

Agilent 990

User Manual



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.

Contents

1 Introduction

Safety Information	6
Safety symbols	6
Safety and regulatory information	7
General safety precautions	7
Shipping Instructions	9
Cleaning Instructions	9
Disposal Instructions	9

2 Installation and Use

Unpacking	12
Specifications	13
Installation	14
Tools required for Micro Gasifier installation	14
Operation	21
Troubleshooting	22

Introduction

Safety Information	6
Shipping Instructions	9
Cleaning Instructions	9
Disposal Instructions	9

To prevent any injury to the user or any damage to the instrument, it is essential that you read the information in this chapter and the user manual(s).

If this manual is not in your native language, or if you have problems understanding the text, contact your Agilent office for assistance. Agilent cannot accept responsibility for any damage or injury caused by misunderstanding of the information in this manual.

Safety Information

Safety 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 potential explosion hazard.



Indicates electrostatic discharge hazard.



Indicates a hazard.
See the Agilent 990 Micro GC user documentation for the item labeled.



Indicates that you must not discard this electrical/electronic product in domestic household waste



Safety and regulatory information

This instrument and its accompanying documentation comply with the CE specifications and the safety requirements for electrical equipment for measurement, control, and laboratory use (CEI/IEC 1010-1)CCSAUS and FCC-b.

This device has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

This instrument is designed for use in combination with the Micro GC. If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

NOTE

This instrument has been tested per applicable requirements of EMC Directive as required to carry the European Union CE Mark. As such, this equipment may be susceptible to radiation/interference levels or frequencies, which are not within the tested limits.

General safety precautions

WARNING

This instrument is designed for chromatographic analysis of appropriately prepared samples. It must be operated using appropriate gases or solvents, and within specified maximum ranges for pressure, flows, and temperatures as described in this manual. If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

WARNING

It is the responsibility of the customer to inform Agilent customer support representatives if the instrument has been used for the analysis of hazardous samples, prior to any instrument service being performed or when an instrument is being returned for repair.

To ensure safe equipment operation, adhere to the following safety practices:

- Perform periodic leak checks on all supply lines and pneumatic plumbing.
- Do not allow gas lines to become kinked or punctured. Place lines away from foot traffic and extreme heat or cold.
- Store organic solvents in fireproof, vented, and clearly labeled cabinets so they are easily identified as either toxic, or flammable, or both types of materials.
- Do not accumulate waste solvents. Dispose of such materials through a regulated disposal program and not through municipal sewage lines.
- To avoid exposure to potentially dangerous voltages, disconnect the instrument from all power sources before removing protective panels.
- When it is necessary to use a nonoriginal, power cord plug, ensure the replacement cord adheres to the color-coding and polarity described in the manual and all local building safety codes.
- Replace faulty or frayed power cords immediately with the same type and rating.

1 Introduction

General safety precautions

- The Power Supply should be placed in a suitable location with sufficient ventilation to remove gases and vapors. Space around the Power Supply must be sufficient to enable cooling of the Power Supply.
- Do not turn on the Power Supply if there is a possibility of any electrical damage. Instead, disconnect the power cord, and contact your Agilent office.
- The supplied power cord must be inserted into a power outlet with a protective earth ground connection. When using an extension cord, ensure that the cord is also properly grounded.
- Do not change the external or internal grounding connections as this could endanger you or damage the Power Supply.
- The Power Supply is properly grounded when shipped. You do not need to make any changes to the electrical connections or to the Power Supply chassis to ensure safe operation.
- Do not place containers with flammable liquids on this Power Supply. Spillage of the liquid over hot parts may cause fire.
- Never try to repair or replace any component that is not described in this manual without the assistance of an Agilent service engineer. Unauthorized repairs or modifications will result in rejection of warranty claims.
- Always disconnect the AC power cord before attempting any type of maintenance.
- Use proper tools when working on the Power Supply to prevent danger for you or damage to the Power Supply.
- The customer should not attempt to replace the fuses in the Power Supply.
- Damage can result if the Power Supply is stored under unfavorable conditions for prolonged periods (for example, subject to heat, water, and so forth).
- This unit has been designed and tested in accordance with recognized safety standards and is designed for use indoors.
- If the Power Supply is used in a manner not specified by the manufacturer, the protection provided by the Power Supply may be impaired.
- Substituting parts or performing any unauthorized modification to the Power Supply may result in a safety hazard.

Shipping Instructions

Follow these steps to prepare your Micro Gasifier for shipping:

- 1 Let the Micro Gasifier cool down for at least 30 minutes before packing.
- 2 Cap every inlet and outlet port.
- 3 Cap all inlet and outlet tubing.
- 4 Always include the power supply with the Micro Gasifier.

Cleaning Instructions

To keep the Micro Gasifier surface clean, refer to the remarks given below:

- Switch the Micro GC off.
- Remove the power cable from the mains.
- Remove the Micro Gasifier power cable.
- Use a soft (no hard or abrasive) brush to carefully brush away all dust and dirt.
- If the outer case is dirty, (never clean the inside) clean it with a soft, clean cloth dampened with mild detergent.
- Never use alcohol or thinners to clean the Micro Gasifier. These chemicals can damage the case.
- Do not get water on the electronics components.
- Do not use compressed air to clean.

Disposal Instructions

Disposal of the Micro Gasifier must be carried out in accordance with all (environmental) regulations applicable in your country.

1 Introduction

Disposal Instructions

Unpacking	12
Specifications	13
Installation	14
Operation	21
Troubleshooting	22

The Micro Gasifier is a helping hand to the Agilent Micro GC, to allow sampling of pressurized gases as well as liquefied gases (LPG). It is a necessary device for these samples, since the Micro GC only accepts gaseous samples having a maximum pressure of 100 kPa.

The Micro Gasifier is designed to enable controlled evaporation of liquefied gases as a means of sample pretreatment before the gas chromatographic analysis. The Micro Gasifier ensures linear evaporation of the LPG sample in the specified range.

The Micro Gasifier contains a vaporizing pressure regulator capable of handling inlet pressures up to 1,000 Psi. The outlet pressure and the vaporizing regulator temperature are factory set to 10 Psi (to protect the Micro GC from too high inlet pressures) and 100 °C respectively.

The Micro Gasifier's specifications have been described in detail in the various Micro GC related data-sheets.

This Micro Gasifier must only be used in combination with the 990 Micro GC.

NOTE

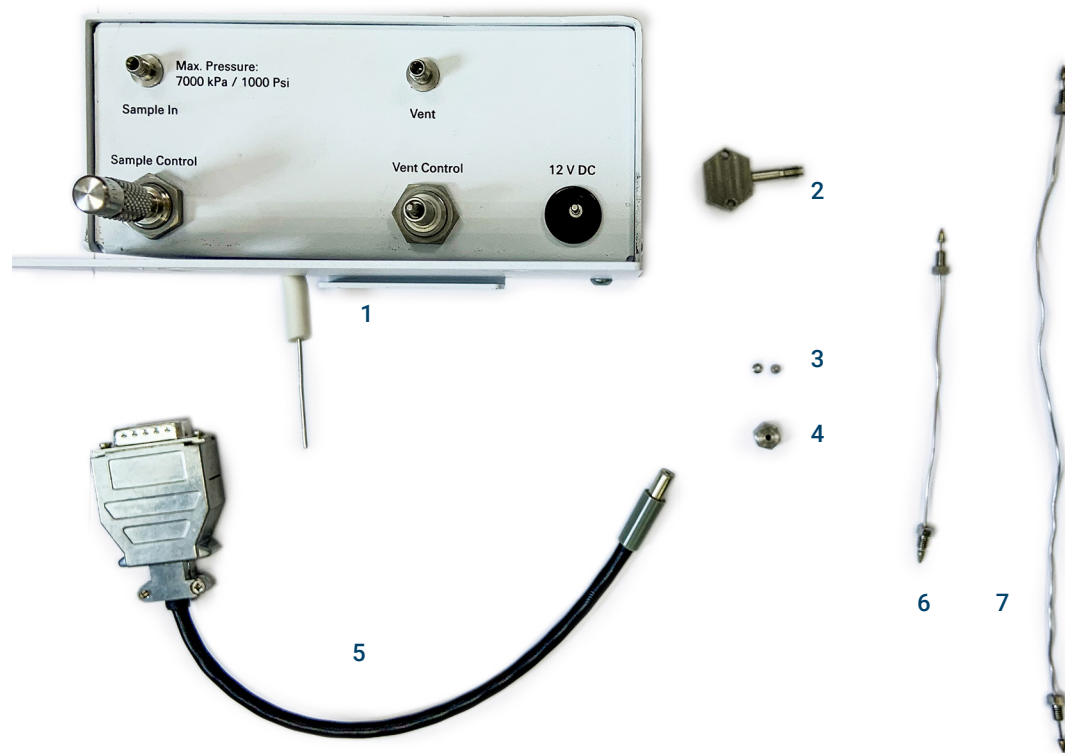
It is advised to configure injectors to heat the sample gas in order to prevent condensation.

Unpacking

Check the packing list to see if you have received all that you require.

Table 1 Packing list

No.	Part number	Description	Quantity
1	G3588-60860	Accessory option 1 Gasifier	1 EA
2	G3588-60682	Inlet Assembly UM	1 EA
3	0100-1490	1/16 in Ferrule set SST	1 PK
4	0100-0053	Stainless nut 1/16 in	1 EA
5	CP741107	Cable Gasifier power supply 490 Micro GC	1 EA
6	G3588-60590	Sample line assembly with nut short	1 EA
7	G3588-60591	Sample line assembly with nut long	1 EA



Specifications

Table 2 Specifications

Feature	Specifications
General	Heated pressure-reducing regulator.
Operation temperature	100 °C ± 5 °C
Sample input pressure	1,000 Psi / 7,000 kPa maximum
Delivery pressure to Micro GC	7.5 Psi ± 2.5 Psi
Repeatability	1 %
Concentration range	50 ppm to 100 %
Sample carry-over	< 1 % (as measured for hexane)

Installation

For optimal operation, the Micro Gasifier must be located as close as possible to the sample inlet at the back of the instrument using a sample line connection configured to be heated.

Tools required for Micro Gasifier installation

- Torx T-10 screwdriver
- Torx T-20 screwdriver
- 5/16 inch wrench
- 3/16 inch wrench
- Adjustable wrench

CAUTION

The Micro GC must be configured for constant flow operation. For more details see the Micro GC user manual.

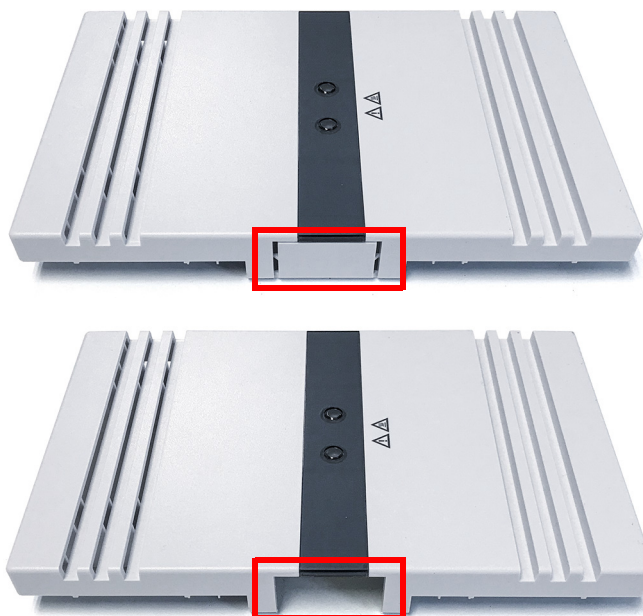
- 1 Remove the Torx T-10 screw at the top of the front cover, and gently pull forward from the top edge to remove the cover.



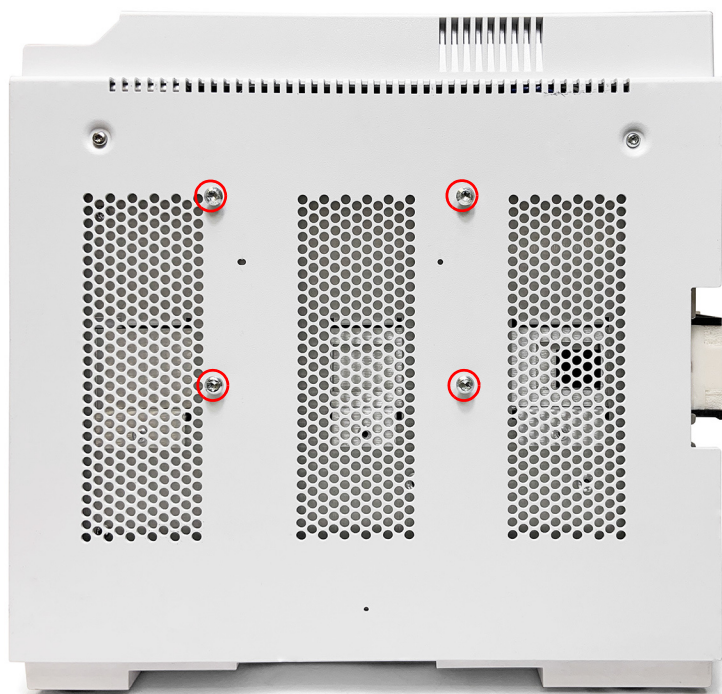
2 Installation and Use

Tools required for Micro Gasifier installation

- 2 Remove the breakaway tab on the **left** side of the front cover to accommodate the sample line connection. Using an adjustable wrench, grip the breakaway tab in the middle and torque until the tab breaks free.



- 3 Attach four Torx T-20 screws to the left side of the GC leaving them loose enough that the accessory bracket can be installed.



2 Installation and Use

Tools required for Micro Gasifier installation

- 4 Slide the accessory bracket onto the Micro GC. Tighten the four Torx T-20 screws to secure the accessory bracket.



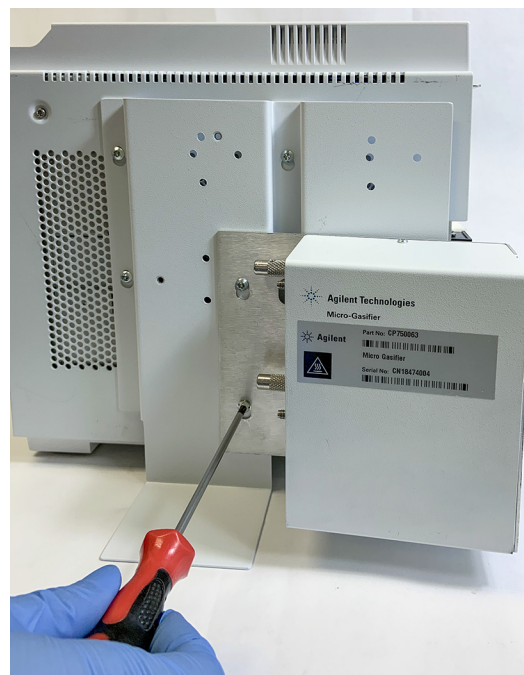
- 5 Attach two Torx T-20 screws onto the bracket leaving them loose enough that the gasifier rack can be installed.



2 Installation and Use

Tools required for Micro Gasifier installation

- 6 Mount the gasifier rack onto the accessory bracket. Tighten the two Torx T-20 screws.



- 7 Remove the two Torx T-10 screws to uninstall the original sample inlet manifold on the cabinet. The sample line nuts may need to be removed beforehand. See the Sample Line Replacement on Page 90 in the Agilent 990 Micro GC User Manual (p/n G3588-90010).



2 Installation and Use

Tools required for Micro Gasifier installation

- 8 Connect the new sample inlet manifold to the gasifier by a 1/16 in nut and ferrule using a 5/16 in wrench.



- 9 Use a 3/16 in wrench to screw the sample line nuts to the inlet manifold. Install the inlet manifold onto the channel by tightening the two Torx T-10 screws. Use a 3/16 in wrench to screw the sample line nuts to the front of the channel.



2 Installation and Use

Tools required for Micro Gasifier installation

- 10 Install the front cover by tightening the Torx T-10 screw on the top.



- 11 Connect the power supply using the included special cable.



- 12 The LPG or high-pressure sample is connected to the SAMPLE-IN socket using a 1/16 in Swagelok connector. All other connections should be made using 1/16 in (pretreated) stainless steel (CP4008) tubing.
- 13 To safely guide hazardous fumes to a fume hood or other appropriate vent, it is possible to connect a long vent line to the VENT outlet.

- 14** The Micro GC must be configured for constant flow operation. For more details, see the 990 Micro GC User Manual
- 15** The Micro Gasifier is equipped with two needle valves, one to control the vent flow, and one to control the sample flow to the Micro GC. The vent control needle valve allows flushing of the regulator under increased flow conditions. The various flows can be measured using a flow meter.

Operation

- 1 After all the connections are made, allow 15 minutes stabilization of the temperature.
- 2 Connect the sample bomb to the Micro Gasifier. In case of a LPG, ensure that the liquid phase is flowing towards the Micro Gasifier.
- 3 Open the sample bomb, and check for leaks.
- 4 Open the VENT needle valve, and allow to flush for one minute, then check the sample vent flow at the VENT-OUTLET.
- 5 Open the SAMPLE needle valve, and adjust a flow through the Micro GC of 10 mL/min.
- 6 Close the VENT needle valve to a flow of 10 mL/min minimum.
- 7 Start the Micro GC run or sequence.

Monitoring the various flows by means of a soap bubble meter, or equivalent, will help setting the optimal conditions.

In case of a high-pressure gas, the same procedure applies.

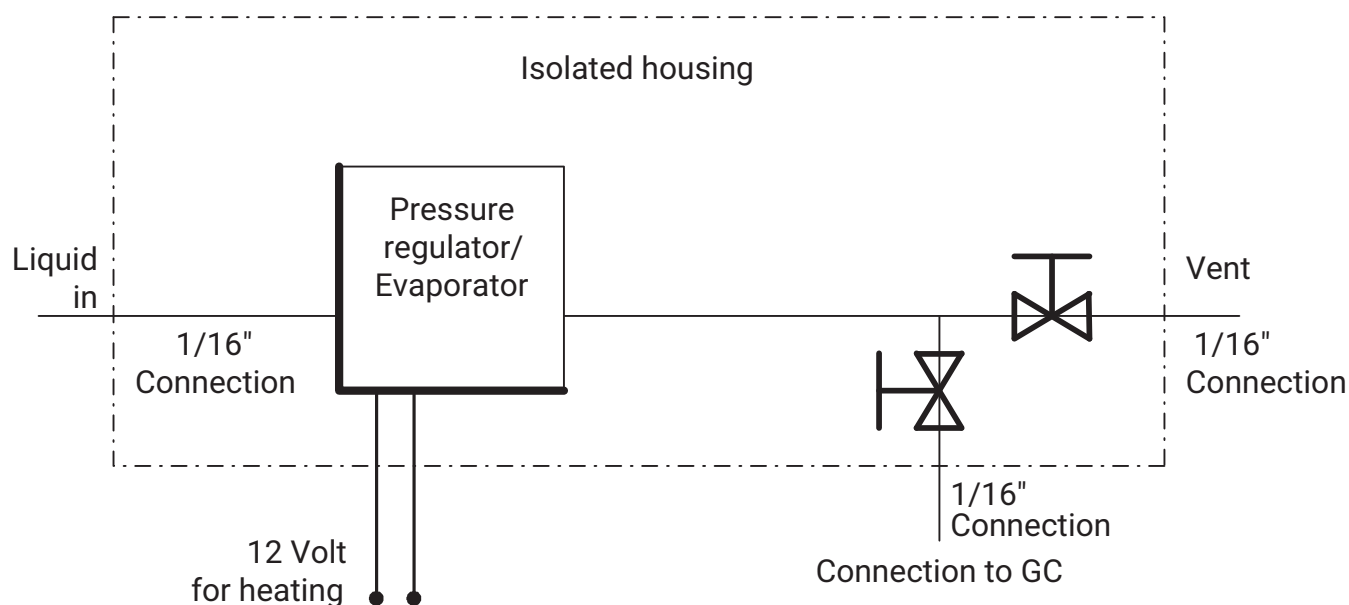


Figure 1. Product diagram

Troubleshooting

If the analysis results show insufficient repeatability, be aware of the following:

- If the pressure in the sample bomb is too low, or if the bottle is not properly filled, proper transfer from the sample bottle to the Micro Gasifier is not possible. Increase the pressure in the sample bottle by pressurizing it using an inert gas at high pressure (required pressure depends on the partial pressure of the sample constituents).
- The integrity of the LPG sample is best warranted using a moving piston cylinder.
- A partially filled sample bomb will lead to discrimination due to evaporation inside the bottle. As a rough guideline, the bomb must be filled with 80% liquid.
- Position the sample bomb or cylinder to ensure the liquid phase leaves the cylinder or bomb.
- The pressure and flow conditions during calibration and actual measurements must be identical. An LPG calibration sample needs to be topped with an inert gas at high (50 bars) pressure. Alternatively, a more expensive solution is the use of a moving piston cylinder.
- Correct the adjustment of the needle valves.
- Check that the cylinder or sample bomb is filled with liquid-gas.

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