



Agilent Ultivo LC/TQ

Site Preparation Guide



Agilent Technologies

Notices

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Manual Part Number

G2571-xxxxx

Edition

First Edition, July 2017

Agilent Technologies, Inc.

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Safety Notices

CAUTION

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.

WARNING

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.

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1 General Information

This document is used to verify that the installation site is properly configured for the Agilent Ultivo LC/TQ system.

The site conditions must meet the minimum specifications, as outlined below, before the Field Service Engineer can proceed with the Agilent Ultivo LC/TQ system installation.

NOTE

Agilent Technologies in this document refers to Agilent Technologies or one of its representatives.

Instrument Identification

Agilent Ultivo LC/TQ is identified by a unique 10-character serial number. This serial number is located on a label on the lower left front corner of the instrument. When corresponding with Agilent Technologies about your instrument, be sure to include the model number and the full 10-character serial number. Write the serial number of your Agilent Ultivo LC/TQ here for reference:

Important Safety Warnings

There are several important safety notices that you should always keep in mind when using the Agilent Ultivo LC/TQ system.

Many internal parts of the Agilent Ultivo LC/TQ carry dangerous voltages

If the Agilent Ultivo LC/TQ is connected to a power source, even if the power switch is off, potentially dangerous voltages exist on:

- The wiring between the Agilent Ultivo LC/TQ power cord and the AC power supply, and the AC power supply itself.

With the power switch on, potentially dangerous voltages also exist on:

- All electronics boards in the instrument.
- The internal wires and cables connected to these boards.

- The wires for any heater.

WARNING

All these parts are shielded by covers. With the covers in place, it should be difficult to accidentally make contact with dangerous voltages. Unless specifically instructed to, never remove a cover.

WARNING

If the power cord insulation is damaged, frayed, or worn, the cord must be replaced. Contact your Agilent service representative.

WARNING

The Agilent Ultivo LC/TQ relies on a protective earth ground for safety. The instrument must be connected to a grounded power outlet.

Interrupting the protective conductor inside or outside the Agilent Ultivo LC/TQ system or disconnecting the protective earth terminal creates a shock hazard for the operator and can damage the instrument.

Make sure the power cords supplied with the Agilent Ultivo LC/TQ are appropriate for your country and site before using them (Refer to Appendix A). Maintain easy access to the power cords so they can be disconnected during maintenance.

The use of incorrect or makeshift fuses or the short-circuiting of fuse holders creates a shock hazard for the operator and can damage the instrument. Replace fuses only with fuses of identical current rating and type.

Excessive fluctuations in the line voltage can create a shock hazard and can damage the instrument. This equipment must be installed in a Category II environment as defined in IEC 664.

Electrostatic discharge is a threat to Agilent Ultivo LC/TQ LC/MS electronics

The printed circuit (PC) boards in the Agilent Ultivo LC/TQ can be damaged by electrostatic discharge. Do not touch any of the boards unless it is absolutely necessary. If you must handle them, wear a grounded wrist strap and take other antistatic precautions. Wear a grounded wrist strap any time you must remove the Agilent Ultivo LC/TQ covers.

Some parts are dangerously hot

Some parts of the Agilent Ultivo LC/TQ operate at temperatures high enough to cause serious burns.

Whenever possible, cool the part of the instrument that you will be maintaining before you begin working on it. You should always cool heated areas of the Agilent Ultivo LC/TQ to room temperature before working on them. They will cool faster if you first set the temperature of the heated zone to room temperature. Turn the zone off after it has reached the setpoint. If you must perform maintenance on hot parts, use a wrench and wear gloves.

Chemical Safety

WARNING


The foreline pump exhaust and source exhaust will contain traces of the chemicals you are analyzing. These could potentially be toxic. Vent the foreline pump exhaust and source exhaust outside your laboratory or into a fume hood. Be sure to comply with all local environmental regulations.

Safety and Regulatory Certifications

The Agilent Ultivo LC/TQ conforms to the following safety standards:

- Canadian Standards Association (CSA): CAN/CSA-C22.2 No. 61010-1-04
- CSA/Nationally Recognized Test Laboratory (NRTL): UL 61010-1
- International Electrotechnical Commission (IEC): 61010-1
- EuroNorm (EN): 61010-1

The Agilent Ultivo LC/TQ conforms to the following regulations on Electromagnetic Compatibility (EMC) and Radio Frequency Interference (RFI):

- CISPR 11/EN 55011: Group 1, Class A
- IEC/EN 61326
- AUS/NZ 

This ISM device complies with Canadian ICES-001. Cet appareil ISM est conforme à la norme NMB-001 du Canada.



The Agilent Ultivo LC/TQ is designed and manufactured under a quality system registered to ISO 9001.

Information

The Agilent Technologies Agilent Ultivo LC/TQ meets the following IEC (International Electro-technical Commission) classifications: Equipment Class I, Laboratory Equipment, Installation Category II, Pollution Degree 2.





This unit has been designed and tested in accordance with recognized safety standards and is designed for use indoors. **If the instrument is used in a manner not specified by Agilent Technologies, the protections provided by the instrument may be impaired.** Whenever the safety protection of the Agilent Ultivo LC/TQ has been compromised, disconnect the unit from all power sources and secure the unit against unintended operation.



Refer servicing to qualified service personnel. Substituting parts or performing any unauthorized modification to the instrument may result in a safety hazard.

Symbols

Warnings in the manual or on the instrument must be observed during all phases of operation, service, and repair of this instrument. Failure to comply with these precautions violates safety standards of design and the intended use of the instrument. Agilent Technologies assumes no liability for the customer's failure to comply with these requirements.

Symbols used in this manual:

	See accompanying instructions for more information
	Indicates a hot surface.
	Indicates hazardous voltages.
	Indicates earth (ground) terminal.

	Indicates electrostatic discharge hazard.
	Indicates that you must not discard this electrical/electronic product in domestic household waste.

Electromagnetic compatibility

This device complies with the requirements of CISPR 11. Operation is subject to the following two conditions:

- This device may not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try one or more of the following measures:

- 1 Relocate the radio or antenna.
- 2 Move the device away from the radio or television.
- 3 Plug the device into a different electrical outlet, so that the device and the radio or television are on separate electrical circuits.
- 4 Make sure that all peripheral devices are also certified.
- 5 Make sure that appropriate cables are used to connect the device to peripheral equipment.
- 6 Consult your equipment dealer, Agilent Technologies, or an experienced technician for assistance.
- 7 Changes or modifications not expressly approved by Agilent Technologies could void the user's authority to operate the equipment.

Sound emission declaration

Sound pressure

Sound pressure $L_p < 70$ dB according to EN 27779:1991.

Schalldruckpegel

Schalldruckpegel $L_P < 70$ dB nach EN 27779:1991.

Cleaning

To clean the unit, disconnect the power and wipe down with a damp, lint-free cloth.

Recycling the Product

For recycling, contact your local Agilent sales representative office.

2 Site Preparation

Overview

This section describes how to properly prepare your site for a new Agilent Ultivo LC/TQ. Follow these instructions carefully as delays due to improper site preparation may result in loss of instrument use during the warranty period.

Before the Agilent Ultivo LC/TQ system can be installed, the site must be properly prepared. Site preparation includes, but is not limited to, ensuring that adequate facilities are available. Among the site requirements are:

- Adequate space is available for the Agilent Ultivo LC/TQ system.
- A suitable supporting bench is available.
- Adequate electrical power is available at the correct voltages and frequencies.
- Environmental control systems are adequate to maintain a correct, stable operating environment.
- An adequate source of clean, dry nitrogen gas for up to:
 - 30 l/min of continuous flow
- Adequate exhaust venting for up to:
 - 30 l/min of continuous flowof nitrogen gas and solvent/sample vapor from the Agilent Ultivo LC/TQ system.
- Preparations for safe exhaust venting are adequate.
- Supplies necessary for instrument operation are available, including solvents, carrier and reagent gasses, and printer paper.

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 Technologies provides service during the warranty period and under maintenance agreements only if the specified site requirements are met.

Customer Responsibility

Unless previous arrangements have been made with Agilent Technologies, site preparation is the customer's responsibility. Customer responsibilities include, but are not limited to:

- 1 Planning, scheduling, and preparing the site according to the specifications in this manual.
- 2 Verifying that the electrical environment is safe and adequate for the Agilent Ultivo LC/TQ system installation and operation.
- 3 Complying with all local laws (codes, ordinances, and regulations) for mechanical, building, and electrical distribution systems, hazardous waste disposal, and chemical storage.

Compliance with local laws must exist prior to installation

- 4 Providing lifting equipment adequate to unload the system from the delivery vehicle and transport it to the site where it will be installed.
- 5 Providing at least two people to help lift the Agilent Ultivo LC/TQ onto the laboratory bench.
- 6 Providing adequate secure storage space for the system until it can be installed by an Agilent Technologies representative.

Agilent responsibility

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

- 1 Unpacking the Agilent Ultivo LC/TQ system and verifying that all components are present and undamaged.
- 2 Connecting the nitrogen gas line to the instrument from the tank, regulators, and lines previously installed by the customer.
- 3 Installing, connecting, and turning on Agilent Ultivo LC/TQ system components.
- 4 Verifying that the system meets Agilent Technologies performance standards.
- 5 Providing **basic** user familiarization for system hardware and software.
- 6 Signing the customer up through the Response Centers for instrument and software support.

Activities not covered as part of installation procedure

Agilent Technologies is ***not*** responsible for:

- Any task not listed in the Agilent Ultivo LC/TQ System Installation Manual or in the installation guides for the LC, data system, and other accessories
- Installing a nitrogen gas generator and/or air compressor unless additional installation time is purchased
- Connecting, or verifying the performance of hardware and software not provided by Agilent Technologies

NOTE

Items that do not include installation by Agilent Technologies must be installed by the customer.

- Testing the Agilent Ultivo LC/TQ system using customer standards or samples
- Detailed instruction in the operation of the computer operating system and MassHunter Workstation software.

NOTE

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.

NOTE

Contact Agilent Technologies for information concerning assistance with laboratory procedures, application development, or chemical analysis consulting.

- Operation of the Agilent Ultivo LC/TQ system following installation

Other documentation

Additional information is contained in the following documentation:

- Agilent Ultivo LC/TQ Maintenance Guide
- Agilent Ultivo LC/TQ System Installation Guide
- Agilent Infinity Series LC User manuals
- G3335AA MassHunter Workstation software manuals and online help
- The appropriate sensitivity specifications for your instrument. See the Agilent Technologies Web site at:

<http://www.agilent.com/chem>

Space and Weight Requirements

The Agilent Ultivo LC/TQ system is designed for indoor use under normal conditions at altitudes of up to 3,300 meters (11,000 feet). It may be used up to an altitude of 3,700 meters (12,000 feet) if the ambient temperature is not above 30° C (as the altitude increases, Atmospheric Pressure Ionization (API) become less efficient). Table 1 lists dimension and weight information for the Agilent Ultivo LC/TQ system and related components. The installation site must have enough bench space for the Agilent Ultivo LC/TQ system, LC system, data system and accessories. In addition, there must be sufficient space around the instrumentation for air flow and maintenance access. At least 30 cm (12 in) to the left of the Agilent Ultivo LC/TQ (see Suggested Configuration 2) and at least 15 cm (approximately 6 inches) behind the Agilent Ultivo LC/TQ must be kept clear.

Also, at least 30 cm (12 in) to the right of the instrument must be clear for proper ventilation and no other devices (e.g. a nitrogen generator) should exhaust into this side of the instrument.

The supporting surface must be sturdy enough to support the weight of the entire Agilent Ultivo LC/TQ system and any accessories.

The foreline pump(s) must be located under the laboratory bench or on the floor. It must be within the 200 cm (79 in) length of the vacuum hose. The hose exits only the back of the Agilent Ultivo LC/TQ. The hose is metal and cannot be bent sharply.

CAUTION

Do not put the foreline pump(s) on your laboratory bench with the Agilent Ultivo LC/TQ due to the vibration that the pump creates. This vibration can lead to a loss of mass accuracy and resolution.

CAUTION

The supporting surface for the Agilent Ultivo LC/TQ system should be kept relatively vibration free.

The Agilent Ultivo LC/TQ spray chamber must be connected to the spray chamber waste bottle which must be positioned below the Agilent Ultivo LC/TQ instrument. The drain bottle is supplied with a 180 cm (72 in) PTFE hose. A hose extension kit (G1946-67002) is available to add 120 cm (48 in) to the drain hose length.

Please refer to Table 1 for further information regarding totals weights for the Agilent Ultivo LC/TQ, foreline pump, and various accessories.

Site Preparation

Table 1: Product Dimensions¹

Model Description	Weight		Height		Depth		Width	
	Kg	lbs	cm	in	cm	in	cm	in
Agilent Ultivo LC/TQ	59.0	130.0	39.5	15.6	32.0	12.6	88.0	34.6
Agilent Jet Stream	1.7	3.8	23	9.2	13.0	5.1	18.0	7.1
G1948B Electrospray Source	1.7	3.8	17	6.8	9.5	3.7	18.0	7.1
G1947B APCI Source	1.7	3.8	23	9.2	13.0	5.1	18.0	7.1
MS40+ Foreline Pump	33.0	72.7	29.7	11.7	41.8	16.5	22.8	9.0

¹ The Agilent Ultivo LC/TQ 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 and utilities your nitrogen source may require.

² The Agilent Ultivo LC/TQ dimensions represent the maximum cabinet dimensions with a Agilent Jet Stream source installed. At least 30 cm (1 ft) to the left and right of the instrument must be added to these dimensions to provide adequate instrument access and ventilation. The supporting surface must be relatively vibration free and capable of supporting the combined weight of the Agilent Ultivo LC/TQ system.



Suggested Configuration 1



Suggested Configuration 2

Electrical requirements

The customer is responsible for providing appropriate electrical power and power outlets for all of the components and accessories used with the Agilent Ultivo LC/TQ system. Power considerations include:

- Voltage ranges of major components
- Power requirements of major components
- Single-phase power configurations
- Power plugs, receptacles and cords

Voltage ranges and power requirements of major components

Table 2 lists the voltage ranges and power requirements for the Agilent Ultivo LC/TQ and related equipment. Extra power capacity for future additions is strongly recommended.

NOTE

Each product listed requires dedicated circuits. The Agilent Ultivo LC/TQ, LC, and data system should each have a separate branch circuit breaker.

The Agilent Ultivo LC/TQ system includes a wide-range power supply that can operate without reconfiguration:

- 200 to 240 Vac, 50/60 Hz

CAUTION

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

Power must meet the stated stability specifications. Use a line monitor to check the power stability. If the line power is unstable, it may be necessary to install a line conditioner.

Table 2

Voltage and Power requirements ¹				
Product	Line voltage	Maximum continuous AC power	Supply circuit rating	No. of outlets
Agilent Ultivo LC/TQ system	200 to 240 VAC ² 50/60 Hz	2700 VA	15 A	1
1260/1290 Infinity II Series LC	100-120 or 220-240 VAC ² 50/60 Hz	800-1200 VA ³	15 A	4 to 6 ³
Agilent Ultivo LC/TQ Data System	100-120 or 220-240 VAC ² 50/60 Hz	1000 VA ³	15 A	4

¹ Excessive fluctuations in the voltage of the power supply can create a shock hazard and can damage the instrument. This equipment must be installed in a Category II environment as defined in IEC 60664.

² All Agilent supplied sources or the Agilent Jet Stream Technology and supplied foreline pump draw their power from the Agilent Ultivo LC/TQ instrument and do not require separate line voltage.

³ Depends on product configuration.

Single-phase power configurations

Electrical power for the Agilent Ultivo LC/TQ may be delivered in either single-phase or 208-Wye configuration. Table 3 lists the primary voltage characteristics of each 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 that is connected to the main earth ground for the facility.

WARNING

The power source to which you connect a Agilent Ultivo LC/TQ must be equipped with a protective earth contact (ground).

WARNING

Do not interrupt the protective earth contact inside or outside the Agilent Ultivo LC/TQ or disconnect the protective earth terminal (ground).

Table 3

Power Configurations

Configuration	Measurement	Nominal Voltage
Single phase	Line to neutral	200, 208, 220, 230, or 240 VAC ¹
	Line to ground	200, 208, 220, 230, or 240 VAC ¹
	Ground to neutral	< 0.5 V rms
208-Wye	Line to line (phase A to phase B)	208, 220 VAC
	Line to ground (phase A to ground)	120, 127 VAC +/- 5%
	Line to ground (phase B to ground)	120, 127 VAC +/- 5%

¹Varies with country. Single phase, 60 Hz operation is not supported for nominal voltage above 220 VAC.

Power plugs and cords

The Agilent Ultivo LC/TQ is supplied with an appropriate power cord and plug for the country in which the order originates. See Appendix A for illustrations of the available power cords. The length of all Agilent Ultivo LC/TQ power cords is approximately 2.4 m (8 ft).

The Agilent Ultivo LC/TQ data system components also include power cords with plugs appropriate for the country in which 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, a special note must be made on the order that 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 Agilent Ultivo LC/TQ are appropriate for your country and site before using them. See Appendix A for a description of power cords used by country.

WARNING

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

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 Agilent Ultivo LC/TQ system. Convenience outlets must share the normal building distribution ground, not the Agilent Ultivo LC/TQ system ground.
- In some geographical areas it may be advisable to install lightning protection for personnel and equipment.

Communication Requirements

Telephone

A telephone with a long cord or a cordless phone to be used at the computer will allow the operator to communicate with Agilent Technologies support personnel.

Site LAN network

If you intend to connect your Agilent Ultivo LC/TQ system to your site's LAN network, you must have an additional shielded twisted pair network cable. In addition, internet access for the control PC is strongly recommended to allow remote control and diagnosis of the Agilent Ultivo LC/TQ through remote access software. This is required for some service contracts.

NOTE

Agilent Technologies is not responsible for connecting to or establishing communication with your site LAN network. The service representative will test the Agilent Ultivo LC/TQ's ability to communicate with the bundled PC ONLY.

NOTE

The IP address for the Agilent Ultivo LC/TQ is fixed and cannot be changed. Placing the 1260/1290 Infinity II Series LC or the Agilent Ultivo LC/TQ on a corporate LAN environment is not supported.

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.

Environmental Conditions

The Agilent Ultivo LC/TQ is designed for use in the following environmental conditions for Class 1 Laboratory Equipment.

Please see Table 4 for a summary of environmental conditions.

Table 4

Environmental Conditions	
Equipment class:	Class 1 Laboratory Equipment
Pollution:	Degree 2
Installation:	Category II
Environment:	Indoor Use
Altitude:	Not to exceed 3,300 m up to 35°C, not to exceed 3,700 m up to 30°C
Electrical Supply:	
	200 to 240 Vac, 50/60 Hz
Mains supply voltage:	Fluctuations not to exceed 10% of nominal supply voltage
Operating Temperature:	15 to 35°C (59 to 95°F)
Humidity:	< 85% RH at 35°C

Temperature and humidity

The Agilent Ultivo LC/TQ is specified for operation under the following conditions:

- 15 to 35°C (59 to 95°F)
- Constant temperature ($< \pm 3^{\circ}\text{C}$ from calibration temperature)
- $< 85\%$ relative humidity at 35°C
- Non-condensing, non-corrosive atmosphere

Environmental control systems must maintain these temperatures and humidity ranges.

For example, the Agilent Ultivo LC/TQ system dissipates up to 1,100 Watts (3,700 BTU/hr). Approximately 600 Watts (2,047 BTU/hr) are removed with the source exhaust. The LC and data system also contribute significantly to the cooling load. The exact amounts will 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 mg/m³. 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 Agilent Ultivo LC/TQ: the spray chamber and the foreline pump(s). The drain hose routes both nitrogen gas and vapor from the spray chamber to the drain bottle. The vapor is made up of mobile phase and sample. The spray chamber and foreline pump vent up to 30 liters/minute of nitrogen gas and vapor.

The foreline pump exhaust contains traces of solvent, sample, and hydrocarbon pump fluid. The mist filter on the foreline pump traps the majority of the pump fluid vapor. It does not trap the traces of solvent and sample that may be present in the exhaust gases.

WARNING

User safety requires that the spray chamber exhaust and the foreline pump exhaust are vented externally to the building and not recirculated by the environmental control system. Exhaust gas venting must comply with all local environmental codes. Health hazards include chemical toxicity of solvents, samples, buffers, pump fluid vapor, and aerosolized biological samples.

WARNING

Failure to vent the foreline pump and spray chamber separately will void the warranty for the Agilent Ultivo LC/TQ. Agilent service representatives will not install an Agilent Ultivo LC/TQ until an adequate exhaust system is present and functioning. See the caution statement below for further details.

CAUTION

The spray chamber exhaust and foreline pump exhaust must be vented using separate lengths of exhaust tubing. These may be connected into a common exhaust manifold. This is to minimize the chances of foreline pump fluid vapor 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 of gas and vapor. Flow is continuous as long as the instrument is on. Both exhaust vents must be at or slightly below atmospheric pressure (negative pressure) with an exhaust flow of 30 l/min. **If a negative pressure vent is not available, the length of the tubing from the foreline pump and the drain bottle to the vent should each not exceed 460 cm (15 ft).**

CAUTION

Positive pressure in the spray chamber exhaust tubing and drain bottle can affect instrument performance and may contribute to excessive background contaminant levels.

Nitrogen Gas Requirements

The Agilent Ultivo LC/TQ requires a very large quantity of high-purity nitrogen for drying gas, sheath gas (systems with Agilent Jet Stream Technology), nebulizing gas, collision cell gas, and to pressurize the calibrant delivery system.

WARNING

Use only nitrogen for the drying, sheath, nebulizing gas and collision cell 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 may also cause deterioration of parts in the Agilent Ultivo LC/TQ and have a negative effect on instrument operation and sensitivity.

Due to the large volumes of nitrogen required for instrument operation, the use of a nitrogen generator (gas separator) or a large (160 liters or greater) dewar of liquid nitrogen is recommended. Agilent Technologies offers several nitrogen gas generators well suited for use with the Agilent Ultivo LC/TQ system. See Appendix B for more detailed information about these generators.

WARNING

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

Nitrogen purity

The nitrogen gas used for drying gas must be free of contaminants. Table 5 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 Agilent Ultivo LC/TQ sensitivity. Even with the gas conditioner (purifier) supplied with the Agilent Ultivo LC/TQ, 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 of gas supplied by a nitrogen generator. Oxygen has less impact on Agilent Ultivo LC/TQ sensitivity, and in some operating modes and certain applications may enhance sensitivity in small concentrations. Therefore, the purity specification for gas from a nitrogen generator can be less stringent.

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

NOTE

There are 2 such high-capacity gas conditioners to be installed in parallel for the Agilent Ultivo LC/TQ system.

Table 5

Nitrogen gas requirements				
Model	Source	Purity	Gas Pressure	Flow
Ultivo LC/TQ	Dewar or Liquid bottled Nitrogen	99.5% pure ¹ or better and hydrocarbon free ²	5.5 to 6.8 bar (80 to 100 psi) ³	Up to 30 liters/minute ⁴ (1800 liters/hour)
	Nitrogen Generator	95.0% pure and hydrocarbon free	5.5 to 6.8 bar (80 to 100 psi) ³	Up to 30 liters/minute ⁴ (1800 liters/hour)

High pressure bottled Nitrogen is not supported for Drying Gas due to high usage of nitrogen.

¹ With the remaining gas being oxygen.

² Less than 0.1 parts per million of hydrocarbons with the remaining gas being oxygen and trace argon.

³ Gas Pressure is at the instrument inlet and not just at the supply side.

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 appropriate regulators for your sources of nitrogen gas. The regulators must be able to supply gas in the specified pressure ranges. The regulator for the drying gas 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 (5988-4970EN) for dual-stage regulators available from Agilent Technologies.

The Agilent Ultivo LC/TQ is supplied with 300 centimeters of heavy-wall 1/4-inch PTFE tubing to connect the nitrogen supply to the Agilent Ultivo LC/TQ. You may need to supply additional heavy-wall 1/4-inch PTFE tubing if the nitrogen supply is located farther from the Agilent Ultivo LC/TQ system. You can substitute 1/4-inch medical-grade polypropylene tubing for the PTFE tubing. You must supply fittings, ferrules, and connectors of a Swagelok design for the 1/4-inch tubing.

Laboratory Supply

Requirements Operating

supplies

Routine operation of the Agilent Ultivo LC/TQ requires the following

supplies:

- Acetonitrile, pesticide residue analysis (PRA) grade or better
- Methanol, PRA grade or better
- Water, Nanopure/HPLC grade or better
- Ammonium formate, 97% purity or better
- Acetic acid, 99.7% minimum purity
- Formic acid, 95% minimum purity

NOTE

It is recommended that the highest grade solvents and chemicals available be used with the Agilent Ultivo LC/TQ. Lower purity grades will result in higher background counts seen in the Agilent Ultivo LC/TQ.

Cleaning solvents

Cleaning tasks for the Agilent Ultivo LC/TQ 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

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

Fume hood

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

Recommended Tools

Table 8 lists the basic hand tools required for maintenance of the Agilent Ultivo LC/TQ system.

Table 8

Commonly used tools	
Description	Part Number
Nebulizer Adjustment Kit	G1960-60470 ¹
Plastic tubing cutter	8710-1930 ¹
Pliers, needle nose	8710-0004
Safety glasses	9300-1159
Screwdrivers	
Flat blade, large	8730-0002
Flat blade, pocket	8730-0008
Torx T-6	8710-2548 ¹
Torx T-10	8710-1623 ¹
Torx T-20	8710-1615 ¹
Wrenches	
3-mm, open end	8710-2699 ¹
1/4-inch x 5/16-inch, open end	8710-0510 ¹
1/2-inch x 7/16-inch, open end	8710-0806 ¹
1/2-inch x 9/16-inch, open end	8710-0877 ¹

¹ Included in the shipping kit supplied with the Agilent Ultivo LC/TQ.

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 writable DVDs or backup hard drives for making backup copies of your data files.

Spare parts and consumables

Table 9 lists recommended spare parts and consumables used in the operation and maintenance of an Agilent Ultivo LC/TQ system. Keeping these parts on hand can reduce system downtime related to instrument maintenance and repair.

Table 9

Recommended spare parts and consumables	
Chemical consumables	Part Number
Calibrant solutions	
ESI-L Calibrant Solution	G1969-85000
APCI-L Calibrant Solution	G1969-85010

Site Preparation

Performance standards

ES/APCI positive ion performance standard (Reserpine)	G2423A
ES negative ion performance standard (Chloramphenicol)	5190-0591

Gas filters

Nitrogen drying gas conditioner (universal trap purifier)	RMSN-4
Maintenance kit for pre-filter cartridges for 5183-2003 or 5183-2004 nitrogen gas generators	5183-2014

General supplies

Abrasive mesh (micro-grit paper)	8660-0827
Cloths, clean, lint-free	05980-60051
Cotton swabs	5080-5400

Agilent Ultivo LC/TQ spare parts

Capillary 90	G6303-80004
Spring, canted coil (for capillary cap)	1460-2571
Capillary seal, front, 1/4-inch id	0905-1475
Agilent Jet Stream Heater Replacement Kit	G1958-68000
Corona needle	G1947-20029
Corona needle holder	G1947-60103
Foreline pump oil, SW60, 1 liter – used with MS40+	6040-1361
Fuse, 8A, Time Delay	2110-0969
Nebulizer Assembly, Agilent Jet Stream Technology	G1958-67098
ESI/AJS Needle Kit	G1958-60137
ESI Nebulizer Assembly	G1946-67098
Electrospray nebulizer needle kit	G2427A
APCI nebulizer needle kit	G1960-20032

Receiving the System

When your Agilent Ultivo LC/TQ 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 Agilent Ultivo LC/TQ shipping containers are large and very heavy. Table 10 lists the dimensions and weight of the Agilent Ultivo LC/TQ base unit shipping container. Additional shipping containers contain the Agilent Ultivo LC/TQ ship kit and PC data system.

Table 10

QQQ Shipping Containers

Description	Width	Depth	Height	Weight
Agilent Ultivo LC/TQ base unit	62.8 cm (24.7 in)	107.9 cm (42.5 in)	56.8 cm (22.3 in)	12 kg (27 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 container 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 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 Agilent Technologies 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 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 -20°C and 50°C (-4°F and 122°F), 20% to 80% relative humidity, non-condensing and non-corrosive.

There are chemicals that are shipped with the system that may also require refrigeration between 4 and 8°C. Additionally, some of these chemicals should **not** be exposed to temperatures below 5°C (41 °F)

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.

If the product is coming from a cold storage environment, allow time for thermal equilibration to room temperature before opening the shipping containers. This will avoid exposing the instrument to condensing humidity.

3 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 Agilent Ultivo LC/TQ base unit is too heavy (approximately 59 kg / 130 lb) to be lifted by one person. At least two people must be available to help lift the Agilent Ultivo LC/TQ onto the laboratory bench.

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

Nitrogen Generator Considerations

Installation of nitrogen generator is not included with the purchase of a Agilent Ultivo LC/TQ bundle. Nitrogen generators can be purchased separately with or without installation. If you do not want to install the generator yourself, you must purchase additional Agilent Customer Engineer time. An additional travel charge is required only if the nitrogen generator is ordered after the Agilent Ultivo LC/TQ is installed.

In addition, you are also responsible for the availability of compressed air to supply certain nitrogen generators including, if necessary, the installation of an air compressor. The air that is supplied to these types of nitrogen generators must be free of hydrocarbons.

Please see Appendix B of this manual for additional information.

System Verification

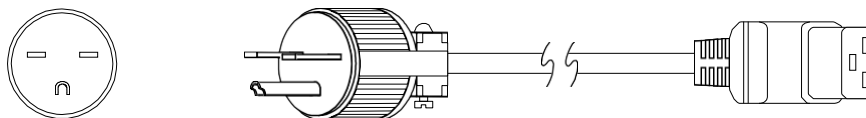
The final step in the installation process is system verification. Your Agilent service representative will test the system against Agilent standards as documented in the Agilent Ultivo LC/TQ System Installation Guide.

The Agilent service representative will not test your system against your standards or samples. Furthermore, the Agilent Customer Engineer 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 an additional cost.

Appendix A: Power Cords

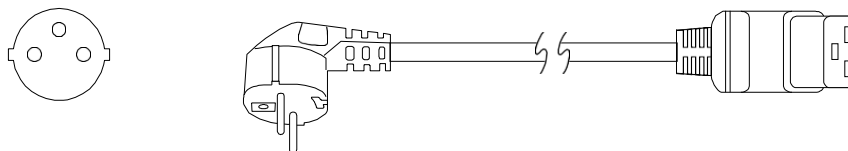
This appendix shows the power cords (IEC C19) available for the Agilent Ultivo LC/TQ. See the section Electrical Requirements for information about ensuring that the correct power cord is supplied with your system.

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

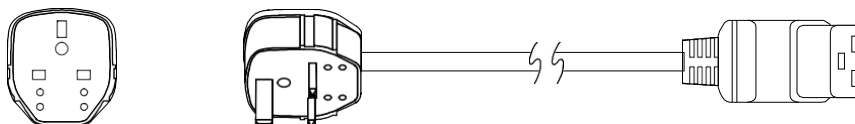


An alternative power cord (G1946-60066) with a NEMA L6-30P connector is available at extra cost. It is useful if a twist-lock plug is desired.

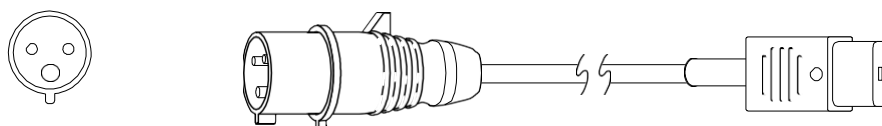
European Power, CEE 7/7 (Agilent Part Number 8120-8621)



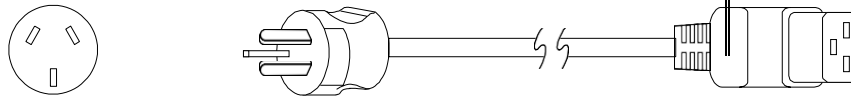
UK / Hong Kong / Malaysia / Singapore, BS 1363 (Agilent Part Number 8120-8620)



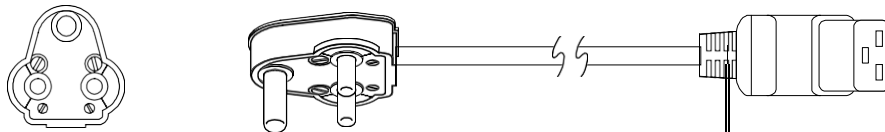
Switzerland / Denmark, IEC 309 (Agilent Part Number 8120-8622)



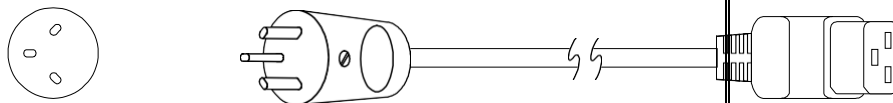
Australia, (Agilent Part Number 8120-8619)
China, (Agilent Part Number 8121-0070)



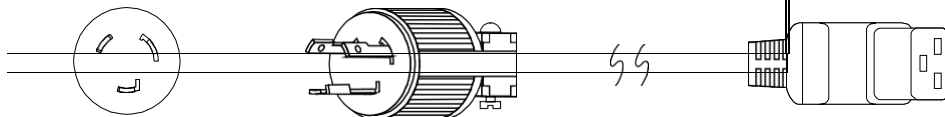
India / South Africa, BS 546 (Agilent Part Number 8121-0710)



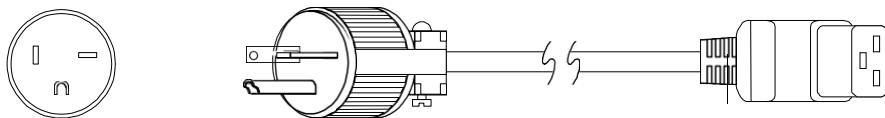
Israel, SI 32 (Agilent Part Number 8121-0161)



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



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



Korea, (Agilent Part Number 8121-1222)
(Not Shown)

Thailand, (Agilent Part Number 8121-1301)
(Not Shown)

Appendix B: Nitrogen Gas Generators

Agilent Technologies offers several nitrogen gas generators that are well suited to supplying the Agilent Ultivo LC/TQ LC/MS with nitrogen. In these generators, clean, compressed air is passed through hollow-fiber membranes that separates it into a concentrated nitrogen output stream and an oxygen-enriched permeate stream. The nitrogen is supplied to Agilent Ultivo LC/TQ while the oxygen is vented from the generator.

Single-instrument gas generators that require clean and dry air

Table 11 lists the physical and performance specifications for the Agilent nitrogen gas generator (5183-2003), and the Agilent nitrogen gas generator with oxygen analyzer (5183-2004). These gas generators can supply sufficient nitrogen for a single Agilent Ultivo LC/TQ LC/MS. The oxygen analyzer is especially helpful in negative ion APCI operation where small concentrations of oxygen can improve performance for some analyses.

Each generator (5183-2003 and 5183-2004) require up to 60 L/min of clean, oil-free air at a pressure of at least 760 kPa (110 psi). You must have either house compressed air or an oil-free air compressor that can meet these requirements. These generators includes two pre-filters for removing particulates and excess water vapor from the air.

Table 11	Specifications for single-instrument nitrogen gas generators	
	Nitrogen purity	95.0% - 98% ¹
	Minimum/maximum air input pressure	415/1000 kPa (60/145 psi)
	Max air consumption	60 l/min at 760 kPa (110 psi) ²
	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 (5183-2003)	none
	Electrical power (5183-2004)	100-120 or 220-240 Vac, 50/60 Hz

¹Varies with the input pressure and output flow required. Purity of 97% can be achieved at the maximum nitrogen output required for 6410 Agilent Ultivo LC/TQ LC/MS operation.

Installation for Nitrogen gas generator that require clean and dry air

Installation is not included in the price of a nitrogen gas generators listed above. 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 32 for more information. The customer is responsible for the installation of any air compressor that is needed.

Table 12

Nitrogen gas generator ordering information

Single-instrument generators	Part Number
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/package)	5180-4145
Maintenance pre-filter cartridge kit for 5183-2003 or 5183-2004	5183-2014

Nitrogen gas generators with internal air compressors

The Agilent nitrogen systems for LC/MS products include a nitrogen generator with built in air compressor(s) and includes installation. These are available under product numbers G1953A and G1954A. These models selectively remove oxygen, moisture and other gases to leave clean, dry, phthalate free Nitrogen. Internal air compressors make these unit independent from in-house air supplies, and fitted castors allow the user to easily position the units in the lab. These gas generators can supply sufficient nitrogen for a single or dual Agilent Ultivo LC/TQ LC/MS, depending on the option selected.

Table 13

Specifications for single-instrument nitrogen gas generator with air compressor (G1953A Option 01 – Peak Scientific NM32LA)

Nitrogen purity	>95.0%
Maximum flow	32 l/min (1.13 cfm)
Maximum pressure	6.90 bar (100 psi)
Dimensions (height x width x depth)	60 cm x 75 cm x 71.2 cm (23.6 in x 29.5 in x 28 in)
Weight	95 kg (209 lbs)
Shipping weight	150 kg (330 lbs)
Noise Level	54 db(A)
Electrical power	220-240 Vac ¹ , 50/60 Hz

¹ 230 VAC +/- 10% is recommended. Manufacturer will provide boost transformer (p/n 0950-5405) for locations below this threshold. Performance is not affected at lower voltages.

Specifications for single-instrument nitrogen gas generator with air compressor (G1953A Option 002 – Peak Scientific Genius 3010)

Nitrogen purity	>95.0%
Maximum flow	64 L/min (2.26 cfm)
Maximum pressure	6.90 bar (100 psi)
Dimensions (height x width x depth)	130.3 cm x 60 cm x 85 cm (51.29 in x 23.6 in x 33.5 in)

Weight	189 kg (417 lbs)
Shipping weight	265.5 kg (585 lbs)
Noise Level	54 db(A)
Electrical power	220-240 Vac ¹ , 50/60 Hz

¹ 230 VAC +/- 10% is recommended. Manufacturer will provide boost transformer (p/n 0950-5405) for locations below this threshold. Performance is not affected at lower voltages.

Specifications for dual-instrument nitrogen gas generator with air compressor (G1953A Option 003 – Peak Scientific Genius 3020)

Number of nitrogen outlets	2
Nitrogen purity	>95.0%
Maximum flow	32 L/min (1.13 cfm)
Maximum pressure	6.90 bar (100 psi)
Dimensions (height x width x depth)	130.3 cm x 60 cm x 85 cm (51.29 in x 23.6 in x 33.5 in)
Weight	189 kg (417 lb)
Shipping weight	265.5 kg (585 lb)
Noise Level	54 db(A)
Electrical power	220-240 Vac ¹ , 50/60 Hz

¹ 230 VAC +/- 10% is recommended. Manufacturer will provide boost transformer (p/n 0950-5405) for locations below this threshold. Performance is not affected at lower voltages.

Table 14

Specifications for single-instrument nitrogen gas generator with air compressor (G1954A – Parker NitroFlow Lab)

Nitrogen purity	> 95.0%
Maximum flow	32 L/min (1.13 cfm)
Maximum pressure	8 bar (116 psi)
Dimensions (height x width x depth)	70 cm x 90 cm x 31 cm (27.6 in x 35.4 in x 12.2 in)
Weight	92.5 kg (204 lbs)
Noise Level	< 58 dB(A)
Electrical power	120VAC/60Hz (20 A), 230VAC/50Hz

¹ Mains supply voltage fluctuations not to exceed +/- 10% of nominal voltage.

After installation of this nitrogen gas generator with internal compressor the Manufacturer must be contacted directly for support and service within the 1 year bundled service and warranty period.

NOTE

Please consult with your Agilent sales representative for the most up to date availability on nitrogen gas generators including those that support the Agilent Ultivo LC/TQ LC/MS.

www.agilent.com

In This Book

This book contains information to prepare your site for the Agilent Ultivo LC/TQ system components.

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Ninth Edition, September 2017

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