



HP 1100 Series
LC/MSD

Site Preparation Manual



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Document History

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equipment that is not
furnished by Hewlett-Packard.

Instrument Identification

Each HP 1100 Series LC/MSD
is identified by a unique
10-character serial number.
This serial number is located
on a label on the lower right
front corner of the instrument.

When corresponding with
Hewlett-Packard about your
instrument, be sure to include
the model number and the full
10-character serial number.

The HP G1947A APCI
Interface and HP G1948A
Electrospray Interface each
have separate serial numbers.
These numbers are located
next to the spray chamber
latches.

Write the serial numbers of
your HP 1100 Series LC/MSD
and interfaces here for
reference:

LC/MSD Serial Number:

APCI Interface Serial Number:

Electrospray Interface
Serial Number:

Noise Declaration

Deutsch

LpA << 70 dB am Arbeitsplatz
normaler Betrieb nach EN
27779:1991

English

LpA << 70 dB operator
position normal operation per
ISO 7779:1988

Manual Conventions

Cautions

Cautions call attention to
procedures which, if not
correctly performed or
adhered to, could result in
damage to the instrument.

Warnings

Warnings call attention to
procedures which, if not
correctly performed or
adhered to, could result in
personal injury.

Table of Contents

Space and Weight Requirements, 6	
Electrical Requirements, 8	
Voltage ranges of major components, 9	
Power configurations, 10	
Power requirements, 11	
Power plugs and cords, 12	
Other electrical considerations, 13	
Air Conditioning Requirements, 14	
Temperature and humidity, 14	
Airborne dust, 14	
Exhaust venting, 15	
Nitrogen Gas Requirements, 16	
Nitrogen purity, 16	
Regulators, tubing, and fittings, 17	
Laboratory Supply Requirements, 18	
Cleaning solvents, 18	
Fume hood, 18	
Telephone, 18	
Tools, 19	
Data system supplies, 19	
Spare parts and consumables, 20	
Receiving the System, 22	
Delivery and unloading, 22	
Inspecting for damage, 23	
Storage, 23	
Unpacking, 23	
Installation and Verification, 24	
Installation, 24	
Verification, 24	
Appendix A. Power Cords, 26	
Appendix B. Nitrogen Gas Generators, 28	
Single-instrument generators, 28	
High-output generator, 29	
Generator installation, 30	
Appendix C. LC Columns and Supplies, 31	
Vials, 31	
HPLC columns, 32	

Site Preparation

Before an HP 1100 Series LC/MSD system can be installed, the site must be properly prepared

Site preparation includes, but is not limited to:

- Ensuring adequate space is available for the LC/MSD system
- Ensuring adequate electrical power is available at the correct voltages and frequencies
- Ensuring the environmental control systems are adequate to maintain a correct, stable operating environment
- Ensuring adequate preparations are made for safe exhaust venting
- Ensuring the supplies necessary for instrument operation are available including a high-volume supply of clean nitrogen gas

Delays due to inadequate site preparation could cause loss of instrument use during the warranty period. In extreme cases, Hewlett-Packard may ask to be reimbursed for the additional time required to complete the installation. HP provides service during the warranty period, and under maintenance agreements, only if the specified site requirements are met.

Site preparation is generally the customer's responsibility

Unless previous arrangements have been made with Hewlett-Packard, site preparation is the responsibility of the customer. Customer responsibilities include, but are not limited to:

- Planning, scheduling, and preparing the site according to the specifications in this manual
- Verifying that the electrical environment is safe and adequate for the LC/MSD system installation and operation
- Compliance with all local laws (codes, ordinances, and regulations) for mechanical, building, and electrical distribution systems. ***Compliance must exist prior to installation.***

- Providing lifting equipment adequate to unload the system from the delivery vehicle and transport it to the site where it will be installed. Also, someone to help lift the LC/MSD onto the laboratory bench.
- Adequate secure storage space for the system until it can be installed by a Hewlett-Packard representative

A Hewlett-Packard representative will perform the actual installation and verify instrument performance

A Hewlett-Packard service representative will install the LC/MSD and verify its performance. The service representative's responsibilities are limited to:

- Unpacking the LC/MSD system and verifying that all components are present and undamaged
- Installing, connecting, and turning on LC/MSD system components
- Verifying that the system meets Hewlett-Packard performance standards
- Providing **basic** user familiarization for system hardware and software

Hewlett-Packard is **not** responsible for:

- Any task not listed in the HP 1100 Series LC/MSD Installation Manual (G1946-90037) or the installation guides for the LC, data system, and other accessories
- Installing a nitrogen gas generator unless additional installation time is purchased
- Connecting, or verifying the performance of, hardware and software not provided by Hewlett-Packard
- Testing the LC/MSD system against customer standards or samples
- Detailed instruction in the operation of the computer operating system and LC/MSD software. Contact Hewlett-Packard for information concerning training classes.
- Setting up laboratory procedures. Assistance with laboratory procedures can be obtained from an HP Applications Engineer (AE) on a consulting basis at additional cost.
- Operation of the LC/MSD system following installation

Space and Weight Requirements

Table 1 lists dimension and weight information for the LC/MSD and related components. Your site must have enough bench space for the LC/MSD, LC, data system, and accessories. In addition, there must be sufficient space around the system for ventilation and maintenance access. At least 30 cm (12 in) to the left of the LC/MSD and at least 5 cm (2 in) behind the LC/MSD must be kept clear.

Benches must be sturdy enough to support the weight of the entire system.

WARNING

While it is possible to stack the HP 1100 Series LC modules on top of the LC/MSD without damaging it, this arrangement is potentially unstable and dangerous.

Stacking the LC modules on top of the LC/MSD is also very inconvenient. It puts the solvent bottles and some LC controls out of reach of all but the tallest users. It means the LC system must be disassembled and removed for some LC/MSD maintenance procedures. We strongly recommend *against* stacking the LC modules on top of the LC/MSD.

The foreline pump can be located on the laboratory bench or on the floor. It must be close to the LC/MSD because they are connected by a 200-cm (79-in) hose. Approximately 30 cm (12 in) of that hose is inside the LC/MSD. The hose can exit the front or back of the LC/MSD. The hose is stiff and cannot be bent sharply.

CAUTION

Do not put the foreline pump on your laboratory bench if vibration-sensitive equipment is located on the bench.

The LC/MSD must also be connected to the drain bottle. The drain bottle must be below the LC/MSD. A 180-cm (72-in) teflon hose is provided to connect the LC/MSD to the drain bottle. Approximately 30 cm (12 in) of that hose is inside the LC/MSD. The hose can be stretched to almost 150 cm (59 in) if necessary. A hose extension kit (G1946-67002) is available. It adds 120 cm (48 in) to the length of the hose.

CAUTION

The total hose length should not exceed 300 cm (120 in).

Table 1

Product dimensions¹				
Product	Dimensions, cm (in)			Weight, kg (lb)
	Height	Width	Depth	
HP 1100 Series LC/MSD ²	48 (19)	64 (25)	62 (25)	61.4 (135)
Foreline pump	23 (9.2)	17 (6.8)	51 (20)	32 (70)
HP G1947A APCI Interface ³	23 (9.2)	18 (7.1)	13 (5.1)	1.7 (3.7)
HP G1948A Electrospray Interface ³	17 (6.8)	18 (7.1)	9.5 (3.7)	1.7 (3.7)
HP 1100 Series LC System	Height and weight of the LC system depends on the number and type of modules included in the system. Most HP 1100 Series LC modules are approximately 35 cm (14 in) wide and 45 cm (18 in) deep.			
Data System	Data system size and weight depend on the components included in the data system. Reserve at least 100 cm (39 in) of bench space for the data system. A typical data system weight is 34 kg (75 lb).			

¹ All dimensions are approximate.

² The LC/MSD requires a source of nitrogen gas. Typically, this is either a 160-liter dewar of liquid nitrogen or a nitrogen generator. Be sure to plan for the space your nitrogen source requires.

³ The electrospray and APCI interfaces attach to the left side of the LC/MSD. Their depths must be added to the width of the LC/MSD. Heights for the interfaces include the height of the nebulizer.

Electrical Requirements

You are responsible for providing appropriate electrical power and power outlets for all of the components in your HP 1100 Series LC/MSD system. Power considerations include:

- Voltage ranges of major components
- Power configurations
- Power requirements
- Power plugs and cords

Voltage ranges of major components

The HP 1100 Series LC/MSD includes a full-range power supply that can operate without reconfiguration on either of two wide ranges of single-phase alternating current (ac) electrical power:

- 200-210 Vac +5/-10%, 50/60 Hz \pm 5% (typical for the United States and Japan)
- 220-240 Vac +5/-10%, 50/60 Hz \pm 5% (typical for Europe)

The HP G1948A Electrospray Interface and the HP G1947A APCI Interface draw their power from the MSD. They are indifferent to the voltage range of the power supplied to the MSD.

The foreline pump also draws its power from the MSD. However, a different foreline pump is supplied depending on the voltage range on which the LC/MSD will be operating. The pump is supplied according to the standard voltage in the country from which the order originates. For example, if an order originates from a Hewlett-Packard sales office in Germany, the foreline pump supplied will be configured to operate on the standard voltage and frequency of electrical power in Germany.

CAUTION

If an instrument is being ordered from one location, but is to be installed in another location with different electrical power characteristics, this must be noted on the order. A special note must also be made if the electrical power at the site is different from the standard electrical power in that country.

Site Preparation
Electrical Requirements

Power configurations

Electrical power for the LC/MSD may be delivered in either single-phase or 208-Wye configuration. Correct grounding for the 208-Wye configuration must be verified by an electrician. The neutral wire **cannot** be used for safety grounding. The ground wire should carry zero current except for ground-fault current or static electric discharge. The entire system should share an isolated, noise-free electrical ground. This system ground should be electrically separate from the ground for the rest of the building, back to the main ground for the facility.

WARNING

Connecting an LC/MSD to a power source which is not equipped with a protective earth contact (ground) creates a shock hazard for the operator and can damage the instrument.

WARNING

Interrupting the protective conductor inside or outside the MSD or disconnecting the protective earth terminal (ground) creates a shock hazard for the operator and can damage the instrument.

Table 2

Power configurations

Configuration	Measurement	Nominal voltage
Single phase	Line to neutral	200, 220, or 240 Vac ¹
	Line to ground	200, 220, or 240 Vac ¹
	Ground to neutral	< 0.5 V rms
208-Wye	Line to line (phase A to phase B)	208 Vac
	Line to ground (phase A to ground)	120 Vac
	Line to ground (phase B to ground)	120 Vac

¹ Varies with country.

Power requirements

Table 3 lists the power requirements for the HP 1100 Series LC/MSD and related equipment. Extra power capacity for future additions is a very good idea.

Each product listed requires a dedicated circuit. The LC/MSD, LC, and data system should each have a separate circuit breaker.

Power must meet the stability specifications listed in Table 3. Use a line monitor to check power stability. If your line power is unstable, you may need to install a line conditioner.

Table 3. Power requirements

Product	Line voltage	Maximum continuous power consumption	Supply circuit rating	Number of outlets
HP 1100 Series LC/MSD ¹	200-210 Vac +5/-10%, 50/60 Hz ± 5% 220-240 Vac +5/-10%, 50/60 Hz ± 5%	1100 VA (U.S. and Japan) 2000 VA (Europe)	15 A	1
HP 1100 Series LC	100-120 or 220-240 Vac ± 10%, 50/60 Hz ± 5%	1000 VA ²	15 A	4 – 6
HP G1030A ChemStation Data System	100-120 or 220-240 Vac ± 10%, 50/60 Hz ± 5%	1000 VA ²	15 A	4 – 6

¹ The LC/MSD operates on either voltage range. The foreline pump is supplied for one voltage range or the other based on the standard voltage in the country where the order originates.

² Depends on product configuration.

WARNING

Excessive fluctuations in the voltage of the power supply can create a shock hazard and can damage the instrument. Make sure the supply voltage does not fluctuate more than +5% or -10% from the rated voltage. This equipment must be installed in a Category II environment as defined in IEC 60664.

Electrical Requirements

Power plugs and cords

The LC/MSD is supplied with a power cord and plug appropriate for the country from which the order originates. For example, if an order originates from a Hewlett-Packard sales office in Germany, the power cord and plug supplied will be compatible with the standard voltage and outlet configuration in Germany. See Appendix A on page 26 for illustrations of the power cords available. The length of all LC/MSD power cords is approximately 2.4 m (8 ft).

Data system components also include power cords with plugs appropriate for the country where the order was placed. Power cord lengths for the data system components and accessories are approximately 2.3 m (7.5 ft).

CAUTION

If an instrument is being ordered from one location, but is to be installed in another location with different electrical power characteristics, this must be noted on the order. A special note must also be made if the electrical power at the site is different from the standard electrical power in that country.

WARNING

Make sure the power cords supplied with the LC/MSD are appropriate for your country and site before using them.

WARNING

Do not use extension cords with the LC/MSD or LC. Extension cords cannot provide enough power and can be a safety hazard.

*Replacement for
HP 5989 MS Engines*

In the United States, the plug on the power cord supplied with the LC/MSD is different from the NEMA twistlock plug required for the HP 5989 MS Engine. A power cord, part number G1946-60066, is available that allows the LC/MSD to be connected to an electrical outlet formerly used by an HP 5989 MS Engine. This cord is not supplied with the LC/MSD but can be ordered separately.

WARNING

Maintain easy access to the power cords so they can be disconnected during maintenance.

Other electrical considerations

Additional electrical considerations include:

- Electromagnetic interference (EMI), such as is generated by NMRs, radio transmitters, and microwave links, may interfere with system performance.
- Protect the system from static electricity by observing humidity and temperature requirements. Minimize the presence of non-conductive products such as carpets and vinyl floor tiles.
- Install emergency-off pushbuttons that can disconnect power to the ventilation system and all electric equipment in the room except overhead lighting.
- Separate convenience outlets should be provided for building maintenance and other appliances. Convenience outlets must be on circuits separate from the LC/MSD system. Convenience outlets must share the normal building distribution ground, **not** the LC/MSD system ground.
- In some geographical areas it may be advisable to install lightning protection for personnel and equipment.

Air Conditioning Requirements

Air conditioning considerations include temperature, humidity, airborne dust, and exhaust venting. Each of these is considered in more detail in the following material.

Temperature and humidity

The HP 1100 Series LC/MSD is specified for operation under the following conditions:

- 15 to 35°C (59 to 95°F)
- Constant temperature (variations < 3°C/hr)
- 40% to 80% relative humidity
- Non-condensing, non-corrosive atmosphere

Environmental control systems must maintain these temperature and humidity ranges.

The LC/MSD dissipates up to 2000 Watts (6800 BTU/hr). The LC and data system also contribute significantly to the cooling load although the exact amounts depend on their configurations. Additional allowances should be made for other heat sources such as heat from other equipment, heat from adjacent rooms, and heat from laboratory personnel.

Airborne dust

HP recommends a maximum airborne particle density of 55 µg/m³. If you suspect your site exceeds this limit, contact your local HP Customer Service Organization. HP Customer Engineers with special training and equipment can test for airborne particle density. They can offer suggestions for reducing airborne dust.

Exhaust venting

There are two sources of exhaust on the LC/MSD: the spray chamber and the foreline pump. The drain hose routes a combination of liquid and vapor from the spray chamber to the drain bottle. The liquid and gas are both made up of undiluted solvent and sample. The foreline pump outputs gas removed from the vacuum manifold by the turbomolecular pumps. The foreline pump exhaust may also contain traces of solvent and sample. The trap on the foreline pump traps only pump fluid. It does not trap exhaust gases or traces of solvent and sample that may be present in the exhaust gases.

WARNING

User safety requires that the exhaust gases from the LC/MSD be vented externally to the building and not recirculated by the environmental control system. Health hazards include chemical toxicity of solvents, samples, buffers, pump fluid vapor, and aerosolized biological samples.

The spray chamber exhaust (via the drain bottle) and the foreline pump exhaust **cannot** be vented into the laboratory. They must be vented external to the building. Further, the spray chamber exhaust and foreline pump exhaust must be vented **separately**. They cannot be joined at any point. This is to prevent traces of foreline pump fluid from entering the spray chamber when drying gas is not flowing.

The combined exhaust flow from the spray chamber and foreline pump is up to 20 l/min. Flow is continuous as long as the instrument is on. The exhaust system must have no backpressure at 20 l/min. Ideally, both exhaust vents should be at or slightly below atmospheric pressure (negative pressure). If a negative pressure vent is not available, the length of the tubing from the foreline pump to the vent and from the drain bottle to the vent should each not exceed 460 cm (15 ft).

WARNING

Back pressure in the spray chamber exhaust tubing and drain bottle can force sample and solvent back up the waste tubing and out the manual injection valve.

Exhaust gas venting must comply with all local environmental codes.

HP service representatives will not install an HP 1100 Series LC/MSD until an adequate exhaust system is present and functioning.

Nitrogen Gas Requirements

The HP 1100 Series LC/MSD requires a very large quantity of high-purity nitrogen for drying gas, nebulizing gas, and to pressurize the calibrant delivery system.

WARNING

Nitrogen is the *only* acceptable drying gas and nebulizing gas. Use of air, oxygen, or other gases, when combined with volatile solvents and high voltages in the spray chamber, could result in an explosion. Use of air, oxygen, or other gases will also cause deterioration of parts in the LC/MSD and have a negative effect on instrument operation and sensitivity.

Due to volume of nitrogen required, we recommend obtaining it from a nitrogen generator (gas separator) or from a large (160 liters or greater) dewar of liquid nitrogen. Hewlett-Packard offers several nitrogen gas generators well suited to use with the LC/MSD. See Appendix B on page 28 for more detailed information about these generators.

Liquid chromatographs other than the HP 1100 Series LC may require compressed gases for the LC autosampler and for sparging the LC solvents. If you are installing a liquid chromatograph other than the HP 1100 Series LC, see the site preparation and installation material supplied with that LC.

WARNING

Compressed or liquefied gases can be dangerous. Please contact your gas supplier for handling and safety information for the gases you use.

Nitrogen purity

The nitrogen gas must be free of contaminants. Table 4 lists specifications for the nitrogen. Purity specifications vary according to the source of the nitrogen. This is due to the different types of contaminants common to different nitrogen sources. Bottled nitrogen tends to be contaminated with hydrocarbons which can severely degrade LC/MSD performance. Even with the gas conditioner (purifier) supplied with the LC/MSD, it is virtually impossible to remove all of the hydrocarbon contaminants if the bottled nitrogen is not **at least** 99.5% pure to start with. Oxygen is the primary contaminant in nitrogen supplied by a generator. Oxygen has less impact on LC/MSD performance and, in some operating modes for some applications, can actually be beneficial in small concentrations. Therefore, the purity specification for nitrogen from a generator can be less stringent.

A high-capacity gas conditioner is supplied with the LC/MSD. Its primary function is to remove hydrocarbon contamination from the nitrogen before the contamination reaches the LC/MSD. This conditioner has 1/4-inch Swagelok fittings.

Table 4

Nitrogen gas requirements

Source	Purity	Pressure range	Flow
Bottled nitrogen	99.5% pure ¹ or better and hydrocarbon free ²	80 – 100 psi	Up to 15 liters/minute ⁴ (900 liters/hour)
Nitrogen generator or liquid nitrogen	98% pure ³ or better and hydrocarbon free ²	80 – 100 psi	Up to 15 liters/minute ⁴ (900 liters/hour)

¹ With the remaining gas being oxygen.

² Less than 0.1 parts per million of hydrocarbons.

³ With the remaining gas being oxygen and trace argon (< 0.1%).

⁴ At least 3 liters/minute is required at all times to prevent air from entering the instrument.

Regulators, tubing, and fittings

You must supply an appropriate regulator for your source of nitrogen gas. The regulator must be able to supply gas in the specified pressure range. It must have one outlet with 1/4-inch Swagelok fittings. Gas generators have built-in regulators so they do not require an external regulator. A dewar of liquid nitrogen typically requires a single-stage regulator (see the dewar manufacturer's literature for specifics). Nitrogen from a house supply requires a single-stage regulator if the supply is at a pressure higher than the specified range. Bottled, compressed nitrogen typically requires a dual-stage regulator. See the HP Chemical Analysis Columns and Supplies Catalog (5966-3487) for dual-stage regulators available from Hewlett-Packard.

300 centimeters of heavy-wall 1/4-inch Teflon tubing is supplied with the LC/MSD for connecting the nitrogen supply to the LC/MSD. You may need to supply additional heavy-wall 1/4-inch Teflon tubing if the nitrogen supply is located farther from the LC/MSD. 1/4-inch medical-grade polypropylene tubing can be substituted for the Teflon tubing. You must supply fittings, ferrules, and connectors of a Swagelok design for the 1/4-inch tubing.

Laboratory Supply Requirements

Complete laboratory supply requirements will vary depending on your applications.

Cleaning solvents

Cleaning tasks for the LC/MSD require the following HPLC-grade (or better) solvents:

- Acetonitrile
- Isopropyl alcohol
- Methanol
- Water

Proper storage, handling, and disposal of these chemicals is required for personal and environmental safety.

WARNING

Chemical solvents should be considered hazardous and must be handled with care. Contact your chemical supplier for solvent handling and safety information.

Fume hood

An auxiliary work space and fume hood are needed for some maintenance procedures.

Telephone

The laboratory should have a telephone with a cord long enough to be used at the data system screen. This allows the system operator to communicate with HP support personnel. In addition, a second, analog phone line is strongly recommended to allow remote control and diagnosis of the LC/MSD through the modem supplied with some HP ChemStations. This is required for some service contracts.

Tools

Maintenance of the LC/MSD requires a few basic hand tools.

Table 5

Commonly used tools

Description	HP Part Number
Adjustment fixture for nebulizer	G1946-20215 ¹
Magnifier	G1946-80049 ¹
Pliers, needle nose	8710-0004
Safety glasses	9300-1159 ¹
Screwdrivers	
flat blade, large	8730-0002
Torx T-10	8710-1623 ¹
Torx T-15	8710-1622 ¹
Wrenches	
0.8-mm, hex	8710-1225 ¹
3-mm, open end	G1946-20203 ¹
1/4-inch x 5/16-inch, open end	8710-0510 ¹
1/2-inch x 9/16-inch, open end	8710-0877 ¹

¹ Included in the shipping kit supplied with the LC/MSD.

Data system supplies

You will need paper for printing the results of the testing done during installation and later for printing reports of your analyses. You may also need appropriate media (floppy disks, tape cartridges, writable CD-ROMs, etc.) for making backup copies of your data files.

Site Preparation
Laboratory Supply Requirements

Spare parts and consumables

The parts in this section are used in the operation and maintenance of an HP 1100 Series LC/MSD system. Keeping these parts on hand can reduce system downtime related to instrument maintenance and repair.

Table 6

Recommended spare parts and consumables

Description	HP Part Number
<i>Chemical consumables</i>	
Calibrant solutions	
Electrospray calibrant solution	G2421A
APCI calibrant solution	G2422A
Performance standards	
APCI negative ion performance standard	G2425A
Electrospray/APCI positive ion performance standard	G2423A
Electrospray negative ion performance standard	G2424A
Myoglobin standard	G2426A
OO/PV standards kit (caffeine) for LC/MS; 5 x 5 ml ampules; 0.5, 1, 5, 25, 50 ng/ μ l	8500-6917
<i>Gas filters</i>	
LC/MSD nitrogen gas conditioner (purifier)	G1946-80047
Maintenance kit for pre-filter cartridge for 5183-2003 or 5183-2004 nitrogen gas generators	5183-2014
Maintenance kit for pre-filter cartridge for 5183-4612 high-output nitrogen gas generator	5183-4651
<i>General supplies</i>	
Abrasive mesh (micro-grit paper)	8660-0852
Cloths, clean, lint-free	05980-60051
Cotton swabs	5080-5400
Nitrile rubber gloves, medium	9300-1751

continued

Recommended spare parts – *continued*

Description	HP Part Number
<i>HP 1100 Series LC parts</i>	
Deuterium lamp, shine through, for DAD detector	2140-0590
LC columns	<i>See Appendix C on page 31</i>
LC column clamps (6/pk)	5063-6526
Maintenance kit: 1 inlet cap, 1 outlet cap, 10 wear retainers, 10 PTFE frits, 4 piston seals, 1 gold outlet seal, 1 gold inlet seal	G1311-68710
PEEK fitting, F120, for 1/16-inch tubing, 2/package	0100-1516
PEEK tubing, 0.005-inch id, 1/16-inch od	0890-1915
Rotor seal (Vespel)	0100-1853
Solvent bottle	
plain neck, 1 liter	9301-0656
threaded neck, 1 liter	9301-1420
Vials and vial caps	<i>See Appendix C on page 31</i>
<i>HP 1100 Series LC/MSD parts</i>	
Capillary	G1946-80009
Capillary seal, front, 1/4-inch id	0905-1475
Corona needle (3/package)	G2429A
Electron multiplier horn	05971-80103
Foreline pump oil, Inland 45, 1 liter	6040-0834
Nebulizer needles	
APCI nebulizer needle	G2428A
electrospray nebulizer needle	G2427A
ferrule for nebulizer needle	G1946-20213

Receiving the System

When your LC/MSD system is delivered, it is your responsibility to provide for removal of the shipping containers from the truck and their storage until installation. Contact your HP service representative as soon as your shipment arrives to arrange an installation date.

Delivery and unloading

The shipping containers are large and heavy. The largest container is approximately:

- 84 cm (33 in) high
- 84 cm (33 in) wide
- 84 cm (33 in) deep
- 82 kg (180 lbs)

They require a loading dock and a fork lift or similar lifting device. If no loading dock and/or suitable lifting device is available, the containers cannot be removed from the delivery truck. If you make prior arrangements with your HP service representative, the system can be delivered in a lift-gate truck. This removes the need for a loading dock, but a lifting device is still required to move the containers.

CAUTION

The shipping containers must be kept upright at all times to prevent damage to the instrument.

All doorways, hallways, floors, and elevators must be able to accommodate the largest, heaviest container.

Inspecting for damage

Once the shipping containers are unloaded, examine them for any obvious **external** damage. If any of the containers appear damaged, note on the carrier's bill of lading that there is: **Apparent damage - subject to inspection and test**. Arrange for both the carrier's claims representative and your HP service representative to be present when the containers are unpacked.

Do not open any of the shipping containers unless a representative of Hewlett-Packard is present. **Opening any of the containers without a Hewlett-Packard representative being present will void the receiving warranty on the instrument.**

Storage

It is your responsibility to store the containers until installation. If your site does not have adequate storage space, the containers may be stored at your expense in a bonded warehouse. Allow space for data system and accessory containers too.

The environment in the storage area should be between 5 and 50°C (41 and 122°F), 20 to 80% relative humidity, non-condensing and non-corrosive.

Unpacking

Do not open any shipping containers until an HP representative is present. Warranty claims for missing items will not be honored unless an HP representative is present to verify the contents of each container as it is unpacked.

The actual shipping containers become your property and should not be returned to Hewlett-Packard.

Installation and Verification

Installation

Once the installation has begun, it should progress in a timely manner to completion. Delays due to inadequate site preparation could cause loss of instrument use during the warranty period. In extreme cases, Hewlett-Packard may ask to be reimbursed for the additional time required to complete the installation.

The LC/MSD is too heavy (approximately 61 kg (135 lb)) to be lifted by one person. You must supply someone to help lift it onto the laboratory bench.

The primary user of the LC/MSD should be present during installation to receive familiarization instruction from the HP service representative.

Nitrogen Generator

Installation is not included with the purchase of a nitrogen generator. If you do not want to install the generator yourself, you must purchase additional HP Customer Engineer (CE) time. Order Support Product # H5949A for one hour of CE time plus travel to perform a nitrogen generator installation. The travel charge is required only if the nitrogen generator is ordered after the LC/MSD is installed.

You are also responsible for the availability of compressed gas to supply the nitrogen generator; including, if necessary, the installation of an air compressor.

Verification

The final step in the installation process is system verification. Your HP service representative will test the system against HP standards as documented for the product(s) you have purchased. The modes of operation for which a signal-to-noise performance verification may be performed are as follows:

- Electrospray, positive ionization (only with HP G1948A Electrospray Interface)
- Electrospray, negative ionization (only with HP G1948A Electrospray Interface)
- Electrospray, multiply charged molecules (only with HP G1948A Electrospray Interface)
- APCI, positive ionization (only with HP G1947A APCI Interface)

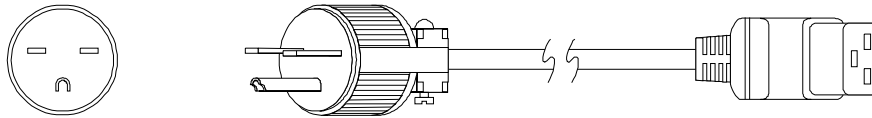
Not all tests are performed for every system.

The HP service representative will not test your system against your standards or samples. Further, the HP service representative will not set up your laboratory procedures. Assistance with laboratory procedures can be obtained from your local HP Applications Engineer (AE) on a consulting basis at additional cost.

Appendix A. Power Cords

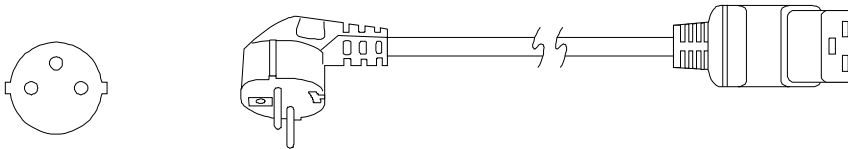
This appendix shows the power cords available for the HP 1100 Series LC/MSD. See page 12 for information about ensuring that the correct power cord is supplied with your system.

US and Canada, NEMA 6-15P (HP Part Number 8120-8623)

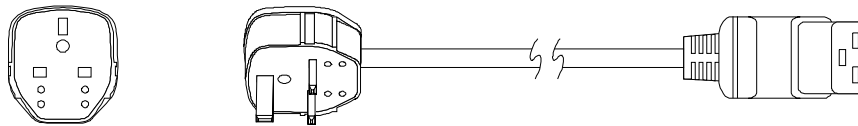


An alternative power cord (G1946-60066) with a NEMA L6-30P connector is available at extra cost. It is useful for sites where the LC/MSD is replacing an HP 5989 MS Engine.

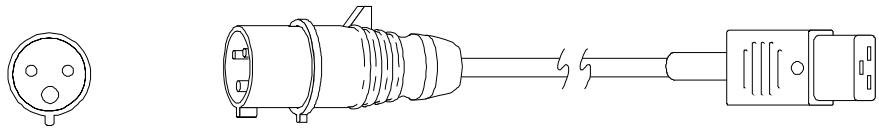
European Power, CEE 7/7 (HP Part Number 8120-8621)



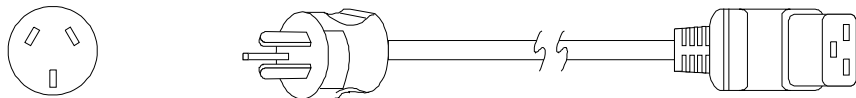
UK / Hong Kong / Singapore, BS 1363 (HP Part Number 8120-8620)



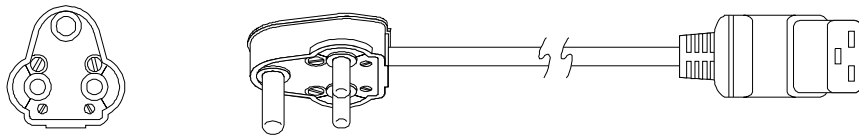
Switzerland / Denmark, IEC 309 (HP Part Number 8120-8622)



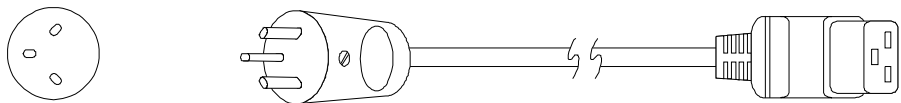
Australia / China, AS 3112-1981 (HP Part Number 8120-8619)



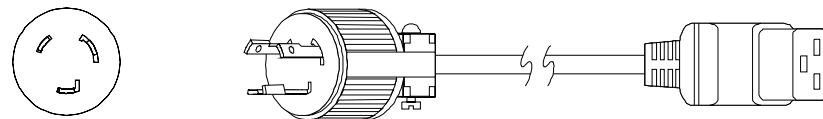
India / South Africa, BS 546 (HP Part Number 8120-6896)



Israel, SI 32 (HP Part Number 8120-8628)



Japan, NEMA L6-20P (HP Part Number G1946-60127)



Appendix B. Nitrogen Gas Generators

Hewlett-Packard offers several nitrogen gas generators that are well suited to supplying an HP 1100 Series LC/MSD with nitrogen. In these generators, clean, compressed air is passed through hollow-fiber membranes that separate it into a concentrated nitrogen output stream and an oxygen-enriched permeate stream. The nitrogen is supplied to the LC/MSD while the oxygen is vented from the generator.

Single-instrument generators

The nitrogen gas generator (5183-2003) and the nitrogen gas generator with oxygen analyzer (5183-2004) can supply the nitrogen for a single LC/MSD. The oxygen analyzer is especially helpful in negative ion APCI operation where a small concentration of oxygen can improve performance for some analyses.

These two generators require at least 60 l/min of clean air at a pressure of at least 690 kPa (100 psi). You must have either house compressed air or an oil-free air compressor that can meet these guidelines. Each generator includes two pre-filters for removing particulates and hydrocarbon contamination from the air.

Table 7

Specifications for single-instrument nitrogen gas generators

Nitrogen purity	95.0% - 99.5% ¹
Minimum/maximum air input pressure	415/1000 kPa (60/145 psi)
Maximum air consumption for 15 l/min nitrogen output (LC/MSD maximum requirement)	102 l/min at 760 kPa (110 psi)
Dimensions (height x width x depth)	127 cm x 40 cm x 40 cm (50 in x 16 in x 16 in)
Shipping weight	34 kg (75 lbs)
Electrical power required:	
nitrogen gas generator (5183-2003)	none
generator with oxygen sensor (5183-2004)	100-120 or 220-240 Vac \pm 10%, 50/60 Hz

¹ Purity varies with the input pressure and output flow required. Purity of 98% can be achieved at the maximum nitrogen output required for LC/MSD operation.

High-output generator

With a sufficient supply of clean, oil-free air, the high-output nitrogen gas generator (5183-4612) is capable of supplying enough nitrogen for four LC/MSDs. The quantities of air required are listed in Table 8. You must have either house compressed air or an oil-free air compressor that can meet these requirements. The high-output generator includes two pre-filters for removing particulates and hydrocarbon contamination from the air.

Table 8

Compressed air requirements for the high-output nitrogen generator

Number of instruments	2	3	4
Input air flow rate (l/min) required at 110 psi	154	230	308

Table 9

Specifications for the high-output nitrogen gas generator

Nitrogen purity	95.0% - 99.5% ¹
Minimum/maximum air input pressure	415/1000 kPa (60/145 psi)
Max air consumption	356 l/min at 760 kPa (110 psi) ²
Dimensions (height x width x depth)	170 cm x 61cm x 51cm (67 in x 24 in x 20 in)
Shipping weight	114 kg (250 lbs)
Electrical power required:	none

¹ Purity varies with the input pressure and output flow required. Purity of 98% can be achieved at the maximum nitrogen output required for operation of up to four LC/MSDs.

² See Table 8 for more information.

Appendix B. Nitrogen Gas Generators**Generator installation**

Installation is not included in the price of a nitrogen gas generator. Detailed installation, operation, and maintenance instructions are included with each generator. If you do not want to install the generator yourself, you must purchase additional installation time. See page 24 for more information. You are always responsible for the installation of any air compressor that is needed.

Table 10

Nitrogen gas generator ordering information

Description	HP Part Number
<i>Single-instrument generators</i>	
Nitrogen gas generator	5183-2003
Nitrogen gas generator with oxygen analyzer	5183-2004
Fitting set for single-instrument generator installation: 1/4-inch male NPT to 1/4-inch Swagelok, brass (2/pk)	5180-4145
Maintenance pre-filter cartridge kit for 5183-2003 or 5183-2004	5183-2014
<i>High-output generator</i>	
High-output nitrogen gas generator	5183-4612
Maintenance pre-filter cartridge kit for 5183-4612	5183-4651

Appendix C. LC Columns and Supplies

This appendix lists some of the LC columns and supplies commonly used for LC/MSD analyses. For more column and supply information, see the HP Chemical Analysis Columns and Supplies Catalog (5966-3487) or visit the HP Chemical Analysis site on the World Wide Web at <http://www.hp.com/go/chem>.

Vials

Table 11

Wide-opening crimp-top glass vials, 12 x 32 mm

Description	HP Part Number
Amber crimp-top vial with write-on spot (100/package)	5181-3376
Clear crimp-top vial (100/package)	5181-3375
Clear crimp-top vial with write-on spot (100/package)	5182-0543
Polypropylene wide-opening crimp-top vial, 1 ml (100/package)	5182-0567

Table 12

Crimp caps with septa

Description	HP Part Number
Blue aluminum crimp cap, Teflon/red rubber septa (100/package)	5181-1215
Green aluminum crimp cap, Teflon/red rubber septa (100/package)	5181-1216
Red aluminum crimp cap, Teflon/red rubber septa (100/package)	5181-1217
Silver aluminum crimp caps with Teflon/red rubber (100/package)	5181-1210
Manual crimper	8710-0979

Table 13

Inserts for 2 ml, 12 x 32 mm wide-opening vials

Description	HP Part Number
100 μ l, glass inserts with polymer feet (100/package)	5181-1270
100 μ l, polypropylene inserts with polymer feet (100/package)	5182-0549

Table 14

Vial racks

Description	HP Part Number
For 12 mm vials (5/package - foam)	9301-0987
For 12 mm vials (5/package - plastic)	9301-0722
12 mm tray (5/package)	5181-8824

HPLC columns

Due to their extraordinary stability, ZORBAX StableBond columns provide clean LC/MS separations without bonded-phase contamination. StableBond columns use sterically-protected silanes to minimize column bleed when used at low pH.

Table 15

Column sizes for electrospray or APCI LC/MS and LC/MS/MS

Application	Sample complexity	Recommended column sizes (mm)
Quantitative	Simple matrix	2.1 x 50, 2.1 x 30, 2.1 x 15, 4.6 x 30, 4.6 x 15
Quantitative	Complex matrix	1 x 150, 2.1 x 150, 4.6 x 150
Qualitative	Complex matrix	1 x 150, 2.1 x 150

Table 16

ZORBAX StableBond columns for LC/MS (HP Part Numbers)

Description	μm	Size (mm)	C18	C8	C3
Analytical	5	4.6 x 150	883975-902	883975-906	883975-909
Narrow bore	5	2.1 x 150	883700-922	883700-906	883700-909
Narrow bore	5	2.1 x 50	860975-902	860975-906	860975-909
Rapid resolution	3.5	4.6 x 150	863953-902	863953-906	
Rapid resolution	3.5	4.6 x 75	866953-902	866953-906	

Table 17

ZORBAX StableBond rapid resolution cartridge columns (HP Part Numbers)

Description	μm	Size (mm)	C18	C8
Analytical (3/package)	3.5	4.6 x 15	831975-932	831975-936
Analytical (3/package)	3.5	4.6 x 30	833975-932	833975-936
Analytical	3.5	4.6 x 15	831975-902	831975-906
Analytical	3.5	4.6 x 30	833975-902	833975-906
Narrow bore (3/package)	3.5	2.1 x 15	875700-932	875700-936
Narrow bore (3/package)	3.5	2.1 x 30	873700-932	873700-936
Narrow bore	3.5	2.1 x 15	875700-902	875700-906
Narrow bore	3.5	2.1 x 30	873700-902	873700-906

Table 18

ZORBAX StableBond CN and phenyl columns for LC/MS (HP Part Numbers)

Description	μm	Size (mm)	CN	Phenyl
Analytical	5	4.6 x 150	883975-905	883975-912
Narrow bore	5	2.1 x 150	883700-905	883700-912
Narrow bore	5	2.1 x 50	860975-905	860975-912
Rapid resolution	3.5	4.6 x 150	863953-905	860953-912
Rapid resolution	3.5	4.6 x 75	866953-905	866953-912

Table 19

ZORBAX rapid resolution cartridge hardware

Description	HP Part Number
15-mm spacer, 30-mm spacer, 2 end fitting assemblies	820222-901
15-mm cartridge spacer	820315-015
30-mm cartridge spacer	820330-030
50-mm cartridge spacer	820350-050
Sealing gasket (2/package)	820370-901
End fitting assembly	820311-001



Manual Part Number
G1946-90038



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