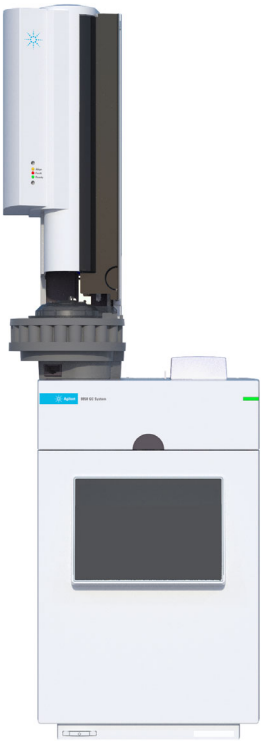
Agilent

Agilent 8850 Gas Chromatograph

Site Preparation Guide



Notices

Manual Part Number

G3940-90010

Edition

First edition, September 2024

Printed in USA

Agilent Technologies, Inc.
2850 Centerville Road
Wilmington, DE 19808-1610 USA

安捷伦科技 （上海）有限公司
上海市浦东新区外高桥保税区
英伦路 412 号
联系电话：（800）820 3278

Warranty

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

Technology Licenses

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

Restricted Rights Legend

U.S. Government Restricted Rights. Software and technical data rights granted to the federal government include only those rights customarily provided to end user customers. Agilent provides this customary commercial license in Software and technical data pursuant to FAR 12.211 (Technical Data) and 12.212 (Computer Software) and, for the Department of Defense, DFARS 252.227-7015 (Technical Data -Commercial Items) and DFARS 227.7202-3 (Rights in Commercial Computer Software or Computer Software Documentation).

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.

Contents

Agilent 8850 GC Site Preparation

This guide outlines the site requirements for GC and automatic liquid sampler (ALS) installation. Site requirements include the necessary space, electrical supplies, gas supplies, operating supplies and consumables required to successfully install the GC and related instruments and systems.

The site must meet the requirements specified in this guide before beginning installation.

Refer to the Agilent Web site at **www.agilent.com** for the most up-to-date listing of GC and ALS supplies and consumables.

Site Preparation Overview

For typical system requirements for system installation, see the diagrams on **page 8**.

- ☐ **1** Ensure that the appropriate installation hardware has been acquired. See **"Installation Kits"** on page 12.
- ☐ **2** Ensure that the location in which the GC system is being installed meets the requirements for environmental conditions. See **"GC Environmental Conditions"** on page 20. Also see **"Heat Dissipation"** on page 20.
- ☐ **3** Prepare bench space for the GC system. Ensure that the bench has the size and weight capacity to accommodate the GC and associated components. See **"Bench Preparation"** on page 7. Also see **"GC Dimensions and Weight"** on page 16.
- ☐ **4** Ensure that system components are oriented so that they can be connected properly. See **"Maximum Length of Cables and Hoses"** on page 9.
- ☐ **5** Ensure that appropriate venting is provided for the GC system. See **"Exhaust Venting"** on page 24.
- ☐ **6** Ensure that a dedicated power circuit is available for each device in the system, as specified. See **"Power Requirements"** on page 28.
- ☐ **7** Ensure that appropriate gas supplies are provided for the GC system. See **"Gas Selection"** on page 34.
- ☐ **8** Ensure that appropriate gas plumbing is provided for the GC system. See **"Gas Plumbing"** on page 39.
- ☐ **9** If the GC system being installed includes a data system, ensure that the PC meets the requirements necessary to properly support the GC system. For more information, see the site prep guide for your data system.
- ☐ **10** If the GC being installed is to be connected to a site LAN, ensure that the appropriate cabling is available. See **"Site LAN"** on page 44.

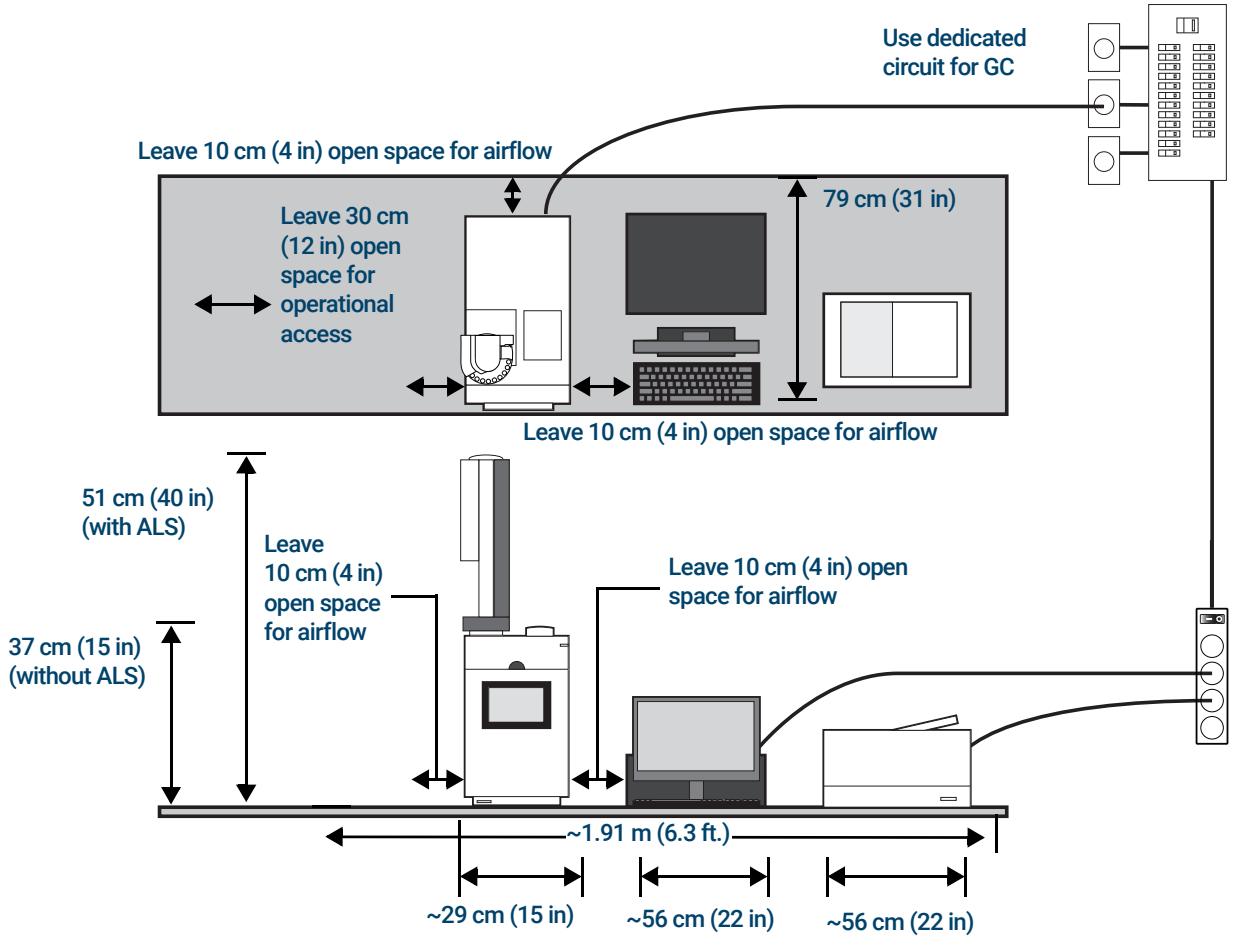
Bench Preparation

When planning a bench layout:

- Consider component dimensions, weights, and space requirements. See **“GC Dimensions and Weight”** on page 16.
- Consider the lengths of cables and hoses for connection of components. See **“Maximum Length of Cables and Hoses”** on page 9.
- Allow space for operational access.
- Note that some repairs to the GC will require access to the back of the instrument(s).

Examples are provided here for systems including a GC with an ALS, computer and printer. See several example layouts below.

Typical GC System - 8850 GC with computer and printer.



Total weight: ~23 kg (51lb)
Maximum power consumption: ~3,950 VA (13,478 btu/hr)

Application	Gas*	Purity	Supply Pressure (psi)†
Carrier	Helium Hydrogen Nitrogen	99.9995 99.9995 99.9995	50 - 80 50 - 80 50 - 80
Detectors			
TCD	Helium	99.9995	50 - 80
FID, TCD	Hydrogen	99.9995	50 - 80
FID, TCD	Nitrogen	99.9995	50 - 80
FID	Air	Zero grade	50 - 80

* Use 1/8-in Swagelok gas connections

† 1 psi = 6.89 kPa

Maximum Length of Cables and Hoses

The distance between system modules may be limited by some of the cabling and the vent or vacuum hoses.

Table 1 Cable and hose lengths

Item	Length
Remote cable	2 m (6.6 ft)
LAN cable	10 m (32.8 ft)
Power cords	2.5 m (8.2 ft)

This page intentionally left blank.

2 GC Installation Kits

This section provides details for available installation hardware.

Refer to the Agilent Web site at **www.agilent.com** for the most up-to-date listing of GC, and ALS supplies and consumables.

Installation Kits

NOTE

Installation kits are not supplied with the GC. Agilent highly recommends the following kits in Table 2.

- Agilent recommends purchasing the installation kit(s) that provides parts useful for GC installation. (**Table 2** lists the appropriate installation kits.)

In addition to these installation kits, fittings and reducers are required to convert gas cylinder regulator fittings (for example, 1/4-inch male NPT) to the 1/8-inch female Swagelok fittings needed to connect gases to the instrument. These fittings are not included with the GC or with the installation kits. See **"Gas Plumbing"** on page 39 for details.

Table 2 Installation kits

Kit	Part number	Contents
Recommended for GCs with FID:		
GC Supply Gas Installation Kit with Gas Purifiers See **Figure 1**.	19199N	Includes Gas Clean Filter system kit CP736530 (with 1 oxygen, 1 moisture, and 2 charcoal filters), 1/8-inch brass nuts and ferrules, copper tubing, 1/8-inch brass tees, tubing cutter, 1/8-inch brass caps, universal external split vent trap with replacement cartridges, and 1/8-inch ball valve.
Recommended for GCs with TCD:		
GC Supply Gas Installation Kit See **Figure 2**.	19199M	Includes 1/8-inch brass nuts and ferrules (20), copper tubing, 1/8-inch brass tees, tubing cutter, 1/8-inch brass caps, 7-mm nut driver, T-10 Torx driver, T-20 Torx driver, 4 open-end wrenches, and 1/8-inch ball valve
Gas Clean carrier gas filter kit, 1/8-inch See **Figure 3**.	CP17974	

Figure 1. GC Supply Gas Installation Kit with Gas Purifiers 19199N

Figure 2. GC Supply Gas Installation Kit 19199M

Figure 3. Gas Clean carrier gas filter kit, 1/8-inch CP17974

This page intentionally left blank.

3 Dimensions and Weights

This section lists the dimensions of the GC and the automatic liquid samplers (ALS).

GC Dimensions and Weight

1 Ensure that you can accommodate the shipping pallets when you take delivery. See **Table 3**.

2 Prepare laboratory bench space before the system arrives. Make sure the prepared area is clean, clear, and level. Pay special attention to the total height requirements. Avoid bench space with overhanging shelves. See **Table 4**.

Table 4 Instrument dimensions, weights, and required clearances

Product	Height	Width	Depth	Weight
GC				
8850 Series GC	50 cm (19.4 in.)	29 cm (11.2 in.)	59 cm (23 in.)	27.4 kg (61 lb)
With optional exhaust deflector			82.5 cm (32.3 in.)	

ALS Dimensions and Weight

Select the laboratory bench space before the system arrives. Pay special attention to the total height requirements. Avoid bench space with overhanging shelves. See **Table 5**.

The instrument needs space for proper convection of heat and ventilation. Allow at least 20 cm clearance between the back of the instrument and wall to dissipate hot air.

Table 5 Required height, width, depth, and weight

Product	Height (cm)	Width (cm)	Depth (cm)	Weight (kg)
G4513A Injector	51	16.5	16.5	3.9
7650A Injector	51	22	24	4.5
Additional space requirements				
• GC with 7693A ALS injector		50 cm (19.5-inch) above the GC		
• GC with 7650 ALS injector		50 cm (19.5-inch) above the GC 9 cm (3.6-inch) in front of the GC 3 cm (1.2-inch) to the left of the GC		

This page intentionally left blank.

4 Environmental Conditions

This section outlines the environmental requirements for use or storage of the GC and automatic liquid sampler (ALS). Heat dissipation information is also provided.

GC Environmental Conditions

Ensure that the instrument will be operated or stored within the recommended environmental ranges. This optimizes instrument performance and lifetime. The specified conditions assume a non-condensing, non-corrosive atmosphere. See **Table 6**.

NOTE

Performance can be affected by sources of heat and cold from heating, air conditioning systems, or drafts.

Table 6 Environmental conditions for operation and storage

Product	Condition	Temperature range	Humidity range	Maximum altitude
8850 GC	Standard oven ramp	15 to 35 °C	5 to 95%	4,615 m
	Storage	–40 to 70 °C	5 to 95%	

Heat Dissipation

- Use **Table 7** to estimate the additional heat dissipated from the equipment. Maximums represent the heat given off when heated zones are ramped at their maximum rates to their maximum temperatures.

Table 7 Heat dissipation

Instrument	Oven type	Heat Dissipation
8850 GC	Standard (100V, 120V)	3,800 BTU/hour maximum
8850 GC	Fast (120V, 200V - 240V)	4,800 BTU/hour maximum

ALS Environmental Conditions

Operating the instrument within the recommended ranges optimizes instrument performance and lifetime. The sampler system operates in the same environment as its parent GC. See **"GC Environmental Conditions"** on page 20.

The conditions assume a non-condensing, noncorrosive atmosphere.

Table 8 Environmental conditions for operation and storage

Product	Conditions	Operating temp range	Operating humidity range	Maximum altitude
G4513A Injector	Operation	0 to 40 °C	5–95%	4,300 m
7650 Injector	Operation	0 to 40 °C	5–95%	4,300 m

This page intentionally left blank.

5 Exhaust Venting

This section outlines the exhaust venting requirements for GC and automatic liquid sampler (ALS) installation.

Exhaust Venting

During normal operation, the GC exhausts hot oven air. Depending on the installed inlet and detector types, the GC can also exhaust (or vent) uncombusted carrier gas and sample. Proper venting of these exhausts is required for operation and safety.

Venting hot air

WARNING

Do not place temperature-sensitive items (for example, gas cylinders, chemicals, regulators, and plastic tubing) in the path of the heated exhaust. These items will be damaged and plastic tubing will melt. Be careful when working behind the instrument during cool-down cycles to avoid burns from the hot exhaust.

1 Hot air (up to 350 °C) from the oven exhaust, power supply exhaust and chassis exhaust exit through various vents in the rear of the instrument. See **Figure 4**.

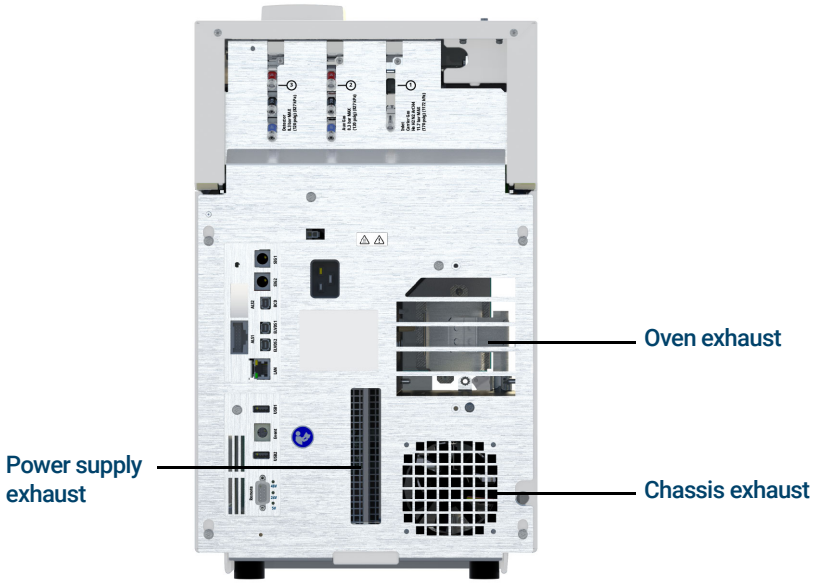


Figure 4. Exhaust outlets

2 For most applications, an optional oven exhaust deflector is available. The exhaust deflector requires 23.5 cm (9.25 inches) behind the GC.

Venting other gases

During normal operation of the GC, depending on the detector and inlet configuration, some of the carrier gas and sample vents outside the instrument through the split vent, septum purge vent, and detector exhaust. If any sample components are toxic, noxious, otherwise

hazardous, or if hydrogen is used, the exhaust must be vented to a fume hood. If the GC is in an enclosed small space then a fume hood should be used regardless of the GC gases connected.

Place the GC in the hood or attach a large diameter venting tube to the outlet for proper ventilation.

NOTE

Exhaust venting must comply with all local environmental and safety codes. Contact your Environmental Health & Safety (EHS) specialist.

1 Place the GC in the hood or attach a large diameter venting tube to the relevant outlet for proper ventilation. See **"Exhaust vent fittings"** on page 25.

2 To further prevent contamination from noxious gases, attach a chemical trap to the vent(s). Order part number RDT-1020, Universal/external split vent trap. This trap comes with 3 cartridges and uses 1/8-inch Swagelok fittings. for replacement cartridges, see the Agilent catalog for consumables and supplies, or visit the Agilent website at www.agilent.com.

Exhaust vent fittings

The various inlet and detector vents terminate in the following fittings:

- TCD: The detector exhaust terminates in a 1/8-inch od tube.
- SSL: The split vent terminates in a 1/8-inch Swagelok female fitting.
- All inlets: The septum purge vent terminates in 1/8-inch od tubing.

This page intentionally left blank.

6 GC System Power Requirements

This section details the power requirements for GC and automatic liquid sampler (ALS) installation.

Power Requirements

Power consumption and requirements depend on the country to which the unit ships.

The number and type of electrical outlets depend on the size and complexity of the system.

WARNING

To protect users, the metal instrument panels and cabinet are grounded through the three-conductor power line cord in accordance with International Electrotechnical Commission (IEC) requirements.

A proper earth ground is required for GC operations. Any interruption of the grounding conductor or disconnection of the power cord could cause a shock that could result in personal injury.

Be sure to verify proper receptacle grounding.

WARNING

Do not use extension cords with Agilent instruments. Extension cords normally are not rated to carry enough power and can be a safety hazard.

The length of the power cord is 2.5 meters (8.2 feet).

CAUTION

Use of power line conditioners is not recommended for Agilent GC and GC-MS systems. Doing so may cause damage to the equipment. If a UPS is required due to poor power quality or as backup power, please request UPS selection guidance from Agilent.

1. Ensure that each instrument in your GC system can be connected to a dedicated circuit with an isolated ground. (Note that ALS instruments receive their power from the GC.)
2. Power requirements are printed near the power cord attachment on the rear panel of each instrument. Although your GC should arrive ready for operation in your country, compare its power requirements with those listed in **Table 10**. If the voltage option you ordered is not suitable for your installation, contact Agilent Technologies.

Table 10 Power requirements

Product	Oven type	Line voltage (VAC)	Frequency (Hz)	Power Rating (VA)	Current rating (amps)	Power outlet current rating
8850 GC	Standard	100 (−10% / +10%)	50/60 ± 5%	1500	15	15 Amp Dedicated
8850 GC	Standard	120 (−10% / +10%)	50/60 ± 5%	1700	14.1	15 Amp Dedicated
8850 GC	Fast	120 (−10% / +10%)	50/60 ± 5%	2180	18.2	20 Amp Dedicated
8850 GC	Fast	200 (−10% / +10%)	50/60 ± 5%	2420	12.1	15 Amp Dedicated

Table 10 Power requirements (continued)

Product	Oven type	Line voltage (VAC)	Frequency (Hz)	Power Rating (VA)	Current rating (amps)	Power outlet current rating
8850 GC	Fast	220 (–10% / +10%)	50/60 ± 5%	2800	12.7	15 Amp Dedicated
8850 GC	Fast	230 (–10% / +10%)	50/60 ± 5%	3010	13.1	15 Amp Dedicated
8850 GC	Fast	240 (–10% / +10%)	50/60 ± 5%	3220	13.4	15 Amp Dedicated
All						
Data system PC (monitor, CPU, printer)		100/120 (–10% / +5%)	50/60 ± 5%	1000	10/8.3	15 Amp Dedicated
Data system PC (monitor, CPU, printer)		200/240 (–10% / +5%)	50/60 ± 5%	1000	4.1-5	10 Amp Dedicated

NOTE

The GC and related equipment meet the following International Electrotechnical Commission (IEC) classifications: Equipment Class I, Laboratory Equipment, Installation Category II, and Pollution Degree 2.

North America fast heating oven (Canada, Mexico, United States)

The GC has a fast heating oven option available.

The power cord supplied with your GC is rated for 250 V15 A and is a two-pole, three wire cord with grounding, type L6-15R/L6-15P. (Part number 8121-0075).

Canadian installation

When installing a GC in Canada, make sure your GC power supply circuit meets the following additional requirements:

- The circuit breaker for the branch circuit, which is dedicated to the instrument, is rated for continuous operation.
- The service box branch circuit is marked as a “Dedicated Circuit.”

Common instrument power cord plugs

Table 11 shows common Agilent power cord plugs.

Table 11 Power cord terminations

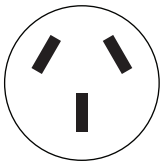
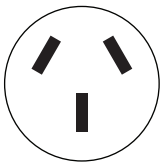
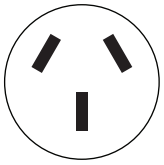
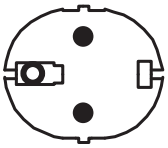
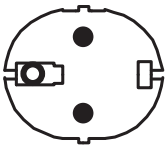
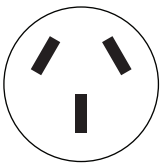
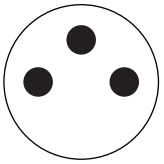
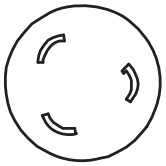
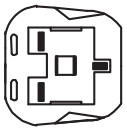
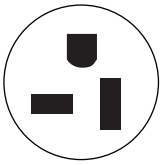
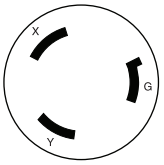
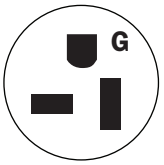
Part number	Country	Voltage	Amps	Cable length (m)	GC connector type	Termination type	Plug
8121-0675	Argentina	240	16	4.5	C19	AS 3112	
8120-8619	Australia	240	16	2.5	C19	AS 3112	
8121-1787	Brazil	240	16	2.5	C19	IEC 60906-1	
8121-0070	China	220	16	2.5	C19	GB 1002	
8120-8622	Denmark, Switzerland	230	16	2.5	C19	Swiss/Denmark 1302	
8120-8621	Europe	220 / 230 / 240	16	2.5	C19	CEE/7/V11	
8121-1222	Korea	220 / 230 / 240	16	2.5	C19	CEE/7/V11	
8121-0710	India, South Africa	240	15	2.5	C19	AS 3112	

Table 11 Power cord terminations

Part number	Country	Voltage	Amps	Cable length (m)	GC connector type	Termination type	Plug
8120-0161	Israel	230	16, 16 AWG	2.5	C19	Israeli SI32	
8120-6903	Japan	200	20	4.5	C19	NEMA L6-20P	
8120-8620	United Kingdom, Hong Kong, Singapore, Malaysia	240	13	2.5	C19	BS1363/A	
8120-6894	United States	120	20	2.5	C19	NEMA 5-20P	
8121-0075	United States	240	15	2.5	C19	NEMA L6-15P	
8120-6360	Taiwan, South America	120	20	2.5	C19	NEMA 5-20P	
8121-1301	Thailand	220	15	1.8	C19		

ALS Power Requirements

The ALS components draw power from the GC. No other power source is required.

7 Gas Selection and Plumbing

This section outlines the requirements for gas selection and plumbing.

Refer to the Agilent Web site at **www.agilent.com** for the most up-to-date listing of GC, and ALS supplies and consumables.

Gas Selection

Table 12 lists gases usable with Agilent GCs and capillary columns. When used with capillary columns, GC detectors require a separate makeup gas for optimum sensitivity.

WARNING

When using hydrogen (H_2) as the carrier gas or fuel gas, be aware that hydrogen gas can flow into the GC and create an explosion hazard. Therefore, be sure that the supply is turned off until all connections are made and ensure 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, periodically leak test all connections, lines, and valves before operating the instrument or after maintenance. Always turn off the hydrogen supply at its source before working on the instrument.

Table 12 Gases usable with Agilent GCs and capillary columns

Detector type	Carrier	Preferred makeup	Alternate choice	Detector, anode purge, or reference
Flame ionization (FID)	Hydrogen Helium Nitrogen Argon Argon/Methane (5%)	Nitrogen Nitrogen Nitrogen Nitrogen	Helium Helium Helium	Hydrogen and air for detector
Thermal conductivity (TCD)	Hydrogen Helium Nitrogen	The TCD must use the carrier gas for makeup and reference	The TCD must use the carrier gas for makeup and reference	The TCD must use the carrier gas for makeup and reference

Table 13 lists gas recommendations for packed column use. In general, makeup gases are not required with packed columns.

Table 13 Gases usable with Agilent GCs and packed columns

Detector type	Carrier gas	Comments	Detector, anode purge, or reference
Flame ionization (FID)	Nitrogen	Maximum sensitivity	Hydrogen and air for detector.
	Helium	Acceptable alternative	
Thermal conductivity (TCD)	Helium	General use	Reference must be same as carrier and makeup.
	Hydrogen	Maximum sensitivity*	
	Nitrogen	Hydrogen detection†	
	Argon	Maximum hydrogen sensitivity*	

* Slightly greater sensitivity than helium. Incompatible with some compounds.

† For analysis of hydrogen or helium. Greatly reduces sensitivity for other compounds.

For installation checkout, Agilent requires the gas types shown in **Table 14**.

Table 14 Gases and reagents required for checkout

Detector	Gases required
FID	Carrier: helium Makeup: nitrogen Fuel: hydrogen Aux gas: Air
TCD	Carrier and reference: helium

Hydrogen Carrier Gas

Refer to the Agilent 8850 GC *Safety Manual* for important safety information about hydrogen gas.

If hydrogen is being used as a carrier gas, special considerations apply due to hydrogen's flammability and chromatographic properties.

- Agilent highly recommends the G6693A Leak Detector to safely check for leaks.
- Hydrogen carrier gas requires special considerations for supply tubing. See **"Gas Plumbing"** on page 39.
- In addition to the supply pressure requirements listed in **"Gas Supplies"** on page 36, Agilent also recommends users of hydrogen gas consider gas source and purification needs.
- When using hydrogen carrier gas with a TCD, or any other detector that vents uncombusted gases, plan to vent the detector output to a fume hood or similar location. Uncombusted hydrogen can present a safety hazard. See **"Exhaust Venting"** on page 24.
- When using hydrogen carrier gas, also plan to safely vent inlet split vent flows and purge vent flows. See **"Exhaust Venting"** on page 24.
- The optional Hydrogen Sensor Accessory, Option 324, checks for free hydrogen that may come from flow path leaks. It monitors free hydrogen levels in the GC column oven and triggers a shutdown of all hydrogen gas flows well before there is a risk.

Gas Purity

Agilent recommends that carrier and detector gases be 99.9995% pure. See **Table 15**. Air needs to be zero grade or better. Agilent also recommends using high quality traps to remove hydrocarbons, water, and oxygen.

Table 15 Carrier, collision and gas purity

Carrier, collision and reagent gas requirements	Purity	Notes
Helium (carrier and collision)	99.9995%	Hydrocarbon free
Hydrogen (carrier) (carrier and self-cleaning ion source)	99.9995%	SFC grade
Nitrogen (carrier)	99.9995%	

Gas Supplies

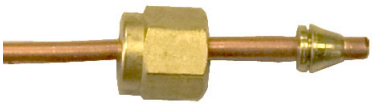
General requirements

Supply instrument gases using tanks, an internal distribution system, or gas generators. If used, tanks require two-stage pressure regulators with packless, stainless steel diaphragms. The instrument requires 1/8-inch Swagelok connections to its gas supply fittings.
See **Figure 5**.

NOTE

Plumb the gas supply tubing/regulators so that one 1/8-inch Swagelok female connector is available for each gas needed at the instrument.

Swagelok nut and ferrules



Female Swagelok fittings on GC

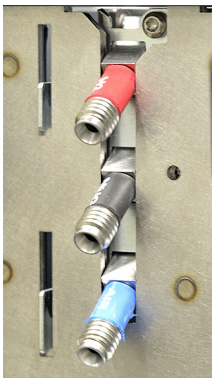


Figure 5. Example Swagelok connector and hardware

Table 16 lists available Agilent two-stage tank regulators. All Agilent regulators are supplied with the 1/8-inch Swagelok female connector.

Table 16 Tank regulators

Gas type	CGA number	Max pressure	Part number
Air (Medical Grade)	346	125 psig (8.6 Bar)	5183-4641
Air (Zero Grade, for GC applications)	590	125 psig (8.6 Bar)	5183-4645
Hydrogen, Argon/Methane	350	125 psig (8.6 Bar)	5183-4642
Oxygen	540	125 psig (8.6 Bar)	5183-4643
Helium, Argon, Nitrogen	580	125 psig (8.6 Bar)	5183-4644

Table 17 and **Table 18** list minimum and maximum delivery pressures for inlets and detectors, measured at the bulkhead fittings on the back of the instrument.

Table 17 Delivery pressures for inlets required at the GC, in kPa (psig)

	Inlet type			
	Split/Splitless 150 psi	Split/Splitless 100 psi	On-column	Purged packed
Carrier (max)	1,172 (170) *	827 (120)	827 (120)	827 (120)
Carrier (min)	(20 psi) above maximum pressure used in method. (If using constant flow control in the inlet, the maximum column pressure occurs at the final oven temperature.)			

* Japan only: 1013 (147)

Table 18 Maximum delivery pressures for detectors, at the GC, in kPa (psig)

	Detector type	
	FID	TCD
Hydrogen	240–690 (35–100)	
Air	380–690 (55–100)	
Makeup	380–690 (55–100)	380–690 (55–100)
Reference		380–690 (55–100)

The minimum supply pressure for Auxiliary EPC and PCM modules is 138 kPa (20 psi) greater than the pressure used in your method. For example, if you need a pressure of 138 kPa (20 psi) for the method, the supply pressure must be at least 276 kPa (40 psi). **Table 19** lists the maximum carrier pressure for Auxiliary EPC and PCM modules.

Table 19 Delivery pressures for Auxiliary EPC and PCM modules, in kPa (psig)

	Aux EPC	PCM 1	PCM 2 or PCM Aux
Carrier (max)	827 (120)	827 (120)	827 (120) with Forward pressure control 345 (50) with Backpressure control

Requirements for hydrogen as a carrier gas

Not all systems can use hydrogen as a carrier gas. See **Gas Selection**.

Hydrogen can be supplied from a generator or from a cylinder.

Agilent recommends use of a high-quality hydrogen gas generator. A high-quality generator can consistently produce purity > 99.9999%, and the generator can include built-in safety features such as limited storage, limited flow rates, and auto-shutdown. Select a hydrogen generator that provides low (good) specifications for water and oxygen content.

If using a hydrogen gas cylinder, Agilent recommends use of Gas Clean Filters to purify the gas. Consider additional safety equipment as recommended by your company safety personnel.

Performance verification

Performance verification requires the following:

- Helium carrier gas.

Gas Plumbing

WARNING

All compressed gas cylinders should be securely fastened to an immovable structure or permanent wall. Compressed gases should be stored and handled in accordance with the relevant safety codes.

Gas cylinders should not be located in the path of heated oven exhaust.

To avoid possible eye injury, wear eye protection when using compressed gas.

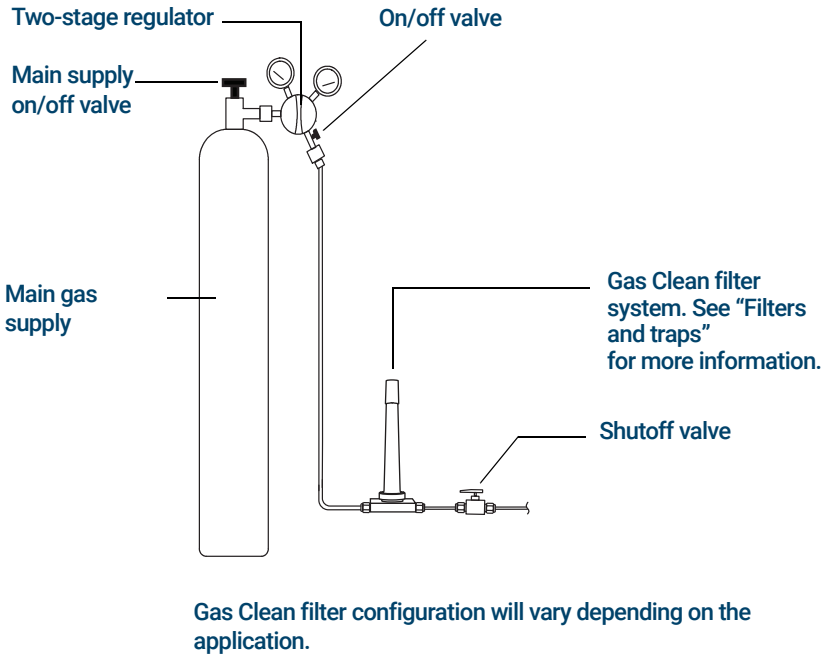


Figure 6. Recommended filters and plumbing configuration from a carrier gas cylinder

- If you have not requested option 305 (pre-plumbed tubing), you must supply pre-cleaned, 1/8-inch copper tubing and a variety of 1/8-inch Swagelok fittings to connect the GC to inlet and detector gas supplies. See the **Installation Kits** for recommended parts.
- Agilent strongly recommends two-stage regulators to eliminate pressure surges. High-quality, stainless-steel diaphragm-type regulators are especially recommended.
- On/off valves mounted on the outlet fitting of the two-stage regulator are not essential but are very useful. Be sure the valves have stainless-steel, packless diaphragms.
- Agilent strongly recommends installation of shut-off valves at each GC inlet supply fitting to allow the GC to be isolated for maintenance and troubleshooting. Order part number 0100-2144. (Note that some optional installation kits include one shut-off valve. See **"Installation Kits"** on page 12 for more information.)
- If you purchased automated valving, the valve actuation requires a **separate** pressurized, dry air supply at 380 kPa (55 psig). This air supply must end in a male fitting compatible with a 1/4-inch id plastic tube at the GC.

- FID detectors require a dedicated air supply. Operation may be affected by pressure pulses in air lines shared with other devices.
- Flow- and pressure-controlling devices require at least 10 psi (69 kPa) pressure differential across them to operate properly. Set source pressures and capacities high enough to ensure this.
- Situate auxiliary pressure regulators close to the GC inlet fittings. This ensures that the supply pressure is measured at the instrument (rather than at the source); pressure at the source may be different if the gas supply lines are long or narrow.
- **Never use liquid thread sealer to connect fittings.**
- **Never use chlorinated solvents to clean tubing or fittings.**

See **"Installation Kits"** on page 12 for more information.

Supply tubing for most carrier and detector gases

Use only preconditioned copper tubing (part number 5180-4196) to supply gases to the instrument. Do not use ordinary copper tubing—it contains oils and contaminants.

CAUTION

Do not use plastic tubing for suppling detector and inlet gases to the GC. It is permeable to oxygen and other contaminants that can damage columns and detectors.

Plastic tubing can melt if near hot exhaust or components.

The tubing diameter depends on the distance between the supply gas and the GC and the total flow rate for the particular gas. Tubing of 1/8-in diameter is adequate when the supply line is less than 15 feet (4.6 m) long.

Use larger diameter tubing (1/4-inch) for distances greater then 15 feet (4.6 m) or when multiple instruments are connected to the same source. Use larger diameter tubing if high demand is anticipated (for example, air for an FID).

Be generous when cutting tubing for local supply lines—a coil of flexible tubing between the supply and the instrument lets you move the GC without moving the gas supply. Take this extra length into account when choosing the tubing diameter.

Supply tubing for hydrogen gas

Agilent recommends using new chromatographic quality stainless steel tubing and fittings when using hydrogen.

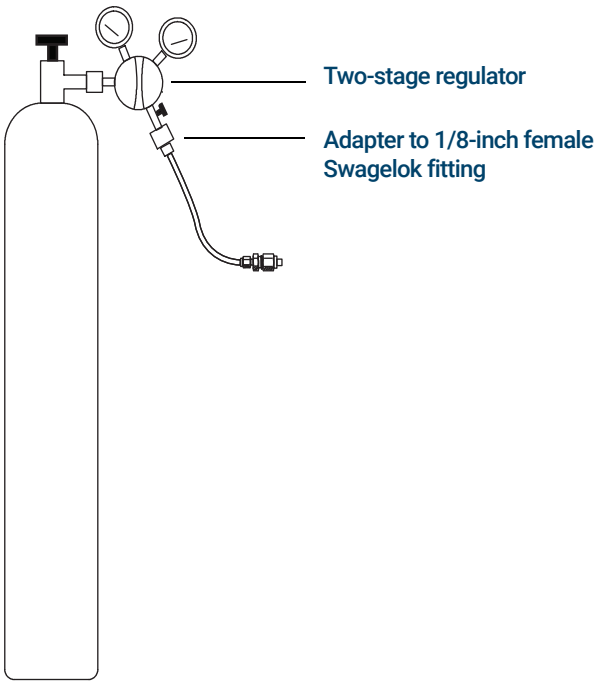
- Do not re-use old tubing when installing or switching to hydrogen supply lines for carrier gas. Hydrogen gas tends to remove contaminants left on old tubing by previous gases (by helium, for example). These contaminants can appear in output as high background noise or hydrocarbon contamination for several weeks.

WARNING

Do not use old copper tubing with hydrogen gas. Old copper tubing can become brittle and create a safety hazard.

Two-stage pressure regulators

To eliminate pressure surges, use a two-stage regulator with each gas tank. Stainless steel, diaphragm-type regulators are recommended.



The type of regulator you use depends on the gas type and supplier. The Agilent catalog for consumables and supplies contains information to help you identify the correct regulator, as determined by the Compressed Gas Association (CGA). Agilent Technologies offers pressure-regulator kits that contain all the materials needed to install regulators properly.

Pressure regulator-gas supply tubing connections

Use PTFE tape to seal the pipe-thread connection between the pressure regulator outlet and the fitting to which you connect the gas tubing. Instrument grade PTFE tape (part number 0460-1266), from which volatiles have been removed, is recommended for all fittings. **Do not use pipe dope to seal the threads**; it contains volatile materials that will contaminate the tubing.

Pressure regulators typically end in fittings that must be adapted to the correct style or size. **Table 20** lists parts needed to adapt a standard 1/4-inch male NPT fitting to a 1/8-inch or 1/4-inch Swagelok fitting.

Table 20 Parts for adapting NPT fittings

Description	Part number
Swagelok 1/8-inch to female 1/4-inch NPT, brass	0100-0118
Swagelok 1/4-inch to female 1/4-inch NPT, brass	0100-0119
Reducing union, 1/4-inch to 1/8-inch, brass, 2/pk	5180-4131

Filters and traps

Using chromatographic-grade gases ensures that the gas in your system is pure. However, for optimum sensitivity, install high-quality filters or traps to remove traces of water or other contaminants. After installing a filter, check the gas supply lines for leaks.

Agilent recommends the Gas Clean Filter system. The Gas Clean Filter system delivers high purity gases to your analytical instruments, reducing the risk of column damage, sensitivity loss, and instrument downtime. The filters are designed for use with the GC, GC/MS, ICP-OES, ICP-MS, LC/MS, and any other analysis instrument using carrier gas. Six filters are available, including CO2, oxygen, moisture, and organics trap (charcoal).

Filter types

Each Gas Clean Filter type is designed to filter out a specific impurity that may exist in the gas supply. The following filter types are available:

- **Oxygen** - Prevents oxidation of the GC column, septum, liner, and glass wool.
- **Moisture** - Delivers fast stabilization times for increased GC productivity, and prevents hydrolization damage to the stationary phase, column, liner, glass wool, or septum in the GC.
- **Process Moisture** - Prevents oxidation of GC components and is safe to use with acetylene in process GC applications.
- **Charcoal** - Removes organic compounds and ensures correct performance of FID detectors in the GC.

Table 21 lists the most common Gas Clean Filter system kits. See the Agilent online store or contact your local Agilent sales representative for additional filters, parts, and accessories applicable to your instrument configuration.

Table 21 Recommended Gas Clean Filter kits

Description	Part number	Use
Gas Clean Filter kit (connecting unit for one filter, including one carrier gas filter, 1/8-inch connections, a smart sensor, and mounting bracket for the GC)	CP179880	Carrier gas only
Gas Clean Filter kit (connecting unit for four filters, including four filters, 1/4-inch connections)	CP7995	FID
Gas Clean Filter kit (connecting unit for four filters, including four filters, 1/8-inch connections)	CP736530	FID
TCD filter kit (with oxygen and moisture filters)	CP738408	TCD

Each separate gas supply requires its own filters.

See also **“Installation Kits”** on page 12.

A Network Requirements

This section outlines the site LAN requirements for GC and automatic liquid sampler (ALS) installation.

Site LAN

NOTE

Agilent Technologies is not responsible for connecting to or establishing communication with your site LAN. The Agilent representative will test the system's ability to communicate on a mini-hub or LAN switch only.

If you intend to connect your system to your site's LAN, you must have an additional shielded twisted pair network cable (8121-0940).

NOTE

The IP addresses assigned to the instrument(s) must be fixed (permanently assigned) addresses. If you intend to connect your system to your site's network, each piece of equipment must have a unique, fixed (static) IP address assigned to it.

This page intentionally left blank.

www.agilent.com

First edition, September 2024

G3940-90010

Agilent