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Varian B.V. Herculesweg 8 4330 EA Middelburg The Netherlands

Micro-GC Field Case 2-4 Channel systems



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.

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DECLARATION OF CONFORMITY

We hereby Declare that the equipment listed below complies with the requirements of: The Low Voltage Directive 73/23/EEC (93/68/EEC) The EMC Directive 89/336/EEC (92/31/EEC and 93/68/EEC)

Applicable Standards

LVD	EN 61010-1 CSA 22.2 No. 1010.1-92	UL	3101-1	
EMC	EN 61326-A1 47CFR part 15	AN	ISI C63.4-1992	>
Type of Equipment:	Field Case for Micro Gas Chromatograph	Model:	CP-4900	

Manufacturer - EU

Print Name: G. A. Wassink

Signed: _

Position: Quality Manager Date: November 28, 2001

Company Name: Varian B.V. Address: Herculesweg 8 P.O. Box 8033 4330 EA Middelburg The Netherlands

Telephone: +31(0) 118 671 000

Authorized Representative – USA

Print Name: Martin O'Donoghue Company Name: Varian, Inc.

Signed:

Address: 2700 Mitchell Drive Walnut Creek, California 94598 USA

Position: General Manager Date: November 28, 2001

Telephone: 925-939-2400



Safety Information

Information

In accordance with Varian's commitment to customer service and safety, this Micro-GC Field case and its accompanying documentation (NEN 5509) complies with the CE specifications and the safety requirements for electrical equipment for measurement, control, and laboratory use (CEI/IEC 1010-1), $_{\rm c}{\rm CSA}_{\rm us}$ 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 case harmful interference in witch case the user will be required to correct the interference at his own expense.

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 native 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. Address 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.



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



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

Warning	Symbol	Warning Description
	WARNING: Shock hazard	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.
\bigotimes	Do not touch	Touching this item may result in damage to the instrument or personal injury.

General Safety Precautions

Follow these safety practices to ensure safe equipment operation.

- 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 toxic and/or flammable materials.
- Do not accumulate waste solvents. Dispose of such materials through a regulated disposal program and not through municipal sewage lines.
- **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.





This instrument is designed for chromatographic analysis of appropriately prepared samples. It must be operated using appropriate gases and/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.

It is the responsibility of the Customer to inform Varian Customer Support Representatives if the instrument has been used 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.
- 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.
- This instrument should be placed in a suitable location with sufficient ventilation to remove gases and vapors. Space around the instrument must be sufficient to enable cooling of the instrument.

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- 5. Before plugging the instrument in or turning the power on, always make sure that the voltage and fuses are set appropriately for your local power source.
- 6. Do not turn on the instrument if there is a possibility of any kind of electrical damage. Instead, disconnect the power cord and contact your Varian office.
- 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.
- 8. Do not change the external or internal grounding connections as this could endanger you and/or damage the instrument.
- The instrument is properly grounded when shipped. You do not need to make any changes to the electrical connections or to the instrument chassis to ensure safe operation.
- 10. When working with this instrument, follow the regulations for GLP (Good Laboratory Practice). Take care to wear safety glasses and appropriate clothing.
- 11. Do not place containers with flammable liquids on this instrument. Spillage of the liquid over hot parts may cause fire.
- 12. This instrument may use flammable or explosive gases e.g. hydrogen under pressure. Be sure to be familiar with and to follow accurately the operation procedures prescribed for those gases before operating the instrument.
- 13. 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.
- 14. Always disconnect the AC power cord before attempting any type of maintenance.
- 15. Use proper tools when working on the instrument to prevent danger for you and/or damage to the instrument.
- 16. The customer should not attempt to replace the battery or fuses in this instrument.
- 17. Damage can result if the instrument is stored under unfavorable conditions for prolonged periods (e.g. subject to heat, water, etc.).
- 18. Do not shut off column flow when the oven temperature is high or may damage the column.
- 19. This unit has been designed and tested in accordance with recognized safety standards and designed for use indoors and under specified conditions outdoor.
- 20. If the instrument is used in a manner not specified by the manufacturer, the protection provided by the instrument may be impaired.
- 21. Substituting parts or performing any unauthorized modification to the instrument may result in a safety hazard.
- 22. Changes or modifications not expressly approved by the responsible party for compliance could void the user's authority to operate the equipment.

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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 asneeded 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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Introduction



Congratulations and thank you for purchasing the Varian, Inc. Micro-GC Field Case. The Micro-GC Field Case is used to bring the Micro-GC (2 and 4 channel) to the sample source. Operation is continuous with interchangeable, rechargeable battery packs, and internal gas supply.



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

Pre-installation requirements

In order to assure a quick, safe and uncomplicated installation, we kindly request you to make provisions as stated below before our Varian, Inc. service engineer will install your instrument(s).

Environmental requirements

- Pollution degree: 2
- Humidity: 5% to 95% RH
- Temperature: +5 ° to +40 °C operating, -20 ° to +65 °C non-operating
- The Micro-GC Field Case is intended for indoor and outdoor use.
- The Micro-GC Field Case should be protected from corrosive chemicals or gases, dust/particulate accumulation, and direct venting of air conditioners, heaters, furnaces or fans.

Space requirements

- Allow sufficient bench space to permit installation of workstations, integrators and other Micro-GC equipment. The table below lists the physical dimensions and weight of the Micro-GC Field Case and the peripheral instruments which may be installed near it.
- Allow 10-20 cm of space at the sides and rear of the Micro-GC Field Case to permit free air circulation.

	Heig	ght	Wia	lth	De	ept	Wei	ight
Instrument	Inch.	Cm	Inch.	Cm	Inch.	Cm	Lb.	Kg
Micro-GC 2-CH	11	28	6.5	16	12	30	14	6
Micro-GC 4-CH	11	28	6.5	16	21.5	55	22	10
Power supply	2.5	6.4	4	9.5	7	17.8	2	1
Field Case 2-CH	15	38	12	30	16	41	35	16
Field Case 4-CH (with	18.5	47	15	38	28.5	73	68	30
trolley)								
Chromatography Workstation (computer with monitor, approximate values)	17	43	17	43	21	53	35	16

Power source

Voltage of 12 Vdc, 130W.

Installation Category (overvoltage category): II

For more details refer to the Micro-GC Power Supply user manual (CP501267).

Gas supply

External gas supply

Gas bottle provided with a proper working two-stage pressure assembly to adjust the carrier gas pressure to 550 ± 10 kPa (80 ± 2 Psi).

Purity of applied gases

Gases in gas bottles must have a minimum purity of 99.995%

Safety regards

Gas bottles must be fixed to a table or to a wall.

Gas samples

- Do not introduce liquid sample into your Micro-GC.
- Type of samples: non-condensing gas
- Samples other than non-condensing gases (wet, vapors, particles and polymers) must be filtered in advance.
- Sample temperature between 0 and 40 $^\circ$ C ± 5 $^\circ$ C of the analyzer
- Sample pressure between 0 and 100 kPa (1 bar, 15 psi)
- Outlet of sample container must fit to a stainless steel capillary of 1/16" outside diameter, provided with a Swagelok® female nut.

Micro-GC Field Case Installation

Inspection

The Micro-GC Field Case will arrive packed in one large box and one or more smaller cartons. Inspect the cartons carefully for damage or signs of rough handling. Report damage to the carrier and to your local Varian office.

Unpacking

Unpack the Micro-GC Field Case and accessories carefully and transfer to the work area, using proper handling techniques. Inspect the Micro-GC Field Case and accessories carefully for damage or signs of rough handling. Report damage to the carrier and to your local Varian office.



Avoid back strain or injury by following all safety precautions when lifting (heavy) objects.

The 4-channel Field Case will be (standard) supplied with a trolley making transport easier.



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Unpacking

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

Packing list

Micro-GC Field Case

Accessories

Manual, Micro-GC Field Case (paper copy)	CP501269
Car cigarette lighter adapter	CP740291
Charger for 12V battery pack NiMH	CP740427
Battery pack NiMH	CP740328
Carrier gas refill assembly BS3	CP737161
Carrier gas refill assembly DIN10	CP736964
Carrier gas refill assembly DIN6	CP738012
Carrier gas refill assembly CGA580	CP737013
Carrier gas refill assembly FRANCE	CP737381

Carrier gas

The carrier gas supply tank is empty (transport regulations) and therefore should be refilled using the procedure <u>CARRIER GAS REFILL</u><u>INSTRUCTIONS</u>.

The common used carrier gas for the Micro-GC is $\rm H_e$ or $\rm N_2.$ The recommended purity for carrier gas is 99.995 % minimum.

Connect Micro-GC

Remove Field Case Interior

1. Loosen the screw at the back of the Field Case.



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- 2. Remove the Field Case interior by gently pulling at the handgrip.

3. Place the interior on a flat table and rotate 90° counter clockwise.



4. Place the Micro-GC.



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User Manual Micro-GC Field Case

Introduction and initial operation



5. Screw the Micro-GC and the interior together with the two (2) Torx-T20 screws.

- 6. Set the interior horizontal.
- 7. At the back of the interior, connect the power connector.





8. Connect the "Carrier in" (at Micro-GC) with "Carrier 1" (Field Case interior) using the included tubing (situated in the battery compartment).

9. Connect the communication cable inside the Micro-GC. See user manual Micro-GC.



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10. Slide the interior back in the Field Case and lock it with the (Un)lock screw.

- 11. Connect the Micro-GC to the sample source. For details see Micro-GC user manual.
- 12. At the front of the Field Case open the battery compartment by squeeze the two clips together and gently pull.



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 Connect the battery to the system (in case one battery connect the cable with label "battery 1"). The fan at the back and the two (2) LEDs at the front will be activated for a few seconds indicating electronics is testing and ready.

Close the battery compartment door.



- It's advisable to charge <u>the battery(s)</u> before operation using the external charger (CP740427).
- 14. Connect the Workstation PC to the Micro-GC.
- 15. Turn the carrier gas on using the Valve 1(2) Carrier gas open/close valve.
- 16. Switch the Micro-GC on.
- 17. After a few minutes the system should be ready for use (see Micro-GC user manual).



Always leave the Micro-GC Field Case door open, using the door lock.



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Battery location

The Ni-MH rechargeable battery(s) are located in the front of the Field Case in a special designed compartment.



Open the compartment by squeeze the two clips together.



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The battery(s) will be visible.



The battery(s) can be removed by unplugging the connector and slightly pulling the battery(s) out of their compartment.

INSTRUMENT OVERVIEW

Front view



BACK view



User Manual Micro-GC Field Case

Reference

Battery operation

The Micro-GC Field Case is equipped with a 12V 9Ah (ampere-hours) Ni-MH (Nickel metal hydride) battery. For more details see <u>battery pack</u>.

Depending on the condition in which the Micro-GC is used, the battery will provide power up to eight (8) hours before recharging becomes necessary.

If the column temperature is frequently set above 50 °C the battery will need recharging sooner. When reconditioning columns or stabilizing the system it is advisable to plug in the power supply during this period.

The 2-channel system is supplied with one (1) battery standard; the 4-channel system is supplied with two (2) batteries standard.

The two (2) green LEDs in the front of the Field Case that indicates the battery status. See flow diagram below for more details.





Internal Buzzer

The buzzer is located in the Field Case and gives information about the battery status.

Duration	Action
Interval beep (10 seconds)	Battery voltage below 10.5 Volt; replace or recharge battery

Additional information

- During startup the system will check how many batteries are available and choose the one which is most charged. Only one battery at the time (when two batteries are present) will be used to power the Micro-GC.
- If the battery voltage will become lower then 9.1 Volt, the system will (in case of two batteries) automatically switch to the second battery.
- Charging the batteries is only outside the Field Case possible using the external charger (CP740427).

Reference

Battery Pack

Introduction



This Battery Pack (Model/partnumber CP740328) must <u>only</u> be used in combination with the Micro-GC Field Case and the Battery Charger (CP740427). This Battery Pack is tailored to meet the power needs of the Micro-GC 2 and 4 channel.



For problems or questions about the Battery Pack, please contact your nearest Varian, Inc. subsidiary or Varian, Inc. representative.

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General precautions



This battery (Model/partnumber CP740328) is designed for use in combination with the Micro-GC Field Case. If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.



It is the responsibility of the Customer to inform Varian Customer Support Representatives if this battery 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.

Prohibited Items regarding the Battery Handling

- 1. The battery should be placed in a suitable location with sufficient ventilation. Space around the battery must be sufficient to enable cooling.
- 2. Never disassemble a battery as the electrolyte inside is strong alkaline and can damage skin and clothes.
- 3. Never attempt to short-circuit a battery. Doing so can damage the product and generate heat than can cause burns.
- 4. Disposing of a battery in fire can cause the battery to rupture. Also avoid placing batteries in water as this causes batteries to cease to function.
- 5. Never solder anything directly to a battery. This can destroy the safety features of the battery by damaging the safety vent inside the cap.
- Never reverse charge or overcharge with high currents. Doing so causes rapid gas generation and increased gas pressure, thus causing batteries to swell or rupture.
- 7. Never insert a battery with the positive and negative poles reversed as this can cause the battery to swell or rupture.
- 8. Use only the Power Supply that has been supplied by Varian, Inc.
- 9. Do not use the battery in an appliance or for purposes for which it was not intended.
- 10. Do not charge the battery if there is a possibility of any kind of electrical damage. Instead, disconnect the power cord and contact your Varian office.
- 11. Batteries should always be charged prior to use. Be sure to charge correctly.
- 12. Do not place containers with flammable liquids near the battery. Spillage of the liquid over hot parts may cause fire.

In order to take full advantage of the properties of the Ni-MH Battery Pack and to prevent problems due to improper use, note the following points during use of battery operated products.

Charging



- 1. Charge the battery within an ambient temperature range of 0 °C to 40 °C.
- Ambient temperature during charging affects charging efficiency. As charging efficiency is best within a temperature range of 10 °C to 30 °C, place the Battery Pack and charger within this temperature range.
- 3. At temperature below 0 °C the gas absorption reaction is not adequate, causing gas pressure inside the battery to rise, which can activate the safety vent and lead to leakage of alkaline gas and deterioration in performance and battery leakage.
- 4. Parallel charging of batteries should be avoided.



- 5. Never attempt reverse charging. Charging with polarity reversed can cause a gas pressure inside the battery to rise, which can activate the safety vent, lead to alkaline electrolyte leakage, rapid deterioration in battery performance, battery swelling, or battery rupture.
- 6. Overcharging should be avoided. Repeated overcharging can lead to deterioration in performance. Overcharging means charging a battery when it is already fully charged.
- 7. Trickle charging (continuous charging) cannot be used with Ni-MH batteries. To avoid overcharging, a timer measuring the total charge time should be used.

Discharging

- 1. Discharge the battery within an ambient temperature range of -10 °C to +45 °C
- Discharge capacity drops at temperatures below -10 °C or above +45 °C. Such decreases in discharge capacity can lead to deterioration in battery performance.



- 3. Since over-discharging (deep discharge) damages the battery characteristics do not leave the battery connected to the instrument for long periods of time. Avoid shipping the battery connected with the instrument.
- 4. High-current discharging can lead to heat generation and decreased discharging efficiency.

Storage

- 1. Store battery in a dry location with low humidity, no corrosive gases, and at a temperature range of -20 °C to +45 °C.
- 2. Storing the battery in a location where humidity is extremely high or where temperatures fall below -10 °C or above +45 °C can lead to rusting of metallic parts and battery leakage due to expansion or contraction in parts composed of organic materials.
- 3. Long-term storage can accelerate battery self-discharging and lead to the deactivation of reactants; locations where the temperature ranges between +10 °C and +30 °C are suitable for long-term storage.
- 4. When charging for the first time after long-term storage, deactivation of reactants may lead to increased battery voltage and decreased battery capacity. Restore such batteries to original performance by repeating several cycles of charging and discharging.



5. When storing batteries for more then one (1) year, charge at least once a year to prevent leakage and deterioration in performance due to self-discharging.

Service Life Battery

- Batteries used under proper conditions of charging and discharging can be used 500 cycles or more. Significantly reduced service time in spite of proper charging means that the life of the battery has been exceeded. At the end of service life, an increase in internal resistance or an internal short-circuit failure may occur.
- 2. Batteries are chemical products involving internal chemical reactions. Performance deteriorates not only with use but also during prolonged storage. Normally, a battery will last two (2) years (or 500 cycles) if used under proper conditions and not overcharged or overdischarged. However, failure to satisfy conditions concerning charging, temperature, and other factors during actual use can lead to shortened life (or cycle life), damage to products, and deterioration in performance due to leakage and shortened service life.

Reference

CARRIER GAS REFILL INSTRUCTIONS

Your Micro-GC Field Case is equipped with a refillable, high pressure carrier supply tank(s) which has been approved to 12000 kPa, and has an internal volume of 300 cc.

When the instrument is in use the pressure should not drop in the red area since the Micro-GC needs at least 550 ± 10 kPa (80 ± 2 psi) to work properly.

Refilling is done by means of a Carrier Gas Refill Assembly.



Pressure gauge Relief valve Connection to gas supply cylinder

> This special tool is connected directly to the valve on the gas supply cylinder. Because this connection differs from country to country, Varian, Inc. offers a range of Refill Assembly's (see <u>Accessories</u>) to meet all major standards. If the connector of this device, despite a careful choice, does not match your supply unit, ask your local gas supplier for the right part.

It should have 1/4" NPT male thread at the other end. Exchanging is easy.

User Manual Micro-GC Field Case





High-pressure gas stores an incredible amount of energy and is dangerous in its own right even if the gas is inert like He or N₂. Therefore, filling your tank can be EXTREMELY HAZARDOUS. Filling the tank can be done safely if the following steps are followed.

Refill procedure

- 1. Install Refill Assembly onto gas supply cylinder.
- 2. Check and make sure that the valve on Refill Assembly is closed.
- 3. At the front of the Field Case, remove the 1/8"nut at "Fill 1(2)".
- 4. Connect the 1/8" tube from Refill Assembly to "Fill 1(2)" port on the front panel. Finger tighten and loosen the nut 1/4 turn.
- First, open the valve on gas supply cylinder, then slightly open valve on Refill Assembly just a tiny little bit and listen for gas leaking through the nut. (This purges Refill Assembly so that no air enters the gas carrier gas cylinder).
- 6. When Refill Assembly has been sufficiently purged, tighten the "Fill 1(2) nut.
- 7. While watching pressure gauge on Refill Assembly, slightly open the refill valve. When pressure on gauge reads 10000 to 12000 kPa, close both valves on Refill Assembly and gas supply cylinder.

By that time it is possible that the relief valve may have started to blow, this is normal. The relief valve is meant to limit the pressure in the carrier gas cylinder.

8. Disconnect 1/8" tube from "Fill 1(2)". Now escaping gas comes from the Refill assembly letting off pressure. Cap off "fill 1(2)" port.



The carrier gas cylinder can only be filled to the maximum when the pressure in the gas supply cylinder has sufficient pressure to allow that. If the gas supply pressure has dropped below the set point of the relief valve the gauge on the refill assembly will indicate this pressure when both valves are open.

Additional refill information

In case the carrier supply tank depressurized completely and is possible contaminated with air:

- 1. Install Refill Assembly onto gas supply cylinder.
- 2. Check and make sure that the valve on Refill Assembly is closed.
- 3. Close the "Valve 1(2)".
- 4. Disconnect at the back of the Field Case the tubing connecting the "Carrier 1(2) and "Carrier gas 1(2)".
- 5. At the front of the Field Case, remove the 1/8"nut at "Fill 1(2)".
- 6. Connect the 1/8" tube from Refill Assembly to "Fill 1(2)" port on the front panel. Finger tighten and loosen the nut 1/4 turn.
- 7. First, open the valve on gas supply cylinder, then slightly open valve on Refill Assembly just a tiny little bit and listen for gas leaking through the nut. (This purges Refill Assembly so that no air enters the carrier gas cylinder).
- 8. When Refill Assembly has been sufficiently purged, tighten the "Fill 1(2) nut.
- 9. Fill the carrier gas cylinder to about 1500 kPa.
- 10. Turn "Valve 1(2)" to Open, relieve pressure in carrier gas cylinder, and close valve.
- 11. Purge this way at least twice, don't close valve the last time, but reconnect the removed tubing.
- 12. While watching pressure gauge on Refill Assembly, slightly open the refill valve. When pressure on gauge reads 10000 to 12000 kPa, close both valves on Refill Assembly and gas supply cylinder.

By that time it's possible that the relief valve may have started to blow, this is normal. The relief valve is meant to limit the pressure in the carrier gas cylinder.

13. Disconnect 1/8" tube from "Fill 1(2)". Now escaping gas comes from the Refill Assy. letting off pressure. Cap off "fill 1(2)" port.

Shipping instructions

If the Micro-GC Field Case for any reason must be sent back to the factory it is very important to follow the additional shipping instructions:



- 1. Always include the power supply.
- 2. Include if used, the sample inlet filter.
- 3. Relieve the pressure completely from the internal carrier gas cylinder(s) (transporting rules).

Cleaning instructions

To keep the Micro-GC Field Case surface clean refer to the remarks given below:

- Clean only when Micro-GC Field Case is disconnected from the charger/power supply.
- 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 Battery Pack, these chemicals can damage the case.
- Be careful not to get water on the electronics components.
- Do not use compressed air to clean.

Disposal instructions

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