

G2570A 6850 GC/MSD System

Setup and Installation



Agilent Technologies

Notices

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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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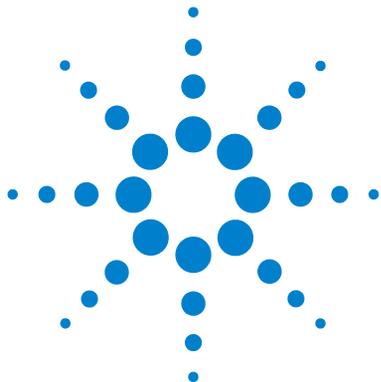
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This section provides information on how to identify specifically what type of MSD you are working with as well as how to properly clean the instrument. Also included in this section are the “[Important Safety Warnings](#)” which list critical safety precautions for all users.



Introduction

This document provides site preparation, installation, and operation instructions for the Agilent Technologies G2570A 6850 GC/MS System. The G2570A system consists of:

- A 5973N Series Mass Selective Detector (MSD) with a diffusion pump (MSD model G2577A)
- An MSD-ready 6850 Gas Chromatograph (GC)
- A computer running the MSD ChemStation software.
- Optional 59864B vacuum gauge controller
- Optional 7683 Automatic Liquid Sampler (ALS) injector (G2613A, G2913A) or 6850 Autosampler (G2880A)

When referring to the G2570A 6850 GC/MSD System in this manual:

- GC refers to the MSD-ready 6850 Gas Chromatograph (GC)
- MSD refers to the 5973N with a diffusion pump
- GC/MSD refers to the entire G2570A system

See [Figure 1](#) for a photograph of the G2570A 6850 GC/MSD System.

Installation must be performed by an authorized Agilent Technologies service provider.

Each 5973N is identified by a unique 10-character serial number. This serial number is located on a label on the lower left side near the front of the instrument. Each 6850 is identified by a serial number located on the lower right side of the instrument.

When corresponding with Agilent Technologies about your instrument, be sure to include the model number and both full 10-character serial numbers.

Use [Table 8](#) on page 90 to write down the serial numbers of the G2570A system components.

Description of G2570A System

Figure 1 identifies the main system components.

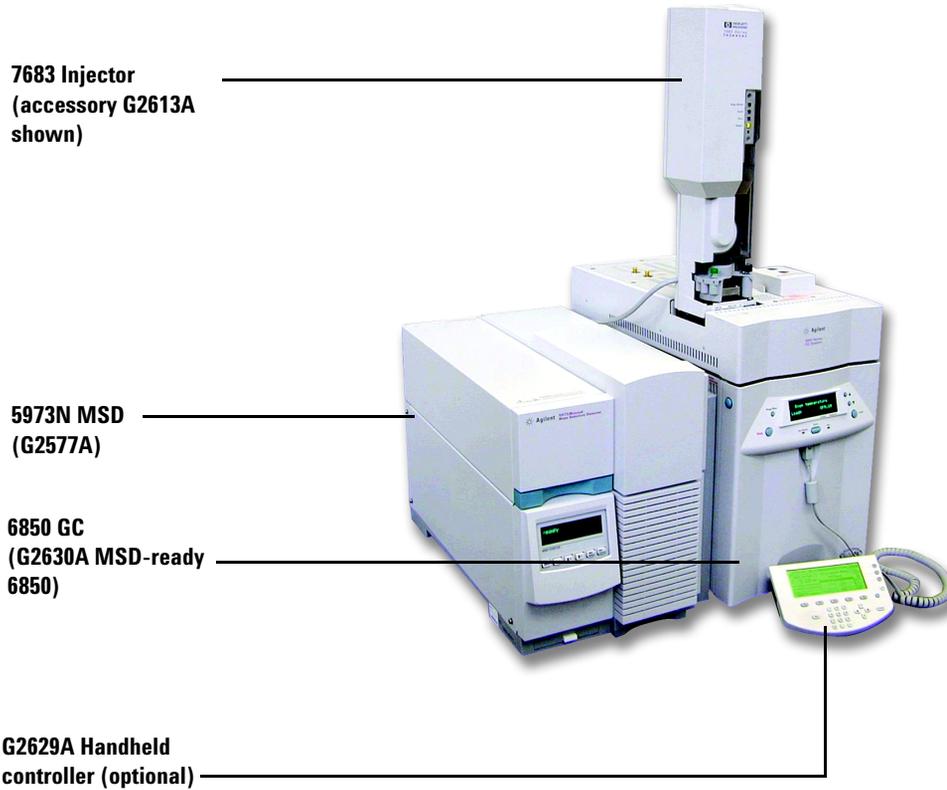


Figure 1 G2570A 6850 GC/MSD System

MSD-Ready 6850 GC

This special configuration of the 6850 GC (firmware version A.05.03 or later, serial number \geq US10243001) is only available as part of the G2570A system. The gas chromatograph has been modified as follows:

- The on/off power switch is on the GC right side in the lower front corner.
- A hole is prepared in the left outer panel, insulation and oven wall to accommodate the GC-MS interface heater.
- The GC-MS interface heater uses the detector heated zone. There is no internal GC detector.
- The Injector Mounting Bracket support mounts behind the power switch on the right side panel.
- The GC is configured only with a split/splitless inlet containing an unpacked, single taper deactivated liner (p/n 5181-3316).

With frequent GC column changes, Agilent recommends purchasing additional column clips (G2630-20890).

5973N MSD

The G2577A diffusion pump EI MSD is the only MSD used in the G2570A system.

MSD ChemStation Hardware and Software

The G2570A system comes with a computer, monitor, printer, LAN switch, and LAN cabling for one system. It also includes the MSD ChemStation software.

Supported Accessories

The G2570A system supports the following accessories:

- 7683 Automatic Liquid Sampler (ALS) injector (G2613A, G2913A) or 6850 Autosampler (G2880A)
- Valving compatible with the standard 6850 GC
- High-Pressure Merlin Microseal (part number 5182-3442)
- Ion Gauge Controller (59864B)
- G2629A Handheld Controller for the 6850 GC

Other detectors and other means for introducing samples into the split/splitless inlet are NOT standard items.

Important Safety Warnings

Before moving on, the following are important safety notices that you should always keep in mind when using the 5973 Series MSD. See the 6850 GC user documentation for its safety warnings.

Many internal parts of the MSD carry dangerous voltages

If the MSD is connected to a power source, even if the power switch is off, potentially dangerous voltages exist on the wiring between the MSD power cord and the AC power supply, the AC power supply itself, and the wiring from the AC power supply to the power switch.

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 unless the MSD is turned off.

WARNING

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

Connecting the MSD to power sources that are not equipped with protective earth contacts creates a shock hazard for the operator and can damage the instrument.

Interrupting the protective conductor inside or outside the MSD 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 MSD are appropriate for your country and site before using them. Maintain easy access to the power cords so they can be disconnected during maintenance. See [Appendix A](#) for more information.

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. Make sure the supply voltage does not fluctuate more than +5% or -10% from the rated voltage. This equipment must be installed in a Category II environment as defined in IEC 664.

Electrostatic discharge is a threat to MSD electronics

The printed circuit (PC) boards in the MSD 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 MSD right side cover.

Many parts are dangerously hot

Many parts of the MSD operate at temperatures high enough to cause serious burns.

You should always cool these areas of the MSD 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. Whenever possible, cool the part of the instrument that you will be maintaining before you begin working on it.

WARNING

Be careful when working behind the GC. During cool-down cycles, the GC emits hot exhaust which can cause burns.

WARNING

The insulation around the GC inlets, detectors, valve box, and the insulation cups is made of refractory ceramic fibers. To avoid inhaling fiber particles, we recommend the following safety procedures: ventilate your work area; wear long sleeves, gloves, safety glasses, and a disposable dust/mist respirator; dispose of insulation in a sealed plastic bag; wash your hands with mild soap and cold water after handling the insulation.

Hydrogen Safety

WARNING

The use of hydrogen as a GC carrier gas is potentially dangerous.

WARNING

When using hydrogen (H₂) as the carrier gas or fuel gas, be aware that hydrogen gas can flow into the GC oven and create an explosion hazard. Therefore, be sure that the supply is off until all connections are made and ensure that the inlet and detector column fittings are either connected to a column or capped at all times when hydrogen gas is supplied to the instrument.

Hydrogen is flammable. Leaks, when confined in an enclosed space, may create a fire or explosion hazard. In any application using hydrogen, leak test all connections, lines, and valves before operating the instrument. Always turn off the hydrogen supply at its source before working on the instrument.

Hydrogen is a commonly used GC carrier gas. Hydrogen is potentially explosive and has other dangerous characteristics.

- Hydrogen is combustible over a wide range of concentrations. At atmospheric pressure, hydrogen is combustible at concentrations from 4% to 74.2% by volume.
- Hydrogen has the highest burning velocity of any gas.
- Hydrogen has a very low ignition energy.
- Hydrogen that is allowed to expand rapidly from high pressure can self-ignite.
- Hydrogen burns with a nonluminous flame which can be invisible under bright light.

Dangers unique to GC/MSD operation

Hydrogen presents a number of dangers. Some are general, others are unique to GC or GC/MSD operation. Dangers include, but are not limited to:

- Combustion of leaking hydrogen.
- Combustion due to rapid expansion of hydrogen from a high-pressure cylinder.
- Accumulation of hydrogen in the GC oven and subsequent combustion (see your GC documentation and the label on the top edge of the GC oven door).
- Accumulation of hydrogen in the MSD and subsequent combustion.

Hydrogen accumulation in an MSD

WARNING

The MSD cannot detect leaks in inlet and/or detector gas streams. For this reason, it is vital that column fittings should always be either connected to a column or have a cap or plug installed.

All users should be aware of the mechanisms by which hydrogen can accumulate ([Table 1](#)) and know what precautions to take if they know or suspect that hydrogen has accumulated. Note that these mechanisms apply to all mass spectrometers, including the MSD.

Table 1 Hydrogen accumulation mechanisms

Mechanism	Results
Mass spectrometer turned off	A mass spectrometer can be shut down deliberately. It can also be shut down accidentally by an internal or external failure. A mass spectrometer shutdown does not shut off the flow of carrier gas. As a result, hydrogen may slowly accumulate in the mass spectrometer.
Mass spectrometer automated isolation valves closed	Some mass spectrometers are equipped with automated diffusion pump isolation valves. In these instruments, deliberate operator action or various failures can cause the isolation valves to close. Isolation valve closure does not shut off the flow of carrier gas. As a result, hydrogen may slowly accumulate in the mass spectrometer.
Mass spectrometer manual isolation valves closed	Some mass spectrometers are equipped with manual diffusion pump isolation valves. In these instruments, the operator can close the isolation valves. Closing the isolation valves does not shut off the flow of carrier gas. As a result, hydrogen may slowly accumulate in the mass spectrometer.

Table 1 Hydrogen accumulation mechanisms

Mechanism	Results
GC off	A GC can be shut down deliberately. It can also be shut down accidentally by an internal or external failure. If a 6850 GC equipped with Electronic Pressure Control (EPC) is shut off, the EPC stops the flow of carrier gas. If the carrier flow is not under EPC control, the flow increases to its maximum. This flow may be more than some mass spectrometers can pump away, resulting in the accumulation of hydrogen in the mass spectrometer. If the mass spectrometer is shut off at the same time, the accumulation can be fairly rapid.
Power failure	If the power fails, both the GC and mass spectrometer shut down. The carrier gas, however, is not necessarily shut down. As described previously, in some GCs a power failure may cause the carrier gas flow to be set to maximum. As a result, hydrogen may accumulate in the mass spectrometer.

WARNING

Once hydrogen has accumulated in a mass spectrometer, extreme caution must be used when removing it. Incorrect startup of a mass spectrometer filled with hydrogen can cause an explosion.

WARNING

After a power failure, the mass spectrometer may start up and begin the pumpdown process by itself. This does not guarantee that all hydrogen has been removed from the system or that the explosion hazard has been removed.

Precautions

Take the following precautions when operating a GC/MSD system with hydrogen carrier gas.

Equipment precaution

Make sure the front side-plate thumbscrew is fastened finger-tight. Do not overtighten the thumbscrew; it can cause air leaks.

WARNING

Failure to secure your mass MSD as described above greatly increases the chance of personal injury in the event of an explosion.

General laboratory precautions

- Avoid leaks in the carrier gas lines. Use leak-checking equipment to periodically check for hydrogen leaks.
- Eliminate from your laboratory as many ignition sources as possible (open flames, devices that can spark, sources of static electricity, etc.).
- Do not allow hydrogen from a high pressure cylinder to vent directly to atmosphere (danger of self-ignition).
- Use a hydrogen generator instead of bottled hydrogen.

Operating precautions

- Turn off the hydrogen at its source every time you shut down the GC or MSD.

- Turn off the hydrogen at its source every time you vent the MSD (do not heat the capillary column without carrier gas flow).
- Turn off the hydrogen at its source every time isolation valves in an MSD are closed (do not heat the capillary column without carrier gas flow).
- Turn off the hydrogen at its source if a power failure occurs.
- If a power failure occurs while the GC/MSD system is unattended, even if the system has restarted by itself:
 - 1 Immediately turn off the hydrogen at its source.
 - 2 Turn off the GC.
 - 3 Turn off the MSD and allow it to cool for 1 hour.
 - 4 Eliminate **all** potential sources of ignition in the room.
 - 5 Open the vacuum manifold of the MSD to atmosphere (remove the manifold window or analyzer or open the side-plate; do not just open the vent valve).
 - 6 Wait at least 10 minutes to allow any hydrogen to dissipate.
 - 7 Start up the GC and MSD as normal.

When using hydrogen gas, check the system for leaks to prevent possible fire and explosion hazards based on local Environmental Health and Safety (EHS) requirements. Always check for leaks after changing a tank or servicing the gas lines. Always make sure the vent line is vented into a fume hood.

Chemical safety

WARNING

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

Safety and Regulatory Certifications

NOTE

This section describes the safety and regulatory information for the 5973N MSD. For similar information about the 6850 GC, refer to its user documentation.

The 5973 Series Mass Selective Detector 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 61010A–1
- International Electrotechnical Commission (IEC): 61010–1
- EuroNorm (EN): 61010–1

The 5973 Series Mass Selective Detector 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 a la norme NMB–001 du Canada.



The 5973 Series Mass Selective Detector is designed and manufactured under a quality system registered to ISO 9001.

Information

The Agilent Technologies 5973N Mass Selective Detector 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 the manufacturer, the protection provided by the instrument may be impaired. Whenever the safety protection of the 5973 Series Mass Selective Detector 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.

See accompanying instructions for more information.



Indicates a hot surface.



Indicates hazardous voltages.



Indicates earth (ground) terminal.



Indicates explosion hazard.



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 am nach EN 27779:1991.

Cleaning

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

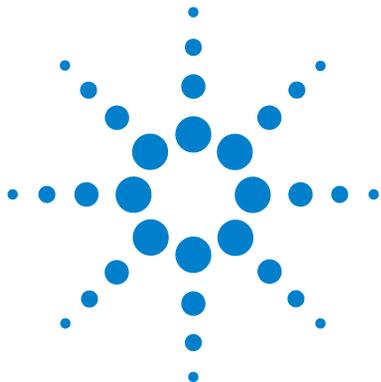
Recycling the Product

For recycling, contact your local Agilent sales office.

Other Documentation

Additional information is contained in the following documentation:

- 5973N and the 5973 inert Mass Selective Detector Hardware Manuals, which are located on the 5973N and 5973 inert Mass Selective Detector User Information CD-ROM
- 6850 Series GC manuals
- GC accessories (autosampler, etc.) manuals
- MSD ChemStation software manuals and online help
- The sensitivity specifications for your instrument: see the Agilent Technologies Web site at <http://www.agilent.com/chem>
- For updated information, see the Agilent Technologies Web site at <http://www.agilent.com/chem>



2 Site Preparation

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This section describes how to properly prepare your site for a new G2570A system installation. Follow these instructions carefully as delays due to improper site preparation may result in loss of instrument use during the warranty period.



Overview

Before the G2570A 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 all system components.
- 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.
- Preparations for safe exhaust venting are adequate.
- Supplies necessary for instrument operation are available, including solvents, carrier and reagent gasses, and printer paper.
- Conveniently located telephone.

NOTE

Installation and verification will **only** be performed using helium carrier 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 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:

- Planning, scheduling, and preparing the site according to the specifications in this manual
- Verifying that the electrical environment is safe and adequate for the G2570A system installation and operation
- Complying with all local laws (codes, ordinances, and regulations) for mechanical, building, and electrical distribution systems, hazardous waste disposal, and chemical storage
Site 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
- Providing someone to help lift the system components onto the laboratory bench
- Providing adequate secure storage space for the system until it can be installed by an authorized Agilent service provider

Agilent responsibility

An authorized Agilent service provider will install the G2570A system and verify its performance. The service provider's responsibilities are limited to:

- Unpacking the system components and verifying that all are present and undamaged
- Connecting the carrier gas line to the instrument from the tank, regulators, and lines previously installed by the customer
- Installing, connecting, and turning on system components
- Verifying that the system meets Agilent performance standards
- Providing **basic** user familiarization for system hardware and software

- Signing the customer up through the Response Centers for instrument and software support

Agilent Technologies is not responsible for:

- Any task not listed in this manual or the installation guides for the GC, data system, and other accessories
- Installing helium carrier gas or reagent gas tanks and regulators
- Connecting or verifying the performance of hardware and software not provided by Agilent

NOTE

Items that do not include installation by Agilent must be installed by the customer. The customer must arrange for this service in advance.

- Connecting the GC/MSD/ChemStation system to the site network
- Testing the 6850 GC/MSD System against customer standards or samples
- Providing detailed instruction in the operation of the computer operating system and the MSD ChemStation software

NOTE

Visit www.agilent.com/chem on the Web for information concerning training classes.

- Setting up laboratory procedures

NOTE

Contact Agilent Technologies for information concerning Application Assist or Chemical Analysis Consulting services.

- Operating the G2570A system following installation

Receiving the System

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

Delivery and unloading

The shipping containers are large and heavy. The largest container in the shipment is 122 cm (48 inches) × 122 cm × 122 cm. It contains several smaller cartons that can be removed from the large container after delivery to facilitate moving them to the location where the instrument is to be installed. After removing the smaller cartons and discarding the outer container, the largest remaining carton, which contains the GC, is approximately:

- 89 cm (35 inches) high
- 82 cm (32 inches) wide
- 74 cm (29 inches) deep
- 60 kg (132 lbs)

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

Inspecting for damage

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

Do not open any of the shipping containers unless an authorized Agilent service provider is present. **Opening any of the containers without an authorized Agilent service provider being present will void the receiving warranty on the instrument.**

Storage

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

The environment in the storage area should be between 5 °C and 40 °C (41 °F and 104 °F), 10% to 95% relative humidity, non-condensing and non-corrosive.

Unpacking

The shipping containers become your property and should not be returned to Agilent Technologies.

Space and Weight Requirements

Table 2 lists dimension and weight information for the MSD and related components. Your site must have enough bench space for the MSD, GC, data system, and accessories. In addition, there must be sufficient space around the system for ventilation and maintenance access. At least 30 cm (12 inches) to the left of the MSD and at least 20 cm (8 1/4 inches) behind the MSD must be kept clear.

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

The foreline pump can be located on the laboratory bench or on the floor. It must be close to the MSD because it is connected by a 200-cm (79-inch) hose. 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.

Table 2 Product dimensions* for a single 6850 GC/5973N MSD system

Product	Dimensions, cm (in) [†]			
	Height	Width	Depth	Weight, kg (lb)
5973N Series MSD				
G2577A Diffusion pump EI MSD	41 (16)	30 (12)	56 (14)	37 (80)
6850 GC [‡]	50 (19.7)	29 (12) 37 (15)**	54 (22)	23 (51)
Data System	Data system size and weight depend on the components included in the data system. Reserve at least 100 cm (39 in) of bench space for the data system. A typical data system weight is 34 kg (75 lb).			

* All dimensions are approximate.

† Be sure to plan for the space for your carrier gas source(s).

‡ The 6850 GC requires at least 44 cm of free space above it. Refer to 6850 documentation for more information.

** With G2880A autosampler.

Communications Requirements

Telephone

A telephone with a cord long enough to be used at the computer will allow the MSD operator to communicate with authorized Agilent service providers.

Site network

Agilent is not responsible for connecting to or establishing communication with your site network. The authorized Agilent service provider will only test the instruments' ability to communicate on the supplied LAN switch.

NOTE

The IP addresses assigned to the instrument(s) must be fixed (permanently assigned) addresses. If you intend to connect your 6850 GC/MSD System to your site's network, each piece of equipment (the MSD, the GC, and the PC) must have a unique IP address assigned to it.

Electrical Requirements

You are responsible for providing appropriate electrical power and power outlets for all of the components in your G2570A system. Please see [Table 4](#) for power requirements. Power considerations include:

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

NOTE

Refer to the 6850 user documentation for GC electrical requirements.

Voltage ranges of major components

The 5973 Series MSD includes a full-range power supply that can operate without reconfiguration on either of two wide ranges of single-phase alternating current (AC) electrical power:

- 120-127 VAC 60 Hz (typical for North America)
- 200-240 VAC, 50/60 Hz (typical for Europe and Japan)

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

NOTE

The MSD does not support 100 VAC input power. In countries that have only 100 VAC power, a step-up transformer must be used to provide the appropriate voltage to the MSD.

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 MSD may be delivered in either single-phase or 208-Wye configuration. Correct grounding for the 208-Wye configuration must be verified by an electrician. The neutral wire **cannot** be used for safety grounding. The ground wire should carry zero current except for ground-fault current or static electric discharge. The entire system should share an isolated, noise-free electrical ground. This system ground should be electrically separate from the ground for the rest of the building, back to the main ground for the facility. Power configurations are provided in [Table 3](#).

WARNING

Connecting any G2570A system to a power source which is not equipped with a protective earth contact (ground) creates a shock hazard for the operator and can damage the instrument.

WARNING

Interrupting the protective conductor inside or outside any G2570A component or disconnecting the protective earth terminal (ground) creates a shock hazard for the operator and can damage the instrument.

Table 3 Power configurations

Configuration	Measurement	Nominal voltage*
Single phase, 120-127 VAC	Line to neutral	120 or 127 VAC
	Line to ground	120 or 127 VAC
	Ground to neutral	< 0.5 V rms
Single phase, 200-240 VAC	Line to neutral	200, 220, or 240 VAC
	Line to ground	200, 220, or 240 VAC
	Ground to neutral	< 0.5 V rms
208-Wye	Line to line (phase A to phase B)	208 VAC
	Line to ground (phase A to ground)	120 VAC
	Line to ground (phase B to ground)	120 VAC

* Varies with country and/or region

Power requirements

[Table 4](#) lists the power requirements for the G2570A system and related equipment. Extra power capacity for future additions is a very good idea.

Each product listed requires a dedicated circuit. Agilent recommends that the MSD, GC, and data system each have a separate circuit breaker. All of the equipment **must** share a common ground.

Power must meet the stability specifications listed in [Table 4](#). Use a line monitor to check power stability. If your line power is unstable, you may need to install a line conditioner.

Table 4 Power requirements

Unit	Line voltage (VAC)	Frequency (Hz)	Current (A)	Power (VA)
5973N with diffusion pump*	120–127	60	15	900
	200–240	50	8–12	
6850 GC, with standard oven†	120	47–63	15	1440
	230	47–63	8–12	2000

* 100 V version of 5973N is not supported.

† 100 V version of 6850 GC is not supported.

Power plugs and cords

See “Power Cords” on page 91 for illustrations of the power cords available.

Data system components also include power cords with plugs appropriate for the country where the order was placed.

Power cord lengths for the MSD and the data system components and accessories are approximately 2.3 m (7.5 ft).

WARNING

Make sure the power cords supplied with all system components are appropriate for your country and site before installing the system. See “Power Cords” on page 91

WARNING

Do not use extension cords with the MSD or GC. Extension cords normally are not rated to carry enough power and can be a safety hazard.

NOTE

Maintain easy access to the power cords so they can be disconnected for 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.
- Provide separate convenience outlets for building maintenance and other appliances. Convenience outlets must be on circuits separate from the G2570A system. Convenience outlets must share the normal building distribution ground, **not** the MSD system ground.
- In some geographical areas it may be advisable to install lightning protection for personnel and equipment.

Air Conditioning Requirements

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

Temperature, humidity, and altitude

The 5973 Series MSD is specified for operation under the following conditions:

- Operation requires constant temperature (variations < 2 °C/h)
- Operation and storage require a non-condensing, non-corrosive atmosphere
- The temperature and humidity limits in [Table 5](#)
- Maximum altitude for operation: 2300 m (7500 ft)

Table 5 Temperature and humidity limits

	Operating		Maximum
Temperature Range	20–27 °C 68–80 °F	±2 °C/h ±3.6 °F/h	5–40 °C 41–104 °F
Relative Humidity	20%–50% noncondensing		10%–95%

Environmental control systems must maintain these temperature and humidity ranges.

The MSD is rated for 900 Watts (3000 BTU/h). The GC and the data system also contribute significantly to the cooling load although the exact amounts depend on their configurations.

Some guidance data are shown below:

- 5973N MSD with diffusion pump
 - 3164 kJ/h max including GC/MS interface
 - 3000 BTU/h max including GC/MS interface

- 6850 GC
 - 5062 kJ/h max
 - 4800 BTU/h max

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 authorized Agilent service provider. 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 three sources of exhaust on the G2570A system: the foreline pump, the GC split vent, and the GC septum purge. The foreline pump outputs gas removed from the vacuum manifold by the high vacuum pumps.

The foreline pump exhaust will also contain traces of solvent and sample.

WARNING

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

WARNING

The pump exhaust contains carrier gas and traces of solvents, analytes, and foreline pump oil. The supplied oil trap stops only pump oil. It does *not* trap or filter out toxic chemicals. If you are using toxic solvents or toxic or flammable carrier gas, or analyzing toxic chemicals, do not install the oil trap. Install a hose to take the pump exhaust to a fume hood.

The foreline pump exhaust **cannot** be vented into the laboratory if any hazardous materials will be introduced into the GC/MS system, including samples, solvents, carrier gases, and reagent gases. It must be vented externally to the building or vacuum-exhausted to a fume hood.

If a negative pressure vent is not available, the length of tubing from the foreline pump to an ambient pressure vent should not exceed 460 cm (15 ft). The exhaust can **not** be connected to a positive pressure vent.

Exhaust gas venting must comply with all local environmental and safety codes.

For split vent and septum purge vent requirements, see the GC documentation.

Fume (exhaust) hood

An auxiliary work space and fume hood are needed for some maintenance procedures. Vent external to building via ambient-pressure vent system, within 460 cm (15 ft) of both GC vents and MSD foreline pump, or vent to a fume hood. Any exhaust vent system must not be part of any building environmental control system that recirculates air. Exhaust venting must comply with all local environmental and safety codes.

WARNING

Hydrogen is potentially explosive. Take extreme care when using hydrogen as the GC carrier gas in a GC/MS system. Read “[Hydrogen Safety](#)” on page 15 before operating the MSD with hydrogen carrier gas.

Carrier Gas Requirements

Table 6 lists the specifications for the carrier gases.

Table 6 Carrier gas requirements

	Purity	Typical pressure range	Typical flow (mL/min)
Helium (required at installation)	99.9995% or better and hydrocarbon free	345 to 550 kPa 50 to 80 psi	20 to 50 (column and split flow)
Hydrogen	99.9995% or better and SFC grade		

Regulators, tubing, and fittings

You must supply an appropriate dual-stage regulator (stainless-steel diaphragm type) for the carrier 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. See the Agilent catalog for consumables and supplies, or visit the Agilent Chemical Analysis Web site at <http://www.agilent.com/chem> for dual-stage regulators available from Agilent Technologies.

You must supply fittings, ferrules, and connectors of a Swagelok design for the 1/8-inch tubing.

Laboratory Supply Requirements

Laboratory supply requirements vary with applications.

Cleaning solvents

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

- Methylene chloride
- Isopropyl alcohol
- Methanol
- Acetone
- Water

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

CAUTION

Do not use carbon disulfide as a cleaning solvent on or around the GC or MSD. It is corrosive and will damage the MSD analyzer. Use of carbon disulfide as a cleaner will void the warranty on the analyzer.

Carbon disulfide may be used as a sample solvent in standard-sized injections (typically 2 μ L or less).

WARNING

Chemical solvents should be considered hazardous and must be handled with care. Contact your chemical supplier for solvent handling and safety information, preferably a material safety data sheet (MSDS).

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 will also need appropriate hardware and media (flexible disks, tape cartridges, CD writers, etc.) for making backup copies of your data files.

Spare parts and consumables

The supplies and parts listed in [Table 7](#) are used in the operation and maintenance of a 5973 Series MSD system. Keeping these parts on hand can reduce system downtime related to instrument maintenance and repair. Refer also to the 6850 GC user documentation, to the latest Agilent catalog for consumables and supplies, and to the Agilent Web site at www.agilent.com/chem.

Table 7 Maintenance supplies and consumables

Description	Part number
6850 GC Ship Kit	G2630-00031
Miscellaneous consumables	
One-year maintenance kit	5183-0296
He/H ₂ gas filter for GC	RMSH-2
Bracket for RMSH-2 He/H ₂ filter	UMC-5-2
Abrasive sheets (5/pk)	5061-5896
Cloths, lint-free (15/pk)	05980-60051
Cotton swabs (100/pk)	5080-5400
Diffusion pump fluid, 18.5 mL, approximately 30 mL needed (diffusion pump MSDs only)	6040-0809
Foreline pump oil, Inland 45, 1 liter	6040-0834
El filament (2/pk)	05972-60053
El high temp filament	G2590-60053
Octafluoronaphthalene (OFN)	8500-5441
Gloves, clean	
large	8650-0030
small	8650-0029
Nitrile rubber gloves, medium	9300-1751

Table 7 Maintenance supplies and consumables (continued)

Filaments	
El filament (2/pk)	05972-60053
El high temp filament	G2590-60053
Chemical Consumables	
PFTBA (EI calibration fluid)	05971-60571
EVAL A (evaluation sample)	05990-60045
OFN (Octafluoronaphthalene)	8500-5441
Benzophenone	8500-5440
Diffusion pump fluid, 18.5 mL, approximately 30 mL needed (diffusion pump MSDs only)	6040-0809
Foreline pump oil, Inland 45, 1 liter	6040-0834
Gas Filters	
He/H ₂ gas purifier for GC	RMSH-2
Bracket for RMSH-2 He/H ₂ filter	UMC-5-2
Commonly used tools	
Safety glasses	9300-1159
Wrenches	
1/2-inch x 9/16-inch, open end	8710-0877
Ferrules	
Blank, graphite-vespel	5181-3308
GC/MS interface	
0.3-mm id, 85% Vespel 15% graphite, for 0.10-mm id columns	5062-3507

Table 7 Maintenance supplies and consumables (continued)

0.4-mm id, 85% Vespel 15% graphite, for 0.20-mm id and 0.25-mm id columns	5062-3508
0.5-mm id, 85% Vespel 15% graphite, for 0.32-mm id columns	5062-3506
0.8-mm id, 85% Vespel 15% graphite, for 0.53-mm id columns	5062-3538
Inlet	
0.27-mm id, 90% Vespel 10% graphite, for 0.10-mm id columns	5062-3518
0.37-mm id, 90% Vespel 10% graphite, for 0.20-mm id columns	5062-3516
0.40-mm id, 90% Vespel 10% graphite, for 0.25-mm id columns	5181-3323
0.47-mm id, 90% Vespel 10% graphite, for 0.32-mm id columns	5062-3514
0.74-mm id, 90% Vespel 10% graphite, for 0.53-mm id columns	5062-3512
Standard checkout column (HP5-MS, 30 m × 0.25 mm × 0.25 μm)	190915-433E
Column clips *	G2630-20890

* These clips are unique to the G2570A system only.

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 primary user and, if possible, all other users of the MSD should be present during installation to receive familiarization instruction from the authorized Agilent service provider.

Verification

The final step in the installation process is system verification. Your authorized Agilent service provider will test the system against Agilent Technologies specifications as documented for the product(s) or system(s) you have purchased. (Not all tests are performed for every system.)

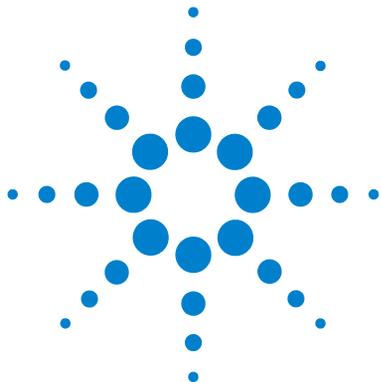
The authorized Agilent service provider will not test your system against your standards or samples. Further, the authorized Agilent service provider will not set up your laboratory procedures. Assistance with laboratory procedures can be obtained from your local Agilent Technologies Applications Engineer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

Sensitivity specifications

For the current sensitivity specifications for your instrument, refer to the Agilent Web site at www.agilent.com/chem.

NOTE

SIM performance verification is not performed at installation and must be purchased if desired.



3 Installation

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This chapter contains instructions for installing the G2570A system.



Overview

Installing the G2570A system includes the following:

- Unpacking and inspecting shipped materials
- Installing the computer and peripherals
- Installing the GC
- Installing the MSD
- Installing the MSD ChemStation software
- Integrating the GC and MSD
- Evaluating performance
- Familiarizing the customer with the system

Purpose of Installation

The purpose of installation is to ensure that the system is correctly installed and functioning as designed, in the customer's facility. Correct installation is the first step in ensuring that instruments and systems operate reliably over their expected lifetimes. An authorized Agilent service provider must perform the installation.

This document describes the overall installation process. It also provides details about MSD installation and the steps needed to integrate and test the G2570A system. Some steps require additional procedures; this information can be found in the following documents:

- 6850 GC User Information CD-ROM
- ALS User Information CD-ROM/documentation
- MSD ChemStation installation manual

Customer Responsibilities

The customer should ensure that the installation site is prepared in accordance with the specifications contained in [Chapter 2](#), “Site Preparation”, and in the Site Prep Summary on the 6850 CD-ROM.

A customer representative should be present at all times during the installation.

The G2570A system is shipped in the following boxes:

- 6850 GC, MSD-Ready
- 6850 Handheld Controller (optional)
- 5973Network MSD
- Foreline pump for MSD
- Computer hardware

Unpack and verify the contents of each container in the presence of an authorized Agilent service provider.

Check serial numbers and fill in serial number fields, if necessary, in [Table 8](#) on page 90.

Also:

- Check voltage settings of the instruments and computer systems.
- Verify that power cables are correct (must connect with power receptacles).

Verify instrument line voltage options are correct and the correct line voltage is delivered to the work area.

The following items are not included in the standard installation. They are the responsibility of the customer, unless previous arrangements have been made between the customer and the authorized Agilent service provider.

- Preparation of all site facilities including the provision of adequate space, supporting bench, and power to match the unit(s) purchased. See [Chapter 2](#), “Site Preparation”.
- Operating supplies: high-purity carrier and reagent gas(es), syringes, pipettes, vials, and solvents. See [Chapter 2](#), “Site Preparation”.
- Training for programs not specifically listed in this document.
- Tests of customer-supplied samples, equipment, and/or method development.
- Any tasks not described in this manual.

In addition, the customer is required to:

- Provide someone to help lift the GC and MSD onto the bench.
- Have the primary user and, if possible, all other users of the MSD present during installation to receive familiarization instruction from the authorized Agilent service provider.

Before You Start

Verify that all the conditions specified in [Chapter 2](#), “Site Preparation” have been met.

Installing the MSD ChemStation Computer

- 1** Unpack the computer, monitor, printer, and the modem (if present).
- 2** Position the computer components on the bench.
- 3** Install the computer.

See the computer installation documentation. Please pay attention to the voltage requirements in the computer documentation.

- 4** Position the network switch on the bench, and plug in its power supply.

See the switch installation documentation.

- 5** Connect a shielded LAN cable between the LAN connector on the back of the PC to connector #3 on the network switch.
- 6** Install the printer.

See the printer installation documentation.

- 7** Turn on the printer, monitor, and PC, in that order.

The network switch does not have a power switch; it is “on” whenever it is connected to AC power.

Installing the GC

Materials needed:

- Column cutter (5181-8836)
- Flat-blade screwdriver
- Wrenches, 7/16 inch, open-ended (2 needed)
- 6850 Series GC shipping kit

- 1 Place GC on bench.

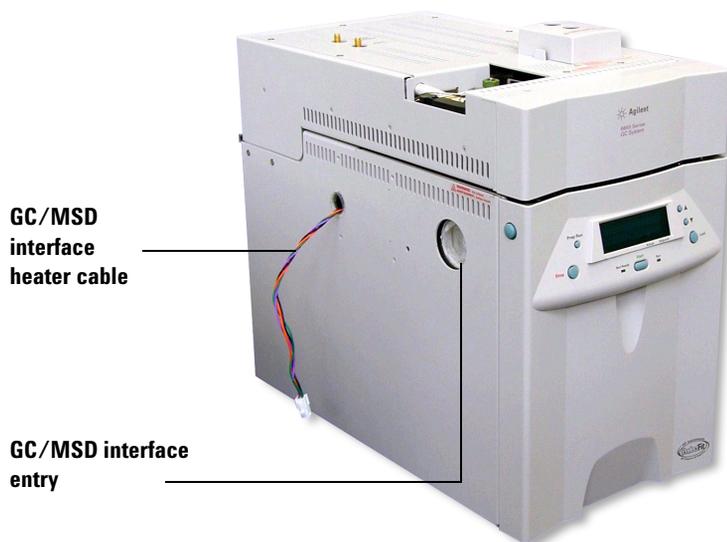


Figure 2 6850 GC with MSD interface.

WARNING

To prevent injury, get lifting assistance.

Connecting the Helium Lines to the GC

- 1 Connect the 6-foot copper tubing (or a custom length) to the carrier gas supply line (Figure 3).

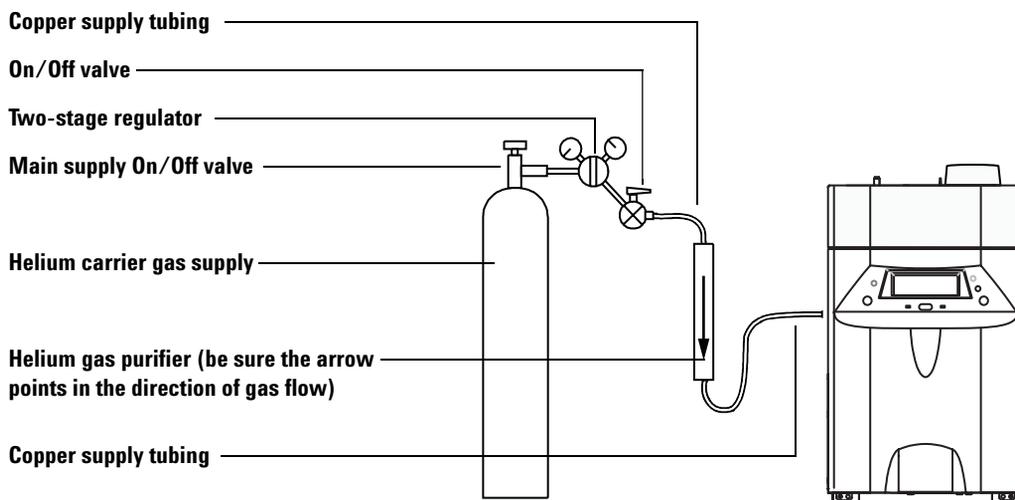


Figure 3 Connect helium

- 2 Turn on the carrier gas flow at a low pressure, 35 to 55 kPa (5 to 8 psi).
- 3 Let the line purge for 5 to 10 minutes.
- 4 Connect the other end of the tubing to the input of the gas purifier.

CAUTION

Only remove the caps in the gas stream or the gas purifier will be contaminated by air. This will ruin the gas purifier.

- 5 Connect one end of another length of copper tubing to the output of the gas purifier.
- 6 Let the line and gas purifier purge for 5 to 10 minutes.

NOTE

While purging gas lines, you can begin installing the MSD ChemStation software.

- 7 Connect the other end of the tubing to the GC carrier gas fitting.

Purge the flow system for 10 minutes. You can continue with the next step while you wait.

- 8 After connecting and purging the copper tubing sections and universal trap helium gas purifier with the UPC/Zero Grade Helium carrier gas, attach the carrier gas line to the fitting marked "carrier gas" at the rear of the GC.

If space permits, it is suggested that the Helium gas purifier be attached with the purifier bracket to the rear portion of the right side panel. See [Figure 4](#).

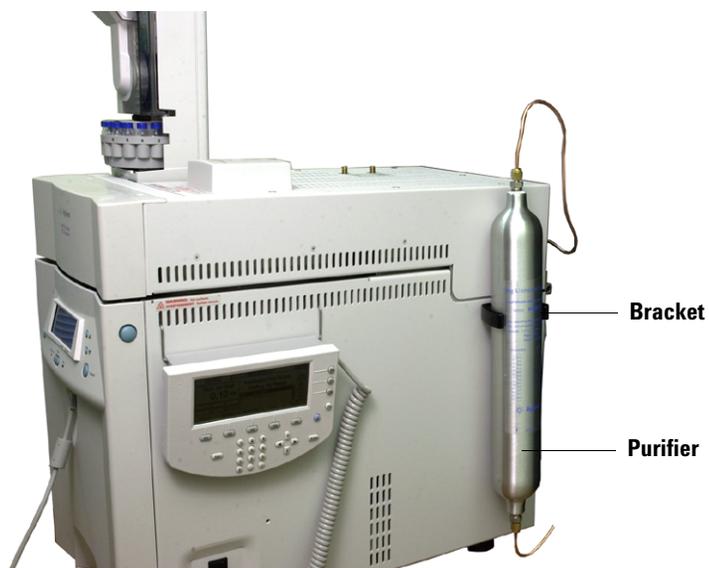


Figure 4 GC right-side view showing purifier

- 9 Set the pressure to approximately 345 kPa (50 psi).

Make sure all connections are tight, including the septum retainer nut, liner insert weldment nut and the inlet column nut containing the ferrule plug.

NOTE

The 6850 GC does not ship with a column attached to the inlet.

- 10 If available, connect the Handheld Controller to the GC.

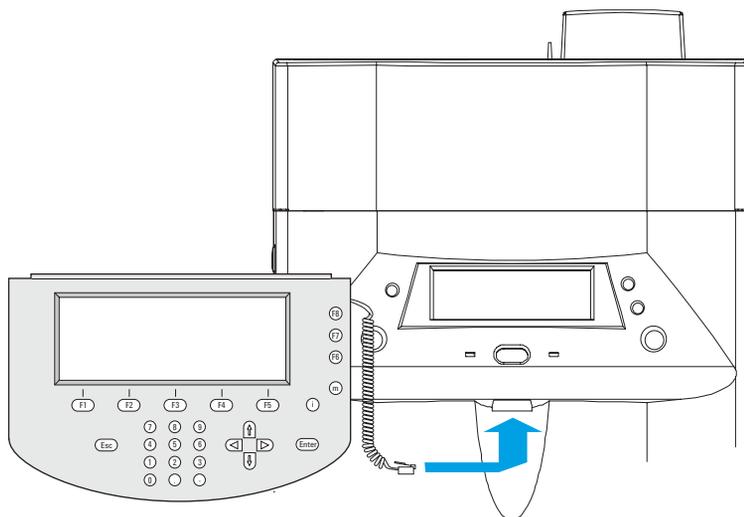


Figure 5 Optional Handheld Controller connection

- 11 Connect a shielded LAN cable between the LAN connector on the back of the GC and connector #2 on the network switch. See [Figure 6](#).

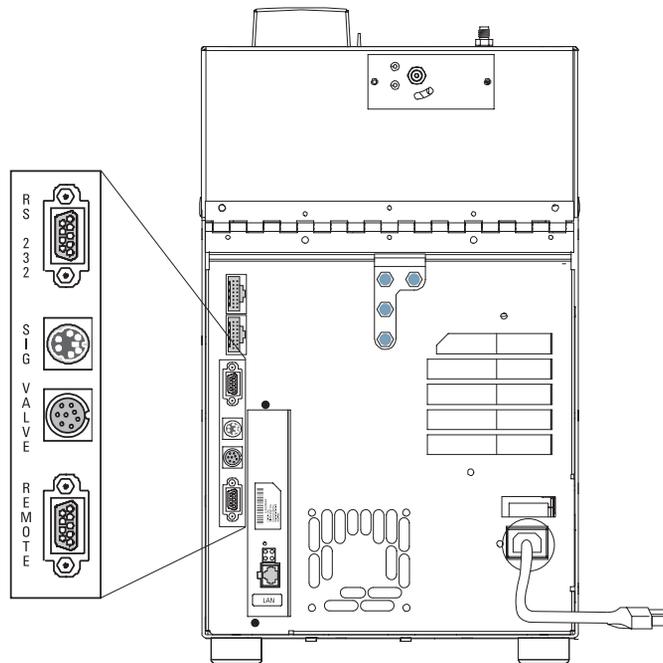


Figure 6 Back panel view

You will connect the APG start/stop cable later. See [step 6](#) on [page 72](#) for instructions.

- 12 Connect the power cord to the GC and to the appropriate wall socket.

Reconfiguring the Column Outlet

- 1 Lay the column (19091S-433E found in the GC ship kit) on a clean surface with the column label facing the user in the 12 o'clock position. Note that the inlet and outlet ends of the column are oriented the same as when a GC detector is used and the column outlet is positioned at the back (closer to the fan) of the column cage holder. See [Figure 7](#).

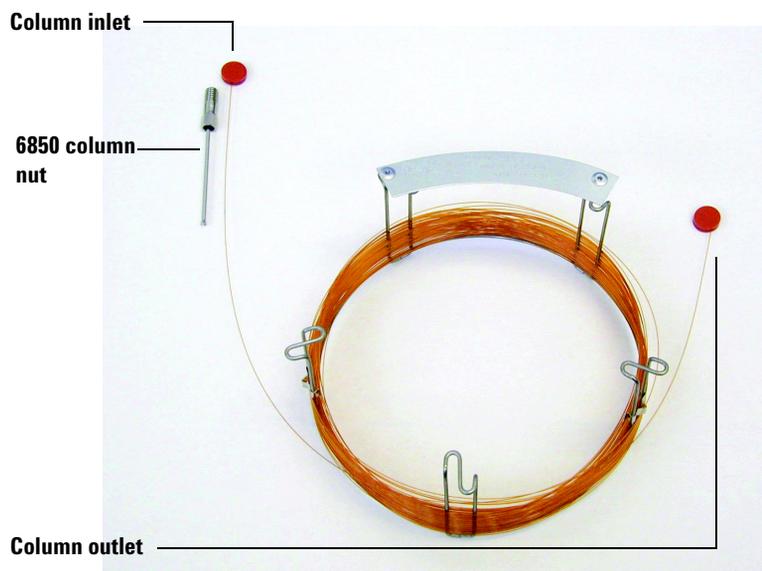


Figure 7 Column

Installation

- 2 Remove the septum cap from the column OUTLET side and uncoil 2 column loops. See [Figure 8](#).

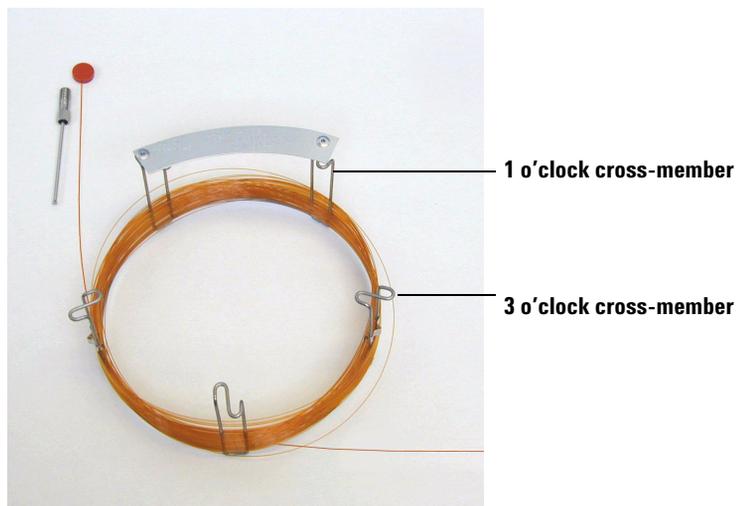


Figure 8 Column with 2 uncoiled loops.

3 Attach three column clips (part number G2630-20890) to the column cage as follows:

- Attach one clip onto the back of the 1 o'clock cross-member piece of the column cage.
- Attach two clips onto the front of the 3 o'clock cross-member piece of the column cage.

These clips will help provide appropriate orientation of column ends for their insertion into the GC inlet and MSD interface.

See [Figure 9](#).

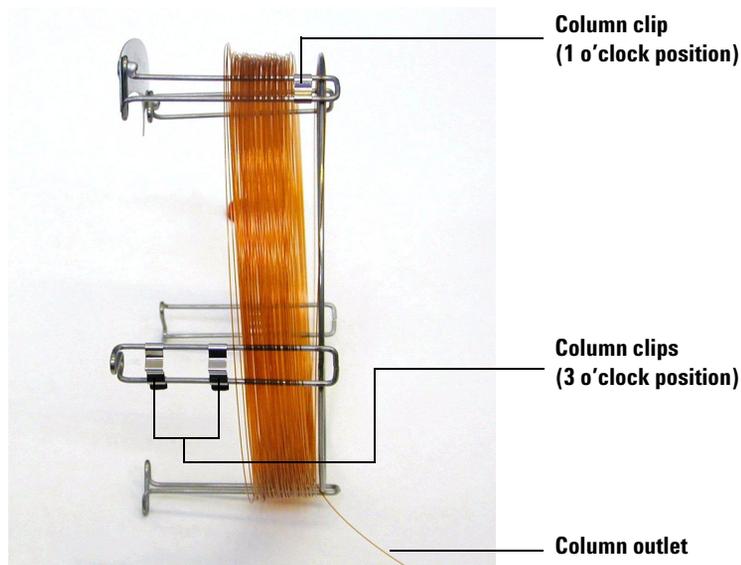


Figure 9 Column with column clips attached.

- 4 Feed the outlet side of the column through the 1 o'clock positioned clip so that the column outlet is pointing toward the front of the column cage. See [Figure 10](#).

CAUTION

Be careful not to scratch the column coating.

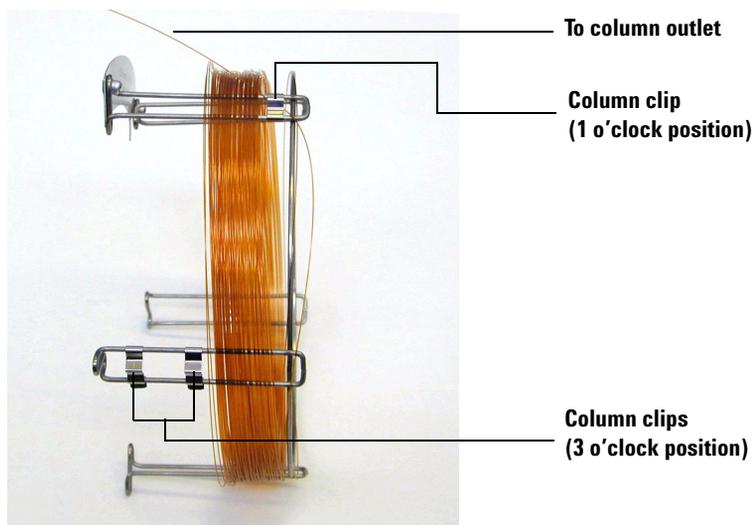


Figure 10 Column fed through 1 o'clock position.

- Next, feed the outlet side of the column through the 3 o'clock positioned clips so that the column outlet is pointing toward the back of the column cage. Make sure that the part of the column that is between the two clips does NOT extend above the column label. See [Figure 11](#).

CAUTION

Be careful not to scratch the column coating.

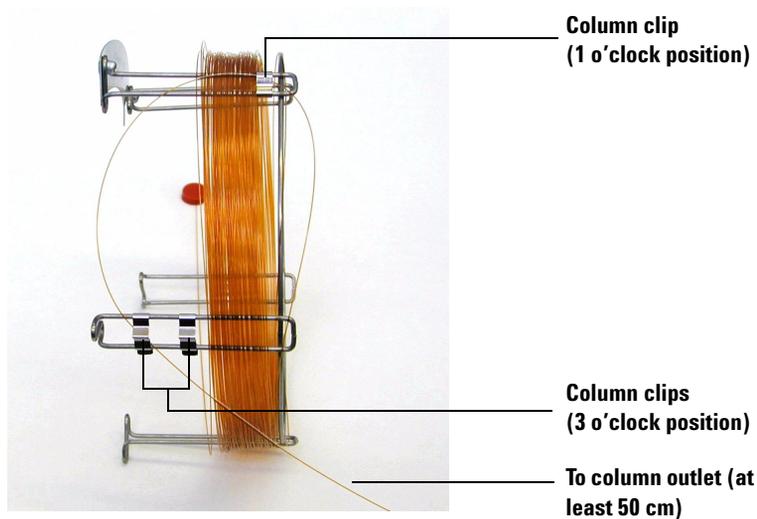


Figure 11 Column fed through 3 o'clock position.

There should be approximately 50 cm of column extending beyond the 3 o'clock positioned clip.

- Carefully rewind the remainder of the column outlet end around the column cage.

Installing the MSD ChemStation Software

Install the MSD ChemStation software as described in its installation manual. Be sure to:

- Assign an IP address to the GC. See the MSD ChemStation installation manual (or G2629A Handheld Controller information system, if available).
- Configure a GC-only instrument so you can complete GC setup.

When connected, be sure to set the GC oven and inlet temperatures to ambient to allow column installation.

Installing the Column into the Split/Splitless Inlet

- 1** Install the column into the split/splitless inlet as described in your 6850 GC documentation. When installed properly, the column should not slide with a gentle tug.
- 2** Use the MSD ChemStation to:
 - Configure the column, including its maximum temperature
 - Set a column flow of 1–2 mL/min
- 3** Verify column flow by placing the outlet end of the column in a beaker of water and checking for bubbles at the column outlet.

Allow five minutes before applying heat to any GC thermal zone. This wait time is to purge trapped air from the column.

- 4** Set the inlet to 300 °C.
- 5** Set the initial oven temperature to 40 °C.

Conditioning the Column

1 Set the following oven temperature program:

- 1 minute initial time
- 8 °C/min ramp rate
- 280 °C final temperature
- 280 °C post-run temperature

This procedure conditions an HP5-MS capillary column. The temperatures of the GC thermal zones (inlet, column oven, and GC/MS interface) must never exceed the upper limit specified for the column.

2 Once the oven temperature exceeds 80 °C, inject 5 µL methanol into GC; repeat two more times at 5-minute intervals.

This will help remove any contamination from the column before it is installed into the MSD.

3 Hold at temperature and purge the column while preparing the MSD.

4 When the MSD is prepared and ready for installation on the bench, set oven temperature to 35 °C.

5 When the oven temperature reaches 35 °C, set the inlet temperature to 25 °C.

6 When the inlet temperature is below 100 °C, turn off the GC.

Preparing the MSD for Installation

Materials needed:

5973N MSD Hardware Manual
Tygon tubing or hose for pump exhaust (11-mm id)
Wrench, 1/4-inch × 5/16-inch open end
5973 Series MSD Shipping Kit

- 1 Unpack the MSD and foreline pump, and place them on the bench near the GC.

WARNING

To prevent injury, get lifting assistance

- 2 Remove the analyzer cover of the MSD. See the 5973N MSD Hardware Manual for more information.
- 3 Equalize the pressure in the MSD by turning the vent valve knob counterclockwise 1/2 turn.

The MSD is not under vacuum. It has been backfilled with clean, dry nitrogen for shipping.

CAUTION

The MSD is shipped with an empty calibration vial. The MSD cannot be tuned without calibration fluid.

- 4 Add PFTBA (05971-60571) to the EI calibration vial at the front of the MSD.

See the 5973N MSD Hardware Manual for more information.

Preparing the Vacuum System

Materials needed:

5973N MSD Hardware Manual
Diagonal cutters
Plastic gloves

- 1 Remove the plugs from the inlet and the outlet of the pump.
- 2 Verify that the available ac power matches the voltage rating of the foreline pump.
- 3 Attach the correct line voltage identification sticker to the MSD back panel.
- 4 Place the oil drip pan under the foreline pump as shown [Figure 12](#) on page 69.
- 5 Remove the cable ties holding the foreline hose.
- 6 Remove the blank flange from the free end of the hose, and connect the hose to the inlet port of the pump.
- 7 If non-toxic and non-flammable carrier gas, solvents, and analytes will be used, install the pump exhaust oil trap on the outlet of the pump. Otherwise, install a hose (11-mm id) to take the foreline pump exhaust outside or to a fume (exhaust) hood.

CAUTION

Remove the red plug from the outlet of the pump before switching on the MSD power. Operation with the plug in place will destroy the pump.

WARNING

The pump exhaust contains carrier gas and traces of solvents, analytes, and pump oil. The supplied trap stops only pump oil. It does not trap or filter out toxic chemicals. If you are using toxic solvents or toxic or flammable carrier gas, or analyzing toxic chemicals, vent the pump exhaust to a fume hood.

- 8 Remove the cap from the diffusion pump (diffusion pump MSDs only.)

CAUTION

Turning on the power to the MSD with the diffusion pump cap installed will result in serious damage to the instrument. See the instructions taped to the MSD.

- 9 Connect the foreline pump power cord to the receptacle on the rear of the MSD.

WARNING

The foreline pump must be plugged into the receptacle provided in the back of the MSD in order to have adequate overcurrent protection. Plugging the pump into a wall outlet will void the warranty on the pump.

- 10 Install the optional 59864B gauge controller. Be sure not to stress the cable or the tube may crack.

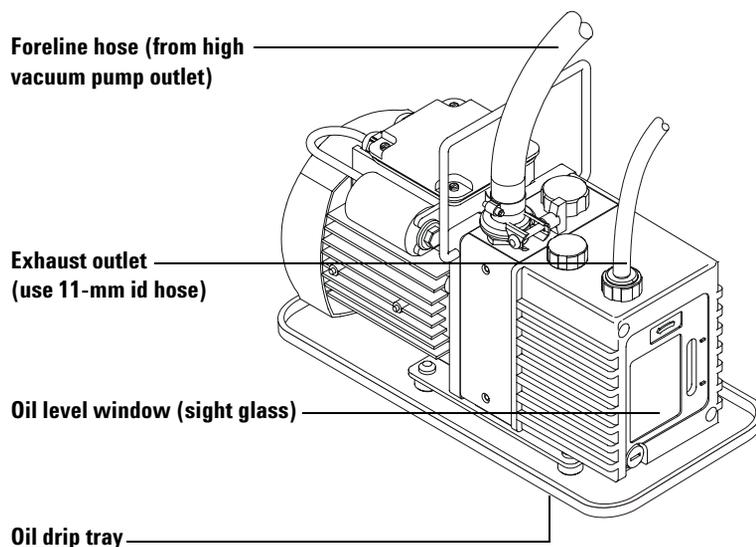


Figure 12 Preparing the vacuum system

WARNING

The gauge controller must be properly grounded. See the manufacturer's manual supplied with the gauge controller.

Connecting the MSD and the GC

- 1 Exit the MSD ChemStation.
- 2 Verify that the GC power is turned off.
- 3 Install the GC/MS interstitial panel (part number G2589-00031) onto the midsupport and front-support legs of the right side of the MSD. Use three M4 T-15 screws.



Figure 13 GC/MS interstitial panel installation.

- 4** Connect the GC and the MSD end of the GC/MS interface cable.

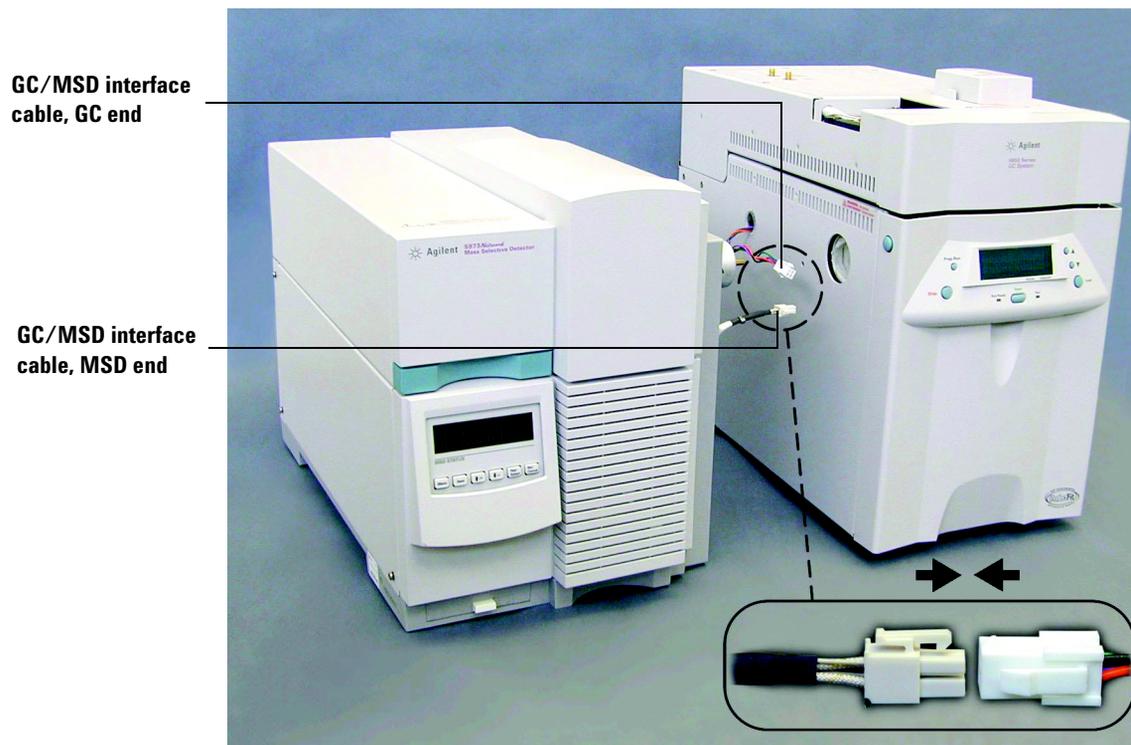


Figure 14 GC and MSD connection.

5 Carefully push the MSD and GC together.

When positioned properly, the end of the GC/MS interface cover will touch the oven wall and the GC/MS interface tip will protrude slightly into the GC oven.

- 6** Connect the cables on the back of the MSD (see [Figure 15](#)).
 - APG start/stop cable between the GC Remote connector and the Remote connector on the MSD
 - LAN cable between the MSD and connector #1 on the network switch
 - Foreline pump power cable

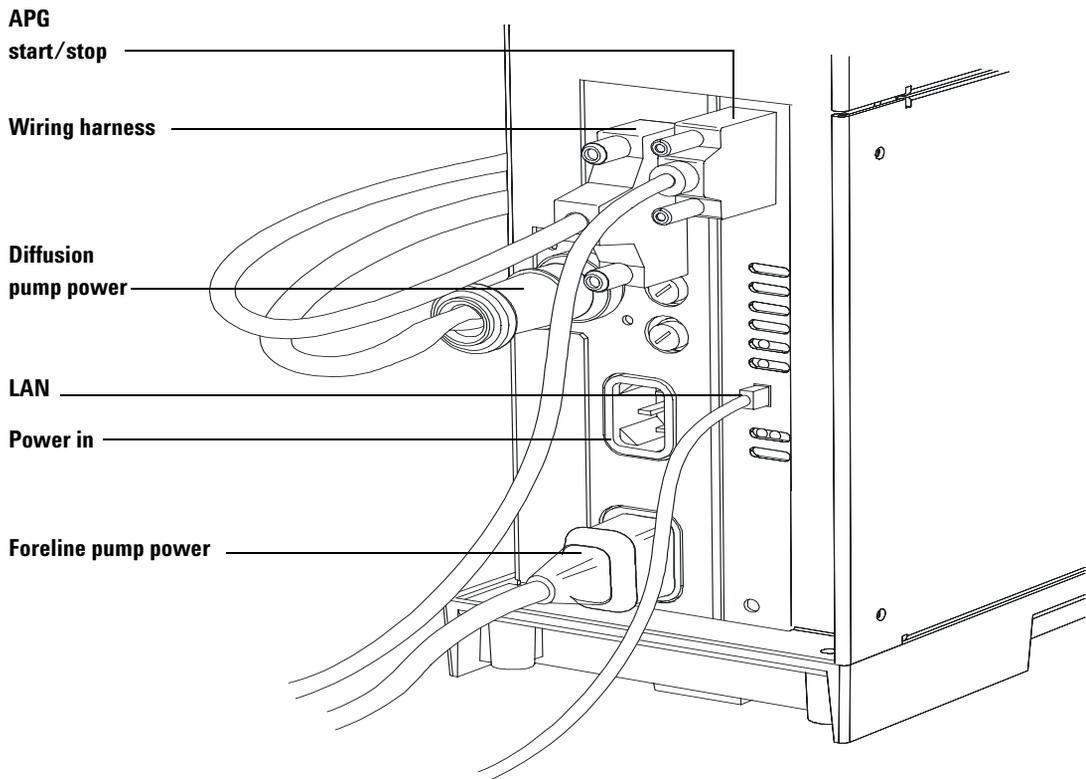


Figure 15 MSD Rear panel view

- 7** Connect the MSD power cord to an appropriate ac outlet.
- 8** Remove the MSD analyzer cover.

- 9 Loosen the sideplate thumbscrews completely, disconnect the source power and side board control cables, and open the analyzer.

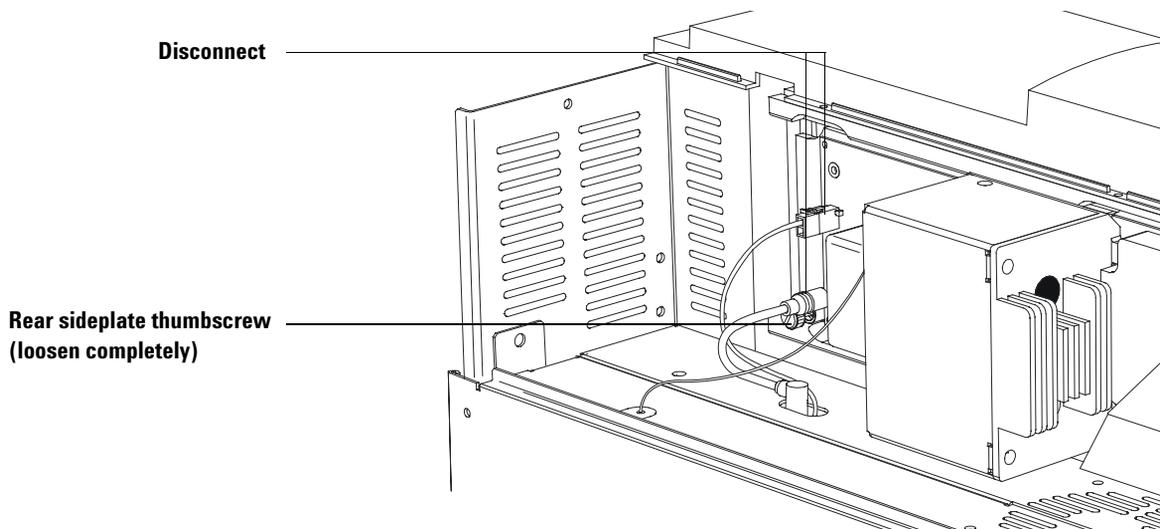


Figure 16 Loosen sideplate thumbscrews

- 10 Remove the interface column nut and blank ferrule from the GC end of the GC/MSD interface.

Configuring a GC/MSD Instrument

Before installing the column, configure the MSD ChemStation for later communications.

- 1 Open the MSD ChemStation configuration editing program.
- 2 Reconfigure **Instrument 1** by adding the MSD to the existing configuration. Input the IP address you reserved for the MSD.
- 3 Save the new configuration.
- 4 Close all MSD ChemStation components.

Installing the Column in the GC/MSD Interface

- 1 Carefully unwind the outlet end of the GC column until the 3 o'clock clip is reached.
- 2 Slide an interface column nut (part number 05988-20066) and ferrule (part number 5062-3508) onto the outlet end of the GC column.

The tapered end of the ferrule must point towards the nut.

- 3 Slide the column into the GC/MSD interface until the column protrudes into the analyzer chamber at least 5 cm.
- 4 Adjust the length of the column from the 3 o'clock clip to the back of the interface column nut to be 22–28 cm. See [Figure 17](#).
- 5 Hand tighten the interface nut.
- 6 Carefully close the oven door while observing to see that the column does not develop sharp bends or touch the oven walls/floor. Try this procedure several times.



Figure 17 Oven door opened and closed.

- 7** Loosen the interface nut and push the column an additional 3–5 cm into the analyzer chamber.
- 8** Make a clean cut of the column so that now only 3–5 cm protrudes into the analyzer chamber.
- 9** Clean the outside of the free end of the column with a lint-free cloth moistened with methanol.
- 10** Adjust the column so that it protrudes 1 to 2 mm into the analyzer chamber past the end of the GC/MS interface, and hand tighten the nut.

Make sure the position of the column does not change as you retighten the nut.

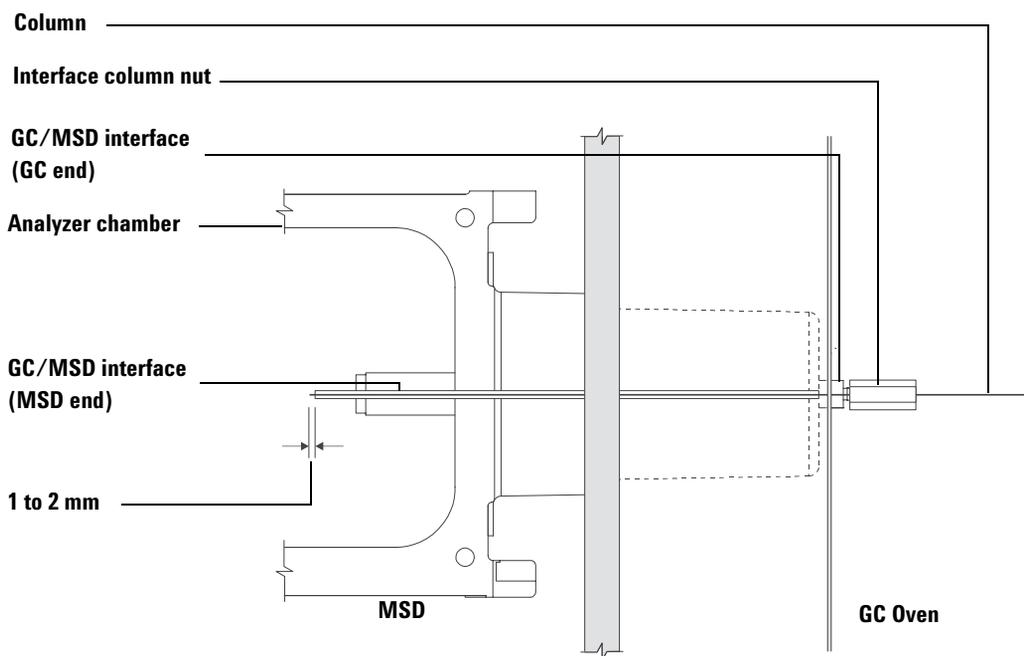


Figure 18 MSD - GC column connection

- 11** Repeat [step 6](#) to assure column integrity.

12 Tighten the interface nut an additional 1/4 to 1/2 turn with a 1/4-inch open-end wrench.

Check the tightness after one or two heat cycles.

13 Turn the GC on.

14 Verify that the inlet temperature is set to 25 °C.

15 Close the analyzer side plate, then reconnect the source power and side board control cables.

16 Turn on the MSD power switch to initiate MSD pump down.

Press on the side plate of the MSD to achieve a good seal.

Verify that the foreline pump and front fan turn on and that the foreline pump stops gurgling within 60 seconds.

17 Reinstall the MSD analyzer cover.

Verifying EI System Performance

Verify performance as described below.

Preparing the MSD

- 1 Open the MSD ChemStation online instrument.
 - Verify no communication errors occur at startup. (If an error message appears, verify that device's IP address was entered correctly at the instrument and in the software.)
 - Proceed through any dialogs which resolve configuration issues. Save the changed default method, DEFAULT.M, as desired.
 - Verify the GC/MSD configuration is correct.

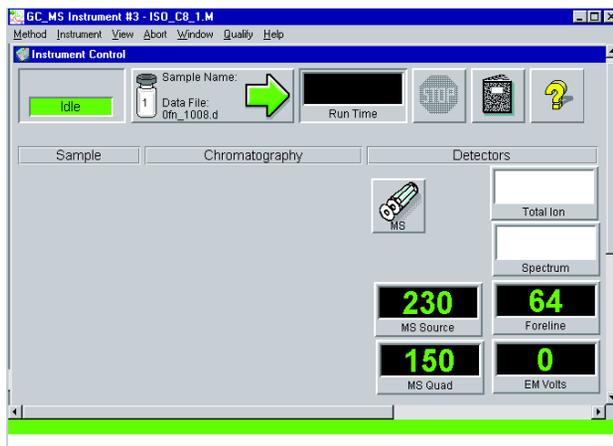


Figure 19 Instrument view

- 2 Set the GC/MS interface temperature to 280 °C using the detector temperature in the MSD ChemStation. (Remember the GC/MS interface connects to the detector wiring harness.)
- 3 Verify the source temperature is set to 230 °C and the quadrupole temperature is set to 150 °C.

Verifying the autotune performance

- 1 Verify that the system has been pumping down for at least 60 minutes.
- 2 In the **Instrument Control** view, select **Checkout Tune** from the **Checkout** menu.

The software will perform an autotune and print out the report.

- 3 When the autotune has completed, select **Evaluation Tune** from the **Checkout** menu.

The software will evaluate the last autotune and print a System Verification - Tune report.

NOTE

The system may fail the water background tests. All other tests should pass.

Verifying the sensitivity performance

- 1 Set up to inject 1 μL of OFN solution (part number 8500-5441), either manually or with the autoinjector.
- 2 If injecting with an autoinjector, load the sample into a sample vial and place the vial in turret position 1.
- 3 In the **Instrument Control** view, select **Sensitivity Check** from the **Checkout** menu.

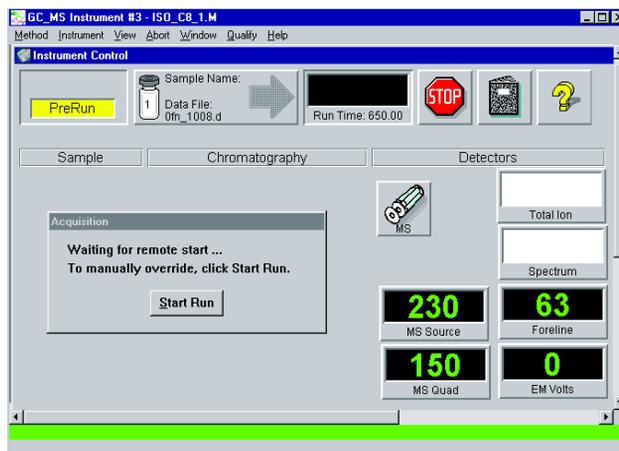
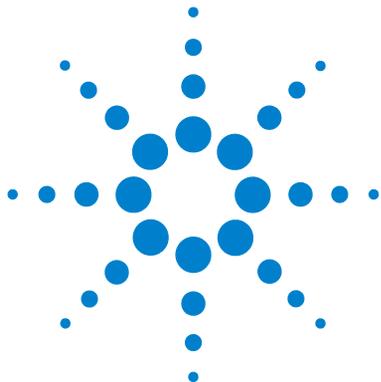


Figure 20 Waiting for remote start... status box.

- 4 Verify that the **Run Time Clock (Instrument View)** is displaying and updating the elapsed time.
- 5 At the end of the analysis, verify that both the GC and MS have finished.

When the method is completed, an evaluation report should be printed out.

- 6 Verify that the RMS signal-to-noise ratio meets the published specification for the G2570A system. Please see the Agilent Web site at www.agilent.com/chem for specifications.



4 Checklists

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This section provides a series of checklists which will help you verify your completion of the installation process. Also included are checklists which will aid you in becoming familiar with the system.



Customer Responsibilities

Not included in installation

- Training on LAN
- Connecting the instrument up to the customer's site LAN (available upon time/material)

Inspect shipped materials

- Shipping containers should not be opened until an authorized Agilent service provider is present.
- Verify the contents of each carton.
- Retain shipping containers and material until installation is complete and performance is verified.
- Check serial numbers and enter them into installation documentation.
- Notify the distribution center of discrepancies (if any).

Before you start

- Be sure that all conditions specified in [Chapter 2](#), "Site Preparation" have been met.

Installing the MSD ChemStation

- Install the computer, monitor, printer, and network switch.
- Connect the LAN cable from the PC to connector #3 on the network switch.
- Turn on the printer, monitor, and PC (in that order).

Installing the GC

Connecting helium line to the GC

- Place the GC on the bench.
- Connect the supply gas, carrier gas trap, and GC with copper tubing.
- Set the carrier gas line pressure to approximately 345 kPa (50 psi).
- Leak-check all connections.
- Connect the Handheld Controller (optional).
- Connect the ALS (optional).
- Connect the LAN cable between the back of the GC and connector #2 on the network switch.
- Connect the power cord to the GC and the appropriate wall socket.
- Verify that the GC passes the self test.

Reconfiguring the column outlet

- Lay out the column on a clean surface.
- Remove the septum cap from the OUTLET side of column; attach the three column clips.
- Feed the outlet side of column through the 1 o'clock-positioned clip.

- Feed the outlet side of column through the 3 o'clock-positioned clips.
- Rewind the remainder of the column outlet end around the column cage.

Installing the MSD ChemStation software

- Assign an IP address to the GC.
- Install MSD ChemStation software as described in its installation manual.
- Configure a GC-only instrument.

Installing the column into the split/splitless inlet

- Install the column provided according to 6850 GC documentation.
- Configure the column parameters and set the flow rate to 1–2 mL/min; verify the column flow.
- Purge the column for 5–10 min with carrier gas before applying oven heat.
- Set the inlet temperature to 300 °C and oven to 40 °C.

Conditioning the column

- Condition the column according to the program on [page 65](#).

MSD Preparation

- ❑ Upper front knockout in the GC exterior oven wall needs to have the installation removed from the cutout.
- ❑ Verify AC power and outlet.
- ❑ Unpack foreline pump and MSD and place on the bench.

Installing the MSD

Preparing the vacuum system

- Remove the plugs from the inlet and the outlet of the pump.
- Verify that the available ac power matches the voltage rating of the foreline pump; attach the correct line voltage ID sticker to the MSD back panel.
- Place the oil drip pan under the foreline pump.
- Remove the cable ties holding the foreline hose.
- Remove the blank flange from the free end of the hose, and connect the hose to the inlet port of the pump.
- Be aware of installation differences if using a non-toxic and non-flammable carrier gas versus a volatile carrier gas.
- Remove diffusion pump cap from the 5973N Diffusion pump unit.
- Connect foreline pump to MSD.
- Connect the foreline pump and AC supply power cords to the MSD.
- Vent pump exhaust to a fume hood or install the oil trap filter.
- Fill the PFTBA calibrant vial with calibrant.
- Equalize MSD pressure.
- Install the Micro Gauge Controller (optional).

Connecting the MSD and GC

- Ensure that the MSD and GC are turned off.
- Install the interstitial panel.
- Connect the GC and MSD end of the GC/MS interface cable, then push together the GC and MSD.
- Connect the cables on the back of the MSD.

- Connect the MSD power cord to an ac outlet.
- Remove the MSD analyzer cover.
- Loosen the rear side plate thumbscrew completely.
- Disconnect the source power and side board cables and open the analyzer.
- Remove the interface column nut and blank ferrule.

Configuring the GC/MSD instrument

- Reconfigure **Instrument 1** by adding the MSD to the existing configuration.
- Save the new configuration.

Installing the column in GC/MSD interface

- Unwind the outlet end of GC column until 3 o'clock clip is reached.
- Slide an interface column nut and ferrule onto the outlet end of the column.
- Slide the column onto the GC interface.
- Adjust length of column and hand tighten the interface nut.
- Verify orientation of column in GC.
- Loosen interface nut and push column further into analyzer chamber.
- Make a clean cut of the column.
- Clean the outside of the free end of the column.
- Adjust the column and hand tighten the interface nut.
- Tighten interface nut an additional 1/4 to 1/2 turn.
- Turn the GC on.
- Verify inlet temperature is set to 25 °C.

Checklists

- Close the analyzer side plate and reconnect the source power and side board control cables.
- Turn on the MSD power switch.
- Reinstall the MSD analyzer cover.

Verifying the EI System

- Prepare the MSD.
- Verify the autotune performance.
- Verify the sensitivity performance.

Technical Support

Agilent offers a wide range of technical support through its Web site. This support includes:

- A library of applications and publications
- Classroom educational courses and on-site training
- E-seminars and other web-based training and educational resources
- An online store for ordering consumables, supplies, and accessories

View the Agilent Web site at:

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

Table 8 G2570A system components

Description	Serial number
6850 GC	
5973N Diffusion Pump MSD	
6850 Handheld Controller (accessory)	
7683 autoinjector (accessory)	
G2880A autosampler (accessory)	
Ion Gauge Controller 59864B (accessory)	

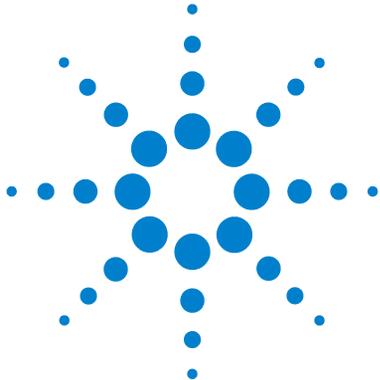
Sales Order Number

Customer Service Order (CSO) Number

Date completed

Customer Signature

Support Provider Signature

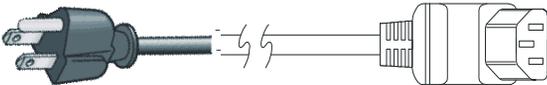
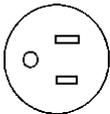


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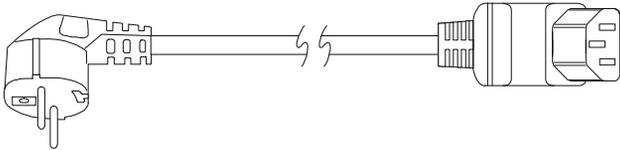
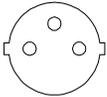
Power Cords

This appendix shows the power cords available for the 5973 Series MSD. See [page 36](#) for information about ensuring that the correct power cord is supplied with your system.

US and Canada, NEMA 6-15P (part number 8120-6825)

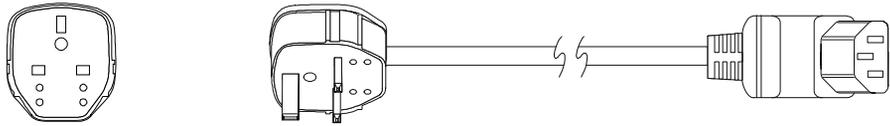


European Power, CEE 7/7 (part number 8120-1689)

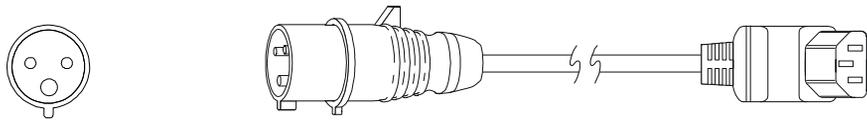


Power Cords

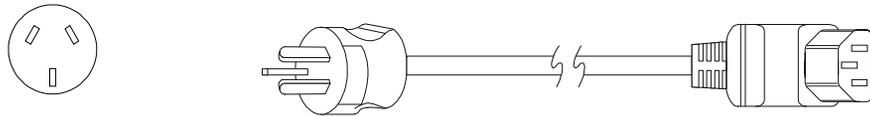
UK / Hong Kong, BS 1363 (part number 8120-1351)



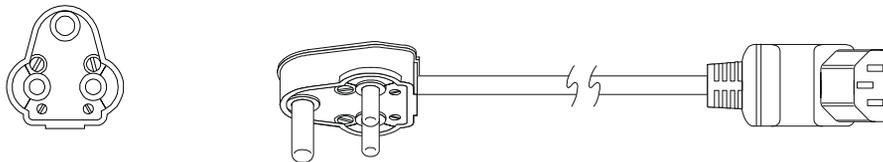
Denmark/Greenland, IEC 309 (part number 8120-3997)



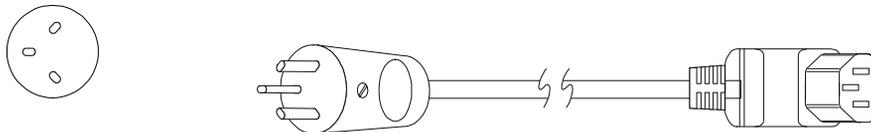
Australia / New Zealand, AS 3112-1981 (part number 8120-1369)



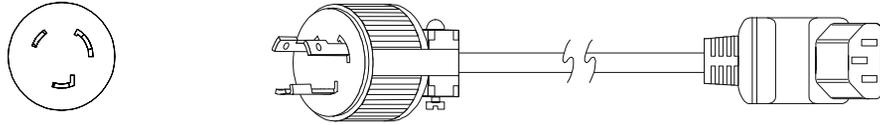
India / South Africa, BS 546 (part number 8120-4211)



Israel, SI 32 (part number 8120-5182)



Japan, NEMA L6-20P (part number G2025-60189)





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