

Varian Liquid Chromatography Modules

Pre-installation Manual

Installation Category II
Pollution Degree 2
Safety Class 1 (EN 61010-1)



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Request for Installation

I understand that if the installation site is not prepared in accordance with the enclosed instructions, additional installation charges may apply.

Company name:

Name:

Company address:

Position:

Telephone:

Preferred installation date:

Signed:

Date:

Pre-Installation Checklist

Your site must meet all requirements before you request installation. Do not unpack the boxes. After completing each requirement, place a check in the appropriate checkbox. Fax or mail this pre-installation checklist to your local Varian office. As soon as it is received, a Varian representative will contact you to arrange a convenient time for installation.

Requirements	☒	
Principal installation area is in compliance with all relevant safety regulations	☐	
Relative humidity maintained between 8 – 80% RH	☐	
Lab temperature maintained between 10 and 35 °C (50 and 95 °F)	☐	
Laboratory is free of excessive particulate matter	☐	
System bench is free from vibrations	☐	
Personal computer with Microsoft Windows® XP or Vista operating system installed	☐	
Specified electrical supply and power outlets installed	☐	
Gas supply (at specified purity), regulator, and gas lines are installed (if required)	☐	
IP address, subnet mask and gateway, if fixed IP for a Varian 325/ 335 detector	☐	
Appropriate network and workstation access	☐	
Sufficient bench space is available for all components	☐	
Bench can support system weight	☐	
All unopened boxes have been checked for damage	☐	
Instrument has been placed near its final location	☐	
Materials and solvents are on site (waste container, LC grade water)	☐	
Principal operator will be available during the installation and certification period	☐	
Have any additional criteria been agreed within the contract? If yes, please specify:	Yes ☐	No ☐
Is there any additional equipment that needs to be connected to the system? If yes, please specify:	Yes ☐	No ☐

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Contents

Safety Practices and Hazards	1
General	1
Electrical Hazards	2
Compressed Gas Cylinders	3
High Pressure Hazards	3
Ultraviolet Radiation	4
Other Precautions	4
Warning and Caution Messages	5
Warning Symbols	6
US FCC Advisory Statement	7
CE Compliance	8
1. Introduction	9
1.1 Installation Guidelines	9
2. Laboratory Environment	11
2.1 Suitability	11
2.2 Environmental Conditions	11
2.2.1 Cleanliness	12
2.2.2 Instrument Cooling Air Supply	12
2.3 Workbench	13
2.3.1 Workbench Location	13
2.4 PC Requirements	13
2.4.1 Recommended Computer Systems	15
3. Laboratory Facilities	17
3.1 Electrical Power Supplies	17
3.1.1 Electrical Requirements	18
3.1.2 LC System Power Connections	19

3.1.3	Fuses	19
3.2	Gas Supplies	20
3.2.1	Storage Cylinder Instructions	20
3.3	Waste Fluid Container	21
3.4	Network Requirements	21
3.5	Guidelines for Software Installation	22
4.	Instrument Shipping Information	23
4.1	Insurance After Delivery	23
4.2	Weights and Dimensions	23
4.3	Transit Damage	25
4.4	Unpacking the Instrument	26
5.	Materials and Solvents	27
5.1	Materials	27
5.2	Solvents	27
6.	Operator Familiarization	29

Safety Practices and Hazards

Your Varian instrument and accessories have been carefully designed so that when used properly, you have an accurate, fast, flexible and safe scientific instrument.

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Information about safety practices appears throughout the documentation (both hard copy and online) provided with your instrument and accessories. Before using the instrument or accessories, you must thoroughly read these safety practices.

Observe all relevant safety practices at all times.

General

Operation of a Varian liquid chromatography module involves the use of high pressure liquids, UV light, compressed gas cylinders and hazardous materials including corrosive fluids and flammable liquids. Careless, improper or unskilled use of this liquid chromatograph can cause death or serious injury to personnel, and/or severe damage to equipment and property.

The Varian liquid chromatography module incorporates interlocks and covers that are designed to prevent inadvertent contact with any potential hazards. If the instrument is used in any manner not specified by Varian, this protection may be impaired. It is good practice to develop safe working habits that do not depend upon the correct operation of the interlocks for safe operation. It is essential that no interlock or cover is bypassed, damaged or removed.

The safety practices described below are provided to help the user operate the instrument safely. Read each safety topic thoroughly before attempting to operate the instrument and ALWAYS operate the liquid chromatograph in accordance with these safety practices.

Electrical Hazards

Exposure to high voltages and UV energy can cause severe skin damage and cataracts of the eyes, while close contact with the electrical components can result in severe heat burns to the skin, and an electrical discharge which may cause death, severe electric shock or sub-surface skin burns.

The Varian liquid chromatography module has been carefully designed to operate safely and effectively when using components that conform to Varian's design criteria. Use of non-approved components may render the system inoperative and/or hazardous. It may also invalidate the warranty on the instrument. Use only related components supplied or authorized by Varian.

- Disconnect the instrument from all power sources before removing protective panels to avoid exposure to potentially dangerous voltages. Panels or covers which are retained by screws may be opened **ONLY** by Varian-qualified representatives. Consult the manuals or product labels supplied with your PC to determine which parts are operator-accessible.
- When it is necessary to use a non-original power cord plug, make sure the replacement cord adheres to the color coding and polarity described in the manual and all local building safety codes.
- Good grounding/earthing is essential to avoid a potentially serious electric shock hazard. Ensure that there is a 3-pin earth-grounded receptacle. Consult the manuals or product labels supplied with your PC for the relevant grounding requirements.
- Replace blown fuses with fuses of the size and rating shown on the fuse panel or in the manual.
- Replace faulty or frayed power cords immediately with the same type and rating.
- Make sure that voltage sources and line voltage match the value for which the instrument is wired.
- Avoid using power supplies from a source that may be subject to electrical or RF interference from other services (for example, large electrical motors, elevators and welders).

Compressed Gas Cylinders

Unless your system is equipped with a helium sparging unit or an ELSD, there are no gas requirements for Varian liquid chromatography modules. For gas requirements on these other devices, consult the operation manual or other documentation enclosed with the particular device. Compressed gas cylinders contain highly pressurized gas. If storage conditions are outside of the recommended suppliers safety codes the cylinders can explode or rapidly release gas into the environment. This may result in injury or death.

- Store and handle compressed gases carefully and in strict adherence to safety codes.
- Secure cylinders to an immovable structure or wall.
- Store and move cylinders in an upright, vertical position. Before transport, remove regulators and install cylinder cap.
- Store cylinders in a well ventilated area away from heat, direct sunshine, freezing temperatures, and ignition sources.
- Mark cylinders clearly so there is no doubt as to their contents.
- Use only approved regulators and connections.
- Use only connector tubing that is chromatographically clean and has a pressure rating significantly greater than the highest outlet pressure from the regulator.

High Pressure Hazards

If a line ruptures, a relief device opens, or a valve opens accidentally under pressure, potentially hazardous high liquid pressures can be generated by the pump causing a high velocity stream of volatile and/or toxic liquids.

- Wear face protection in accordance with local safety regulations when you inject samples or perform routine maintenance.
- Never open a solvent line or valve under pressure. Stop the pump first and let the pressure drop to zero.
- Use shatter-proof reservoirs capable of operating at 50/60 psi (3/4 bar).
- Read and adhere to all Notes, Cautions, and Warnings in the manual.

Ultraviolet Radiation

Varian Liquid Chromatography Modules that use an ultraviolet light source have shielding to prevent radiation exposure to personnel. For continued protection:

- Ensure that protective lamp covers of detectors are in place during operation.
- Do not look directly into detector fluid cells or at the UV light source. When inspecting the light source or fluid cell, always use appropriate protective eye covering.
- Ozone can be generated by radiation from the source lamps. Exposure to ozone can result in severe irritation to the skin, eyes, and upper respiratory system. The maximum permissible exposure level is 0.1 ppm (0.2 mg/m³). Always ventilate the area surrounding the instrument such that the concentration of ozone does not exceed the maximum permissible level. All venting must be to outside air, never within the building.

Other Precautions

Use of the Varian liquid chromatography modules and accessories may involve materials, solvents and solutions which are flammable, corrosive, toxic or otherwise hazardous. Careless, improper or unskilled use of such materials, solvents and solutions can create explosion hazards, fire hazards, toxicity and other hazards that can result in death, serious personal injury or damage to equipment.

Always ensure that laboratory safety practices governing the use, handling and disposal of hazardous materials are strictly observed. These safety practices should include wearing appropriate safety clothing and safety glasses.

Air flow to the cooling fans of the Varian liquid chromatography modules and accessories must be unobstructed. Do not block the ventilation grills on the Varian liquid chromatography modules and accessories. Consult the manuals supplied with your PC, monitor and other peripherals for their specific ventilation requirements.

Great care should be taken when working with glass or quartz parts to prevent breakage and cuts. This is especially important when removing or replacing lamps.

Each Varian liquid chromatography module weighs between 11-34 kg (25-75 lb). To avoid injury to personnel, or damage to the

instrument or property, always use suitable lifting procedures when moving the modules. Use only Varian-supplied spares with your instrument.

Warning and Caution Messages

A Warning message is used in the text when failure to observe instructions or precautions could result in death or injury. The list of symbols that appear in conjunction with warnings are detailed in the next section.



Hot surfaces

A Caution message is used when failure to observe instructions could result in damage to equipment (Varian supplied and/or other associated equipment).

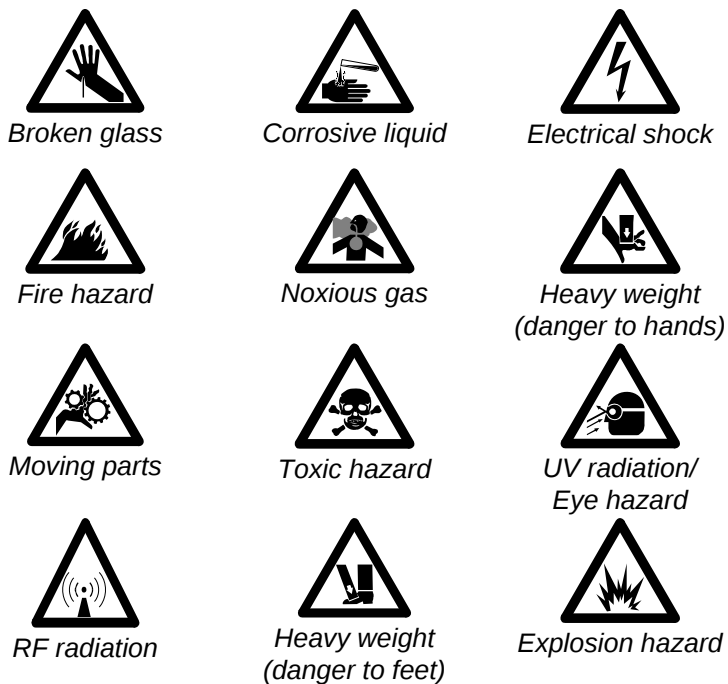
The following symbol may be used on warning labels attached to the instrument. When you see this symbol, refer to the relevant operation or service manual for the correct procedure referred to by that warning label.



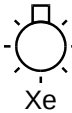
Warning Symbols

The following is a list of symbols that appear in conjunction with warnings in this manual or on the liquid chromatograph. The hazard they describe is also shown.

A triangular symbol indicates a warning. The meanings of the symbols that may appear alongside warnings in the documentation or on the instrument itself are as follows:



The following symbols may appear on the instrument for your information.

I	Mains power on
0	Mains power off
	Fuse
	Single phase alternating current
	Direct current
	When attached to the rear of the instrument, indicates that the product complies with the requirements of one or more EU directives.
	When attached to the rear of the product, indicates that the product has been certified (evaluated) to CSA 1010.1 and UL 3101-1.
	Indicates high voltage xenon flash lamp present.

The symbols above may be used on warning labels attached to the instrument. When you see these symbols, refer to the relevant operation or service manual for the correct procedure referred to by that warning label.

US FCC Advisory Statement

This equipment generates, uses and can radiate radio frequency energy, and if not installed and operated in accordance with the instruction manual may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of Federal Communications Commission (FCC) Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area may cause interference, in which case the user will be required to take whatever measures may be necessary to correct the interference at his or her expense.

CE Compliance

Your Varian modular liquid chromatograph has been designed to comply with the requirements of the Electromagnetic Compatibility (EMC) Directive and the Low Voltage (electrical safety) Directive (commonly referred to as the LVD) of the European Union. Varian has confirmed that each product complies with the relevant Directives by testing a prototype against the prescribed EN (European Norm) standards.

Proof that a product complies with these directives is indicated by:

- the CE Marking appearing on the rear of the product, and
- the documentation package that accompanies the product containing a copy of the Declaration of Conformity. The Declaration of Conformity is the legal declaration by Varian that the product complies with the directives listed above, and shows the EN standards to which the product was tested to demonstrate compliance. It is also signed by Varian's Authorized Representative in the EU, and by the representative of the manufacturing plant.



After all safety regulations have been met, check the checklist box:
Principal installation area is in compliance with all relevant safety regulations.

1. Introduction

This publication contains the information required to successfully prepare a site for a Varian modular liquid chromatograph installation.

On completion of the site preparation, fill in the check-list on page iii and send this pre-installation check-list to your local Varian agent or Varian sales and service office. As soon as it is received, Varian or your Varian agent will contact you to arrange a convenient time for installation.

If you have difficulty in preparing for the installation, and for details of operator training courses, please contact your Varian sales or field support representative.

1.1 Installation Guidelines

Allow a minimum of 1 day for the installation of the Varian modular liquid chromatograph by a Varian field support representative.

The installation will include the following:

- Instrument installation
- Instrument software installation and registration
- Accessory installation
- Basic customer training
- Maintenance overview

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2. Laboratory Environment

This section includes information on laboratory requirements for the Varian modular liquid chromatograph including:

- Suitability
- Environmental conditions
- Workbench
- PC requirements

2.1 Suitability

The instrument is suitable **only** for indoor use and is classified suitable under the following categories (EN 61010-1):

- Installation category II
- Pollution degree 2
- Safety class 1 (EN 61010-1)

Table 1. Suitable environmental conditions for the Varian Modular HPLC instruments

Condition	Altitude	Temperature	Humidity (%RH) non-condensing
Non-operating (Transport)	0-3050 m (0-10000 ft)	5-45 °C (41-113 °F)	20-80
Non-operating and meeting dielectric strength tests	Sea level	5-45 °C (41-113 °F)	90-95
Operating within specifications	0-3050 m (0-10000 ft)	10-35 °C (50-95 °F)	8-80

2.2 Environmental Conditions

The area selected for the operation of a Varian modular liquid chromatograph **must be free from drafts, corrosive**

atmospheres and vibration. Sample preparation areas and materials storage facilities should be located in a separate room.

The area should be a dust free, low humidity environment. Air conditioning is strongly recommended for control of the environment. For optimum analytical performance it is recommended that the ambient temperature of the laboratory be between 20 and 25 °C (68 and 77 °F).

- ☒ After the humidity requirements have been met, check the checklist box: Relative humidity maintained between {8 and 80%} RH.
- ☒ After the temperature requirements have been met, check the checklist box: *Lab temperature maintained between 10 and 35 °C (50 and 95 °F).*

2.2.1 Cleanliness

Limit dust levels to less than 36 000 000 particles (0.5 microns or larger) per cubic meter of air. This is equivalent to a clean office.

- ☒ After the cleanliness requirements have been met, check the checklist box: *Laboratory is free of excessive particulate matter.*

2.2.2 Instrument Cooling Air Supply

The Varian modular liquid chromatograph requires **clean, dry, non-corrosive air for cooling purposes**. This is supplied to the instrument through air supply vents in the instrument.

The air supply is used to cool the electronics of the instrument. Several of these assemblies contain parts prone to corrosion. The introduction of cooling air contaminated with high levels of acid vapor or other corrosive substances may cause damage to the instrument.

Due to the corrosive nature of some analytical work, it is recommended that in applications demanding high usage of corrosive materials, an external cooling air supply system be provided. It is **strongly recommended** that the cooling air be supplied from an environmentally controlled area that is away from the instrument and any other area where corrosive materials are stored or used.

2.3 Workbench

The Varian modular liquid chromatograph is a precision instrument. The workbench must be free from vibration and must be stable and strong enough to support the total weight of the equipment to be placed on top of the workbench. The bench top should be large enough to permit free circulation of air through the main instrument and around each of the accessories.

The information provided in the weights and dimensions table will help make planning easier. Portable or semi-permanent trolleys must not be used as work benches for the HPLC system.

To avoid damage through spillage of samples being used, the instrument bench top should be covered with a material that is resistant to common organic solvents used in HPLC and impervious to liquid spillage. For comfortable working conditions and easy access to the instrument sample introduction system, Varian recommends that the height of the workbench be approximately 900 mm (36 in.) high.



After the workbench vibrational requirements have been met, check the checklist box: *System bench is free from vibrations.*

2.3.1 Workbench Location

The workbench location should permit service access from all sides. A minimum of 400 mm (16 in.) free space at the sides of the HPLC system and approximately 750 mm (30 in.) at the rear of the instrument is required for maintenance and service access.

The Varian modular liquid chromatograph should not be located close to an access door, window or any other area where drafts may cause unstable temperature conditions.

2.4 PC Requirements

The recommended configuration represents the minimum on which you can run the software. This PC configuration may be out of manufacture, or you may want to use a PC you already have.

Table 2. Varian modular liquid chromatograph PC requirements

Recommended
Intel Processor minimum 2.8GHz (2.2 GHz for Dual core processors) If the computer will have National Instruments GPIB card(s) installed, the

processor should not be a multiprocessor and hyper threading must be disabled. Intel Core 2Duo Processor is supported.
Client or Standalone system > 1 GB recommended with Windows XP SP2 or Windows Vista® operating system, >= 2 GB RAM required Server* >2 GB recommended.
Client or Standalone system > 10GB recommended Server* >160 GB recommended. Details to be defined with customer according to the yearly amount of data generated, and the desired retention of data 'on-line' (i.e. without off-line archiving) NTFS Partitions only.
100/1000BaseT Ethernet NIC
Slots available and appropriate for any required cards for instrument interfaces (GPIB)
CD ROM drive >16x required DVD-ROM drive recommended Windows® -compatible keyboard and mouse
Minimum 1024x768 screen resolution; 1280x1024 screen resolution recommended.
For the use of 335-LC Photo Diode Array detector features, the graphic card should be in the list below: • INTEL integrated video card • AM Radeon AGP • ATI Mobility 128 AGP • ATI Rage Mobility 128 AGP • ATI mobility M3 • ATI 3D Rage PRO AGP 2X • ATI Rage 128 Pro Ultra GL AGP • ATI Rage XL PCI (B41) • ATI Rage 128 Ultra (16MB) • Neomagic Magicgraph 128XD • NeoMagic MagicMedia256ZX • Mga-mil: (chip: MGA-2064WB4R2; CNA: TI TVP3026 220MHZ) • Nvidia Riva TNT (with last driver version: chip: NV4; memory: 16Mo; Files: nv4_mini.sys, nv4_disp.dll; Version : 4.00,4.0.0) • NVIDIA GeForce4 MX 420, 64MB DDR • NVidia GeForce4 440 MX • Matrox G200 AGP List of known non compatible graphic cards:

• Intel815 Video Accelerator (4Mo). • S3 Savage graphics adapter works only with 256 colours • ATI Radeon X1300 pci.
Recommended Server* Redundancy • Redundant Power Supply • Redundant Network Card • Mirroring System Disk (RAID 1) • RAID 1 or RAID 5 Storage Disks • 'Hot Plug' Hard Drives • Backup Unit (DLT type with automated backup software)
Client or Standalone system: Windows® XP Pro (SP1or SP2), or Windows Vista® (Enterprise and Business) Server*: Windows® 2000 server or Windows® Server 2003 (with the applicable Service Packs) NTFS Partitions only Server must be either part of a Domain or be a Domain Server

* For Galaxie™ CDS server specifications, please contact your local Varian sales representative.

Varian recommends and supplies Dell™ PCs. For a complete list of qualified PCs and printers, please contact your local Varian representative.

PCs supplied with Letter of Credit orders will be an international brand and will be the 'Recommended' configuration or better.

Higher rated PC components can be substituted for those listed above e.g., processor type, amount of memory, screen size and resolution, operating system version, etc.

Additionally you need to have a valid copy of Galaxie in order to run the instrument. This may need to be ordered. Please contact your local Varian representative if you need more information.

2.4.1 Recommended Computer Systems

Varian uses and recommends Dell PCs.

To ensure the best performance and reliability when using Varian software to run your analytical instruments, we recommend using Dell PCs.

Although our software is designed to work on any correctly configured PC, all testing and evaluation is completed using Dell PCs only.

Details of recommended PC configurations for Varian products can be found on the Varian Inc. website: www.varianinc.com.



After the PC requirements have been met, check the checklist box:
Personal computer with Microsoft Windows XP® or Vista operating system installed.

3. Laboratory Facilities

This section includes information on the laboratory facilities required to support the operation of the LC system. These include:

- Electrical power supply
- Gas supplies
- Waste fluid container
- Network requirements
- Guidelines for software installation

3.1 Electrical Power Supplies

The installation of electrical power supplies must comply with the rules and/or regulations imposed by the local authorities responsible for the use of electrical energy in the workplace.

All power supplies for the Varian modular liquid chromatograph and its accessories should be single phase, AC, 3 wire systems (active, neutral, ground; or two active and ground). Each connection should be terminated at an appropriate receptacle within reach of each assembly's power cable. Use of power boards or extension cables is **not** recommended.

Avoid using power supplies from a source that may be subject to electrical interference from other services (such as large electric motors, elevators, welders and air conditioning units).

Varian modular liquid chromatographs are supplied with a 2 meter long (6 feet and 6 in.) mains supply cable.

3.1.1 Electrical Requirements

Table 3. System electrical specifications

System unit	Required supply voltage	Nominal rating
210/218 pump	115-230 V AC, 50–60 Hz	270 VA/550 VA
SD-1 pump	115-230 V AC, 50–60 Hz	350 VA
SD-2 pump	230 V AC, 50–60 Hz	1000 VA
325 UV-Vis detector	120/230 V AC, 50–60 Hz	130 VA
335 Photodiode Array detector	120/230 V AC, 50–60 Hz	130 VA
380/385-LC ELS detector	115-230 V AC, 50–60 Hz	480 VA
356-LC RI detector	115-230 V AC, 50–60 Hz	150 VA
410 autosampler	115-230 V AC, 50–60 Hz	200 VA
420 autosampler	115-230 V AC, 50–60 Hz	250 VA
430 autosampler	115-230 V AC, 50–60 Hz	250 VA
440-LC fraction collector	115-230 V AC, 50–60 Hz	100 VA
500 column valve module	115-230 V AC, 50–60 Hz	250 VA
510 column thermostat	115-230 V AC, 50–60 Hz	400 VA
530 fluidics module	115-230 V AC, 50–60 Hz	150 VA
Personal computer (typical)	115, 120, 220, 240 VAC	300 VA
Printer (typical)	115, 120, 220, 240 VAC	85 VA

3.1.2 LC System Power Connections

Table 4. power connections for Varian liquid chromatography module

Power supply phase	Single
Cable rating	(220-240 V countries) 5 A minimum
Cable rating	(100-120 V countries) 12 A minimum

	Plug supplied	Required wall socket
Australia	Complies with AS3112	To comply with AS3112. HPM 787 or Clipsal 2015 (250 V, 10 A)
USA	Complies with Nema 5-15P	To comply with Nema 5-15R. Hubbell 5262 (125 V, 15 A)
Canada	Complies with Nema 5-15P Complies with CS 22.2 No. 42	To comply with Nema 5-15R. Hubbell 5262 (125 V, 15 A)
Europe	Complies with CEE 7 Sheet VII	To comply with CEE 7 Sheet VII (250 V, 10/16 A)



After the electrical requirements have been met, check the checklist box: *Specified electrical supply and power outlets installed.*

3.1.3 Fuses

Information on fuses can be found in each of the individual manuals.

Note

For safety reasons, any other internal fuse is not operator accessible, and should only be replaced by Varian-authorized personnel. Fuse information on the rear of the instrument is the most up-to-date.

3.2 Gas Supplies

Except for the ELS detector, unless your system is equipped with a helium sparging unit, there are no gas requirements for the Varian modular LC system. For gas requirements on these other devices, consult the operation manual or other documentation enclosed with the particular device.

The installation of compressed or liquid gas supplies must comply with the rules and/or regulations imposed by the local authorities responsible for such use in the workplace.

The ELS detector should be supplied with clean, dry nitrogen gas (>98% purity, filtered to 0.2 μm), between 414-689 KPa (60-100 PSI) in pressure. For optimum performance a gas pressure of 414 KPa (60 PSI) is recommended. Air can only be used for non-flammable solvents. The instrument is not calibrated for use with gasses other than air or nitrogen. For operation with other inert gases contact your Varian representative for advice.

A convenient 4 mm push-in connection for the gas source is provided at the rear of the ELS detector.

3.2.1 Storage Cylinder Instructions

Cylinders containing gas under pressure should be firmly secured to a rigid structure, and the storage area must be adequately ventilated.

Never locate gas cylinders near a source of ignition, or in a position that is subject to direct heat. Gas storage cylinders often incorporate a pressure release device which will discharge the gas at a predetermined temperature, usually around 52 °C (125 °F).

If gases are to be plumbed from a remote storage area to the instrument site, ensure that the local outlets are fitted with stop valves, pressure gauges and suitable regulators which are easily accessible to the instrument operator. The gas outlets must be provided within 1.5 meters (5 feet) of the instrument.

Note You are responsible for installation of gas supplies or gas cylinders. Varian authorized personnel will not be involved in the setting up or installation of any gas supplies other than the connections into the liquid chromatograph.



After the gas requirements have been met, check the checklist box: *Gas supply (at specified purity), regulator, and gas lines are installed.*

3.3 Waste Fluid Container

Operation of the Varian modular liquid chromatograph requires the use of a waste container for the disposal of excess fluids. Suitable tubing is supplied with the HPLC system for use with most solvents.

A chemically inert container, appropriately sized to hold waste coming from the instrument must be provided by the instrument user. It should be located underneath the workbench where it is protected by the bench and in full view of the operator.

3.4 Network Requirements

The Varian 325 or 335 detectors require an Ethernet connection to the PC via a shielded twisted pair Ethernet crossover cable Category 5 or better (provided with the detector).

If connection is required to an Ethernet network, then a shielded twisted pair Ethernet non-crossover cable Category 5 or better will be required (not supplied).

Most PC's come pre-configured with an Ethernet connection either built into the motherboard or with an Ethernet network card installed. Check that the intended PC has this configuration and if not, a network card will have to be fitted. Refer to the installation chapter for details.

If the user is supplying their own PC, then they are responsible for installing and configuring the card. They are also responsible for setting up and maintaining any LAN configuration where a detector may be used.

All network issues are to be dealt with by the users.



After the network details have been obtained (IP address, subnet mask and gateway if using a fixed IP for a Varian 325/335 detector), check the checklist box: *IP address, subnet mask and gateway if using a fixed IP for a Varian 325/335 detector.*



After the appropriate network and work station access are available, check the checklist box: *Appropriate network and work station access.*

3.5 Guidelines for Software Installation

Varian recommends that you purchase a PC with the Varian liquid chromatography modules. The supplied PC will come with the appropriate operating system as loaded by the PC supplier.

For instructions on installing the Windows® operating system, please refer to the appropriate manuals supplied with the software. It is the responsibility of the customer to ensure that the operating system software has been installed and is functional, if the customer is supplying the PC or the operating system.

Note Varian will not assume responsibility for loss of data.

The Varian liquid chromatography module requires a version of Galaxie™ software in order to be operated.

A Varian field support representative will have advised you what version of the Galaxie software is required and what options you have in terms of upgrading.

The Varian field support representative will connect the PC to the HPLC system and any factory-approved accessories purchased at installation. Initial instrument software installation is also included as part of the system installation. For information on installing the Galaxie software, consult the Varian Modular HPLC System Installation Overview, publication number 8510251200, which is supplied with each instrument.

For networking Galaxie™ software, consult the Galaxie CDS Installation Guide.

4. Instrument Shipping Information

Generally, Varian modular liquid chromatographs are sold **Free On Board** shipping point, with the transportation from this point at the customer's expense.

4.1 Insurance After Delivery

As the carrier's liability ceases when the equipment is delivered, Varian recommends that the instrument owner arranges separate insurance that will cover transportation from the delivery point to the installation site. The delivery point will vary according to the carrier, the shipping method, and in some cases the terms of sale. Some carriers will only deliver to their own distribution center, while others may deliver to the actual installation site.

4.2 Weights and Dimensions

Table 5. Weights and dimensions

System Unit	Height	Width	Depth	Weight
Solvent Delivery Modules				
210/218 pump	19.7cm 7.75 in.	29.2 cm 11.5 in.	46.4 cm 18.3 in.	22.0 kg 48.0 lb
SD-1 pump	27.0 cm 10.5 in.	41.0 cm 16.0 in.	56.0 cm 22.0 in.	34.0 kg 75.0 lb
SD-2 pump	19.7 cm 7.6 in.	29.2 cm 11.5 in.	57.5 cm 20.3 in.	27.0 kg 60.0 lb
Detectors				
325 UV-Vis detector	21.2 cm 8.3 in.	29.6 cm 11.7 in.	47.5 cm 18.7 in.	15.5 kg 34.0 lb
335 photodiode array detector	21.2 cm 8.3 in.	29.6 cm 11.7 in.	47.5 cm 18.7 in.	15.5 kg 34.0 lb

System Unit	Height	Width	Depth	Weight
356-LC RI detector	21.2 cm 9.0 in.	29.6 cm 12.0 in.	47.5 cm 19.0 in.	11.0 kg 25.0 lb
380/385-LC ELS detector	41.5 cm 17.0 in.	20.0 cm 8.0 in.	45.0 cm 18.0 in.	11.0 kg 25.0 lb
Auto Samplers/Fraction Collectors				
410 autosampler	34.0 cm 13.4 in.	30.0 cm 11.8 in.	50.0 cm 19.7 in.	19.0 kg 42.0 lb
<i>with cooling option</i>				21.0 kg 46.0 lb
420 autosampler	44.0 cm 17.3 in.	28.0 cm 11.0 in.	54.0 cm 21.3 in.	22.0 kg 48.0 lb
<i>with cooling option</i>				26.0 kg 66.0 lb
430 autosampler	44.0 cm 17.3 in.	28.0 cm 11.0 in.	40.0 cm 15.7 in.	21.0 kg 46.0 lb
<i>with cooling option</i>				26.0 kg 58.0 lb
440-LC fraction collector	51.0 cm 21.0 in.	49.0 cm 20.0 in.	28.5 cm 12.0 in.	18 kg 34 lb
Peripheral Components				
500 column valve module	50.8 cm 20.0 in.	13.7 cm 5.4 in.	38.1 cm 15.0 in.	13.6 kg 30.0 lb
510 column thermostat	52.0 cm 20.5 in.	17.0 cm 6.8 in.	33.0 cm 13.0 in.	16.0 kg 35.2 lb
530 fluidics module	19.7 cm 7.6 in.	29.2 cm 11.5 in.	47.0 cm 18.5 in.	15.0 kg 32.0 lb
Ancillary equipment (Mobile phase reservoirs, column mount assembly, dynamic mixer, manual injector, etc.)	46.0 cm 18.0 in.	31.0 cm 12.0 in.	46.0 cm 18.0 in.	— —



Warning

The Varian liquid chromatograph module can weigh between 11-34 kg (25-75 lb). To avoid injury to personnel or damage to equipment, always use suitable lifting procedures when moving the modules.



After the bench space requirements have been met, check the checklist box: *Sufficient bench space is available for all components.*



After the bench support requirements have been met, check the checklist box: *Bench can support system weight.*

4.3 Transit Damage

Transit damage will only be admitted by the carrier if it is reported as agreed in the terms of his agreement. For any claims against damage in transit, the following general rules apply.

- Before accepting delivery, you should inspect the packages for signs of obvious damage. The nature of any obvious damage must be noted on the carrier's waybill, and then must be countersigned by a representative of the carrier.
- Within the time limits stated in the terms of conditions of carriage, a further inspection must be made for concealed damage. If any damage is found at this stage, the carrier must be notified in writing and all packaging material must be retained for subsequent inspection by a representative of the carrier.
- A copy of any damage report must be forwarded to the Varian sales office dealing with the supply of the equipment.

Varian modular liquid chromatographs are inherently robust, and the packaging is designed to prevent damage. It must be remembered that the contents form part of a precision measuring system and all packages should be handled accordingly. In transit, sharp jolts and shocks must be avoided and the packages must not be inverted or tilted unnecessarily. Markings on the shipping cartons generally indicate the required orientation of the carton.



After all boxes have been checked for damage, check the checklist box: *All unopened boxes have been checked for damage.*

4.4 Unpacking the Instrument

Do not unpack the instrument under any circumstances without the presence of a Varian field support representative.

Place all boxes near the final instrument location.



After all boxes have been placed near the final instrument location, check the checklist box: *Instrument has been placed near its final location.*



Warning

The Varian liquid chromatograph module can weigh between 11-34 kg (25-75 lb). To avoid injury to personnel or damage to equipment, always use suitable lifting procedures when moving the modules. Not all options may be present, so consult your purchase order for more information.

5. Materials and Solvents

The Varian field support representative will prepare solutions to tune and evaluate the Varian liquid chromatography module. Please supply the following materials and solvents.

**Warning – Chemical Hazard – Noxious Fumes**

Danger of skin irritation, burns and inhalation. To avoid injury to personnel or damage to equipment, always follow appropriate safety guidelines when using chemicals and always wear appropriate safety equipment and clothing.

5.1 Materials

Table 6. Materials

Quantity	Item
2	1 L clean and new Wheaton bottles to use as mobile phase reservoirs

5.2 Solvents

Table 7. Solvents

Quantity	Solvent
2 liters	HPLC grade water

Additional tubing is required to complete the installation of your system. Most of this tubing is included in the accessory kits of LC modules. Additional tubing (PEEK™ or stainless steel) may be required for installation of special valves or modules. For most analytical HPLC systems (flow rates up to 1 mL/min), 1/16 in. tubing with an internal diameter (ID) of 0.005 in. can be used

throughout. However, use 0.005 in. ID or smaller tubing downstream of the sample injector or autosampler to prevent peak broadening. Keep tubing lengths as short as possible to prevent peak broadening and minimize run time.

Semi-prep and preparative systems have other interconnect tubing requirements and limitations. Typically, a system that uses flow rates up to 200 mL/min requires 1/16 in. OD tubing with an internal diameter as large as 0.040 in. Use tubing ~0.010 in. smaller than this in the rest of the system. Usually preparative systems use 1/8 in. tubing (0.062 in. ID) throughout. Always consult the module Operator's Manual for specific recommendations.



After the materials and solvent requirements have been met, check the checklist box: *Materials and solvents are on site.*

6. Operator Familiarization

The Varian liquid chromatography module is installed by a Varian field support representative. During installation, the Varian field support representative will demonstrate the basic operating procedures while conducting the installation performance tests during the installation procedure. The Varian field support representative however, is not necessarily experienced in complex analytical routines and is not authorized to conduct extensive training.

To ensure that your operators benefit the most, operator training should be completed before your equipment is installed. It is strongly recommended that you take advantage of the special training courses that are conducted at various locations by the Varian sales organization.

In some areas it may be possible to arrange for operator training to be carried out after the installation, using your own instrument. To check this possibility, please contact your local Varian Sales and Service Office.

When waiting for tests or instrument warm up to complete, the Varian field support representative will demonstrate some of the basic system operating procedures.

If your system computer was purchased from Varian, it will be configured, formatted, partitioned and loaded with its operating system. The Galaxie™ Chromatography software will be loaded during installation.

Please note that you must have a working knowledge of the computer operating system, as this type of instruction is not provided by Varian. The Online Help supplied with the HPLC system provides step-by-step instructions for setting up the system and detailed operating instructions for the analysis procedures. It does not include instructions for operation of the computer.



After the principal operator has been identified and will be available during the installation, check the checklist box: *Principal operator will be available during the installation and certification period.*

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