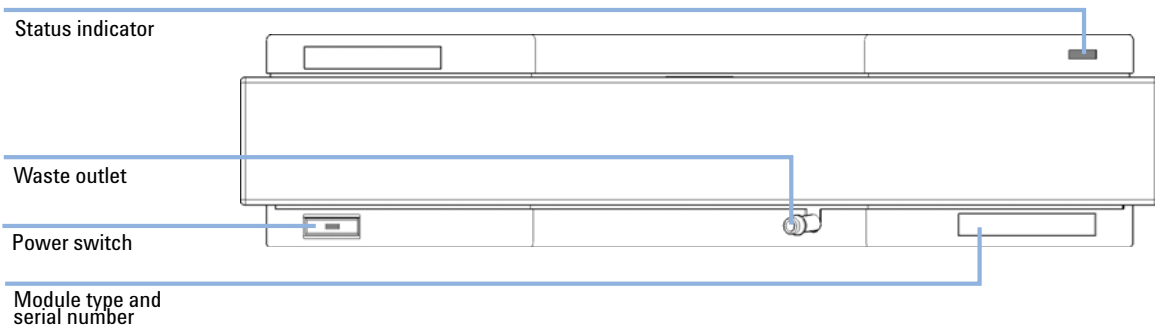


Figure 8 Front of the Vacuum Degasser

- 5 Press in the power switch to turn ON the vacuum degasser.

NOTE

The power switch stays pressed in and a green indicator lamp in the power switch is ON when the vacuum degasser is turned ON. When the line power switch stands out and the green light is OFF, the vacuum degasser is turned OFF.

Flow Connections to the Vacuum Degasser

Parts required	Description Solvent cabinet including solvent bottles (filled with solvent) and bottle head assemblies Solvent outlet tubes Syringe with adapter
Hardware required	Degasser
Preparations	Install the degasser

WARNING

When opening capillary or tube fittings, solvents may leak out.

The handling of toxic and hazardous solvents and reagents can carry health risks.

- Observe appropriate safety procedures (for example, wear 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 Put the solvent cabinet with the bottle(s) on top of the vacuum degasser.
- 2 Remove the front cover by pressing the snap fasteners on both sides.



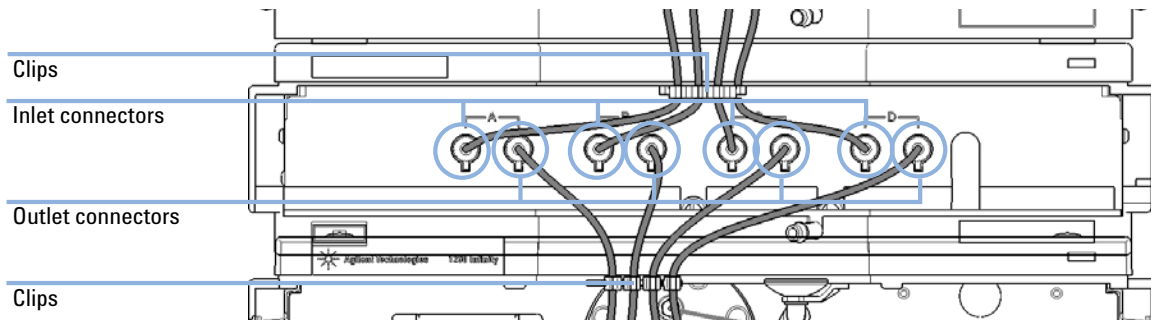
Figure 9 Removing the Front Cover

- 3 If the vacuum degasser is not used with an Agilent 1260 Infinity pump, connect the waste tube from the accessory kit to the waste outlet and place into your waste system.
- 4 Put the bottle head assemblies into solvent bottles containing your mobile phase.

3 Installing the Degasser

Flow Connections to the Vacuum Degasser

- 5 Connect the solvent tubes from the bottle head assemblies to the inlet connectors A through D (typically the left connection of the channel) of the vacuum degasser. Use the mounting tool for simplified holding and fixing of the tubing fitting. Fix the tubes in the clips of the vacuum degasser.



- 6 Connect the outlet tubes to the output ports (typically right connection of the channel) of the vacuum degasser. Use the mounting tool to fix the tube screw.
- 7 Prime the degasser before first use (see “[Priming the Degasser with the Pump](#)” on page 35).

NOTE

Atmospheric gases can diffuse through the tubing and dissolve in the mobile phase solvents. For best chromatographic results, keep the length of tubing between the vacuum degasser and your pump as short as possible.

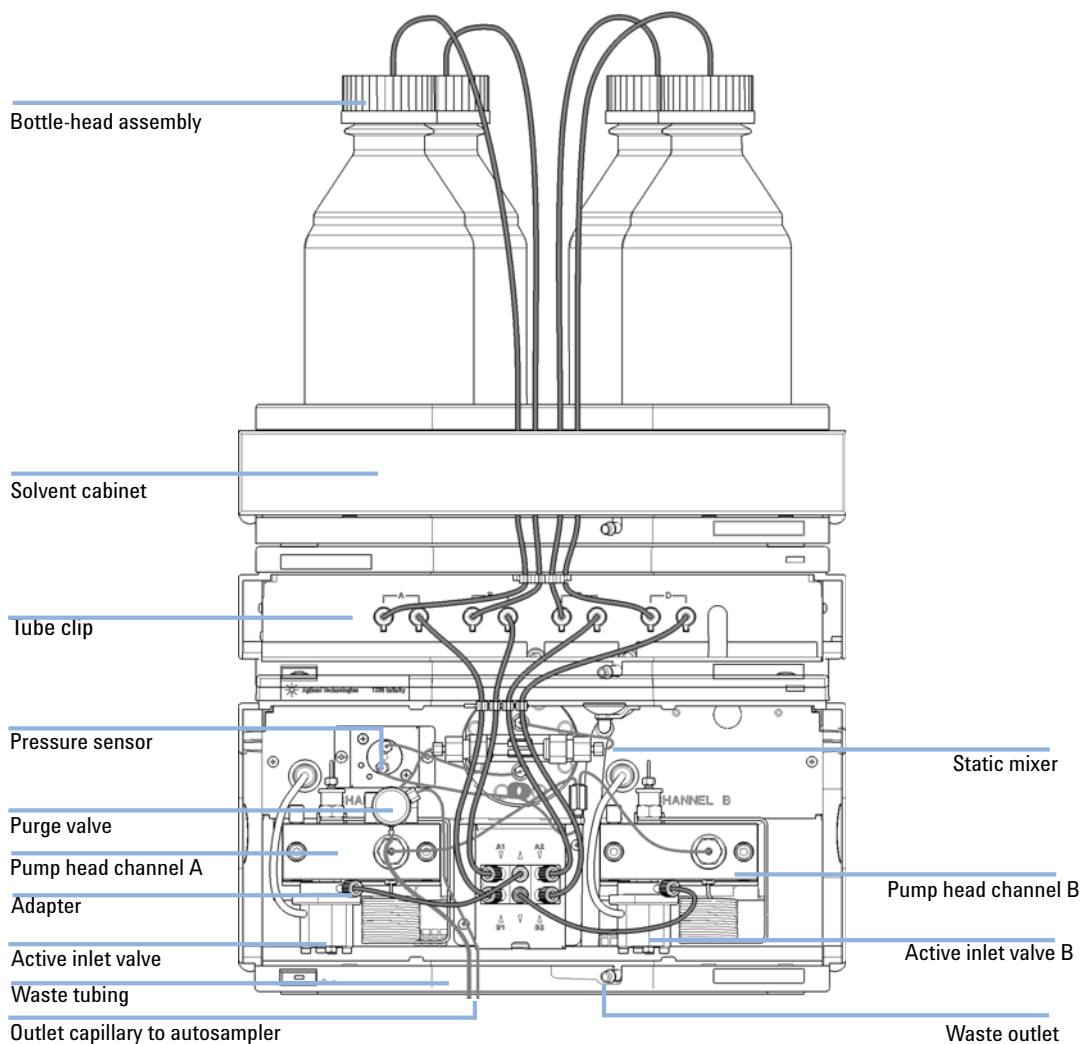


Figure 10 Flow Connection to the Vacuum Degasser

Operational Hints for the Vacuum Degasser

General Priming Instructions

WARNING

When opening capillary or tube fittings, solvents may leak out.

The handling of toxic and hazardous solvents and reagents can carry health risks.

→ Observe appropriate safety procedures (for example, wear 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.

Before using a new degasser or new tubings for the first time:

- 1** Prime all tubings with at least 5 ml of iso-propanol no matter whether the channels will be used with organic mobile phase or with water.
If you are changing to a solvent that is immiscible with the solvent currently in the tubing continue as follows:
- 2** Replace the current solvent with iso-propanol, if current solvent is organic or with water, if current solvent is an inorganic buffer or contains salt.

Priming the Degasser with the Pump

The vacuum degasser can be primed by drawing solvent through the degasser by pumping with the connected pump.

For priming the vacuum degasser using the pump the following is recommended:

- 1 Connect all tubings to and from degasser and pump.
- 2 Open the pump's purge valve to waste.
- 3 Pump at a flow rate of about 5 ml/min until the solvent reaches the pump. Pumping at higher flow rates will stress the system and might result in a failure to prime the degasser with the pump.
- 4 Prime each channel of the degasser and pump individually with at least 5 mL of solvent.

NOTE

When the pump has been turned off for a certain time (for example, overnight) oxygen will rediffuse into the solvent channels between the degasser and the pump. Volatile fractions of a solvent mixture can evaporate from the solvent if left in the degasser with no flow for an extended time causing a composition change of the mixture. Therefore priming of the vacuum degasser and the pumping system is required before starting an application.

NOTE

In case priming with the pump should fail, the degasser can be primed with a syringe. This might happen because the used solvent is highly volatile or the degasser and pump inlet lines are completely dry and the pump therefore fails to draw the solvent from the solvent bottle through the degasser channels into the pump.

Priming the Degasser with a Syringe (only recommended if priming with the pump fails)

CAUTION

Damage to degasser

Drawing the solvent through the degasser very quickly might destroy the chambers.

→ Draw the solvent through the degasser channels with moderate speed in order to avoid damage to the chambers!

- 1 Disconnect solvent outlet tube of the channel that is supposed to be primed from your pump.
- 2 Connect syringe adapter to solvent outlet tube.
- 3 Push syringe adapter onto syringe.
- 4 Pull syringe plunger to draw at least 5 mL of solvent through degasser and tubing.
- 5 Replace the priming solvent with the new solvent of your choice.
- 6 Pull syringe plunger to draw at least 5 mL of solvent through degasser and tubing.
- 7 Disconnect syringe adapter from solvent tube.
- 8 Connect solvent tube to your pump.
- 9 Repeat step 1 on page 36 to step 8 on page 36 for the other solvent channels.

NOTE

When priming the vacuum degasser with a syringe the solvent is drawn through the degasser tubes faster compared to priming with a pump. The solvent at the degasser outlet will therefore not be fully degassed. Pump for approximately 5 minutes with your selected flow rate before starting any application. This will allow the vacuum degasser to properly degas the solvent in the degasser tubes.

NOTE

Priming the degasser with a syringe is only recommended if priming with a pump (see “Priming the Degasser with the Pump” on page 35) fails.

Transporting the Vacuum Degasser

WARNING**Solvents leaking out**

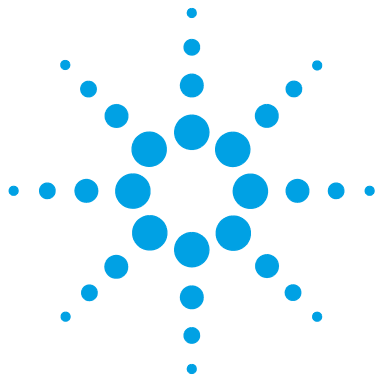
Solvents remaining in the solvent channels may leak out during transport. This can possibly cause personal damage.

→ Drain any remaining solvents from the degassing channels before transporting the degasser.

- 1 Pull the solvent inlet tubing out of the solvent bottle of channel A.
- 2 Let the pump draw solvent and air through channel A of the degasser, until the chamber of channel A is completely dry.
- 3 Repeat these steps for the remaining solvent channels.

3 Installing the Degasser

Transporting the Vacuum Degasser



4 Using the Degasser

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This chapter explains how to use the module.



Leak and Waste Handling

WARNING

Toxic, flammable and hazardous solvents, samples and reagents

The handling of solvents, samples and reagents can hold health and safety risks.

- When working with these substances observe appropriate safety procedures (for example by wearing goggles, safety gloves and protective clothing) as described in the material handling and safety data sheet supplied by the vendor, and follow good laboratory practice.
- The volume of substances should be reduced to the minimum required for the analysis.
- Do not operate the instrument in an explosive atmosphere.
- Never exceed the maximal permissible volume of solvents (6 L) in the solvent cabinet.
- Do not use bottles that exceed the maximum permissible volume as specified in the usage guideline for the Agilent 1200 Infinity Series Solvent Cabinets.
- Arrange the bottles as specified in the usage guideline for the solvent cabinet.
- A printed copy of the guideline has been shipped with the solvent cabinet, electronic copies are available on the Internet.
- The residual free volume in the appropriate waste container must be large enough to collect the waste liquid.
- Check the filling level of the waste container regularly.
- To achieve maximal safety, check the correct installation regularly.

NOTE

Recommendations for Solvent Cabinet

For details, see the usage guideline for the Agilent 1200 Infinity Series Solvent Cabinets.

For details on correct installation, see [“Installation Information on Leak and Waste Handling”](#) on page 24.

When to Use a Vacuum Degasser

WARNING

Unspecified Conditions

Operating the instrumentation under conditions other than its intended use might result in a potential safety hazard or might damage the instrumentation.

→ Never operate your instrumentation under conditions other than those specified by the vendor.

For flow rates less than 10 mL/min:

- if your detector is used with maximum sensitivity in the low UV wavelength range,
- if your application requires optimum injection precision,
- if your application requires highest retention time reproducibility (mandatory at flow rates below 0.5 mL/min,
- if your sample or detection is sensitive to dissolved oxygen in the mobile phase (degradation),
- with a fluorescence detector,
- with an LC-MS-detector.

For capillary LC application with our Agilent 1260 Infinity Capillary and Nano LC System.

Generally a degasser should be used when negative effects due to dissolved gas in the mobile phase exceed the limits that are acceptable for the user. Negative effects that can be caused by dissolved gas are:

- Unstable flow due to unstable pumping conditions. This may result in an increased pressure ripple or increased standard deviations of peak retention times and peak areas especially at low flow rates.
- Baseline noise on detectors that are sensitive to changes in the refractive index,
- sample degradation,
- fluorescence quenching due to dissolved oxygen,
- baseline drift in electrochemical detectors due to dissolved oxygen especially in reduction mode.

Prevent Blocking of Solvent Filters

Contaminated solvents or algae growth in the solvent bottle will reduce the lifetime of the solvent filter and will influence the performance of the pump. This is especially true for aqueous solvents or phosphate buffers (4 – 7 pH). The following suggestions will prolong lifetime of the solvent filter and will maintain the performance of the pump.

- Use sterile, if possible amber solvent bottles to slow down algae growth.
- Filter solvents through filters or membranes that remove algae.
- Exchange solvents every two days or refilter.
- If the application permits add 0.0001 – 0.001 M sodium azide to the solvent.
- Place a layer of argon on top of your solvent.
- Avoid exposure of the solvent bottles to direct sunlight.

Checking the Solvent Filters

The solvent filters are on the low-pressure side of the pumping system. A blocked filter therefore does not affect the pressure readings of the pump. The pressure readings cannot be used to identify blocked filters. If the solvent cabinet is placed on top of the vacuum degasser the filter condition can be checked in the following way:

Remove the tubing at the inlet port of the vacuum degasser. If the filter is in good condition the solvent will freely drip out of the solvent tube (due to hydrostatic pressure). If the solvent filter is partly blocked no solvent or only very little solvent will drip out of the solvent tube.

Cleaning the Solvent Filters

- Remove the blocked solvent filter from the bottle-head assembly and place it in a beaker with concentrated nitric acid (35%) for one hour.
- Thoroughly flush the filter with bidistilled water (remove all nitric acid).
- Replace the filter.

NOTE

Never use the system without solvent filter installed.

Solvent Information

Observe the following recommendations on the use of solvents.

- Follow recommendations for avoiding the growth of algae, see pump manuals.
- Small particles can permanently block capillaries and valves. Therefore, always filter solvents through 0.4 µm filters.
- Avoid or minimize the use of solvents that may corrode parts in the flow path. Consider specifications for the pH range given for different materials like flow cells, valve materials etc. and recommendations in subsequent sections.

Material Information

Materials in Flow Path

Following materials are used in the flow path of this module:

Table 3 Materials in flow path

Part	Materials
Internal tubings	TFE/PDD copolymer, PFA
Inlets	PEEK
Tubings	FEP
Fittings	ETFE

Material Information

Materials in the flow path are carefully selected based on Agilent's experiences in developing highest quality instruments for HPLC analysis over several decades. These materials exhibit excellent robustness under typical HPLC conditions. For any special conditions, please consult the material information section or contact Agilent.

Disclaimer

Subsequent data were collected from external resources and are meant as a reference. Agilent cannot guarantee the correctness and completeness of such information. Data is based on compatibility libraries, which are not specific for estimating the long-term life time under specific but highly variable conditions of UHPLC systems, solvents, solvent mixtures and samples. Information can also not be generalized due to catalytic effects of impurities like metal ions, complexing agents, oxygen etc. Apart from pure chemical corrosion, other effects like electro corrosion, electrostatic charging (especially for non-conductive organic solvents), swelling of polymer parts etc. need to be considered. Most data available refers to room temperature (typically 20 – 25 °C, 68 – 77 °F). If corrosion is possible, it usually accelerates at higher temperatures. If in doubt, please consult technical literature on chemical compatibility of materials.

PEEK

PEEK (Polyether-Ether Ketones) combines excellent properties regarding biocompatibility, chemical resistance, mechanical and thermal stability. PEEK is therefore the material of choice for UHPLC and biochemical instrumentation.

It is stable in a wide pH range, and inert to many common solvents.

There is still a number of known incompatibilities with chemicals such as chloroform, methylene chloride, THF, DMSO, strong acids (nitric acid > 10 %, sulphuric acid > 10 %, sulfonic acids, trichloroacetic acid), halogenes or aqueous halogene solutions, phenol and derivatives (cresols, salicylic acid etc.).

Polyimide

Agilent uses semi-crystalline polyimide for rotor seals in valves and needle seats in autosamplers. One supplier of polyimide is DuPont, which brands polyimide as Vespel, which is also used by Agilent.

Polyimide is stable in a pH range between 1 and 10 and in most organic solvents. It is incompatible with concentrated mineral acids (e.g. sulphuric acid), glacial acetic acid, DMSO and THF. It is also degraded by nucleophilic substances like ammonia (e.g. ammonium salts in basic conditions) or acetates.

Polyethylene (PE)

Agilent uses UHMW (ultra-high molecular weight)-PE/PTFE blends for yellow piston and wash seals, which are used in 1290 Infinity pumps and for normal phase applications in 1260 Infinity pumps.

Polyethylene has a good stability for most common inorganic solvents including acids and bases in a pH range of 1 to 12.5. It is compatible to many organic solvents used in chromatographic systems like methanol, acetonitrile and isopropanol. It has limited stability with aliphatic, aromatic and halogenated hydrocarbons, THF, phenol and derivatives, concentrated acids and bases. For normal phase applications, the maximum pressure should be limited to 200 bar.

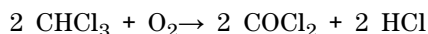
Tantalum (Ta)

Tantalum is inert to most common HPLC solvents and almost all acids except fluoric acid and acids with free sulfur trioxide. It can be corroded by strong bases (e.g. hydroxide solutions > 10 %, diethylamine). It is not recommended for the use with fluoric acid and fluorides.

Stainless Steel (ST)

Stainless steel is inert against many common solvents. It is stable in the presence of acids and bases in a pH range of 1 to 12.5. It can be corroded by acids below pH 2.3. It can also corrode in following solvents:

- Solutions of alkali halides, their respective acids (for example, lithium iodide, potassium chloride, and so on) and aqueous solutions of halogens.
- High concentrations of inorganic acids like nitric acid, sulfuric acid and organic solvents especially at higher temperatures (replace, if your chromatography method allows, by phosphoric acid or phosphate buffer which are less corrosive against stainless steel).
- Halogenated solvents or mixtures which form radicals and/or acids, for example:



This reaction, in which stainless steel probably acts as a catalyst, occurs quickly with dried chloroform if the drying process removes the stabilizing alcohol.

- Chromatographic grade ethers, which can contain peroxides (for example, THF, dioxane, di-isopropylether). Such ethers should be filtered through dry aluminium oxide which adsorbs the peroxides.
- Solutions of organic acids (acetic acid, formic acid, and so on) in organic solvents. For example, a 1 % solution of acetic acid in methanol will attack steel.
- Solutions containing strong complexing agents (for example, EDTA, ethylene diamine tetra-acetic acid).
- Mixtures of carbon tetrachloride with 2-propanol or THF.

Diamond-Like Carbon (DLC)

Diamond-Like Carbon is inert to almost all common acids, bases and solvents. There are no documented incompatibilities for HPLC applications.

Fused silica and Quartz (SiO₂)

Fused silica is used in 1290 Infinity Flow Cells and capillaries. Quartz is used for classical flow cell windows. It is inert against all common solvents and acids except hydrofluoric acid and acidic solvents containing fluorides. It is corroded by strong bases and should not be used above pH 12 at room temperature. The corrosion of flow cell windows can negatively affect measurement results. For a pH greater than 12, the use of flow cells with sapphire windows is recommended.

Gold

Gold is inert to all common HPLC solvents, acids and bases within the specified pH range. It can be corroded by complexing cyanides and concentrated acids like aqua regia.

Zirconium Oxide (ZrO₂)

Zirconium Oxide is inert to almost all common acids, bases and solvents. There are no documented incompatibilities for HPLC applications.

Platinum/Iridium

Platinum/Iridium is inert to almost all common acids, bases and solvents. There are no documented incompatibilities for HPLC applications.

Fluorinated polymers (PTFE, PFA, FEP, FFKM)

Fluorinated polymers like PTFE (polytetrafluorethylene), PFA (perfluoroalkoxy) and FEP (fluorinated ethylene propylene) are inert to almost all common acids, bases, and solvents. FFKM is perfluorinated rubber, which is also resistant to most chemicals. As an elastomer, it may swell in some organic solvents like halogenated hydrocarbons.

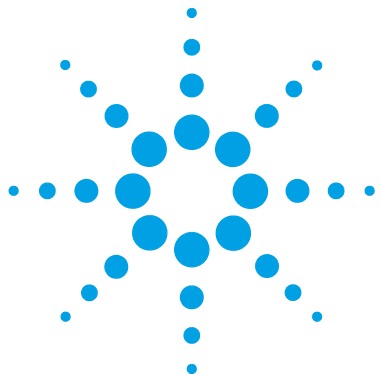
TFE/PDD copolymer tubings, which are used in all Agilent degassers except G1322A, are not compatible with fluorinated solvents like Freon, Fluorinert, or Vertrel. They have limited life time in the presence of Hexafluoroisopropanol (HFIP). To ensure the longest possible life with HFIP, it is best to dedicate a particular chamber to this solvent, not to switch solvents, and not to let dry out the chamber. For optimizing the life of the pressure sensor, do not leave HFIP in the chamber when the unit is off.

Sapphire, Ruby and Al₂O₃-based ceramics

Sapphire, ruby and ceramics based on aluminum oxide Al₂O₃ are inert to almost all common acids, bases and solvents. There are no documented incompatibilities for HPLC applications.

4 Using the Degasser

Solvent Information



5 Optimizing Performance

Increasing the Degasser Performance and Degassing Level 50

This chapter gives hints on how to optimize the performance or use additional devices.



Increasing the Degasser Performance and Degassing Level

For some critical applications it might be useful to increase the degasser's performance and degassing level by using two channels of the degasser in series with only one solvent channel of the pump. For doing so:

- 1** Connect the solvent inlet tubing (bottle head assembly, Bottle-head assembly (G1311-60003)) coming from the solvent bottle to the inlet line of the first channel, you want to use.
- 2** Connect the outlet of the first channel to the inlet of the 2nd solvent channel of the degasser with the help of the short connecting tubing (p/n G1379-68706), delivered with the accessory kit of the degasser.
- 3** Connect to the outlet of the 2nd channel of the degasser and into the pump.

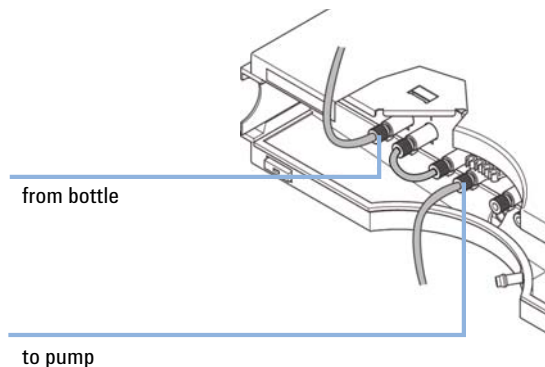
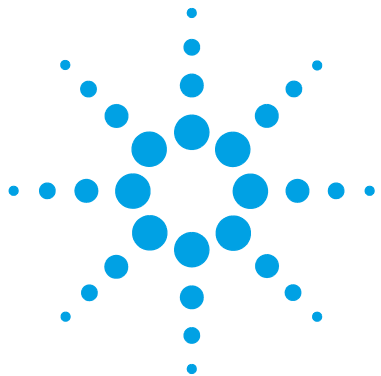


Figure 11 Connecting two degasser channels in series



6 Troubleshooting and Diagnostics

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Status Indicator becomes Red and Vacuum Pump was Running	56

This chapter gives an overview about the troubleshooting and diagnostic features and the different user interfaces.



Overview of the Degasser's Indicators

Status Indicators

The vacuum degasser is provided with two status indicators which indicate the operational state (ready, busy, and error states) of the vacuum degasser. The status indicators provide a quick visual check of the operation of the vacuum degasser (see [Figure 12](#) on page 53).

Hardware Symptoms

A red status lamp at the vacuum degasser indicates a problem with the vacuum system or with the electronic control. The vacuum degasser generates an error output on the remote lines. The following pages describe hardware symptoms which help you to isolate the cause of a hardware failure (see [“Hardware Symptoms”](#) on page 55).

Status Indicators

Two status indicators are located on the front of the module. The lower left indicates the power supply status, the upper right indicates the module status.

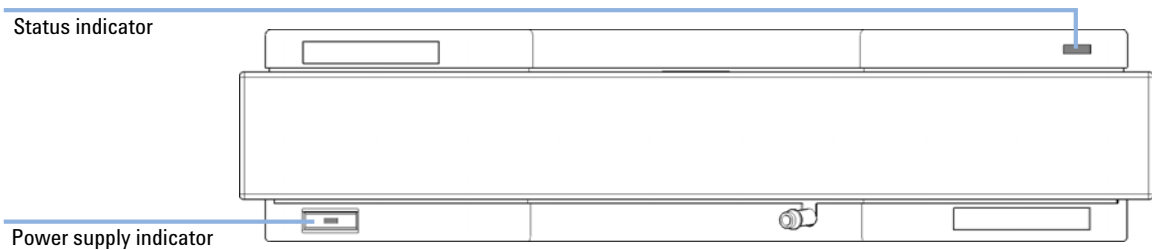


Figure 12 Location of Status Indicators

Module Status Indicator

The module status indicator indicates one of six possible module conditions:

- When the status indicator is *OFF* (and power switch light is on), the module is in a *prerun* condition, and is ready to begin an analysis.
- A *green* status indicator, indicates the module is performing an analysis (*run* mode).
- A *yellow* indicator indicates a *not-ready* condition. The module is in a not-ready state when it is waiting for a specific condition to be reached or completed (for example, immediately after changing a set point), or while a self-test procedure is running.
- An *error* condition is indicated when the status indicator is *red*. An error condition indicates the module has detected an internal problem which affects correct operation of the module. Usually, an error condition requires attention (e.g. leak, defective internal components). An error condition always interrupts the analysis.

If the error occurs during analysis, it is propagated within the LC system, i.e. a red LED may indicate a problem of a different module. Use the status display of your user interface for finding the root cause/module of the error.

- A *blinking* indicator indicates that the module is in resident mode (e.g. during update of main firmware).
- A *fast blinking* indicator indicates that the module is in boot loader mode (e.g. during update of main firmware). In such a case try to re-boot the module or try a cold-start.

CAUTION

Red status LED indicates error

This indicates either an internal leak in the vacuum system or an electronic failure.

- To prevent any damage, switch off the vacuum degasser and remove the solvent bottles from the solvent cabinet to stop any gravity-caused flow of solvent into the vacuum chamber.
- In case of an internal leak it is possible that solvent may enter the vacuum chamber and solvent may leak into the waste drain.
- Apply troubleshooting information in “[If the Status Indicator is Red](#)” on page 56.

Hardware Symptoms

In case of a problem with the vacuum system or the electronic control the vacuum degasser status lamp will be red. The vacuum degasser will generate an error output on the remote lines. This will shut down other system modules when connected via remote cable, see [“Installing the Vacuum Degasser”](#) on page 28. The vacuum degasser itself is not able to generate any error messages in the Agilent 1260 Infinity system logbook. The following pages describe hardware symptoms which help you to isolate the cause of a hardware failure.

All Lamps are Off

If all other modules in the system are on (power switch lamp is green) and are recognized by the connected user interface (module parameters can be set, module-specific screens appear, and so on), then do the following to determine the problem with the vacuum degasser:

- ✓ Ensure the power cable is connected to the degasser, and the power cable is connected to line power.
- ✓ Ensure the power switch on the front of the module is ON.
- ✓ Ensure the power fuses are OK.

The fuse holders are located on the rear panel of the vacuum degasser and are part of the power socket. Check the fuses (see [“Exchanging the Fuses of the Power Inline Filter”](#) on page 63), and change if necessary:

- ✓ If the previous steps did not solve the problem, contact your Agilent service representative.

If the Status Indicator is Red

Sufficient vacuum is normally built up after the initial start-up and controlled by the pressure sensor.

If the vacuum cannot be reached, the vacuum degasser will switch to the error state. The error condition can be reset by turning the vacuum degasser off and on again.

If the Status Indicator is Yellow and the Vacuum Pump is not Running

NOTE

The status indicator is yellow during the startup phase of the degasser until the operating pressure is reached. This may take several minutes.

Please contact your Agilent service representative.

Status Indicator becomes Red and Vacuum Pump was Running

Sufficient vacuum is normally built up after the initial start-up and controlled by the pressure sensor.

If the vacuum cannot be reached, the vacuum degasser will switch to the error state. The error condition can be reset by turning the vacuum degasser off and on again.

The following parts can be responsible for an insufficient vacuum:

- 1 Leaky tubing,
- 2 leaky or defective internal parts.

Contact your Agilent service representative.



7 Maintenance

Warnings and Cautions	58
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Cleaning the Module	61
Assembling the Main Cover	62
Exchanging the Fuses of the Power Inline Filter	63

This chapter describes the maintenance of the module.



Warnings and Cautions

WARNING

Toxic, flammable and hazardous solvents, samples and reagents

The handling of solvents, samples and reagents can hold health and safety risks.

- When working with these substances observe appropriate safety procedures (for example by wearing goggles, safety gloves and protective clothing) as described in the material handling and safety data sheet supplied by the vendor, and follow good laboratory practice.
 - The volume of substances should be reduced to the minimum required for the analysis.
 - Do not operate the instrument in an explosive atmosphere.
-

WARNING

Electrical shock

Repair work at the module can lead to personal injuries, e.g. shock hazard, when the cover is opened.

- Do not remove the cover of the module.
 - Only certified persons are authorized to carry out repairs inside the module.
-

WARNING

Personal injury or damage to the product

Agilent is not responsible for any damages caused, in whole or in part, by improper use of the products, unauthorized alterations, adjustments or modifications to the products, failure to comply with procedures in Agilent product user guides, or use of the products in violation of applicable laws, rules or regulations.

- Use your Agilent products only in the manner described in the Agilent product user guides.
-

WARNING

Sharp metal edges

Sharp-edged parts of the equipment may cause injuries.

- To prevent personal injury, be careful when getting in contact with sharp metal areas.
-

CAUTION

Safety standards for external equipment

- If you connect external equipment to the instrument, make sure that you only use accessory units tested and approved according to the safety standards appropriate for the type of external equipment.
-

Introduction to Maintenance

The vacuum degasser is designed for easy repair. The most frequent repairs such as exchanging power fuses and assembling the main cover can be performed by the user.

Cleaning the Module

To keep the module case clean, use a soft cloth slightly dampened with water, or a solution of water and mild detergent.

WARNING

Liquid dripping into the electronic compartment of your module can cause shock hazard and damage the module

- Do not use an excessively damp cloth during cleaning.
 - Drain all solvent lines before opening any connections in the flow path.
-

Assembling the Main Cover

When If cover is broken

Tools required **Description**
None

Parts required

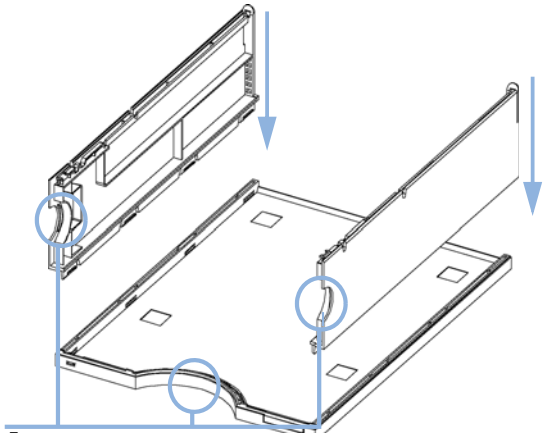
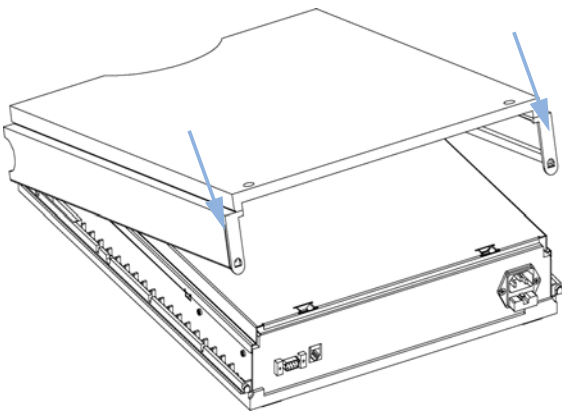
#	p/n	Description
1	5065-9989	Cover kit (includes base, top, left and right)

CAUTION

Wrong assembly

Once installed wrongly, you may not be able to remove the side from the top part.

→ Make sure to install the side parts in the correct orientation.

<p>1 Place the top part on the bench and insert the left and right side into the top part.</p>  <p>Front</p>	<p>2 Replace the cover.</p> 
<p>Next Steps:</p> <p>3 Replace the vacuum degasser in the stack and reconnect the cables and capillaries.</p> <p>4 Turn on the vacuum degasser.</p>	

Exchanging the Fuses of the Power Inline Filter

When When defective

Tools required **Description**
None

Parts required	#	p/n	Description
	2	2110-0458	Fuse: 250V, T 500 mA, compatible to all supported line voltages

NOTE

The module power supply has wide-ranging capability (see [Table 1](#) on page 17). It accepts any line voltage in the range mentioned in the table. Consequently there is no voltage selector in the rear of the module. There are two externally accessible fuses, that protect the power supply. These fuses are identical for all accepted line voltages.

WARNING

Potential hazard of physical injury or death or damage to the instrument.

Using fuses other than the one specified for this module and purpose can lead to personal injury or damage of the electronic components.

→ Never use fuses other than the ones supplied by Agilent Technologies to ensure proper functionality and compliance with safety or EMC regulations.

WARNING

Use of unsupplied cables

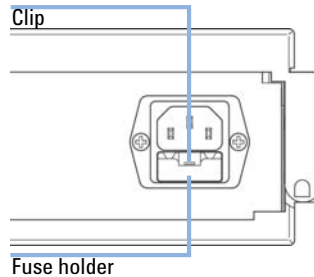
Using cables not supplied by Agilent Technologies can lead to damage of the electronic components or personal injury.

→ Never use cables other than the ones supplied by Agilent Technologies to ensure proper functionality and compliance with safety or EMC regulations.

7 Maintenance

Exchanging the Fuses of the Power Inline Filter

- 1 Switch off the power switch at the front of the instrument.
- 2 Remove the power cable from the power connector at the rear of the instrument.
- 3 Press down the clip of the fuse holder and pull out of the power socket.



- 4 Remove the fuses from the fuse holder.
- 5 Ensure the fuse wires inside the fuses are not broken. If a test meter is available, check the resistance of each fuse. A good fuse shows a low resistance (typically less than 1 Ohm).
- 6 If a fuse is defective (wire broken or high resistance), insert a new fuse.
- 7 Reinsert the fuse holder and the power cable.
- 8 Switch on the power switch.



8 Parts for Maintenance

Cover Parts 66

Fuse 67

Accessory Kit 68

This chapter provides information on parts for maintenance.



Cover Parts

Item	p/n	Description
1	5065-9989	Cover kit (includes base, top, left and right)
2	5043-0207	Name plate 1260
3	5065-9990	Front cover
4	5041-8365	Blank plug for unused channels
5	5041-8387	Tube clip

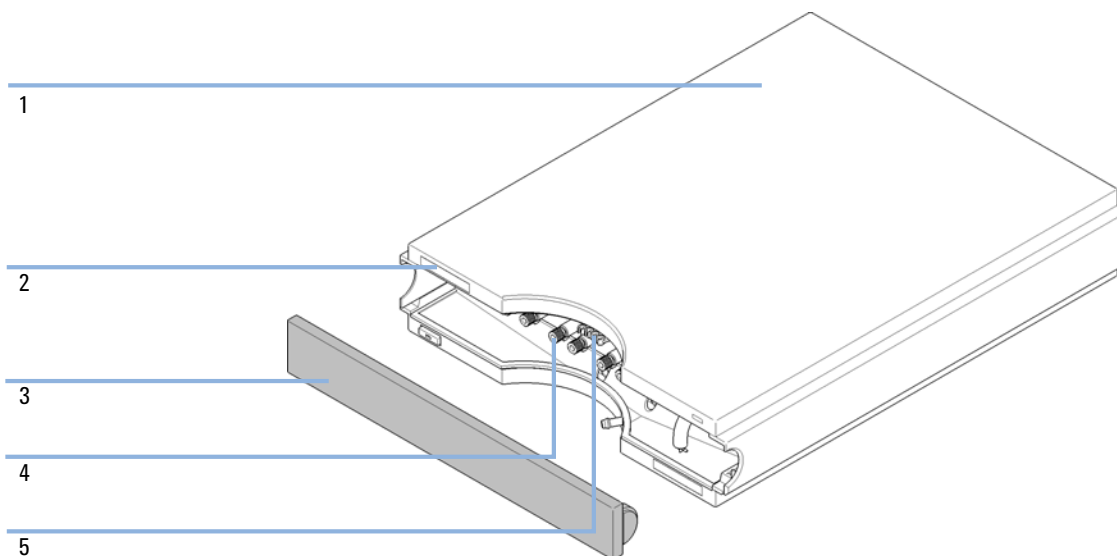


Figure 13 Cover Parts

Fuse

Item	p/n	Description
1	2110-0458	Fuse: 250V, T 500 mA, compatible to all supported line voltages

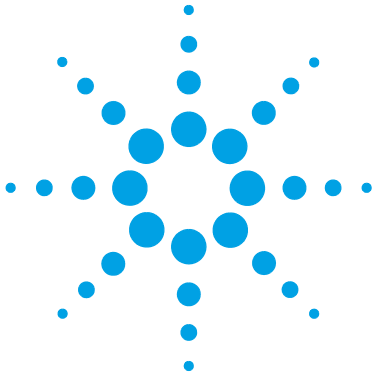


1

Figure 14 Fuse

Accessory Kit

Item	p/n	Description
1	G1379-68705	Accessory Kit for 1260 Infinity High Performance Degasser
2	G1379-68706	Connecting tubing (to connect to channels in series for increased performance) 2x
3	G1322-67300	Kit of 4 solvent tubes including labels for connection degasser to MCGV (Quaternary Pump)
4	5062-2461	Waste tube, 5 m (reorder pack)
5	0100-1710	Mounting Tool for Tubing Connections
6	5061-3378	Remote Cable



9 Identifying Cables

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Remote Cables	74
BCD Cables	77
CAN Cable	79
External Contact Cable	80
Agilent Module to PC	81
Agilent 1200 Module to Printer	82

This chapter provides information on cables used with the Agilent 1200 Infinity Series modules.



Cable Overview

NOTE

Never use cables other than the ones supplied by Agilent Technologies to ensure proper functionality and compliance with safety or EMC regulations.

Analog cables

p/n	Description
35900-60750	Agilent module to 3394/6 integrators
35900-60750	Agilent 35900A A/D converter
01046-60105	Analog cable (BNC to general purpose, spade lugs)

Remote cables

p/n	Description
03394-60600	Agilent module to 3396A Series I integrators 3396 Series II / 3395A integrator, see details in section “Remote Cables” on page 74
03396-61010	Agilent module to 3396 Series III / 3395B integrators
5061-3378	Remote Cable
01046-60201	Agilent module to general purpose

BCD cables

p/n	Description
03396-60560	Agilent module to 3396 integrators
G1351-81600	Agilent module to general purpose

CAN cables

p/n	Description
5181-1516	CAN cable, Agilent module to module, 0.5 m
5181-1519	CAN cable, Agilent module to module, 1 m

LAN cables

p/n	Description
5023-0203	Cross-over network cable, shielded, 3 m (for point to point connection)
5023-0202	Twisted pair network cable, shielded, 7 m (for point to point connection)

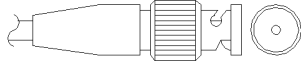
External Contact Cable

p/n	Description
G1103-61611	General Purpose Cable

RS-232 cables

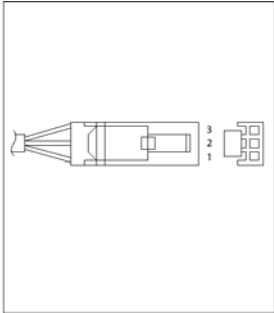
p/n	Description
G1530-60600	RS-232 cable, 2 m
RS232-61601	RS-232 cable, 2.5 m Instrument to PC, 9-to-9 pin (female). This cable has special pin-out, and is not compatible with connecting printers and plotters. It's also called "Null Modem Cable" with full handshaking where the wiring is made between pins 1-1, 2-3, 3-2, 4-6, 5-5, 6-4, 7-8, 8-7, 9-9.
5181-1561	RS-232 cable, 8 m

Analog Cables

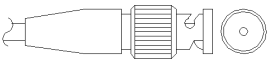


One end of these cables provides a BNC connector to be connected to Agilent modules. The other end depends on the instrument to which connection is being made.

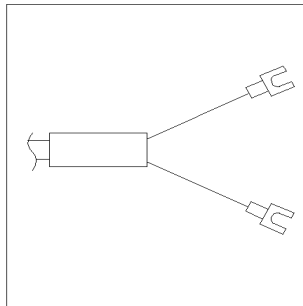
Agilent Module to 3394/6 Integrators

p/n 35900-60750	Pin 3394/6	Pin Agilent module	Signal Name
	1		Not connected
	2	Shield	Analog -
	3	Center	Analog +

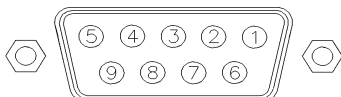
Agilent Module to BNC Connector

p/n 8120-1840	Pin BNC	Pin Agilent module	Signal Name
	Shield	Shield	Analog -
	Center	Center	Analog +

Agilent Module to General Purpose

p/n 01046-60105	Pin	Pin Agilent module	Signal Name
	1		Not connected
	2	Black	Analog -
	3	Red	Analog +

Remote Cables



One end of these cables provides a Agilent Technologies APG (Analytical Products Group) remote connector to be connected to Agilent modules. The other end depends on the instrument to be connected to.

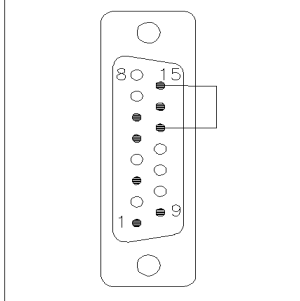
Agilent Module to 3396A Integrators

p/n 03394-60600	Pin 3396A	Pin Agilent module	Signal Name	Active (TTL)
	9	1 - White	Digital ground	
	NC	2 - Brown	Prepare run	Low
	3	3 - Gray	Start	Low
	NC	4 - Blue	Shut down	Low
	NC	5 - Pink	Not connected	
	NC	6 - Yellow	Power on	High
	5,14	7 - Red	Ready	High
	1	8 - Green	Stop	Low
	NC	9 - Black	Start request	Low
	13, 15		Not connected	

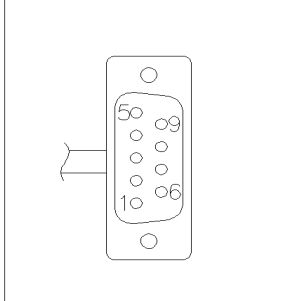
Agilent Module to 3396 Series II / 3395A Integrators

Use the cable Agilent module to 3396A Series I integrators (03394-60600) and cut pin #5 on the integrator side. Otherwise the integrator prints START; not ready.

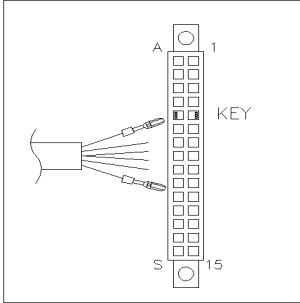
Agilent Module to 3396 Series III / 3395B Integrators

p/n 03396-61010	Pin 33XX	Pin Agilent module	Signal Name	Active (TTL)
	9	1 - White	Digital ground	
	NC	2 - Brown	Prepare run	Low
	3	3 - Gray	Start	Low
	NC	4 - Blue	Shut down	Low
	NC	5 - Pink	Not connected	
	NC	6 - Yellow	Power on	High
	14	7 - Red	Ready	High
	4	8 - Green	Stop	Low
	NC	9 - Black	Start request	Low
	13, 15		Not connected	

Agilent Module to Agilent 35900 A/D Converters

p/n 5061-3378	Pin 35900 A/D	Pin Agilent module	Signal Name	Active (TTL)
	1 - White	1 - White	Digital ground	
	2 - Brown	2 - Brown	Prepare run	Low
	3 - Gray	3 - Gray	Start	Low
	4 - Blue	4 - Blue	Shut down	Low
	5 - Pink	5 - Pink	Not connected	
	6 - Yellow	6 - Yellow	Power on	High
	7 - Red	7 - Red	Ready	High
	8 - Green	8 - Green	Stop	Low
	9 - Black	9 - Black	Start request	Low

Agilent Module to General Purpose

p/n 01046-60201	Wire Color	Pin Agilent module	Signal Name	Active (TTL)
	White	1	Digital ground	
	Brown	2	Prepare run	Low
	Gray	3	Start	Low
	Blue	4	Shut down	Low
	Pink	5	Not connected	
	Yellow	6	Power on	High
	Red	7	Ready	High
	Green	8	Stop	Low
	Black	9	Start request	Low

BCD Cables

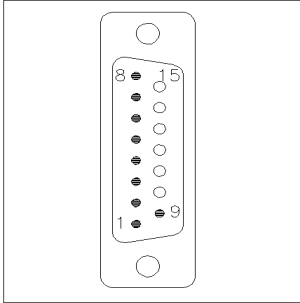


One end of these cables provides a 15-pin BCD connector to be connected to the Agilent modules. The other end depends on the instrument to be connected to

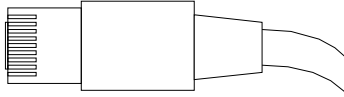
Agilent Module to General Purpose

p/n G1351-81600	Wire Color	Pin Agilent module	Signal Name	BCD Digit
	Green	1	BCD 5	20
	Violet	2	BCD 7	80
	Blue	3	BCD 6	40
	Yellow	4	BCD 4	10
	Black	5	BCD 0	1
	Orange	6	BCD 3	8
	Red	7	BCD 2	4
	Brown	8	BCD 1	2
	Gray	9	Digital ground	Gray
	Gray/pink	10	BCD 11	800
	Red/blue	11	BCD 10	400
	White/green	12	BCD 9	200
	Brown/green	13	BCD 8	100
	not connected	14		
	not connected	15	+ 5 V	Low

Agilent Module to 3396 Integrators

p/n 03396-60560	Pin 3396	Pin Agilent module	Signal Name	BCD Digit
	1	1	BCD 5	20
	2	2	BCD 7	80
	3	3	BCD 6	40
	4	4	BCD 4	10
	5	5	BCD0	1
	6	6	BCD 3	8
	7	7	BCD 2	4
	8	8	BCD 1	2
	9	9	Digital ground	
	NC	15	+ 5 V	Low

CAN Cable



Both ends of this cable provide a modular plug to be connected to Agilent modules CAN or LAN connectors.

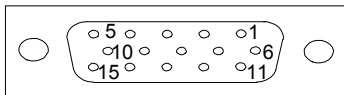
CAN Cables

p/n	Description
5181-1516	CAN cable, Agilent module to module, 0.5 m
5181-1519	CAN cable, Agilent module to module, 1 m

LAN Cables

p/n	Description
5023-0203	Cross-over network cable, shielded, 3 m (for point to point connection)
5023-0202	Twisted pair network cable, shielded, 7 m (for point to point connection)

External Contact Cable



One end of this cable provides a 15-pin plug to be connected to Agilent modules interface board. The other end is for general purpose.

Agilent Module Interface Board to general purposes

p/n G1103-61611	Color	Pin Agilent module	Signal Name
	White	1	EXT 1
	Brown	2	EXT 1
	Green	3	EXT 2
	Yellow	4	EXT 2
	Grey	5	EXT 3
	Pink	6	EXT 3
	Blue	7	EXT 4
	Red	8	EXT 4
	Black	9	Not connected
	Violet	10	Not connected
	Grey/pink	11	Not connected
	Red/blue	12	Not connected
	White/green	13	Not connected
	Brown/green	14	Not connected
	White/yellow	15	Not connected

Agilent Module to PC

p/n	Description
G1530-60600	RS-232 cable, 2 m
RS232-61601	RS-232 cable, 2.5 m Instrument to PC, 9-to-9 pin (female). This cable has special pin-out, and is not compatible with connecting printers and plotters. It's also called "Null Modem Cable" with full handshaking where the wiring is made between pins 1-1, 2-3, 3-2, 4-6, 5-5, 6-4, 7-8, 8-7, 9-9.
5181-1561	RS-232 cable, 8 m

Agilent 1200 Module to Printer

p/n	Description
5181-1529	Cable Printer Serial & Parallel, is a SUB-D 9 pin female vs. Centronics connector on the other end (NOT FOR FW UPDATE). For use with G1323 Control Module.



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Electrical Connections 85

Rear view of the module 85

Interfaces 86

Overview Interfaces 89

This chapter describes the degasser in more detail on hardware and electronics.



Operating Principle of the 1260 Infinity High Performance Degasser

During initialization, the status indicator is amber and the degasser vacuum pump tries to reach a target pressure below 146 mbar/hPa. If this limit cannot be reached within 10 minutes, an error is thrown and the status indicator gets red. As soon as the limit has been reached, which typically happens after about 2 minutes, the pump goes to a continuous regulation mode, where the pump tries to regulate to 100 mbar/hPa target pressure. If this pressure limit cannot be reached, it is increased stepwise to a maximum of 146 mbar and the status indicator goes to amber. If a stable pressure between 100 mbar and 146 mbar max. can be kept, the status indicator switches to off. If the maximum limit of 146 mbar is exceeded, the status indicator goes to red and an error is thrown.

Electrical Connections

- The REMOTE connector may be used in combination with other analytical instruments from Agilent Technologies if you want to use features such as start, stop, common shut down, prepare, and so on.
- With the appropriate software, the RS-232C connector may be used to control the module from a computer through a RS-232C connection. This connector is activated and can be configured with the configuration switch.
- The power input socket accepts a line voltage of 100 – 240 VAC \pm 10 % with a line frequency of 50 or 60 Hz. Maximum power consumption varies by module. There is no voltage selector on your module because the power supply has wide-ranging capability. There are no externally accessible fuses, because automatic electronic fuses are implemented in the power supply.

NOTE

Never use cables other than the ones supplied by Agilent Technologies to ensure proper functionality and compliance with safety or EMC regulations.

Rear view of the module

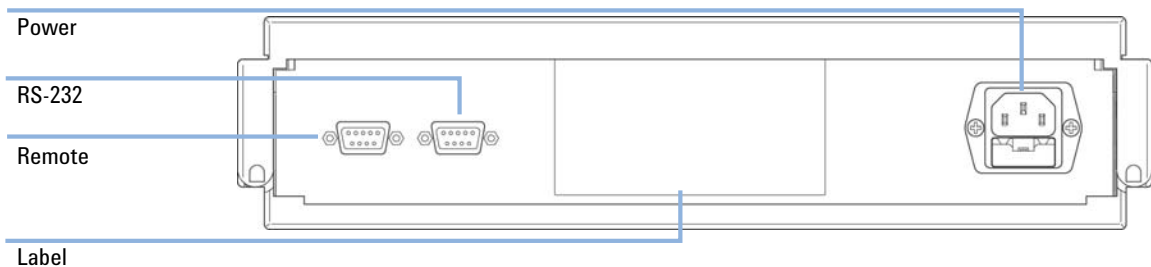


Figure 15 Rear View of Degasser – Electrical Connections and Label

Interfaces

The Agilent 1200 Infinity Series modules provide the following interfaces:

Table 4 Agilent 1200 Infinity Series Interfaces

Module	CAN	LAN/BCD (optional)	LAN (on-board)	RS-232	Analog	APG Remote	Special
Pumps							
G1310B Iso Pump G1311B Quat Pump G1311C Quat Pump VL G1312B Bin Pump K1312B Bin Pump Clinical Ed. G1312C Bin Pump VL 1376A Cap Pump G2226A Nano Pump G5611A Bio-inert Quat Pump	2	Yes	No	Yes	1	Yes	
G4220A/B Bin Pump G4204A Quat Pump	2	No	Yes	Yes	No	Yes	CAN-DC- OUT for CAN slaves
G1361A Prep Pump	2	Yes	No	Yes	No	Yes	CAN-DC- OUT for CAN slaves
Samplers							
G1329B ALS G2260A Prep ALS	2	Yes	No	Yes	No	Yes	THERMOSTAT for G1330B/K1330B
G1364B FC-PS G1364C FC-AS G1364D FC- μ S G1367E HiP ALS K1367E HiP ALS Clinical Ed. G1377A HiP micro ALS G2258A DL ALS G5664A Bio-inert FC-AS G5667A Bio-inert Autosampler	2	Yes	No	Yes	No	Yes	THERMOSTAT for G1330B/K1330B CAN-DC- OUT for CAN slaves
G4226A ALS	2	Yes	No	Yes	No	Yes	

Table 4 Agilent 1200 Infinity Series Interfaces

Module	CAN	LAN/BCD (optional)	LAN (on-board)	RS-232	Analog	APG Remote	Special
Detectors							
G1314B VWD VL G1314C VWD VL+	2	Yes	No	Yes	1	Yes	
G1314E/F VWD K1314F Clinical Ed.	2	No	Yes	Yes	1	Yes	
G4212A/B DAD K4212B DAD Clinical Ed.	2	No	Yes	Yes	1	Yes	
G1315C DAD VL+ G1365C MWD G1315D DAD VL G1365D MWD VL	2	No	Yes	Yes	2	Yes	
G1321B FLD K1321B FLD Clinical Ed. G1321C FLD	2	Yes	No	Yes	2	Yes	
G1362A RID	2	Yes	No	Yes	1	Yes	
G4280A ELSD	No	No	No	Yes	Yes	Yes	EXT Contact AUTOZERO
Others							
G1170A Valve Drive	2	No	No	No	No	No	1
G1316A/C TCC K1316C TCC Clinical Ed.	2	No	No	Yes	No	Yes	
G1322A DEG K1322A DEG Clinical Ed.	No	No	No	No	No	Yes	AUX
G1379B DEG	No	No	No	Yes	No	Yes	
G4225A DEG K4225A DEG Clinical Ed.	No	No	No	Yes	No	Yes	

10 Hardware Information

Interfaces

Table 4 Agilent 1200 Infinity Series Interfaces

Module	CAN	LAN/BCD (optional)	LAN (on-board)	RS-232	Analog	APG Remote	Special
G4227A Flex Cube	2	No	No	No	No	No	CAN-DC- OUT for CAN slaves 1
G4240A CHIP CUBE	2	Yes	No	Yes	No	Yes	CAN-DC- OUT for CAN slaves THERMOSTAT for G1330A/B (NOT USED), K1330B

¹ Requires a HOST module with on-board LAN (e.g. G4212A or G4220A with minimum firmware B.06.40 or C.06.40) or with additional G1369C LAN Card

NOTE

The detector (DAD/MWD/FLD/VWD/RID) is the preferred access point for control via LAN. The inter-module communication is done via CAN.

- CAN connectors as interface to other modules
- LAN connector as interface to the control software
- RS-232C as interface to a computer
- REMOTE connector as interface to other Agilent products
- Analog output connector(s) for signal output

Overview Interfaces

CAN

The CAN is inter-module communication interface. It is a 2-wire serial bus system supporting high speed data communication and real-time requirement.

LAN

The modules have either an interface slot for an LAN card (e.g. Agilent G1369B/C LAN Interface) or they have an on-board LAN interface (e.g. detectors G1315C/D DAD and G1365C/D MWD). This interface allows the control of the module/system via a PC with the appropriate control software. Some modules have neither on-board LAN nor an interface slot for a LAN card (e.g. G1170A Valve Drive or G4227A Flex Cube). These are hosted modules and require a Host module with firmware B.06.40 or later or with additional G1369C LAN Card.

NOTE

If an Agilent detector (DAD/MWD/FLD/VWD/RID) is in the system, the LAN should be connected to the DAD/MWD/FLD/VWD/RID (due to higher data load). If no Agilent detector is part of the system, the LAN interface should be installed in the pump or autosampler.

RS-232C (Serial)

The RS-232C connector is used to control the module from a computer through RS-232C connection, using the appropriate software. This connector can be configured with the configuration switch module at the rear of the module. Refer to *Communication Settings for RS-232C*.

NOTE

There is no configuration possible on main boards with on-board LAN. These are pre-configured for

- 19200 baud,
- 8 data bit with no parity and
- one start bit and one stop bit are always used (not selectable).

10 Hardware Information

Interfaces

The RS-232C is designed as DCE (data communication equipment) with a 9-pin male SUB-D type connector. The pins are defined as:

Table 5 RS-232C Connection Table

Pin	Direction	Function
1	In	DCD
2	In	RxD
3	Out	TxD
4	Out	DTR
5		Ground
6	In	DSR
7	Out	RTS
8	In	CTS
9	In	RI

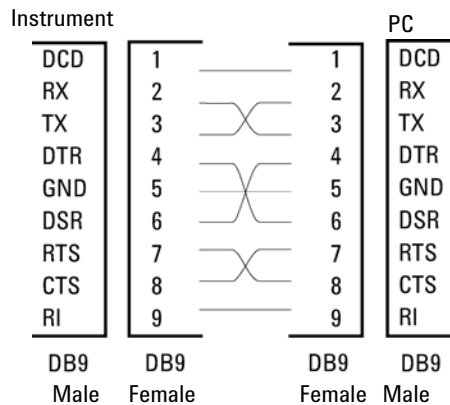


Figure 16 RS-232 Cable

Analog Signal Output

The analog signal output can be distributed to a recording device. For details refer to the description of the module's main board.

APG Remote

The APG Remote connector may be used in combination with other analytical instruments from Agilent Technologies if you want to use features as common shut down, prepare, and so on.

Remote control allows easy connection between single instruments or systems to ensure coordinated analysis with simple coupling requirements.

The subminiature D connector is used. The module provides one remote connector which is inputs/outputs (wired- or technique).

To provide maximum safety within a distributed analysis system, one line is dedicated to **SHUT DOWN** the system's critical parts in case any module detects a serious problem. To detect whether all participating modules are switched on or properly powered, one line is defined to summarize the **POWER ON** state of all connected modules. Control of analysis is maintained by signal readiness **READY** for next analysis, followed by **START** of run and optional **STOP** of run triggered on the respective lines. In addition **PREPARE** and **START REQUEST** may be issued. The signal levels are defined as:

- standard TTL levels (0 V is logic true, + 5.0 V is false),
- fan-out is 10,
- input load is 2.2 kOhm against + 5.0 V, and
- output are open collector type, inputs/outputs (wired- or technique).

NOTE

All common TTL circuits operate with a 5 V power supply. A TTL signal is defined as "low" or L when between 0 V and 0.8 V and "high" or H when between 2.0 V and 5.0 V (with respect to the ground terminal).

Table 6 Remote Signal Distribution

Pin	Signal	Description
1	DGND	Digital ground
2	PREPARE	(L) Request to prepare for analysis (for example, calibration, detector lamp on). Receiver is any module performing pre-analysis activities.
3	START	(L) Request to start run / timetable. Receiver is any module performing run-time controlled activities.
4	SHUT DOWN	(L) System has serious problem (for example, leak: stops pump). Receiver is any module capable to reduce safety risk.
5		Not used
6	POWER ON	(H) All modules connected to system are switched on. Receiver is any module relying on operation of others.
7	READY	(H) System is ready for next analysis. Receiver is any sequence controller.
8	STOP	(L) Request to reach system ready state as soon as possible (for example, stop run, abort or finish and stop injection). Receiver is any module performing run-time controlled activities.
9	START REQUEST	(L) Request to start injection cycle (for example, by start key on any module). Receiver is the autosampler.

Special Interfaces

There is no special interface for this module.



11 Appendix

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The Waste Electrical and Electronic Equipment (WEEE) Directive
(2002/96/EC) 97

Radio Interference 98

Sound Emission 99

Agilent Technologies on Internet 100

This chapter provides addition information on safety, legal and web.



General Safety Information

General 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 assumes no liability for the customer's failure to comply with these requirements.

WARNING

Ensure the proper usage of the equipment.

The protection provided by the equipment may be impaired.

→ The operator of this instrument is advised to use the equipment in a manner as specified in this manual.

Safety Standards

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, and so on) 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.

Any adjustment, maintenance, and repair of the opened instrument under voltage should be avoided whenever possible. When inevitable, this has to be carried out by a skilled person who is aware of the hazard involved. Do not attempt internal service or adjustment unless another person, capable of rendering first aid and resuscitation, is present. Do not replace components with power cable connected.

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.






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.

When working with solvents, observe appropriate safety procedures (for example, goggles, safety gloves and protective clothing) as described in the material handling and safety data sheet by the solvent vendor, especially when toxic or hazardous solvents are used.

Safety Symbols

Table 7 Safety Symbols

Symbol	Description
	The apparatus is marked with this symbol when the user should refer to the instruction manual in order to protect risk of harm to the operator and to protect the apparatus against damage.
	Indicates dangerous voltages.
	Indicates a protected ground terminal.
	Indicates eye damage may result from directly viewing the light produced by the deuterium lamp used in this product.
	The apparatus is marked with this symbol when hot surfaces are available and the user should not touch it when heated up.

WARNING

A WARNING

alerts you to situations that could cause physical injury or death.

- Do not proceed beyond a warning until you have fully understood and met the indicated conditions.

CAUTION

A CAUTION

alerts you to situations that could cause loss of data, or damage of equipment.

- Do not proceed beyond a caution until you have fully understood and met the indicated conditions.

The Waste Electrical and Electronic Equipment (WEEE) Directive (2002/96/EC)

Abstract

The Waste Electrical and Electronic Equipment (WEEE) Directive (2002/96/EC), adopted by EU Commission on 13 February 2003, is introducing producer responsibility on all electric and electronic appliances starting with 13 August 2005.

NOTE

This product complies with the WEEE Directive (2002/96/EC) marking requirements. The affixed label indicates that you must not discard this electrical/electronic product in domestic household waste.

Product Category:

With reference to the equipment types in the WEEE Directive Annex I, this product is classed as a Monitoring and Control Instrumentation product.



NOTE

Do not dispose off in domestic household waste

To return unwanted products, contact your local Agilent office, or see www.agilent.com for more information.

Radio Interference

Cables supplied by Agilent Technologies are screened to provide optimized protection against radio interference. All cables are in compliance with safety or EMC regulations.

Test and Measurement

If test and measurement equipment is operated with unscreened cables, or used for measurements on open set-ups, the user has to assure that under operating conditions the radio interference limits are still met within the premises.

Sound Emission

Manufacturer's Declaration

This statement is provided to comply with the requirements of the German Sound Emission Directive of 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)

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In This Book

This manual contains information about the Agilent 1260 Infinity High Performance Degasser (G4225A). The manual describes the following:

- introduction,
- site requirements and specifications,
- installing the degasser,
- using the degasser,
- troubleshooting and diagnostics,
- maintenance,
- parts for maintenance,
- identifying cables,
- appendix.

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