

Agilent 490 Micro GC Field Case

User Manual

Notices

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Manual Part Number

G3581-90005

Edition

Third edition, August 2017

Printed in China

Agilent Technologies, Inc.
412 Ying Lun Road
Waigaoqiao Freed Trade Zone
Shanghai 200131 P.R.China

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WARNING

A **WARNING** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a **WARNING** notice until the indicated conditions are fully understood and met.

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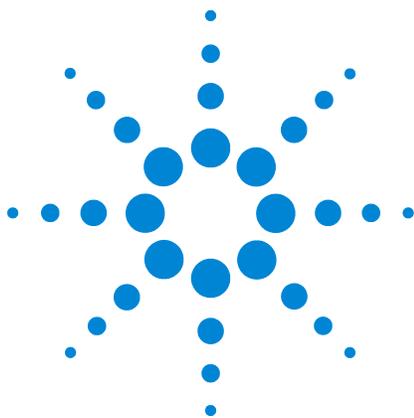
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Safety Information

In accordance with the Agilent commitment to customer service and safety, the:

- 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 61010-1) and $cCSA_{US}$.
- Battery Pack and Charger and its accompanying documentation complies with the Safety, Battery Pack UL2054, UL1015 (cabling) and CE, Charger to CE, and documentation to NEN 5509.

This device has been tested and complied with CEC-400-2015-021, California Energy Commission appliance efficiency regulations on battery charger systems.



This device has been tested and found to comply with IEC 61326-1 and CISPR 11 limits. 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.

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

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

If you have any problems understanding the text in this manual, we advise you to contact your Agilent Technologies service office for assistance. Agilent Technologies, Inc. cannot accept responsibility for any damage or injury caused by misunderstanding of the information in this manual.

Special considerations and precautions appear in this manual in the form of **NOTES**, **CAUTIONS**, and **WARNINGS**. It is important that you operate your equipment in accordance with the instructions in this manual and any additional information, which may be provided by Agilent Technologies, Inc. Address any questions regarding the safe and proper use of your equipment to your local Agilent office.

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

NOTE

This instrument has been tested per applicable requirements of the 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.

WARNING

This instrument is designed for chromatographic analysis of appropriately prepared samples. It must be operated using appropriate gases, solvents, or both, 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 to the Agilent Service Center for repair.

WARNING

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

CAUTION

- Disconnect the instrument from all power sources before removing the protective panels to avoid exposure to potentially dangerous voltages.
- When it is necessary to use a non-original 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.
- Place this instrument 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.
- 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.
- Do not turn the instrument on if there is a possibility of any kind of electrical damage. Instead, disconnect the power cord and battery packs and contact your Agilent office.
- Insert the supplied power cord 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 instrument, or both.
- 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.
- When working with this instrument, follow the regulations for Good Laboratory Practice (GLP). Take care to wear safety glasses and appropriate clothing.
- Do not place containers with flammable liquids on this instrument. Spilling the liquid over hot parts may cause fire.
- This instrument may use flammable or explosive gases. Be sure to be familiar with and to accurately follow the operation procedures prescribed for those gases before operating the instrument.
- 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 and battery packs before attempting any type of maintenance.
- Use proper tools when working on the instrument to prevent danger for you, damage to the instrument, or both.
- Do not attempt to replace fuses in this instrument.
- Damage can result if the instrument is stored under unfavorable conditions for prolonged periods (for example, subject to heat, or water).
- Do not shut off column flow when the oven temperature is high, it may damage the column.
- This unit has been designed and tested in accordance with recognized safety standards and designed for use indoors.
- If the instrument is used in a manner not specified by Agilent Technologies, the protection provided by the instrument may be impaired.
- Substituting parts or performing any unauthorized modification to the instrument may result in a safety hazard.
- Changes or modifications not expressly approved by the responsible party for compliance could void the user's authority to operate the equipment.

Initial 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 Agilent Technologies, Inc. office.

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 Agilent Technologies, Inc. office.

The Micro GC field case will be supplied with an integrated trolley for easier transportation.



Figure 1 Field case with trolley

Unpacking

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

Packing list

- Micro GC field case
- Accessories (optional)
- Ship kit

Table 1 Accessories

Car cigarette lighter adapter	CP740291
Charger for 12 V battery pack NiMH	CP740427
Battery pack NiMH	CP740328
Gas cylinder for 2-channel field case 75mL	G3581-63011
Gas cylinder for 4-channel field case 300mL	G3581-63012
Field Case kit for manual injection	G3581-63006
Carrier gas refill assembly DIN10	G3581-60701
Carrier gas refill assembly BS3	G3581-60702
Carrier gas refill assembly FRANCE	G3581-60703
Carrier gas refill assembly DIN6	G3581-60704
Carrier gas refill assembly CGA580	G3581-60705

Table 2 Field case ship kit G3581-63010

Part Number	Description	Quantity
0100-0090	Tee, 1/8 inch Brass	1
G1530-21020	Field case Gas Supply Tubing	1
G3581-60612	Back Sample in Kit	1
G3581-00524	FC Back Sample in Holder	1
1390-1023	Captive screw M4X0.7X12MM	1
CP86757	Screw M4X8 Torx 8.8 SV	3

Carrier gas

The carrier gas supply cylinders are empty (transport regulations) and should be refilled using the procedure “[Carrier Gas Refill Instructions](#)” on page 37.

The common carrier gas for the Micro GC is He, N₂, or Ar. The recommended purity for carrier gas is 99.999 % minimum.

NOTE

Never use hydrogen carrier gas in the gas cylinder.

Instrument Overview

Congratulations and thank you for purchasing the Agilent Technologies, Inc. Micro GC field case (Figure 2). 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 an internal gas supply.



Figure 2 Micro GC field case

For problems or questions about your Micro GC field case, please contact your nearest Agilent Technologies, Inc. representative.

Inside view

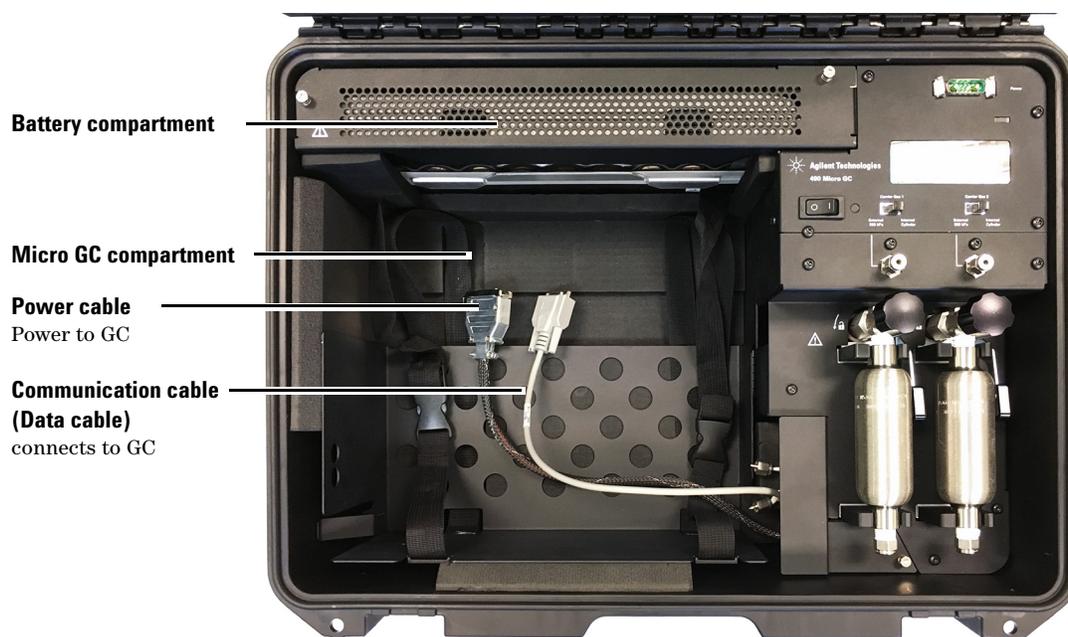


Figure 3 Inside view

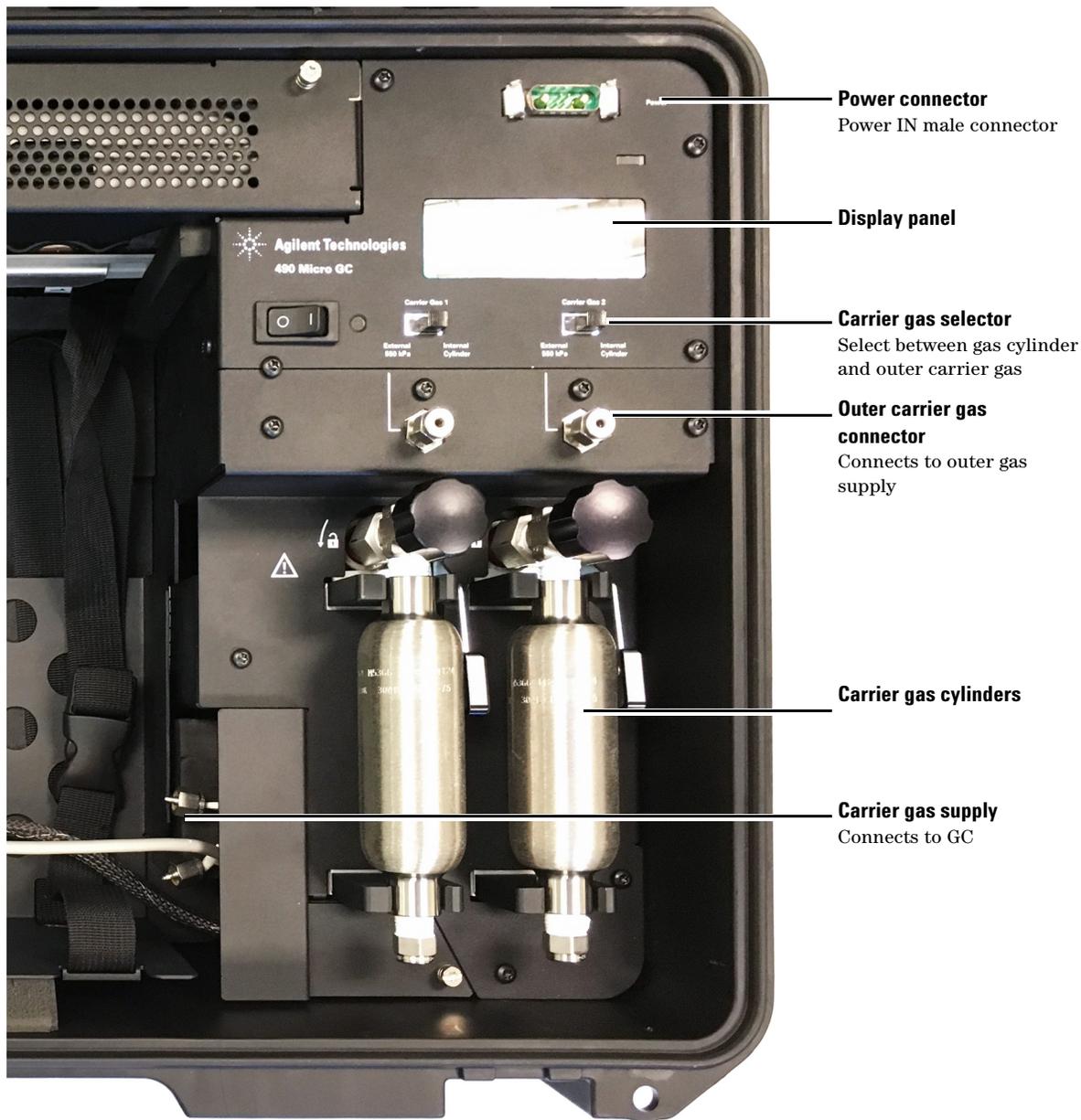


Figure 4 Inside view detail

For more information on the Battery status see [“Battery Pack”](#) on page 48.

For more information on the Carrier 1 and Fill 1 see [“Carrier Gas Refill Instructions”](#) on page 37.

Power source

The Micro GC field case can be powered by batteries or the power supply.

Power supply

- Voltage of 12 Vdc, 150 W
- Only use the power supply (p/n G3581-60080) provided with the Micro GC. See the Micro GC User Manual for more information.

Battery pack

The Micro GC field case is equipped with a 12 V 10 Ah (ampere-hours) Ni-MH (Nickel metal hydride) battery. See [Chapter 3 “Battery Pack and Charger”](#) on page 47 for more details.

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

Maximum temperatures when using battery as power source:
Column temp 150C, Injector temp 90C, Sample line temp 90C.

When reconditioning columns or stabilizing the system it is advisable to plug in the power supply during this period.

Both the 2-channel system and 4-channel system support the use of up to two batteries simultaneously.

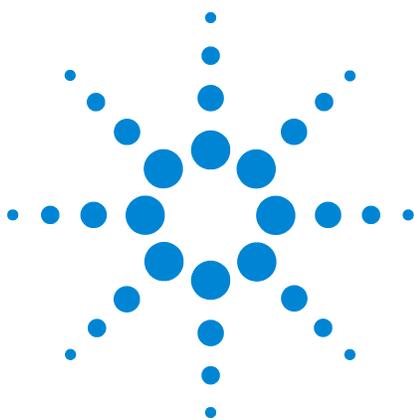
All ambient requirements for the Micro GC, except for the maximum operating temperature, are applicable to the field case. Please read the Micro GC user manual for more details.

When operating the Micro GC in the field case, while using the batteries, the maximum allowable ambient temperature is 50°C.

WARNING

This battery (p/n 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.

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Minimum Requirements to Use the Field Case

To use the field case, the Micro GC must be equipped with main board G3581-65000 version F0 and Firmware version 4.01

Table 3 Firmware compatibility

Micro GC main board with FW	CP490240/41/ 42/50/51/52 (legacy)	G3581-63001/ 002/003
CP740010 with FW 2.44	yes	no
G3581-65000 (D0) with FW 3.xx	yes	no
G3581-65000 (F0) with FW 3.32	yes	no
G3581-65000 (F0) with FW 4.0x	yes	yes

Table 4 Field Cases

Part Number	Description
CP490240	Legacy Field case 2-channel standard
CP490241	Legacy Field case 2-channel double volume
CP490242	Legacy Field case 2-channel two carrier gases
CP490250	Legacy Field case 4-channel standard
CP490251	Legacy Field case 4-channel double volume
CP490252	Legacy Field case 4-channel two carrier gases
G3581-63001	Fieldcase 2-channel 2 Carrier Gases
G3581-63002	Fieldcase 4-channel Std 1 Carrier Gas
G3581-63003	Fieldcase 4-channel 2 Carrier Gases

Field Case Sample Inlet Requirements

Table 5 Field Case Sample Inlet Requirements

Sample and sample inlet type	Remarks and Requirements
Micro GC Front inlet	Not compatible with field case. Marketing will block ordering front inlet & field case in the configurator (SAP and sales).
Single or dual rear inlet	Items required for install are provided in field case shipping kit Table 2 on page 10. See “ Install Sample Inlet ” on page 20 for installation instructions.
Heat -traced sample line	Install on internal inlet. See Micro GC user manual G3581-90001 for instructions.
Manual syringe injection	Install optional Field Case kit for manual injection PN G3581-63006.

NOTE

Micro GC front inlet is not compatible with the field case.

Table 6 Manual injection kit for field case G3581-63006

Part Number	Description	Quantity
G3581-63006	Sample-in connection kit	1
G3581-00524	FC Back Sample-in Holder	1
G3581-60610	Septum Nut IN Kit	1
G3581-60611	Luer Lock IN Kit	1
CP742983	Septum injection port Assembly	1
VLZLA1	Female Luer adapter to 1/16 fittings	1
CP914757	Fitting, ext. Luer lock,10-32 thrd,1/pk	1
CP86757	Screw M4X8 Torx 8.8 SV	1
1390-1023	Captive Screw M4X0.7X12mm	1

Install Sample Inlet

Install the back sample-in connector.

- 1 Connect the G3581-60612 to the back sample in connector on micro the GC, using a wrench to tighten the nut on the adapter.
- 2 With one CP86757 screw, mount bracket G3581-00524 to adapter.
- 3 Remove the rear panel screw



Figure 5 Remove rear panel screw

- 4 Mount the assembly to the rear panel of the micro GC with one 1390-1023 screw.



Figure 6 Install the back sample-in connector

Connecting Gas Supply for Single Carrier Gas

- 1 Connect carrier gas supply to Tee union (0100-0090).
- 2 Connect field case gas supply tube (G1530-21020) to Tee union output.

Connecting the Micro GC to the Field Case

NOTE

The GC must have a sample-in connector installed BEFORE the GC is installed into the field case. See the section “[Field Case Sample Inlet Requirements](#)” on page 19.

- 1 Open the case and remove the mounting bracket.

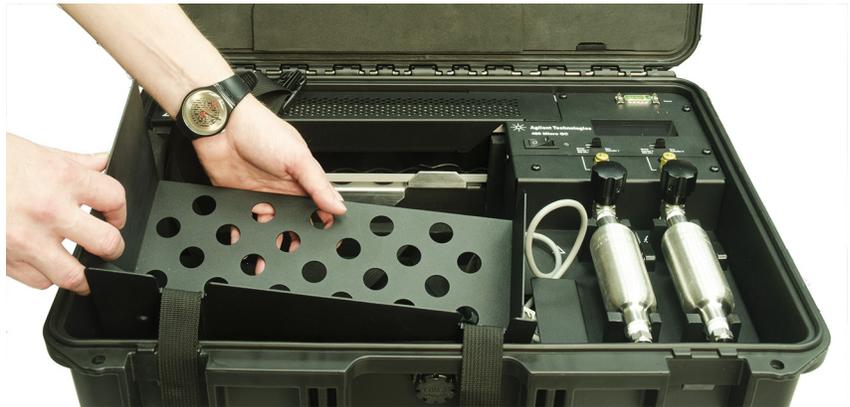


Figure 7 Remove bracket

- 2 Place the GC on the bracket as shown.

Mounting screw location
Attach GC with screw at
this location



Figure 8 Attach bracket to GC with mounting screw

- 3 Attach GC to bracket using screw (CP86757) at bottom. There is 1 screw for the 2-channel GC and 2 for the 4-channel GC.
- 4 Fasten straps around GC.



Figure 9 Straps fastened

WARNING

Do not install the batteries or charge the carrier gas tank until all parts are fully assembled and reinstalled inside the field case.

- 5 To gain access to the power cable, data cable, and carrier gas supply, remove the protective cover by loosening the captive screw with a Torx T-20 driver.

NOTE

With the four channel field case, it is necessary to remove the gas cylinders before removing the protective cover. See [“Removing a Gas Cylinder From the Field Case”](#) on page 39



Figure 10 Remove protective cover



Figure 11 Protective cover removed

- 6 Place the mounted GC on top of the open field case and attach the power cable.



Figure 12 Attach the power cable

- 7 Lower the GC into the field case. The straps assist in installing and removing the GC.

CAUTION

When placing GC into the field case, do not damage or obstruct the data cable or carrier gas connections.



Figure 13 Placing the Micro GC in the field case

- 8 Connect the carrier gas supply to the GC. The connector can only be fastened after the GC is mounted in field case.

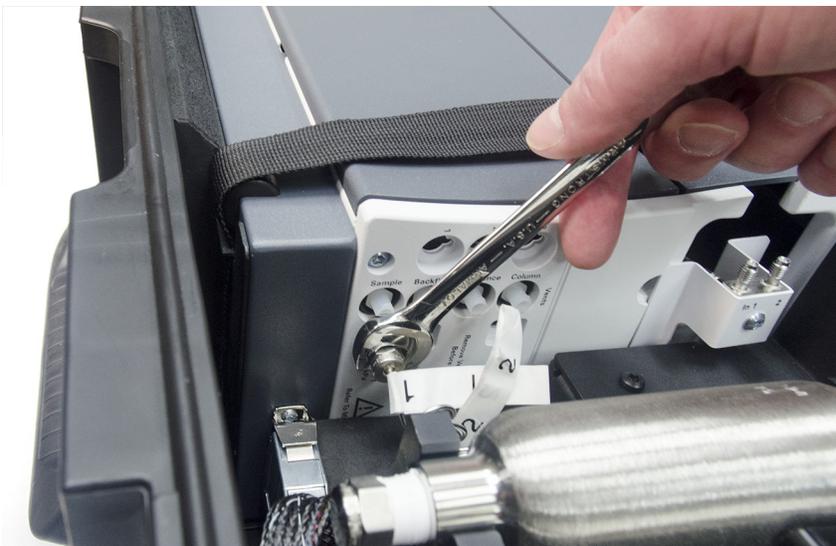


Figure 14 Connect carrier gas supply

- 9 Open the GC to access the data connection. You will need to unfasten the straps.



Figure 15 Micro GC Field case communication cable connected

- 10 Connect the RS232 communication cable to the COM 2 connector.
- 11 Close the GC and refasten the straps.
- 12 Replace the protective cover.



Figure 16 GC installed in field case

- 13** Connect the Micro GC to the sample source. For details, see the Micro GC user manual.
- 14** Install the field case battery (“[Installing the Field Case Battery](#)” on page 30).
- 15** Connect the Workstation PC to the Micro GC. For details, see the Micro GC user manual.
- 16** Turn the carrier gas on by selecting the gas source and opening the appropriate gas cylinder valve.
- 17** Switch on the field case.
- 18** After a few minutes, the system should be ready for use (see the Micro GC user manual).

Installing the Field Case Battery

NOTE

The field case is shipped with battery disconnected. Connect battery inside the battery compartment before operation.

- 1 Inside near the hinge of the field case, open the battery compartment by unscrewing the captive Torx T-20 screws.



Figure 17 Removing the battery compartment cover

NOTE

The field case may only be used with the supplied battery (CP740328) or the power supply (G3581-60080).

- 2 When installing one battery, place the battery in the compartment and connect the battery to the cable labeled **battery 1** (Figure 18 and Figure 19).



Figure 18 Labeled battery connectors



Figure 19 Installing the battery in the 2-Channel field case

- 3** To install more than one battery in the 2-channel field case, remove the metal battery spacer and foam insert (Figure 20). Connect a battery to one of the connectors and install it in place of the foam insert. Replace the metal bracket and install the second battery on top of the bracket and connect to the remaining connector (Figure 19). To install more than one battery in the 4-channel field case, insert the batteries side by side (Figure 21). Connect each battery to a connector.

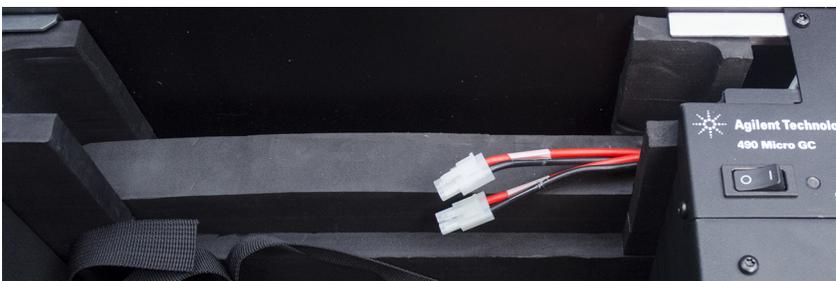


Figure 20 Metal battery spacer removed, foam insert shown

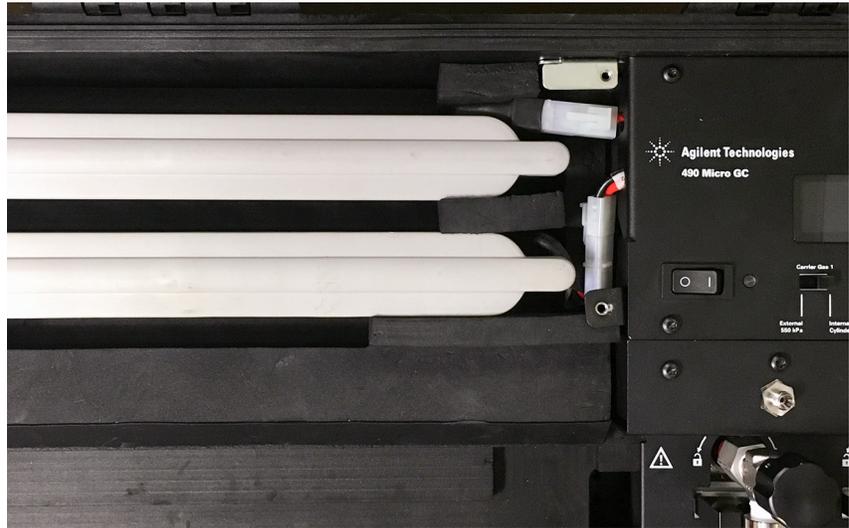


Figure 21 4-Channel field case with two batteries installed

- 4 Ensure the cables are correctly positioned in the cable guides to prevent damage, then replace the battery compartment door.

NOTE

It is advisable to charge the batteries before operation.

CAUTION

Place the field case in such a way that both the mains appliance inlet or adapter and the battery supply cables are easy to reach for the operator. These connections must be disconnected in case of emergency.

CAUTION

If the field case will not be used for a long period of time, please disconnect batteries inside the battery compartment to avoid over-discharging.

Automatic Battery Selection

During startup, the system will check how many batteries are available and will first use the one connected to the battery 1 connector (**Bat1**) to power the Micro GC.

When the battery voltage becomes lower than 11 Volts, the system will (in case of two batteries) automatically switch to the second battery (**Bat2**).

If both batteries' voltage drop below 10.5 Volts, both batteries will power the system simultaneously

If both batteries' voltage drop below 9.5 Volts, the micro GC will be shut down.

Charging Batteries

Plug the micro GC power supply (G3581-60080) into the power connector at the upper right corner of main panel. The system will start to charge the battery if it is below 90% power.

If the micro GC is powered off, the field case will charge both batteries simultaneously.

If the micro GC is powered on, the field case will charge one battery at a time. Note that it may take longer time to have battery fully charged than usual.

The percentage of battery power will be displayed. See [“Field Case Display”](#) on page 35

Field Case Display

The field case display shows the battery status, GC status, and gas pressure.

Percentage of charge is shown for each battery, followed by a letter indicating battery status.

Table 7 Battery status descriptions

Battery Status	Description
R	Ready
U	Using
C	Charging



Figure 22 Field case display

When the GC is connected, GC status is shown on the right of the display. The possible states are **Not Ready**, **Ready**, **Run**, and **Error**. In addition to the display text, color LED will show at the far right of the display.

Table 8 GC status color descriptions

GC Status	LED color
Not Ready	Yellow
Ready	Off
Run	Green
Error	Red

Internal Buzzer

The buzzer is located in the field case and gives information about the battery status.

Table 9 Buzzer action

Duration	Action
Interval beep (10 seconds)	Battery voltage below 10.5 Volts; recharge battery
Continuous beep	Battery voltage below 10 Volts; recharge battery

Carrier Gas Refill Instructions

Your Micro GC field case is equipped with refillable, high pressure carrier supply cylinders which have been approved to 12,400 kPa. The 2-channel field case is equipped with two 75mL gas cylinders. The 4-channel field case is equipped with either one or two 300mL gas cylinders.

When the instrument is in use, 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.

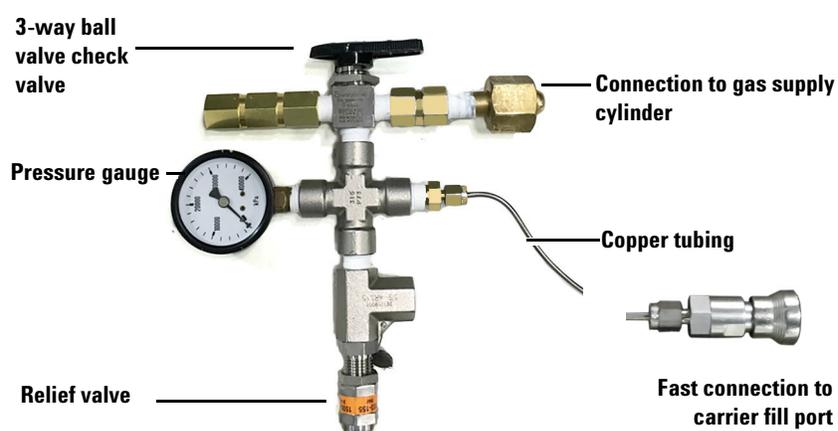


Figure 23 Carrier gas refill assembly

This special tool is connected directly to the valve on the gas supply cylinder. Because this connection differs from country to country, Agilent Technologies, Inc. offers a range of Refill Assembly's 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 inch NPT male thread at one end. Exchanging is easy.

Attach Carrier Gas Refill Assembly to Gas Source

- 1 Connect refill gas assembly and fast connector (0100-2908) with copper tubing (G1530-20620).



Figure 24 Fast connector

- 2 Ensure the 3-way ball valve is in the 'check valve' position.
- 3 Connect the refill assembly to a gas source as shown in Figure 25.

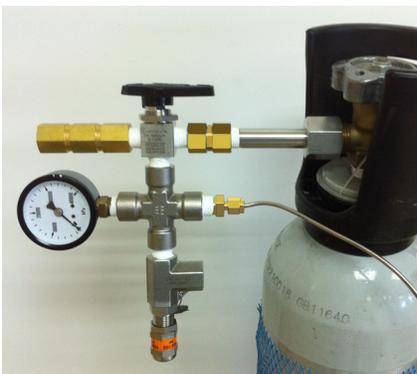


Figure 25 Gas refill assembly connected to a gas supply

- 4 Open the gas source valve.

WARNING

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**. The tank can be filled safely using the following steps.

Removing a Gas Cylinder From the Field Case

- 1 Close gas cylinder valve by turning valve knob clockwise.



Figure 26 Close gas cylinder

- 2 Push the release lever at the right side of the gas cylinder.

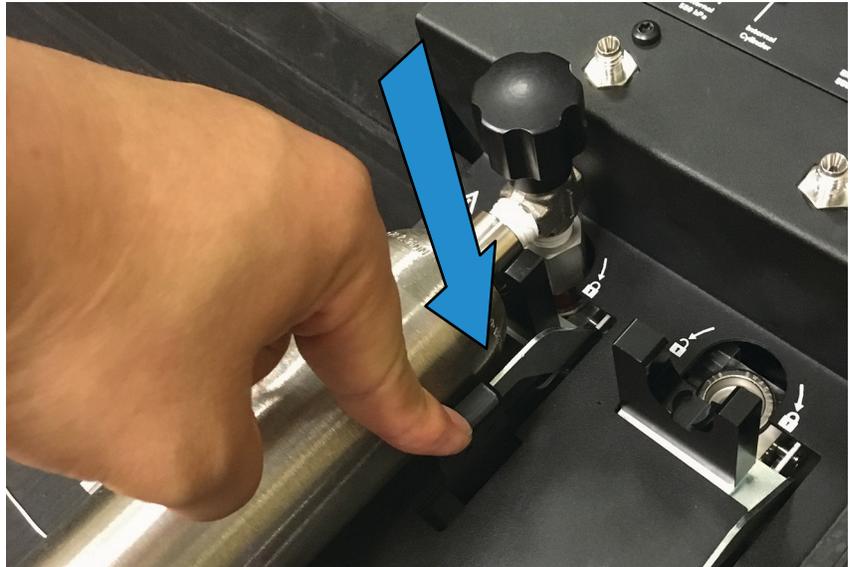


Figure 27 Push release lever

- 3 Pull vertically on cylinder assembly to remove.

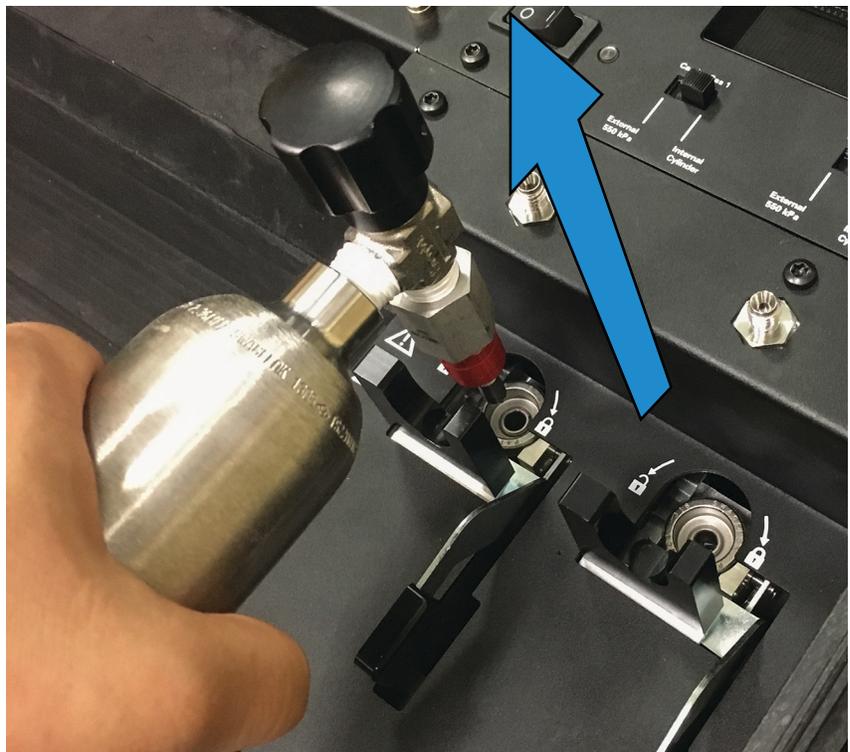


Figure 28 Removing the gas cylinder

NOTE

If pressure is too high, for example above 50bar, it will not be easy to release the gas cylinder from field case. Follow below step to reduce gas flow module pressure

Reducing Gas Flow Module Pressure

- 1 Close the gas cylinder valve.
- 2 Remove the external gas supply connector plug.
- 3 Switch between internal and external gas source several times to reduce pressure inside flow module. Every switch will reduce pressure approximately 4-5bar.



Figure 29 Gas source switch

Gas Cylinder Refill Procedure

- 1 Install the Refill Assembly onto the gas supply cylinder (see [page 37](#)).
- 2 Remove gas cylinder from field case (see [page 39](#)).
- 3 Ensure that on/off valve on gas cylinder is closed.



Figure 30 Gas cylinder

- 4 Ensure 3-way ball valve on refill assembly is set to the 'check valve' position.

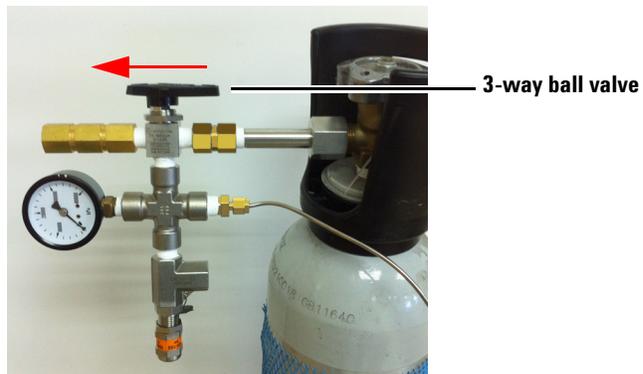


Figure 31 Ball valve in 'check valve' position

- 5 Connect the gas cylinder to the fast connector at the end of refill assembly.

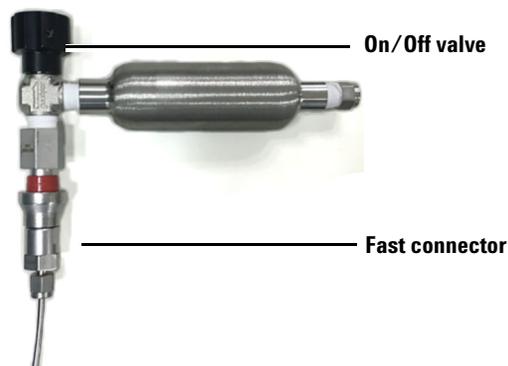


Figure 32 Fast connector connected to gas cylinder

- 6 Open the on/off valve on the gas cylinder. If some carrier gas is still in the cylinder, you will hear the sound of gas relief from check valve.
- 7 Read the pressure gauge on the refill assembly and ensure the pressure is zero.
- 8 Switch the 3-way ball valve to the gas source position. If the pressure of the pressure source is higher than 124bar, you will hear the pressure released from the 'relief valve'. switch the 3-way ball valve back to 'middle' position.

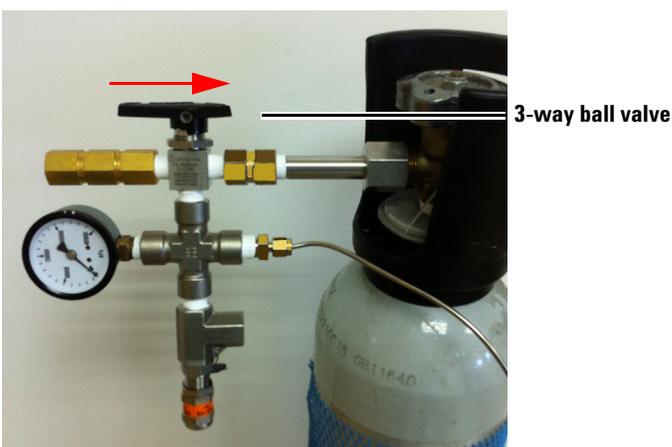


Figure 33 Ball valve in 'gas source' position

- 9 If the pressure of gas source is lower than 124bar, switch the 3-way ball valve back to the 'middle' position when the needle in gauge stabilizes.



Figure 34 Ball valve in 'middle' position

- 10 Close the on/off valve on the gas cylinder.



Figure 35 Gas cylinder On/Off valve

- 11 Switch the 3-way ball valve on refill assembly to the 'check valve' position to release the remaining gas in transfer tubing. You will hear the relief sound.

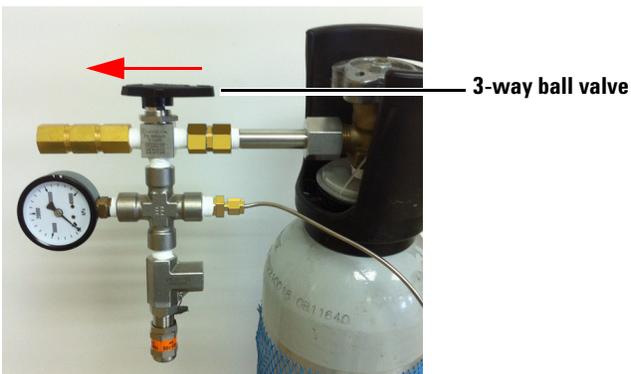


Figure 36 Ball valve in 'check valve' position

- 12 Disconnect the gas cylinder.

NOTE

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.

NOTE

Refilling at high pressure may make the surface of cylinder warm, while fast flushing may make it colder.

Exchanging Gas Species or First Refill of the Gas Cylinder

- 1 Open the on/off valve on the gas cylinder. If some carrier gas is still in the cylinder, you will hear the sound of gas relief from check valve.
- 2 Read the pressure gauge and ensure the pressure is zero.
- 3 If the pressure of gas source is lower than 124bar, switch the 3-way ball valve back to 'middle position' when the needle in gauge stabilizes.
If the pressure of the gas source is higher than 124bar, switch the 3-way ball valve back to 'middle position' when the needle in gauge shows higher than 124bar (12400kpa).
- 4 Switch the 3-way ball valve on the refill assembly to the 'check valve' position. Release the carrier gas in the gas cylinder. You will hear the relief sound.
- 5 Repeat steps 2 through 4 three times.
- 6 Close the on/off valve on the gas cylinder.
- 7 Switch the 3-way ball valve on refill assembly to the 'check valve' position. Release the remaining gas in the transfer tubing. You will hear the relief sound.

NOTE

Refilling at high pressure may make the surface of cylinder warm, while fast flushing may make it colder.

Shipping

If the Micro GC field case must be transported by shipping, it is very important to follow these shipping instructions:

WARNING

Relieve the pressure completely from the internal carrier gas cylinders according to transportation rules.

CAUTION

Avoid shipping the battery connected with the instrument.

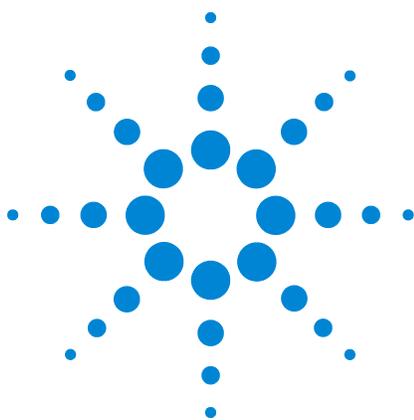
Cleaning

To keep the Micro GC field case surface clean:

- Clean only when the Micro GC field case is disconnected from the charger, power supply, and battery packs.
- Use a soft (not hard or abrasive) brush to carefully brush away all dust and dirt.
- Use a soft, clean cloth, dampened with mild detergent to clean the outside of the case.
- Never clean the inside of the case!
- Be careful not to get water on the electronics components.
- Do not use compressed air to clean the case.

Disposal

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



3 Battery Pack and Charger

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Battery Pack

Introduction

This Battery Pack (CP740328), [Figure 37](#), may be charged inside field case or with the Charger (CP740427), see [Figure 41](#) on page 55. It may only be used to power the field case. This Battery Pack is tailored to meet the power needs of the Micro GC.



Figure 37 Battery Pack (p/n CP740328)

General precautions

WARNING

It is the responsibility of the Customer to inform Agilent Technologies Customer Support Representatives if this battery has been used in combination with the Micro GC for the analysis of hazardous samples prior to any instrument service being performed or when an instrument is being returned to the Agilent Service Center for repair.

WARNING

This battery (p/n 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.

Battery location

The Ni-MH rechargeable battery is located inside the field case along the hinge in a specially designed compartment.

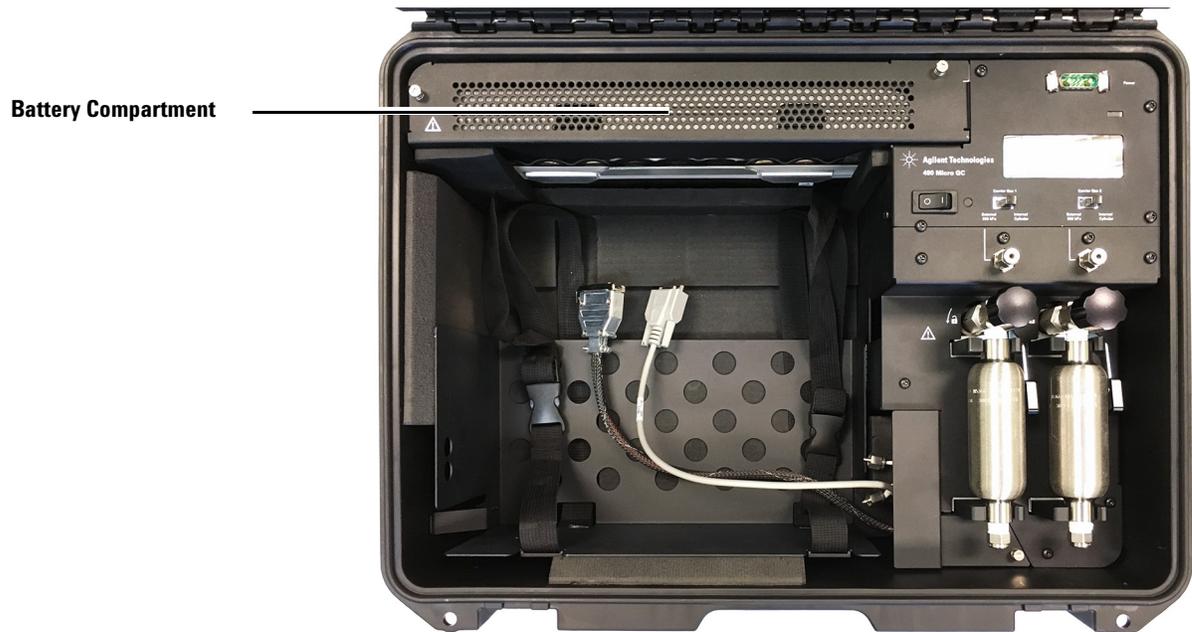


Figure 38 The battery compartment

To access the battery, loosen the captive Torx T-20 screws and lift off the battery compartment cover.



Figure 39 Removing the battery compartment cover

The battery will be visible.

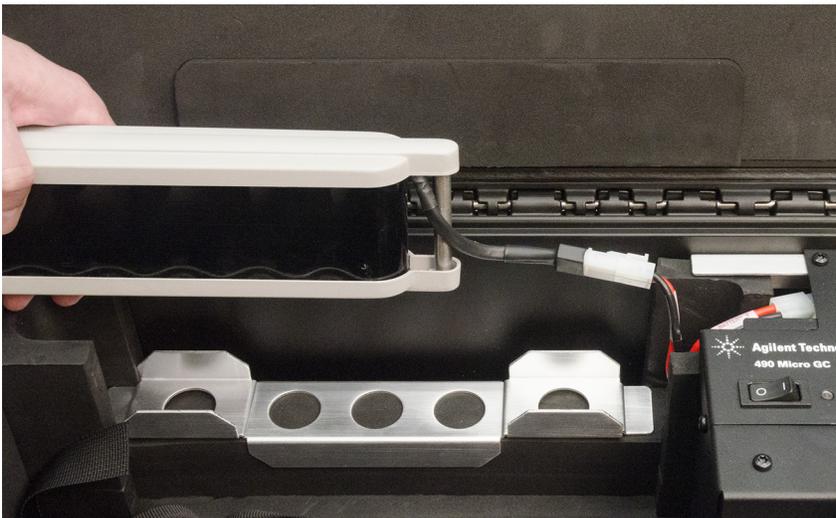


Figure 40 Removing the battery

The battery can be removed by unplugging the connector and lifting the battery out of the compartment.

Battery handling

- Never disassemble the battery as the electrolyte inside is strong alkaline and can damage skin and clothes.
- Never attempt to short-circuit the battery. Doing so can damage the product and generated heat can cause burns.
- Do not dispose of the battery in a fire. Disposing of the battery in fire can cause the battery to rupture. Also avoid placing batteries in water as this causes batteries to cease to function.
- Never solder anything directly to the battery. This can destroy the safety features of the battery by damaging the safety vent inside the cap.
- Do not use the battery in an appliance or for purposes for which it was not intended.
- Do not place containers with flammable liquids near the battery. Spilling liquid over hot parts may cause fire.
- Never use alcohol or thinners to clean the Battery Pack. These chemicals can damage the case.

Charging

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 when charging.

WARNING

Charge the battery within an ambient temperature range of 0 °C to 45 °C.

WARNING

Never attempt reverse charging. Charging with polarity reversed can cause a gas pressure inside the batter to rise, which can activate the safety vent, lead to alkaline electrolyte leakage, rapid deterioration ini battery performance, battery swelling, or battery rupture.

- Batteries should always be charged prior to use. Be sure to charge correctly, and use only the battery charger that has been supplied by Agilent Technologies, Inc.
- The batteries can be charged with the external charger or from in the field case. It is recommended that the batteries be charged in the field case.
- Ambient temperature affects charging efficiency. As charging efficiency is best within a temperature range of 10 °C to 45 °C, when charging, be sure the Battery Pack and charger are within this temperature range.
- At temperatures 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.
- Do not parallel charge batteries.
- Avoid overcharging when using the external charger. Repeated overcharging can lead to deterioration in performance. Overcharging means charging a battery when it is already fully charged.
- To avoid overcharging, use a timer to measure the total charge time.

- 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 using the external charger and repeating several cycles of charging and discharging.
- When recharging, place the battery in a suitable location with sufficient ventilation. Space around the battery must be sufficient to enable cooling.
- 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.
- Never insert the battery with the positive and negative poles reversed as this can cause the battery to swell or rupture.
- Do not charge the battery if there is a possibility of any kind of electrical damage. Instead, disconnect the battery power cords and contact your Agilent Technologies office.

Discharging

CAUTION

Since over-discharging (deep discharge) damages the battery characteristics do not leave the battery connected to the instrument for long periods of time.

Storage

CAUTION

When storing batteries for more than 1 year, disconnect batteries from the field case. Charge at least once per year to prevent leakage and deterioration in performance due to self-discharging.

- Store the battery in a dry location with low humidity, no corrosive gases, and at a temperature range of -20 °C to +50 °C.
- Storing the battery in a location where humidity is extremely high or where temperatures fall below -20 °C or above +50 °C can lead to rusting of metallic parts and battery leakage due to expansion or contraction of parts composed of organic materials.
- 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.

- 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 their original performance by using the external charger and repeating several cycles of charging and discharging.

Battery service life

Batteries used under proper conditions of charging and discharging can be used 500 cycles or more.

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 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.

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.

Cleaning

To keep the Battery Pack surface clean:

- Clean only when the Battery Pack is disconnected from the charger.
- Use a soft (not 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 the battery pack.

Disposal

When the Battery Pack or parts of it has reached the end of its useful life, disposal must be carried out in accordance with all (environment) regulations applicable in your country.

Technical specifications

Table 10 Battery Pack technical specifications

Technology	Ni-MH (Nickel Metal Hydride)
Number of cells	10
Cell-orientation	1 × 10 in row
Nominal output voltage	12 Vdc
Capacity	10000 mAh
Protection	Built-in thermo fuse resettable (75 °C) and current (14 A)
Output cable	Two wires, UL1015 approved
Output connector	2-circuit JST connector Pin 1 (red) +12 V Pin 2 (black) ground
Operation temperature	0 °C to +50 °C
Charge temperature	0 °C to +45 °C
Storage temperature	0 °C to +70 °C
Humidity	0 % to 95 % (non-condensing)
Safety	UL2054, UL1015 (cabling) and CE
Size	348 × 71 × 37 mm
Weight	2,000 grams

Battery Charger

Introduction

This Charger (p/n CP740427), [Figure 41](#), must only be used in combination with the Micro GC Battery Pack (CP740328), see [Figure 37](#) on page 48. This Charger is tailored to meet the power needs of the Battery Pack.



Figure 41 Battery Charger (p/n CP740427)

Features

- Micro controller controlled charging
- Short circuit detection and electronic protection against reversed battery
- Battery condition at the beginning of the charge is of no importance for the Battery Packs
- Safety stages like voltage gradient supervision and -dV switch off as well as a safety timer are integrated

Charger status

LED	Status
Yellow	Battery not connected*
Yellow	Battery initialization and analysis†
Orange	Fast charge
Green with intermittent Yellow flash	Top-off charge
Green	Ready to use and trickle charge
Alternating Orange-Green	Error

* There is power to the charging unit, but the battery is not connected.

† After the battery is connected to the charging unit.

Operation

CAUTION

Keep this charger in a dry place (indoor use only). The charger should be disconnected from the power supply when not in use. Do not plug in the charger if there is a damaged cabinet or power plug.

- 1 The charger will start automatically as soon as a Battery Pack is installed and the charger is plugged into the power supply. (The LED is yellow.)
- 2 The charger starts the fast charging procedure (LED is orange).
- 3 After the fast charging procedure, the charger switches automatically over to top-off charge (LED is green with a yellow flash).
- 4 After the top-off charging procedure, the charger switches automatically over to trickle charge (LED is green).
- 5 Trickle charge will last until either the battery or the power supply cable is disconnected.

Cleaning

To keep the charger surface clean:

- Remove the power cable.
- Use a soft brush (not hard or abrasive) 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 Charger, these chemicals can damage the case.
- Be careful not to get water on the electronics components.
- Do not use compressed air to clean the Battery Charger.

Disposal instructions

Disposal must be carried out in accordance with all environment regulations applicable in your country.

Technical specifications

Table 11 Battery Charger technical specifications

Model	Mascot MC-2215
Main voltage	90 to 264 Vac
Frequency	50 to 60 Hz
Power consumption	45 W
Output voltage	6.2 - 18 Vdc
Maximum charge current	1.8 A
Output cable	Two wires, 1.7 meter
Output connector	2-circuit Mate-N-lok connector Pin 1 (red) +12 V Pin 2 (black) ground
Humidity	0 % to 90 % (non-condensing)
Conformations	2006/95/EC (low voltage) 2004/108/EC (EMC) 93/42/EEC (Medical)
Size	107 × 67 × 36.5 mm
Weight	250 grams

Error Message and Battery Status Indication

Error message

While charging battery inside field case, the system will monitor and display battery status on screen. When an error message appears, contact a service engineer for support.

During battery charging mode, battery voltage over 15.2 V or below 10.0 V, or a voltage drop over 0.5 V indicates a defective battery pack.

During battery charging mode, a charging current over 2.5 A or below 0.4 A may be caused by a defective charging circuit.

If an error is detected, the system will stop operation and show an error message on the display panel, see [Figure 42](#).

Follow the instructions to power off micro GC:

- 1 Unplug the power adapter from field case power connector.
- 2 Disconnect the batteries from the field case.



Figure 42 Error message

Table 12 Error codes

Error message	Battery 1	Battery 2
Over voltage (>15.2 V)	101	201
Under voltage (<10.0 V)	102	202
Over current (>2.5 A)	103	203
Under current (<0.4 A)	104	204
Over voltage drop (>0.5 V)	105	205

Battery status indicator

The Ni-MH rechargeable battery, used under proper conditions of charging and discharging, can be used 500 cycles or more. The system monitors the battery status, and will indicate when it is reaching its service life. At that time, it is recommended to replace it with a new battery pack, CP740328. See [Figure 43](#).



Figure 43 Battery status indicator

3 Battery Pack and Charger



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Printed in China
August 2017



G3581-90005