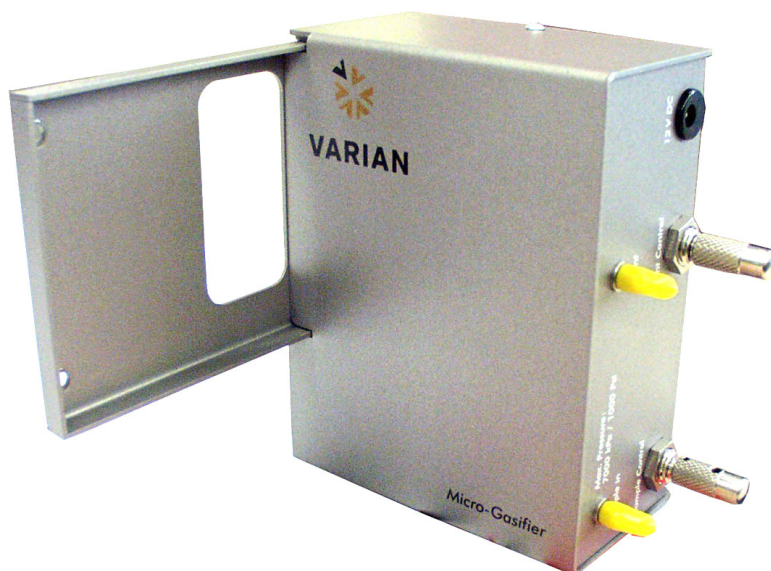


NOTICE: This document contains references to Varian. Please note that Varian, Inc. is now part of Agilent Technologies. For more information, go to www.agilent.com/chem.



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Micro-GC Micro-Gasifier



User Manual

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Varian Analytical Instrument Warranty

Hardware Products

All analytical instruments sold by Varian are warranted to be free from defects in material and workmanship for the periods specified and in accordance with the terms on the face of Varian's quotation or as otherwise agreed upon in writing between Varian and the Customer. The warranty period begins on the date of **shipment** from Varian to the original Customer. However, where installation is paid for by the Customer or included in the purchase price, the warranty period begins upon completion of installation. If the Customer schedules installation to start later than 30 days after delivery or if such delay is caused through the Customer's inability to provide adequate facilities or utilities or through failure to comply with Varian's reasonable pre-installation instructions or through other omissions by Customer, then the warranty period starts on the 31st day from date of shipment. Moreover Varian will charge the Customer for labor and other expenses involved in making multiple or follow-up installation service calls.

Software Products

Where software is provided within the frame of a license agreement concluded between the Customer and Varian, any warranty shall be strictly in accordance with the terms of such agreement.

In the absence of a license agreement and unless an alternate warranty period is agreed upon in writing between Varian and the Customer, the warranty period is as specified on the face of Varian's quotation. Varian warrants such software products, if used with and properly installed on Varian hardware or other hardware as specified by Varian to perform as described in the accompanying Operator's Manual and to be substantially free of those defects which cause failure to execute respective programming instructions; however, Varian does not warrant uninterrupted or error-free operation.

Remedies

The sole and exclusive remedy under hardware warranty shall be **repair** of instrument malfunctions which in Varian's opinion are due or traceable to defects in original materials or workmanship or, at Varian's option, **replacement** of the respective defective parts, provided that Varian may as an alternative elect to **refund** an equitable portion of the purchase price of the instrument or accessory.

Repair or replacement under warranty does not extend the original warranty period.

Repair or replacement under warranty claims shall be made in Varian's sole discretion either by sending a Customer Support Representative to the site or by authorizing the Customer to return the defective accessory or instrument to Varian or to send it to a designated service facility. The Customer shall be responsible for loss or damage in transit and shall prepay shipping cost. Varian will return the accessory or instrument to the Customer prepaid and insured. Claims for loss or damage in transit shall be filed by the Customer. To correct software operation anomalies, Varian will issue software revisions where such revisions exist and where, in Varian's opinion, this is the most efficient remedy.

Limitation of Warranty

This **warranty does not cover** software supplied by the Customer, equipment and software warranted by another manufacturer or replacement of expendable items and those of limited life, such as but not limited to: Filters, glassware, instrument status lamps, source lamps, septa, columns, fuses, chart paper and ink, nebulizers, flow cells, pistons, seals, fittings, valves, burners, sample tubes, probe inserts, print heads, glass lined tubing, pipe and tube fittings, variable temperature dewars, transfer lines, flexible discs, magnetic tape cassettes, electron multipliers, filaments, vacuum gaskets, seats and all parts exposed to samples and mobile phases.

This **warranty shall be void** in the event of accident, abuse, alteration, misuse, neglect, breakage, improper operation or maintenance, unauthorized or improper modifications or tampering, use in an unsuitable physical environment, use with a marginal Power Supply or use with other inadequate facilities or utilities. Reasonable care must be used to avoid hazards.

This warranty is expressly in lieu of and excludes all other express or implied warranties, including but not limited to warranties of merchantability and of fitness for particular purpose, use or application, and all other obligations or liabilities on the part of Varian, unless such other warranties, obligations or liabilities are expressly agreed to in writing by Varian.

Limitation of Remedies and Liability

The remedies provided herein are the sole and exclusive remedies of the Customer. In no case will Varian be liable for incidental or consequential damages, loss of use, loss of production or any other loss incurred.

Spare Parts Availability

It is the policy of Varian to provide operational spare parts for any instrument and major accessory for a period of seven (7) years after shipment of the final production run of that instrument. Spare parts will be available after this seven (7) year period but on an *as available* basis. Operational spare parts are defined as those individual electrical or mechanical parts that are susceptible to failure during their normal operation. Examples include relays, lamps, temperature probes, detector elements, motors, etc. Sheet metal parts, structural members or assemblies and castings, printed circuit boards, and functional modules are normally capable of being rebuilt to like-new condition throughout their useful life and therefore will be supplied only on an *as available* basis after the final production run of the instrument.

Service Availability

Varian provides a variety of services to support its customers after warranty expiration. Repair service can be provided by attractively priced service contracts or on a time and material basis. Technical support and training can be provided by qualified personnel on both a contractual or as-needed basis.

Varian Analytical Instruments Sales Offices

For Sales or Service assistance and to order Parts and Supplies, contact your local Varian office.

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Canada

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VARIAN

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Safety Information

Information

In accordance with Varian's commitment to customer service and safety, this instrument and its accompanying documentation complies with the Safety, UL1950, CSA C22.2, IEC950 and EN60950. EMC standards, CISPR22-B, EN 55022-B, FCC-B. Documentation (NEN 5509) and CE.

To prevent any injury to the user or any damage to the instrument it is essential that you read the information in this chapter.

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

Operating Instructions

This instruction manual is provided to help you establish operating conditions, which will permit safe and efficient use of your equipment.

Special considerations and precautions are also described in the manual, which appear in the form of **NOTES**, **CAUTIONS**, and **WARNINGS** as described below (next page).

It is important that you operate your equipment in accordance with this instruction manual and any additional information, which may be provided by Varian, any questions regarding the safe and proper use of your equipment to your local Varian office.



NOTE

Information to aid you in obtaining optimal performance from your instrument.



CAUTION

Alerts you to situations that may cause moderate injury and/or equipment damage, and how to avoid these situations.



CAUTION

Alerts you to potentially hazardous situations that could result in serious injury, and how to avoid these situations.

Warning Symbol



WARNING:
Shock hazard

Warning Description

Indicates dangerous voltage: (terminals fed from the interior by voltage exceeding 1000V must be so marked).



WARNING:
Burn hazard

Indicates parts that may cause burns when touched



Instruction Manual

Indicates that the user should refer to the manual before operating the equipment.



Protective Conductor terminal

For protection against electrical shock in case of a fault. Used with field wiring terminals to indicate the terminal, which must be connected to ground before operating equipment.



Radioactive hazard

Indicates that the instrument contains radioactive components, which may cause personal injury when handled incorrectly.



Skin puncture

Indicates sharp or suddenly moving parts such as injection needles that may cause injury.



Static discharge Warning

Indicates instrument contains parts that can be damaged by electrostatic discharge. Take care for proper grounding before handling.



Do not touch

Touching this item may result in damage to the instrument or personal injury.

General Safety Precautions

NOTICE: 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.



CAUTION

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.



CAUTION

It is the responsibility of the Customer to inform Varian Customer Support Representatives if this Micro-Gasifier has been used in combination with the Micro-GC for the analysis of hazardous biological, radioactive, or toxic samples, prior to any instrument service being performed or when an instrument is being returned to the Service Center for repair.

Cautions

1. Disconnect the instrument from all power sources before removing protective panels to avoid exposure to potentially dangerous voltages.
2. When it is necessary to use a non-original power cord plug, make sure the replacement cord adheres to the color-coding and polarity described in the manual and all local building safety codes.
3. Replace faulty or frayed power cords immediately with the same type and rating.
4. This 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.
5. Do not turn on the Power Supply if there is a possibility of any kind of electrical damage. Instead, disconnect the power cord and contact your Varian office.
6. The supplied power cord must be inserted into a power outlet with a protective earth ground connection. When using an extension cord, make sure that the cord is also properly grounded.
7. Do not change the external or internal grounding connections as this could endanger you and/or damage the Power Supply.
8. 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.

9. Do not place containers with flammable liquids on this Power Supply. Spillage of the liquid over hot parts may cause fire.
10. Never try to repair or replace any component that is not described in this manual without the assistance of a Varian service engineer. Unauthorized repairs or modifications will result in rejection of warranty claims.
11. Always disconnect the AC power cord before attempting any type of maintenance.
12. Use proper tools when working on the Power Supply to prevent danger for you and/or damage to the Power Supply.
13. The customer should not attempt to replace the fuses in this Power Supply.
14. Damage can result if the Power Supply is stored under unfavorable conditions for prolonged periods (e.g., subject to heat, water, etc.).
15. This unit has been designed and tested in accordance with recognized safety standards and designed for use indoors.
16. If the Power Supply is used in a manner not specified by the manufacturer, the protection provided by the Power Supply may be impaired.
17. Substituting parts or performing any unauthorized modification to the Power Supply may result in a safety hazard.

INTRODUCTION AND INITIAL OPERATION



Introduction

Congratulations and thank you for purchasing the Varian, Inc. Micro-Gasifier used in combination with the Micro-GC.

The Micro-Gasifier is a helping hand to allow sampling of pressurized gases as well as liquefied gases (LPG) to the Varian Micro-GC. 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 pre-treatment before the gas chromatographic analysis. The 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 1000 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 Micro-GC model.



NOTE

For problems or questions about your Micro-Gasifier, please contact your nearest Varian, Inc. subsidiary or Varian, Inc. representative.



NOTE

It is advised to use analytical modules equipped with heated injector to prevent condensation of the sample.

Unpacking

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

Packing list

Micro-Gasifier

Item	Part number
Swagelok® 1/16" ferrule pack	CP4417
Swagelok® Nut 1/16"SS	CP4401
Screw Torx M4x12 mm	CP740223 x2
Power supply 100-240V 12.9V	CP740000
Cable Micro-Gasifier to power supply	CP739851
Mains cable with plug 220 Vac	CP72103
Mains cable with plug 110 Vac	CP177128
Mains cable with plug 240 Vac	CP71735
CD-Rom User manuals 490-GC Micro-GC	CP505532490

MICRO-GASIFIER SPECIFICATIONS

<i>Feature</i>	<i>Specifications</i>
General	Heated pressure-reducing regulator.
Operation temperature	100 °C ± 5 °C
Sample input pressure	1000 Psi / 7000 kPa maximum
Delivery pressure to Micro-GC	7.5 Psi ± 2.5 Psi
Repeatability	1 % rsd
Concentration range	50 ppm to 100 %
Sample carry-over	< 1 % rsd (as measured for hexane)

Varian, Inc is not responsible for printing errors and reserves the right to change specifications, designs and prices without notice and liability.

INSTALLATION

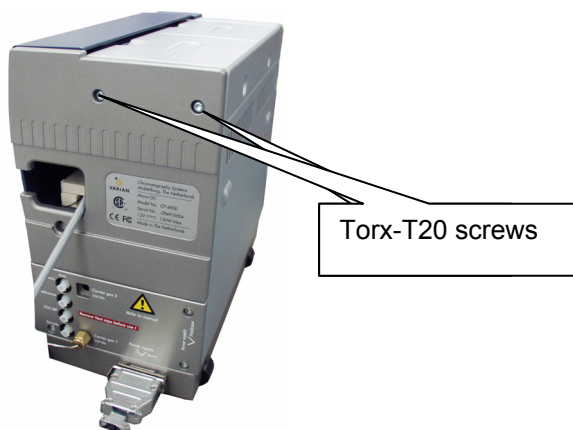
For optimal operation, the Micro-Gasifier must be located as close as possible to the sample inlet at the back of the instrument using the heated sample line connection.



CAUTION

The Micro-GC **must** be configured for constant flow operation. More details see Micro-GC user manual “user settings tab”.

1. Remove the two (2) Torx-T20 screws at the back of the Micro-GC.



2. Mount the Micro-Gasifier at the back of the Micro-GC using the two (2) included screws. Taking care of the following notes:
 - Lead the isolated tubing coming from the Gasifier with some care through the hole at the rear into the heated sample line housing.
 - Arrange the isolation to be as close to the connecting nut as possible.



3. The LPG or high-pressure sample is connected to the SAMPLE-IN socket using a 1/16" Swagelok® connector. All other connections should be made using 1/16" (pretreated) stainless steel (CP4008) tubing.
4. It is possible to connect a long vent line to the VENT outlet, in order to safely guide hazardous fumes to a fume hood or other appropriate vent.
5. The Micro-GC **must** be configured for constant flow operation. More details see Micro-GC user manual "user settings tab".



6. The Micro-Gasifier is equipped with two needle valves. One to control the vent flow, 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.



7. Connect the power supply using the included special cable.

Operation

The following procedure will provide good results:

- After all the connections are made, allow 15 minutes stabilization of the temperature.
- Connect the sample bomb to the Micro-Gasifier. In case of a LPG, assure that the liquid phase is flowing towards the Micro-Gasifier.
- Open the sample bomb and check for leaks.
- Open the 'VENT' needle valve, and allow to flush for 1 minute (eventually check the sample vent flow at the VENT-OUTLET).
- Open the SAMPLE needle valve and adjust a flow through the Micro-GC of 10 ml/min. Close the VENT needle valve to a flow of 10 ml/min minimum.
- 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.

Trouble Shooting

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 depend 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 itself. As a rough guideline, the bomb must be filled with 80% liquid.
- Position the sample bomb or cylinder to ensure the liquid phase to leave the cylinder or bomb.

- The pressure and flow conditions during calibration and actual measurements must be identical. A LPG calibration sample needs to be topped with an inert gas at high (50 bars) pressures. Alternatively, but a more expensive solution, is the use of a moving piston cylinder.
- Correct adjustment of the needle valves.

Are you sure, that the cylinder or sample bomb is filled with liquid-gas?

Cleaning instructions

To keep the Power Supply 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.
- Be careful not to get water on the electronics components.
- Do not use compressed air to clean.

Shipping instructions

If your Micro-Gasifier for any reason must be send back to the factory it's very important to follow up the next additional shipping instructions:

1. Let the Micro-Gasifier cool down (30 minutes) before packing.
2. Cap the in and outlets.
3. Always include the power supply.
4. Cap the in-outlet tubing off.

Disposal instructions

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

Product diagram

