



Agilent 6100 Series

Single Quad LC/MS Systems

Site Preparation Guide

Notices

© Agilent Technologies, Inc. 2010

No part of this manual may be reproduced in any form or by any means (including electronic storage and retrieval or translation into a foreign language) without prior agreement and written consent from Agilent Technologies, Inc. as governed by United States and international copyright laws.

Manual Part Number

G1960-90010

Edition

Third edition, April 2010

Printed in USA

Agilent Technologies, Inc.

Warranty

CAUTION

WARNING

The material contained in this document is provided "as is," and is subject to being changed, without notice, in future editions. Further, to the maximum extent permitted by applicable law, Agilent disclaims all warranties, either express or implied, with regard to this manual and any information contained herein, including but not limited to the implied warranties of merchantability and fitness for a particular purpose. Agilent shall not be liable for errors or for incidental or consequential damages in connection with the furnishing, use, or performance of this document or of any information contained herein. Should Agilent and the user have a separate written agreement with warranty terms covering the material in this document that conflict with these terms, the warranty terms in the separate agreement shall control.

Technology Licenses

The hardware and/or software described in this document are furnished under a license and may be used or copied only in accordance with the terms of such license.

Restricted Rights Legend

If software is for use in the performance of a U.S. Government prime contract or subcontract, Software is delivered and licensed as "Commercial computer software" as defined in DFAR 252.227-7014 (June 1995), or as a "commercial item" as defined in FAR 2.101(a) or as "Restricted computer software" as defined in FAR 52.227-19 (June 1987) or any equivalent agency regulation or contract clause. Use, duplication or disclosure of Software is subject to Agilent Technologies' standard commercial license terms, and non-DOD Departments and Agencies of the U.S. Government will receive no greater than Restricted Rights as defined in FAR 52.227-19(c)(1-2) (June 1987). U.S. Government users will receive no greater than Limited Rights as defined in FAR 52.227-14 (June 1987) or DFAR 252.227-7015 (b) (2) (November 1995), as applicable in any technical data.

Safety Notices

A **CAUTION** 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 damage to the product or loss of important data. Do not proceed beyond a **CAUTION** notice until the indicated conditions are fully understood and met.

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.

Contents

Contents 3

1 Site Preparation 5

Space and weight requirements 6

Electrical requirements 9

Voltage ranges of major components 9

Power configurations 11

Power requirements 12

Power plugs and cords 13

Other electrical considerations 14

Air conditioning requirements 15

Temperature and humidity 15

Airborne dust 15

Exhaust venting 15

Nitrogen gas requirements 17

Nitrogen purity 17

Regulators, tubing, and fittings 18

Regulators, tubing, and fittings 19

Laboratory supply requirements 20

Operating supplies 20

Cleaning solvents 20

Fume hood 20

Telephone 20

Tools 21

Data system supplies 21

Spare parts and consumables 21

Receiving the system 25

Delivery and unloading 25

Inspecting for damage 25

Storage 26

Unpacking 26

Installation and verification 27

Installation 27

Verification 27

Appendix A: Power Cords 28

Appendix B: LC Columns and Supplies 30

Vials 30

LC Columns 31

1 Site Preparation

Before an Agilent 6100 Series Single Quad LC/MS 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 Single Quad LC/MS 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 an adequate supply of clean, dry nitrogen gas

Delays due to inadequate site preparation could cause loss of instrument use during the warranty period. In extreme cases, Agilent Technologies may ask to be reimbursed for the additional time required to complete the installation. Agilent 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 Agilent Technologies, 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 Single Quad LC/MS 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 Single Quad LC/MS onto the laboratory bench.
- Adequate secure storage space for the system until it can be installed by an Agilent Technologies representative

An Agilent Technologies representative will perform the actual installation and verify instrument performance

An Agilent Technologies service representative will install the Single Quad LC/MS and verify its performance. The service representative's responsibilities are limited to:

- Unpacking the Single Quad LC/MS system and verifying that all components are present and undamaged
- Installing, connecting, and turning on Single Quad LC/MS system components
- Verifying that the system meets Agilent Technologies performance standards
- Providing basic user familiarization for system hardware and software

Agilent Technologies is not responsible for:

- Any task not listed in the Agilent 6100 Series Single Quad LC/MS Systems Installation Guide (G1960-90071) 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 Agilent Technologies
- Testing the Single Quad LC/MS system against customer standards or samples
- Detailed instruction in the operation of the computer operating system and Single Quad LC/MS software. Contact Agilent Technologies for information concerning training classes.
- Setting up laboratory procedures. Assistance with laboratory procedures can be obtained from an Agilent Applications Engineer (AE) on a consulting basis at additional cost.
- Operation of the Single Quad LC/MS system following installation
- Hookup and connect the LAN for HOUSE network or Web server

Space and weight requirements

Table 1 lists dimension and weight information for the Single Quad LC/MS and related components. Your site must have enough bench space for the Single Quad LC/MS, 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, 20 cm (7.9 in) to the right of the Single Quad LC/MS and at least 10 cm (3.9 in) behind the Single Quad LC/MS must be kept clear.

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

WARNING

Do not stack the whole Agilent 1100/1200 Series LC systems on top of the Single Quad LC/MS as it is potentially unstable and dangerous. The LC/MS system can handle up to three LC modules on top. The three recommended LC modules that are the Binary Pump, the Degasser and the Solvent Tray. It is not recommended to have any liquid bottle on top of the LC/MS as it may pose a safety hazard.

The foreline pump can be located on a laboratory bench or on the floor. Note that the foreline pump emits vibrations which may affect scientific equipment. Ensure sensitive equipment is properly isolated from the foreline pump vibrations when selecting a location for the foreline pump. It must be close to the Single Quad LC/MS because they are connected by a 200-cm (79-in) hose. Approximately 30 cm (12 in) of that hose is inside the Single Quad LC/MS. The hose exits from the back of the Single Quad LC/MS. 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 Single Quad LC/MS must also be connected to the drain bottle. The drain bottle must be below the Single Quad LC/MS. A 180-cm (72-in) Teflon hose is provided to connect the Single Quad LC/MS to the drain bottle. Approximately 30 cm (12 in) of that hose is alongside the Single Quad LC/MS. 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).

Site Preparation

Table 1. Product dimensions¹

Product	Dimensions, cm (in)			Weight, kg (lb)
	Height	Width	Depth	
6100 Series Single Quad LC/MS Mainframe ²				
• Footprint ³	45.0 (18.0)	35.0 (14.0)	63.5 (25.0)	60.7 (133.8)
• Maximum cabinet dimensions ⁴	45.0 (18.0)	35.0 (14.0)	75.0 (29.0)	63.4 (137.6)
• Foreline pump (Varian MS40+ – 6100B)	22.8 (9.0)	29.7(11.7)	41.8 (16.5)	33.0 (72.7)
• Foreline pump (Edwards E1M18 – 6100A)	23.0 (9.2)	17.0 (6.8)	51.0 (20.4)	32.0 (70.4)
• Foreline pump (Edwards XDS35i – optional)	39 (15.3)	29 (11.4)	47.6 (18.7)	48.0 (106)
Agilent G1948B API-ES Interface ⁵	17.0 (6.8)	18.0 (7.1)	9.5 (3.7)	1.7 (3.75)
Agilent G1947B APCI Interface ⁵	23.0 (9.2)	18.0 (7.1)	9.5 (3.7)	1.7 (3.75)
Agilent G1971B APPI Interface ⁵	23.0 (9.2)	18.0 (7.1)	13.0 (5.1)	1.7 (3.75)
Agilent G1982B NanoSpray source option	15.0 (5.9)	13.0 (5.1)	13.0 (5.1)	1.6 (3.5)
Agilent G1978B Multimode Source ⁵	23.0 (9.2)	18.0 (7.1)	13.0 (5.1)	1.7 (3.75)
Agilent Jet Stream Technology ⁵	23.0 (9.2)	18.0 (7.1)	11.5 (4.5)	1.7 (3.75)
Agilent 1200 Series LC System	Height and weight of the LC system depends on the number and type of modules included in the system. Most Agilent 1100/1200 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 (38 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 Single Quad LC/MS requires a source of nitrogen gas. Typically, this is either a 160-liter Dewar flask of liquid nitrogen or a nitrogen generator. Be sure to plan for the space your nitrogen source requires.

³ The footprint dimensions represent the minimum dimensions of the supporting surface. This surface must also be relatively vibration free and capable of supporting at least 65 kg (143 lb).

⁴ Maximum cabinet dimensions are with the APCI interface installed. Add at least 30 cm (1 foot) in front of the instrument and at least 55 cm (1.8 feet) above the instrument to provide adequate instrument access.

⁵ Agilent Jet Stream Technology, Electrospray, APCI, APPI, and Multimode interfaces attach to the front of the Single Quad LC/MS. Their depths must be added to the depth of the Single Quad LC/MS. 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 Agilent 6100 Series Single Quad LC/MS system. Power considerations include:

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

Voltage ranges of major components

The Agilent 6100 Series Single Quad LC/MS includes a full-range power supply that can operate without reconfiguration on wide ranges of single-phase alternating current (AC) electrical power:

6100A Series	6100B Series
200-240 VAC, 50/60Hz	<ul style="list-style-type: none"> ▪ 200-230 VAC, 60 Hz ▪ or ▪ 200-240 VAC, 50Hz

CAUTION

The Varian MS40+ and Edwards XDS35i pumps feature voltage operation between 200 – 240 VAC.

A 208 VAC nominal Edwards E1M18 Foreline pump is used for main voltages 200-210 VAC.

A 230 VAC nominal Edwards E1M18 Foreline pump is used for main voltages 220-240 VAC.

The foreline pump also draws its power from the LC/MS. However, a different foreline pump may be supplied depending on the voltage range on which the Single Quad LC/MS 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 Agilent Technologies sales office in Germany, the foreline pump supplied may be configured to operated 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.

Power configurations

Electrical power for the Single Quad LC/MS may be delivered in either single-phase or 208-Wye configuration (Table 2). 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 a Single Quad LC/MS to a power source that is not equipped with a protective earth contact (ground) could cause a shock hazard for the operator and can damage the instrument.

WARNING

Interrupting the protective conductor inside or outside the LC/MS or disconnecting the protective earth terminal (ground) could cause a shock hazard for the operator.

Table 2. Power configuration

Configuration	Measurement	Nominal voltage
Single phase	Line to neutral	200, 220, 230, or 240 Vac ¹
	Line to ground	200, 220, 230, or 240 Vac ¹
	Ground to neutral	< 0.5 V rms ²
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.

² If ground to neutral voltage exceeds 0.5 V, notify the customer; a qualified electrician should inspect this issue. Instrument installation can proceed if line to neutral voltage is nominal.

Power requirements

Table 3 lists the power requirements for the Agilent 6100 Series Single Quad LC/MS and related equipment. Extra power capacity for future additions is needed.

Each product listed requires a dedicated circuit. The Single Quad LC/MS, 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
6100 Series Single Quad LC/MS ¹	200-240 V AC	2000 VA	15 A	1
1100/1200 Series LC	100-120 or 220-240 V AC ± 10% 50/60 Hz ± 5%	1000 VA ²	15 A	4 - 6
ChemStation Data System	100-120 or 220-240 V AC ± 10% 50/60 Hz ± 5%	1000 VA ²	15 A	4 - 6

¹ The Single Quad LC/MS operates on either voltage range. The Edwards E1M18 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 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 Over Voltage Category II environment as defined in IEC 60664-1.

Power plugs and cords

The Single Quad LC/MS is supplied with a power cord set appropriate for the country from which the order originates. For example, if an order originates from a Agilent Technologies 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 25 for illustrations of the power cords available. The length of all Single Quad LC/MS power cords is approximately 2.5 m (8 ft).

Data system components also include power cords set 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 Single Quad LC/MS are appropriate for your country and site before using them.

WARNING

Do not use extension cords with the Single Quad LC/MS or LC.

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 the main circuits separate from the Single Quad LC/MS system. Convenience outlets must share the normal building distribution ground, **not** the Single Quad LC/MS 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 Agilent 6100 Series Single Quad LC/MS is specified for operation under the following conditions:

- 15 to 35°C (59 to 95°F)
- The constant temperature is $\pm 3^\circ\text{C}$ from the calibration temperature
- $< 80\%$ relative humidity
- Non-condensing, non-corrosive atmosphere

Environmental control systems must maintain these temperature and humidity ranges.

The Single Quad LC/MS 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

Agilent recommends a maximum airborne particle density of $55 \mu\text{g}/\text{m}^3$. If you suspect your site exceeds this limit, contact your local Agilent Customer Service Organization. Agilent 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 Single Quad LC/MS: 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 exhaust filter in/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 Single Quad LC/MS be vented external 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 30 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 Backpressure in the spray chamber exhaust tubing and drain bottle can force sample and solvent back up the waste tubing and out the stream selection valve.

Agilent service representatives will not install an Agilent 6100 Series Single Quad LC/MS until an adequate exhaust system is present and functioning.

Nitrogen gas requirements

The Agilent 6100 Series Single Quad LC/MS systems requires a very large quantity of high-purity nitrogen for drying gas, nebulizing gas, Agilent Jet Stream Technology sheath gas (if applicable) 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 Single Quad LC/MS 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.

Liquid chromatographs other than the Agilent 1100/1200 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 Agilent 6100 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 Single Quad LC/MS performance. Even with the gas conditioner (purifier) supplied with the Single Quad LC/MS, 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 Single Quad LC/MS 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.

At least one BHT-4 hydrocarbon trap is supplied with the Single Quad LC/MS for the nitrogen gas. Its primary function is to remove hydrocarbon contamination from the nitrogen before the contamination reaches the Single Quad LC/MS. This conditioner has 1/4-inch Swagelok fittings.

On G6130B and G6150B systems, at least one BMT-4 moisture trap is also supplied with the Single Quad LC/MS for the nitrogen gas. Its primary function is to remove moisture from the nitrogen before the moisture reaches the Single Quad LC/MS drying gas. BMT-4 moisture traps should be installed upstream of BHT-4 traps. The BMT-4 conditioner has 1/4-inch Swagelok fittings.

Table 4. Nitrogen gas requirements – 6100 Series *without* Agilent Jet Stream Technology

Source	Purity	Pressure range	Flow
Bottled nitrogen	99.99% pure ¹ or better and hydrocarbon free ²	80 – 100 psi (5.5 to 6.8 bar)	Up to 15 liters/minute ⁴ (900 liters/hour)
Nitrogen generator or liquid nitrogen Dewar	99.5% pure ³ or better and hydrocarbon free ²	80 – 100 psi (5.5 to 6.8 bar)	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.

Table 4.1 Nitrogen gas requirements – 6100 Series *with* Agilent Jet Stream Technology

Source	Purity	Pressure range	Flow
Bottled nitrogen	Not supported	Not supported	Not supported
Nitrogen generator or liquid nitrogen Dewar	99.5% pure ³ or better and hydrocarbon free ²	80 – 100 psi (5.5 to 6.8 bar)	Up to 30 liters/minute ⁴ (1800 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 Agilent Chemical Analysis Columns and Supplies Catalog (5988-4785ENUS) for dual-stage regulators available from Agilent Technologies.

Site Preparation

300 centimeters of heavy-wall 1/4-inch Teflon tubing is supplied with the Single Quad LC/MS for connecting the nitrogen supply to the Single Quad LC/MS. You may need to supply additional heavy-wall 1/4-inch Teflon tubing if the nitrogen supply is located farther from the Single Quad LC/MS. 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 depend on your applications.

Operating supplies

Operation of the Single Quad LC/MS requires the following supplies:

- Acetonitrile, HPLC-grade or better
- Water, HPLC-grade or better
- Ammonium formate, 99.7% minimum purity (for the checkout procedure)

Cleaning solvents

Cleaning tasks for the Single Quad LC/MS require the following HPLC-grade or better solvents:

- Isopropyl alcohol
- Methanol
- Water

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

WARNING

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

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 Agilent support personnel. In addition, a house network needs to be established by customer prior to the system's installation. This house network line will allow remote control and diagnosis of the Single Quad LC/MS through the WebEx. This is required for some service contracts.

Site Preparation

Tools

Maintenance of the Single Quad LC/MS requires the following basic hand tools.

Table 6. Commonly used tools

Description	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-20	8710-1615 ¹
Wrenches	
0.89-mm, hex	8710-1225 ¹
3-mm, open end	8710-2699 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
10-mm, hex	8710-2612 ¹

¹ Included in the shipping kit supplied with the 6100B Single Quad LC/MS.

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 such as floppy disks, tape cartridges, or writable CD-ROM/DVD-ROM for making backup copies of your data files.

Spare parts and consumables

The parts in this section are used in the operation and maintenance of an Agilent 6100 Series Single Quad LC/MS system. Keeping these parts on hand can reduce system downtime related to instrument maintenance and repair.

Table 7. Recommended spare parts and consumables

Description	Part Number
Chemical consumables	
Calibrant solutions – Dependent on LC/MS & Source model	
Electrospray (ESI) calibrant solution	G2431A
APCI/APPI calibrant solution	G2432A
ESI-Low calibrant solution	G1969-85000
▪ APCI/APPI-Low calibrant solution	G1969-85010
Performance standards	
Electrospray/APCI positive ion performance standard	G2423A
OQ/PV standards kit (caffeine) for LC/MS; 5 x 5 ml ampoules; 0.1, 0.5, 1.0, 5.0, 10.0 ng/μl	5065-9908
OQ/PV standards kit (Sulfonamides) for LC/MS; 5 x 2 ml ampoules; 0.01, 0.025, 0.1, 0.5, 1.0 ng/μl	5188-6523
Gas filters	
Big Hydrocarbon Trap, 1/4", for nitrogen	BHT-4
Big Moisture Trap, 1/4", for nitrogen	BMT-4
Universal Hydrocarbon Trap, 1/8"	RMSH-2
General supplies	
Abrasive mesh (micro-grit paper)	8660-0852
Cloths, clean, lint-free	05980-60051
Cotton swabs	5080-5400
1/8-inch od copper tubing, 50 feet length, for Helium line	G2440-60031
Agilent 1200 Series LC parts	
Deuterium lamp, shine through, for DAD detector	2140-0590
LC columns	See Appendix C
LC column clamps (6/package)	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-

Site Preparation

	1915
Rotor seal (Vespel)	0100-1853
Solvent bottle	
plain neck, 1 liter	9301-0656
threaded neck, 1 liter	9301-1420
Vials and vial caps	See Appendix B

continued

Recommended spare parts - *continued*

Description	Part number
Agilent 6100 Series Single Quad LC/MS parts	
Capillary – Dielectric, 0.5 mm	G1946-80009
Capillary – Fast Polarity Switching, 0.6 mm	G1960-80060
Canted coil spring for capillary cap	1460-2571
H.T. capillary cap	G1946-20301
Capillary seal, front, ¼-inch id	0905-1475
Corona needle (3/package)	G2429A
Electron multiplier horn	05971-80103
Foreline pump oil, Inland 45, 1 liter (use with Edwards E1M18)	6040-0834
Foreline pump oil, SW60, 1 liter (use with Varian MS40+)	6040-1361
Inlet filter assembly	G1946-60180
Inlet filter union	0101-0949
Replacement 5 micron filter element for inlet filter assembly	0101-2051
Fuse, 8A, Time Delay	2110-0969
Fuse, 12.5A, Time Delay	2110-1398
Nebulizer needles	
APCI nebulizer needle	G2428A
Electrospray nebulizer needle	G2427A
Agilent Jet Stream nebulizer needle	G1958-60136
Ferrule for nebulizer needle	G1946-20213

Receiving the system

When your Single Quad LC/MS 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 Agilent 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:

- 65.58 cm (27 in) high
- 53.97 cm (21.25 in) wide
- 85.72 cm (33.75 in) deep
- 106 kg (234 lbs)

The shipping containers 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 Agilent 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: ***Apparen damage - subject to inspection and test.*** Arrange for both the carrier's claims representative and your Agilent service representative to be present when the containers are unpacked.

Do not open any of the shipping containers unless a representative of Agilent Technologies is present. Opening any of the containers without an Agilent Technologies 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 shipping container should be kept so it can be used again if there is a need to ship the system from one location to another.

The environment in the storage area should be between 5 and 50 °C (41 and 122 °F), below 95% relative humidity, non-condensing and non-corrosive.

Unpacking

Do not open any shipping containers until an Agilent representative is present. Warranty claims for missing items will not be honored unless an Agilent 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 Agilent Technologies.

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, Agilent Technologies may ask to be reimbursed for the additional time required to complete the installation.

The Single Quad LC/MS is too heavy (approximately 60 kg (134 lb)) to be lifted by one person. You must supply someone to help lift it onto the laboratory bench.

The primary user of the Single Quad LC/MS should be present during installation to receive familiarization instruction from the Agilent service representative.

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 Agilent Customer Engineer (CE) time.

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 Agilent service representative will test the system against Agilent 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 G1948B Electrospray Interface)
- Electrospray with Agilent Jet Stream Technology (if applicable), positive ionization (only with Agilent Jet Stream Technology Interface)

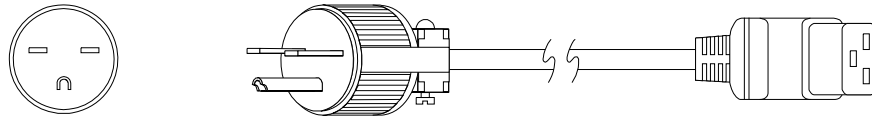
Not all tests are performed for every system.

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

Appendix A: Power Cords

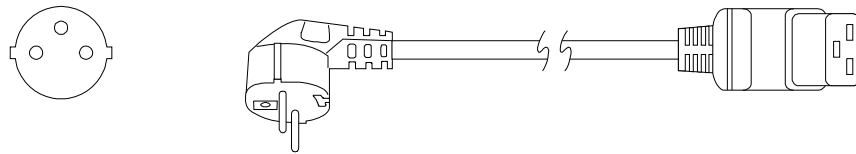
This appendix shows the power cords available for the Agilent 6100 Series Single Quad LC/MS.

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



An alternative power cord (G1946-60066) with a NEMA L6-30P connector is available at extra cost. It is useful if a twist-lock plug is desired.

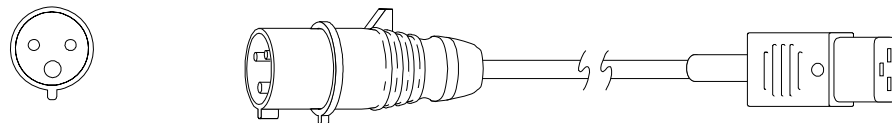
European Power, CEE 7/7 (Agilent Part Number 8120-8621)



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



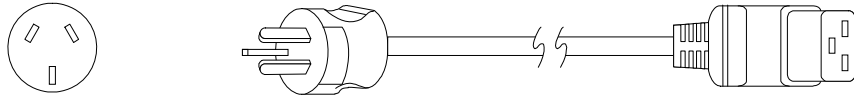
Switzerland / Denmark, IEC 309 (Agilent Part Number 8120-8622)



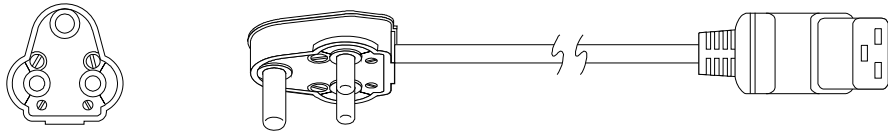
Site Preparation

Australia, (Agilent Part Number 8120-8619)

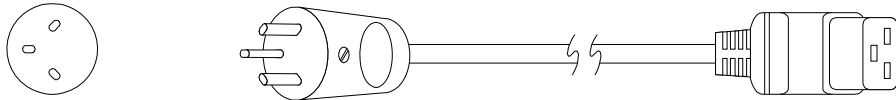
China, (Agilent Part Number 8121-0070)



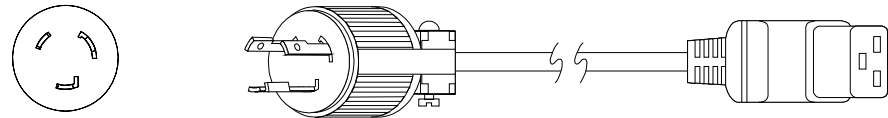
India / South Africa, BS 546 (Agilent Part Number 8121-0710)



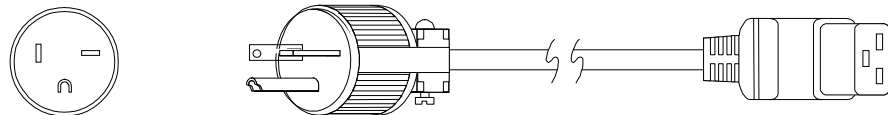
Israel, SI 32 (Agilent Part Number 8121-0161)



Japan, NEMA L6-20P (Agilent Part Number 8120-6903)



Taiwan, NEMA 6-20P (Agilent Part Number 8120-6360)



Korea, 15A, 2.5 M (Agilent Part Number 8121-1222)

(Not Shown)

Appendix B: LC Columns and Supplies

This appendix lists some of the LC columns and supplies commonly used for Single Quad LC/MS analyses. For more column and supply information, see the Agilent Chemical Analysis Columns and Supplies Catalog (5988-4785ENUS) The catalog is also online at <http://www.agilent.com/>. Select **Products**, then **Chemical Analysis**, then **Supplies Catalog**.

Vials

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

Description	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 13. Crimp caps with septa

Description	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 14. Inserts for 2 ml, 12 x 32 mm wide-opening vials

Description	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 15. Vial racks

Description	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

Site Preparation

LC 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 16. 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 17. ZORBAX StableBond columns for LC/MS (Agilent 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 18. ZORBAX StableBond rapid resolution cartridge columns (Agilent part numbers)

Description	µl	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	873700-960

Table 19. ZORBAX StableBond CN and phenyl columns for LC/MS (Agilent part numbers)

Description	µl	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 resolutions	3.5	4.6 x 150	863953-905	860953-912
Rapid resolutions	3.5	4.6 x 75	866953-905	866953-912

Table 20. ZORBAX rapid resolution cartridge hardware

Description	Part number
-------------	-------------

Site Preparation

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

www.agilent.com

© Agilent Technologies, Inc. 2010

Printed in USA 04/10

Third Edition, 04/2010

G1960-90010

