

Agilent 990
Mobile Micro GC

User Manual



Notices

© Agilent Technologies, Inc. 2019

No part of this manual may be reproduced in any form or by any means (including electronic storage and retrieval or translation into a foreign language) without prior agreement and written consent from Agilent Technologies, Inc. as governed by United States and international copyright laws.

Manual Part Number

G3588-90015

Edition

First edition, August 2019

Printed in China

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

Warranty

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

Technology Licenses

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

Restricted Rights Legend

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

Safety Notices

CAUTION

A CAUTION notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a CAUTION notice until the indicated conditions are fully understood and met.

WARNING

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

Contents

1 Getting Started

Safety Information	6
Initial Inspection	8
Unpacking	9
Agilent 990 Mobile Micro GC ship kit G3588-68007	9
Accessories	10
Carrier gas	11
Instrument Overview	12
Power source	14

2 Installation and Use

Mobile Micro GC Sample Inlet Requirements	18
Mobile Micro GC sample inlet requirements	18
LCD Touch Screen	20
Charging Batteries	21
Connecting the Mobile Micro GC to the Sample Source	22
Connect the Workstation PC to the Mobile Micro GC	23
Installing and Removing the Gas Cylinders	24
Reducing gas flow module pressure	24
Carrier Gas Refill Instructions	25
Attach the carrier gas refill assembly to the gas source	25
Removing a gas cylinder from the Mobile Micro GC	27
Gas cylinder refill procedure	28
Exchanging gas species or first refill of the gas cylinder	31
Shipping	32
Cleaning	32
Disposal	32

3 Battery Pack and Charge Board

Introduction	34
General Precautions	34
Battery Handling	35
Charging	36
Discharging	37
Access and toggle the battery switch	37
Battery Service Life	38

Disposal	38
Technical Specifications	39
Battery Status Indication	41
Charge board LED status indicator	41

4 Maintenance

Opening the Mobile Micro GC Internal Cover	44
Mobile Micro GC Channel Exchange	46
Uninstalling GC Channels	46
Installing GC Channels	50
Install Sample Inlet Tubing	57
Connecting the Channel Installation Bracket	58
Channel Carrier Gas Selection	61
Error Messages	62

1

Getting Started

Safety Information	6
Initial Inspection	8
Unpacking	9
Instrument Overview	12

Safety Information

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

- Agilent 990 Mobile Micro GC 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 cCSAus.
- Battery Pack 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 complies 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

This instrument may use flammable or explosive gases. Be familiar with, and 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 is 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 Agilent 990 Mobile Micro GC includes a mobile case and one to four channels. It 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.

Carefully unpack the Micro GC and accessories, and using proper handling techniques transfer to the work area. Inspect the Micro GC and accessories carefully for damage or signs of rough handling. Report damage to the carrier and to your local Agilent Technologies, Inc. office.

The Agilent 990 Mobile Micro GC features an integrated trolley for easier transportation.

The weight of an Agilent 990 Mobile Micro GC equipped with four channels is 83 lb, or 37 kg (it may vary due to different channel configurations). There is an extra handle on the back side of the case for moving the case by two persons.



Figure 1. Agilent 990 Mobile Micro GC with trolley handle extended

Unpacking

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

- Packing list
- Agilent 990 Mobile Micro GC
- Ship kit
- Accessories (optional)

Agilent 990 Mobile Micro GC ship kit G3588-68007

Table 1 Agilent 990 Mobile Micro GC ship kit G3588-68007

No *	Part Number	Description	Quantity
1	2815892301	Polyurethane, 1/16 in x 1/8 in x 25 ft, clear tube	1
2	0100-3004	Barbed luer 1/16 in size 0.57 in PC CLR	2
3	CP736879	Capillary ext. filter	1
4	G3588-90001	Agilent 990 Micro GC Manual on CD ROM	1
5	CP740292	Ethernet cross cable yellow 2.8 m	1
6	CP736729	External sample filter kit	1

* See **Figure 2**.



Figure 2. Ship kit contents

Accessories

Table 2 Accessories

Item	Part Number
Battery pack NiMH	G3588-67052
Gas cylinder for the Mobile Micro GC, 150mL	G3588-60460
990 Mobile Micro GC kit for septum manual injection	G3588-63580
990 Mobile Micro GC kit for luer-lock manual injection	G3588-63581
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

Carrier gas

The carrier gas supply cylinders are empty (transport regulations), and should be refilled using the procedure **Carrier Gas Refill Instructions** on page 25.

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

CAUTION

Due to safety concern, never use hydrogen carrier gas in the gas cylinder.

Instrument Overview

Congratulations and thank you for purchasing the Agilent Technologies, Inc. 990 Mobile Micro GC (**Figure 3**). The Mobile Micro GC is used to bring up to four Micro GC analytical channels to the sample source. The Mobile Micro GC contains one to four analytical channels installed in a mobile case, which is called the “field case”. The field case accommodates the sample connection, pumps, gas cylinders, battery and its charge board, LCD touch screen, and main board. Operation is continuous with interchangeable, rechargeable battery packs, and an internal gas supply.



Figure 3. The Agilent 990 Mobile Micro GC

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



Figure 4. Inside view



Figure 5. Side view of Mainboard communication connections

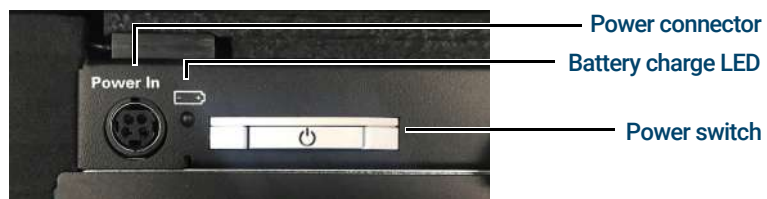


Figure 6. Top view detail of the Mobile Micro GC charge board features



Figure 7. Inside view detail with Channels and Gas Cylinders installed

Power source

The Agilent 990 Mobile Micro GC can be powered by batteries or the power supply.

Power supply

- Voltage of 12 Vdc, 180 W
- Only use the power supply (p/n 0950-5837) provided with the Micro GC. See the Micro GC User Manual for more information.

Battery pack

- The Mobile Micro GC is equipped with a 12 V 22 ampere-hours (Ah), Nickel metal hydride (Ni-MH) battery. See **Battery Pack and Charge Board** on page 33 for more details.
- Depending on the conditions in which the Micro GC is used, two batteries will typically provide power for eight hours before recharging becomes necessary.
- Maximum temperatures when using battery as power source:
 - Column temp 150 °C
 - Injector temp 90 °C
 - Sample inlet temp 90 °C.
- When reconditioning columns or stabilizing the system, it is advisable to plug in the power supply during this period.
- The Mobile Micro GC can support the use of up to two batteries simultaneously.

1 Getting Started

Power source

- Batteries are not user serviceable. Changing or adding batteries should be performed by Agilent service personnel only.
- The maximum allowable ambient temperature is 50 °C when the Mobile Micro GC is using battery power.
- All ambient requirements for the Agilent 990 Micro GC, except for the maximum operating temperature, are applicable to the Agilent 990 Mobile Micro GC. Please read the Agilent 990 Micro GC User Manual (p/n G3588-90010) for more details.

WARNING

The Mobile Micro GC battery (p/n G3588-67052) is designed for use in combination with the Mobile Micro GC. If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

NOTE

The battery cannot charge when the environmental temperature is above 55 °C.

1 Getting Started
Power source

2

Installation and Use

Mobile Micro GC Sample Inlet Requirements	18
LCD Touch Screen	20
Charging Batteries	21
Connecting the Mobile Micro GC to the Sample Source	22
Connect the Workstation PC to the Mobile Micro GC	23
Installing and Removing the Gas Cylinders	24
Carrier Gas Refill Instructions	25
Shipping	32
Cleaning	32
Disposal	32

Mobile Micro GC Sample Inlet Requirements

To use the Mobile Micro GC, at least one modular micro GC channel must be installed.

Mobile Micro GC sample inlet requirements

Table 3 Mobile Micro GC sample inlet requirements

Sample and Sample Inlet Type	Remarks and Requirements
Mobile Micro GC inlet	A sample inlet is already installed on the Mobile Micro GC.
Manual syringe injection	Install optional Mobile Micro GC kit for manual injection. See Table 4 and Table 5 for Mobile Micro GC kit descriptions.

Table 4 Mobile Micro GC kit for septum manual injection (p/n G3588-68580)

Part Number	Description	Quantity
G3588-60580	Septum fitting kit	1
CP742983	Septum injection port assembly	1
CP742990	Support ZF2SI	1
CP742984	Septum low bleed	1



Figure 8. Mobile Micro GC kit for septum manual injection (p/n G3588-63580)

2 Installation and Use

Mobile Micro GC sample inlet requirements

Table 5 Mobile Micro GC kit for luer-lock manual injection (p/n G3588-68581)

Part Number	Description	Quantity
G3588-60581	Luer lock fitting kit	1
VLZLA1	Female luer adapter to 1/16 ftgs	1
CP914757	Fitting, ext luer lock, 10-32 thrd, 1/pk	1



Figure 9. Mobile Micro GC kit for luer-lock manual injection (p/n G3588-63581)

LCD Touch Screen

The LCD Touch screen provides a user interface for displaying instrument status and configurations. It also supports selecting cylinder or external gas source by touch. Please refer to the Installation and Use section of the Agilent 990 Micro GC User Manual (G3588-90010) for an introduction to the LCD touch screen.

To switch the gas source, radio buttons are used on the **FieldCase** tab, as shown in **Figure 10**. Current cylinder pressure and battery remaining capacity/time are also shown on this tab.

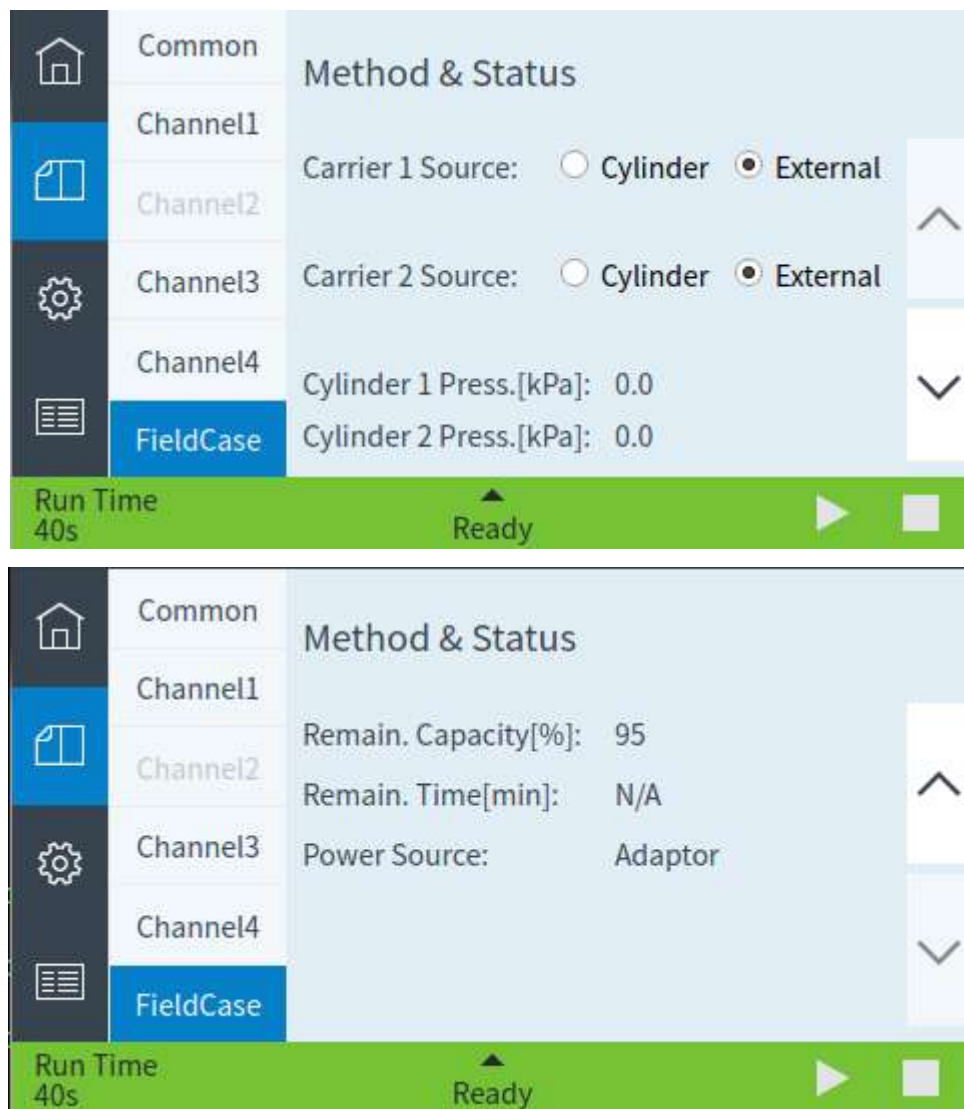


Figure 10. Method & Status, Field Case gas source control interface

Charging Batteries

As soon as the Mobile Micro GC is connected to a power supply, the system will start to charge the batteries if they are below 90% power.

If the Mobile Micro GC is powered **off**, both batteries will charge simultaneously.

If the Mobile Micro GC is powered **on**, it will charge one battery at a time. It may take longer to charge a battery when the Mobile Micro GC is powered on than when the GC is powered off.

The percentage of battery power will be displayed. See **LCD Touch Screen** on page 20.

LED indicator conditions in different working modes are shown **Table 8** on page 41.

2 Installation and Use

Connecting the Mobile Micro GC to the Sample Source

Connecting the Mobile Micro GC to the Sample Source

- 1 Connect sample source tubing to the sample inlet.
- 2 Tighten the nut finger-tight.
- 3 Use a 5/16" wrench to tighten the nut.



For manual injection, refer to the section "Mobile Micro GC Manual Injection" in the Manual Injection Installation Guide (p/n G3588-90028).

2 Installation and Use

Connect the Workstation PC to the Mobile Micro GC

Connect the Workstation PC to the Mobile Micro GC

The external device connection ports on the Mobile Micro GC are located at the left side of the internal cover (See **Figure 5** on page 13). From left to right, are RS-232 (COM-1), USB, Ethernet (LAN), and multiconnector.

The Mobile Micro GC requires an Agilent chromatography data system (CDS) for control, peak identification, integration, data analysis, reporting, and so forth. The CDS requires a LAN (Ethernet) connection or Wi-Fi. Multiple Micro GCs can be controlled using an Agilent data system such as OpenLAB EZChrom, OpenLAB Chemstation, or OpenLAB 2.x. The maximum number of Micro GCs controlled is limited by your software license. For detailed information on setting method parameters, see the help files in the data system. For more information about the Ethernet connection between the Workstation PC and the Micro GC, see the "Communication" chapter in the Agilent 990 Micro GC User Manual (p/n G3588-90010).

Installing and Removing the Gas Cylinders

- 1 Align the gas cylinder with the gas assembly socket.



- 2 Insert the cylinder by pressing down firmly on the gas valve knob. The latch should click as it engages automatically.
- 3 To remove the gas cylinder, press down on the latch. The cylinder will eject from the socket.

NOTE

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

Reducing gas flow module pressure

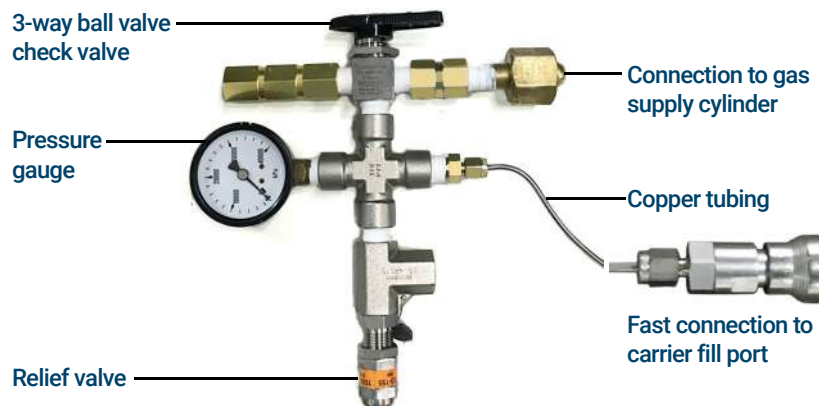
- 1 Close the gas cylinder valve.
- 2 Remove the external gas supply connector plug.
- 3 Using the LCD touch screen, switch between internal and external gas source several times to reduce pressure inside flow module. Every switch will reduce pressure approximately 4 to 5bar.

Carrier Gas Refill Instructions

Your Mobile Micro GC is equipped with refillable, high-pressure carrier supply cylinders which have been approved to 12,400 kPa. The Micro GC is equipped with one or two 150mL 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.



The carrier gas refill assembly 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 Assemblies to meet all major standards. Follow up with your local gas supplier if the carrier gas refill assembly does not fit carrier gas tanks on your GC. The GC tanks accept 1/4 inch NPT male threads.

Attach the carrier gas refill assembly to the gas source

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



- 2 Ensure the 3-way ball valve is in the 'check valve' position.

2 Installation and Use

Attach the carrier gas refill assembly to the gas source

- 3 Connect the refill assembly to a gas source as shown below.



- 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 steps in the [Gas cylinder refill procedure](#) on page 28.

2 Installation and Use

Removing a gas cylinder from the Mobile Micro GC

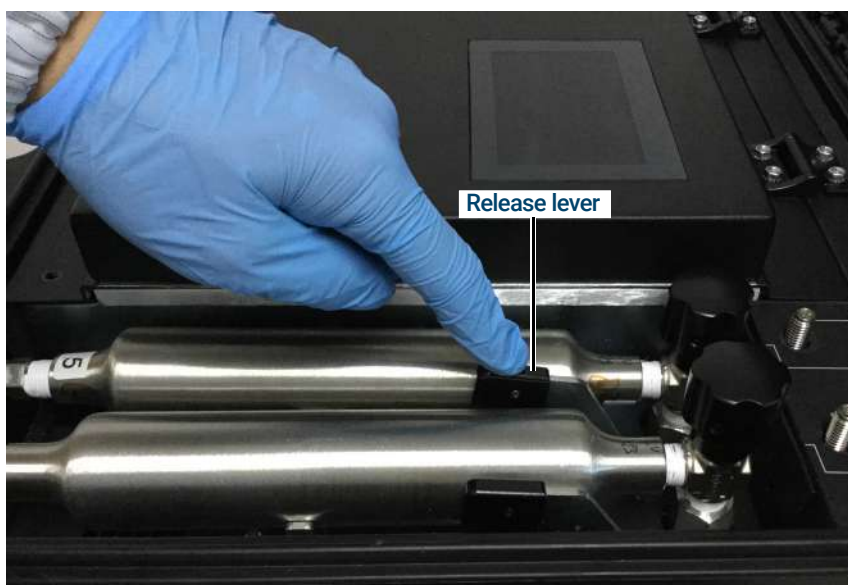
Removing a gas cylinder from the Mobile Micro GC

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



Gas valve
Turn clockwise to close

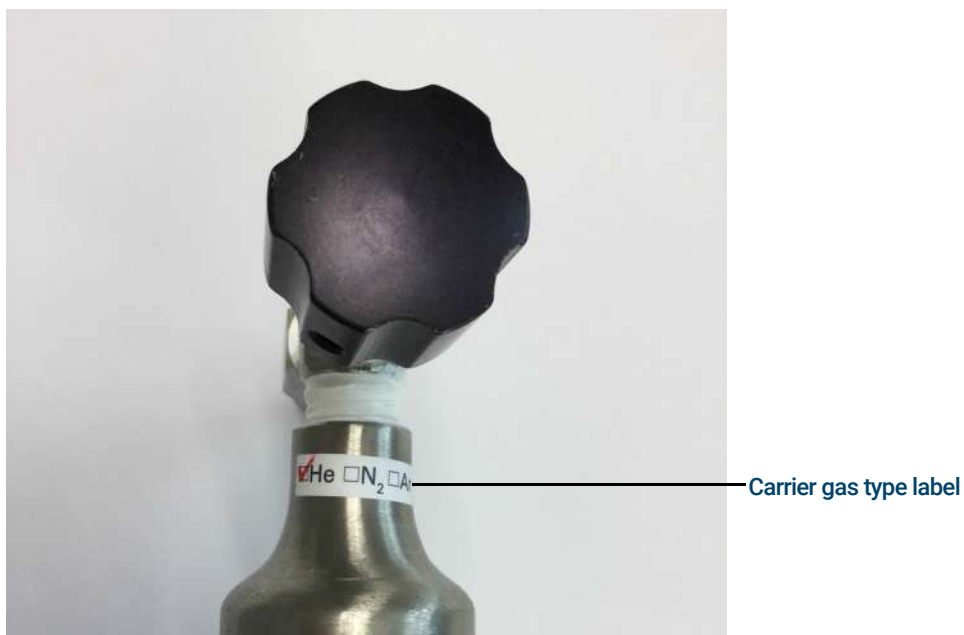
- 2 Push the release lever at the right side of the gas cylinder.



- 3 Pull vertically on cylinder assembly to remove.

Gas cylinder refill procedure

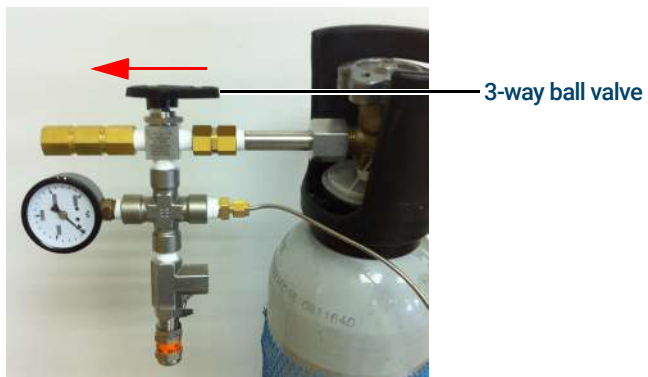
- 1 Mark the carrier gas type on the label on the gas cylinder.



- 2 Install the refill assembly onto the gas source (see [page 25](#)).
- 3 Remove the gas cylinder from the Mobile Micro GC (see [page 27](#)).
- 4 Ensure that the On/Off valve on gas cylinder is closed.



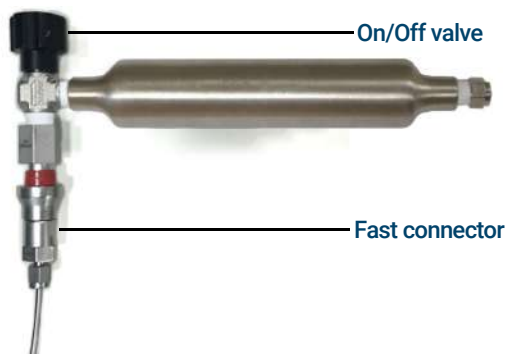
- 5 Ensure 3-way ball valve on refill assembly is set to the 'check valve' position.



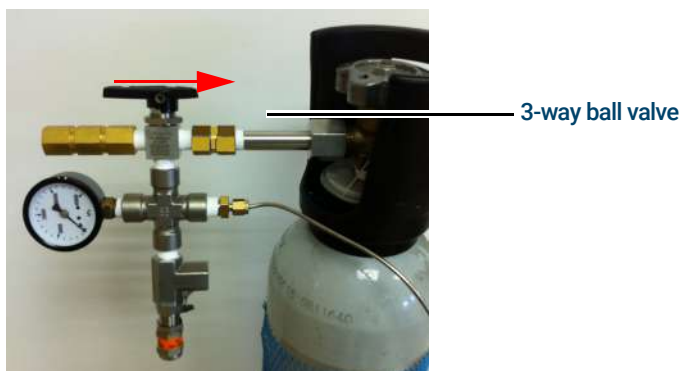
2 Installation and Use

Gas cylinder refill procedure

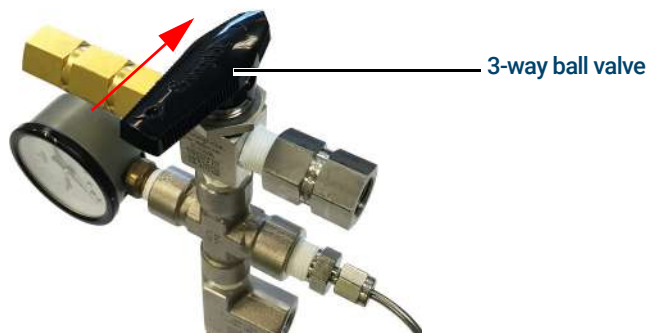
- 6 Connect the gas cylinder to the fast connector at the end of refill assembly.



- 7 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.
- 8 Read the pressure gauge on the refill assembly, and ensure the pressure is zero.
- 9 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.



- 10 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.



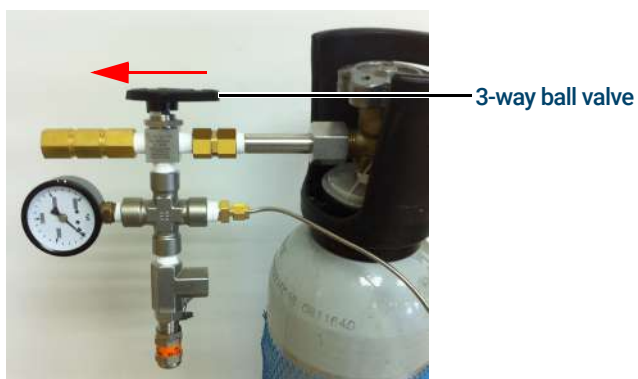
- 11 Close the On/Off valve on the gas cylinder.

2 Installation and Use

Gas cylinder refill procedure



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.



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.

2 Installation and Use

Exchanging gas species or first refill of the gas cylinder

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.
- 4 If the pressure of the gas source is higher than 124bar, switch the 3-way ball valve back to 'middle position'.
- 5 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.
- 6 Repeat steps 2 through 4 three times.
- 7 Close the On/Off valve on the gas cylinder.
- 8 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 Agilent 990 Mobile Micro GC 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

Ship the instrument with the batteries switched off. See [Discharging](#) on page 37.

Cleaning

To keep the Mobile Micro GC surface clean:

- Clean it only when the Mobile Micro GC is disconnected from the power supply.
- Switch off the batteries.
- 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 Micro GC.
- Never clean the inside of the Micro GC.
- Do not get water on the electronics components.
- Do not use compressed air to clean the Micro GC.

Disposal

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

3

Battery Pack and Charge Board

Introduction	34
General Precautions	34
Battery Handling	35
Charging	36
Discharging	37
Battery Service Life	38
Disposal	38
Technical Specifications	39
Battery Status Indication	41

Introduction

The Agilent 990 Mobile Micro GC Battery Pack (p/n G3588-67052) may be charged inside the Agilent 990 Mobile Micro GC. It may only be used to power the 990 Mobile Micro GC.

NOTE

The Mobile Micro GC is shipped with the batteries installed but switched off. Switch on the batteries inside the battery compartment before operation.

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 G3588-67052) is designed for use in combination with the Agilent 990 Mobile Micro GC. If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

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 functioning.

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

The battery supports **Pre-Charging**, **Fast Charging** and **Trickle Charging**. Charging modes are determined by the Mobile Micro GC firmware, and are handled automatically.

Legacy Charging info

To take full advantage of the properties of the Ni-MH Battery Pack, and 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 50 °C.

WARNING

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.

- The batteries are charged while in the Mobile Micro GC.
- High ambient temperature results in shorter battery life.
- Ambient temperature affects charging efficiency. As charging efficiency is best within a temperature range of 5 °C to 45 °C, when charging, be ensure the Battery Pack and charger are within this temperature range. For safety, battery charging/discharging will automatically stopped by the if battery cell overheats.
- 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.
- Never insert the battery with the positive and negative poles reversed as this can cause the battery to swell or rupture.
- Only use the battery pack provided by Agilent.
- The battery cannot start charging when the environmental temperature is above 55 °C.
- It is suggested to fully charge and discharge the batteries for a cycle once per month.

Discharging

CAUTION

If the Mobile Micro GC will not be used for a long period of time, please switch off the battery switch inside the charge board to avoid over-discharging.

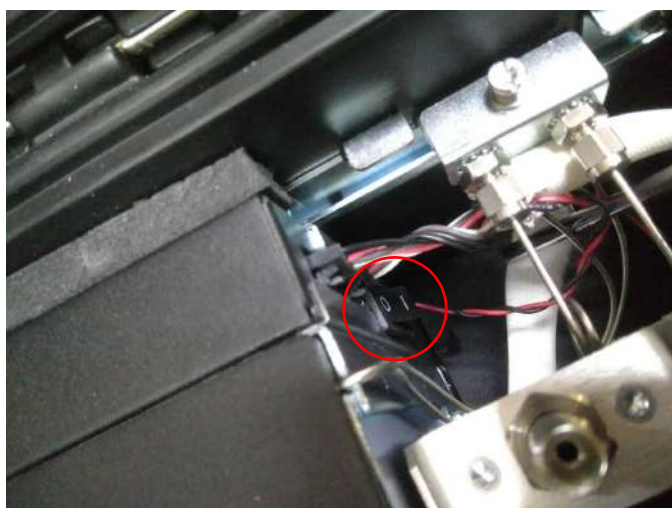
Since over-discharging will shorten the battery life, if the Mobile Micro GC will not be used for a long time (>two weeks), please switch off the battery.

Access and toggle the battery switch

- 1 Remove the foam.



- 2 Toggle the battery switch (0 - OFF, 1 - ON).



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 with use and 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.

Disposal

When a Battery Pack 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 6 Battery Pack technical specifications

Technology	Nickel Metal Hydride (Ni-MH)
Number of cells	10
Cell-orientation	1 × 10
Nominal output voltage	12 Vdc
Capacity	22,000 mAh
Protection	Built-in thermo fuse current (20 A)
Output cable	Four wires, UL1015 approved.
Output connector	4-circuit Molex connector.
Operation temperature	0 °C to +50 °C
Charge temperature	0 °C to +50 °C
Storage temperature	-20 °C to +50 °C
Humidity	0 % to 90 % (noncondensing)
Safety	UL2054, UL1015 (cabling) and CE
Size	278 mm × 171 mm × 44.5 mm
Weight	4,700 grams

3 Battery Pack and Charge Board Technical Specifications

Table 7 Power Adapter technical specifications (Model GST220A12-AG2, p/n 0950-5837)

Feature	Model: GST220A12-AG2
Input voltage	100 Vac to 240 Vac
Input frequency	50-60Hz
Inrush current	120A/230VAC
Output voltage	12.0 Vdc
Output power	180 W
Over voltage protection	105 %-135 % rated output voltage
Ripple and noise	80mV Vp-p
Operating temperature	-30 °C to +70 °C
Storage temperature	-40 °C to +85 °C
Humidity	20 % to 90 % noncondensing
Safety standard	UL60950-1, TUV EN60950-1, BSMI CNS14336, CSA C22.2, CCCGB4943, PSE J60950-1 Approved
RFI/EMC standard	In compliance with CISPR22 (EN55022) Class B and FCC Part 15/CISPR 22 class B, CNS13438 class B, GB9254, EN61000-3-2, EN61000-3-3, EN61000-4-2, EN61000-4-3, EN61000-4-4, EN61000-4-5, EN61000-4-6, EN61000-4-8, EN61000-4-11 (light industry level, criteria A)
Dimensions	210 × 85 × 46 mm (L×W×H)
Weight	1.1 kg approximately

Battery Status Indication

The Ni-MH rechargeable battery, used under proper conditions of charging and discharging, can be used 500 cycles or more.

While charging the battery inside the Mobile Micro GC, the system will monitor and display battery status on screen. When an error message appears, contact a service engineer for support. See the section **Error Messages** on page 62 for detailed information on error messages.

Charge board LED status indicator

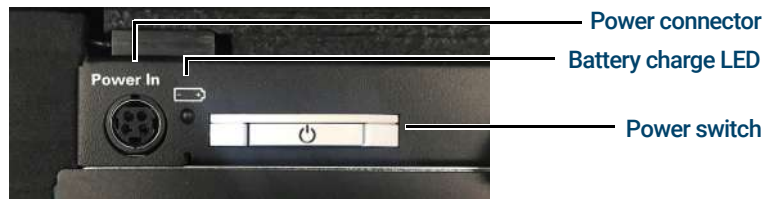


Figure 11. Mobile Micro GC battery charge LED location.

The charge board has one LED indicator for battery information, detailed below:

Table 8 LED indicator behavior

LED	Power Adapter: Charging	Power Adapter: Charging Complete	Battery: Normal	Battery: Low Power	Error	Firmware Upgrade Mode
White LED	blink	on	off	off	off	blink
Red LED	off	off	off	blink	on	blink

3 Battery Pack and Charge Board

Charge board LED status indicator

4

Maintenance

Opening the Mobile Micro GC Internal Cover	44
Mobile Micro GC Channel Exchange	46
Install Sample Inlet Tubing	57
Connecting the Channel Installation Bracket	58
Channel Carrier Gas Selection	61
Error Messages	62

Opening the Mobile Micro GC Internal Cover

WARNING

Before removing the Micro GC covers, allow all heated zones to cool down. Turn off the power, then disconnect the power cord at the source.

WARNING

Remove any tubing connected to the sample-in and carrier gas inlet connectors.

The Mobile Micro GC internal cover houses the LCD touch screen and Mainboard.

- 1 Open the Mobile Micro GC lid.
- 2 Remove the two Torx T-20 screws.



- 3 Open the Mobile Micro GC internal cover by lifting at the front edge.



4 Maintenance
Opening the Mobile Micro GC Internal Cover

- 4 Pull out the anti-pinch lid stopper.



Mobile Micro GC Channel Exchange

NOTE

The GC Channel must have a sample-in connector tubing installed BEFORE it is installed into the Mobile Micro GC. See the section [Install Sample Inlet Tubing](#) on page 57

NOTE

Do not fill the carrier gas tank until all parts are fully assembled and installed in the Mobile Micro GC.

Uninstalling GC Channels

- 1 Open the Mobile Micro GC Internal Cover, see [Opening the Mobile Micro GC Internal Cover](#) on page 44.
- 2 If using internal carrier gas, turn off the carrier gas cylinder.
- 3 Disconnect the Workstation PC to the Mobile Micro GC. For details, see [Connect the Workstation PC to the Mobile Micro GC](#) on page 23.

NOTE

Disconnect and remove channels attached to port 4 first, then port 3, then port 2, and port 1 last. This will minimize dead volume and avoid carry-over when operating the GC with the remaining channels.

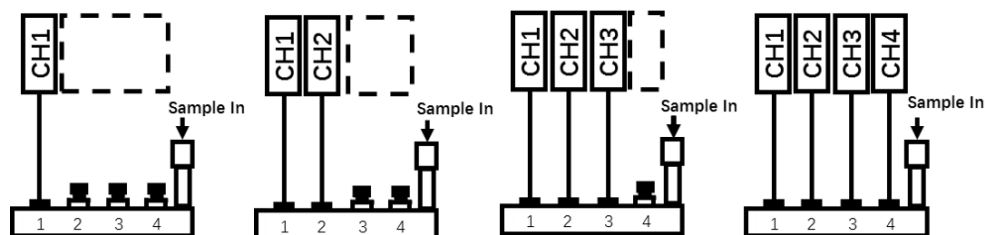
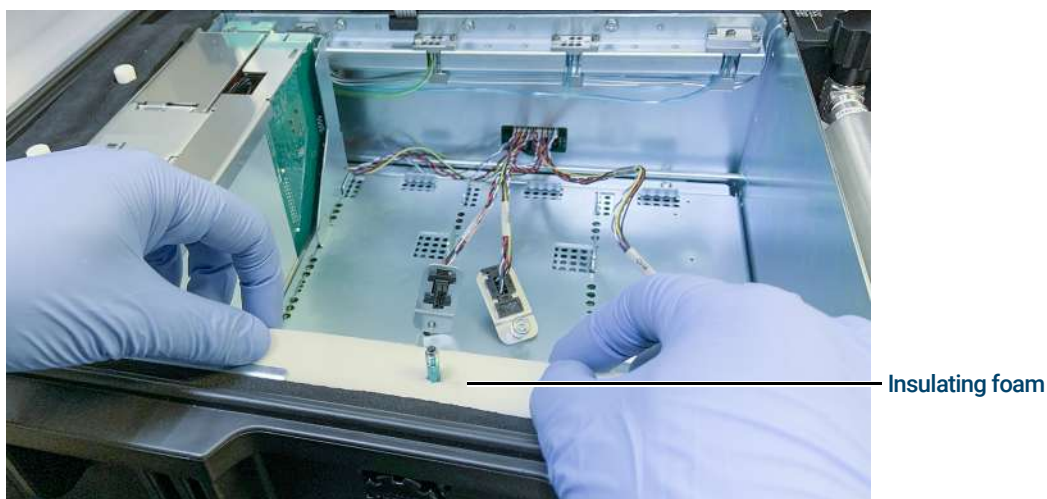


Figure 12. Sample inlet tubing connection rules

- 4 Remove the insulating foam covering the inlet tubing.



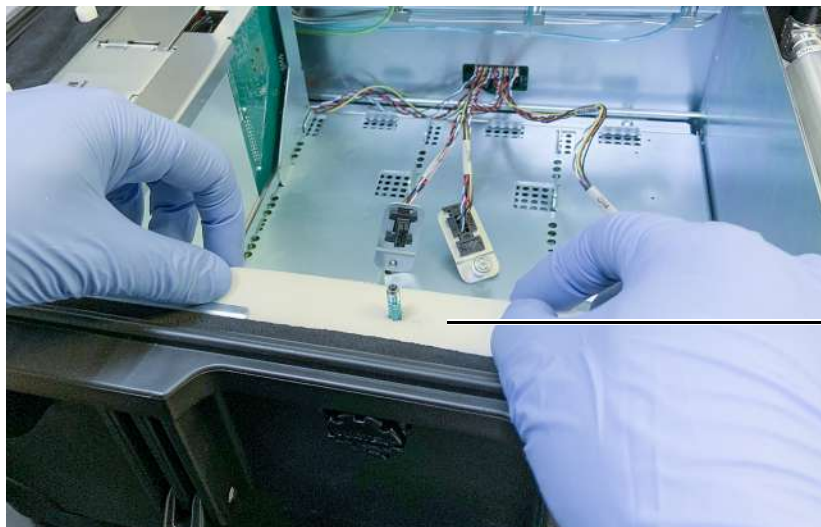
4 Maintenance

Uninstalling GC Channels

- 5 Disconnect the sample inlet tubing from the Mobile Micro GC.
 - The tubing must be disconnected before the GC Channel is removed from the Mobile Micro GC.
 - Disconnect tubing assembly p/n G3588-60590 (or p/n G3588-60591) from the weldment p/n G3588-60513 (or p/n G3588-60512) corresponding to each channel to be removed. Loosen the nut with a 3/16" open-end wrench and complete removal using fingers.



- 6 Put the insulating foam back in place.

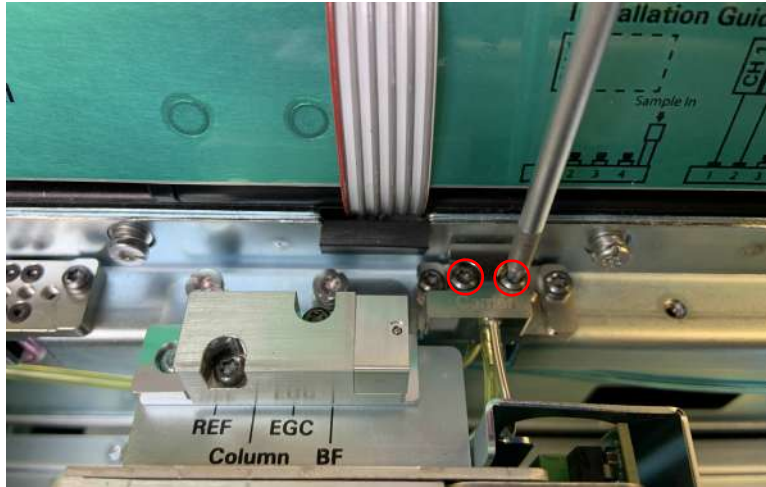


Insulating foam

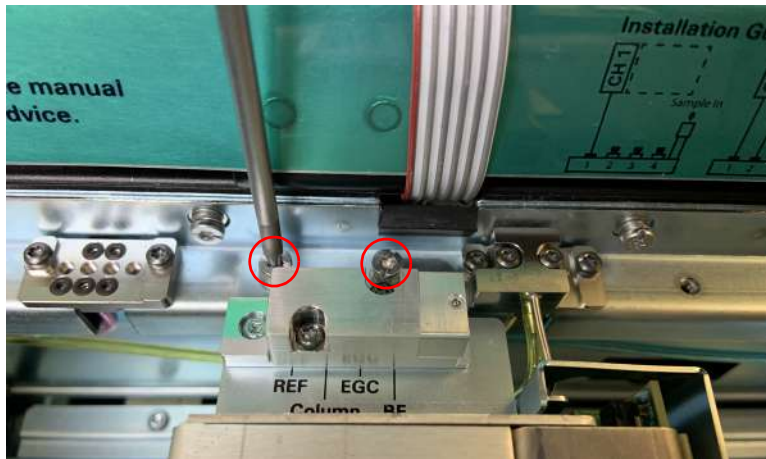
4 Maintenance

Uninstalling GC Channels

- 7 Disconnect the carrier gas inlet fitting by loosening the two T-10 captive screws. See [Channel Carrier Gas Selection](#) on page 61 for details.



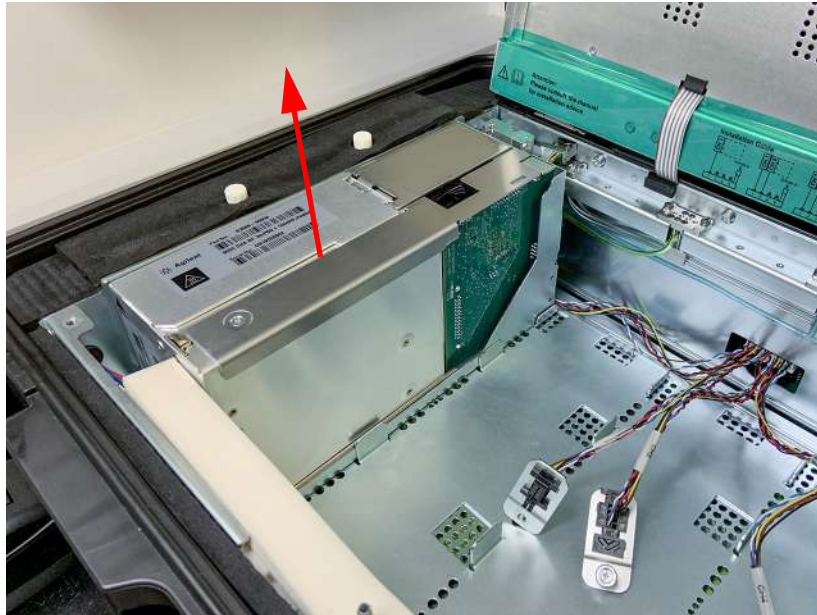
- 8 Unfasten the Channel from the Mobile Micro GC by loosening the two captive bracket screws with a slotted screwdriver or Torx T-15 driver.



4 Maintenance

Uninstalling GC Channels

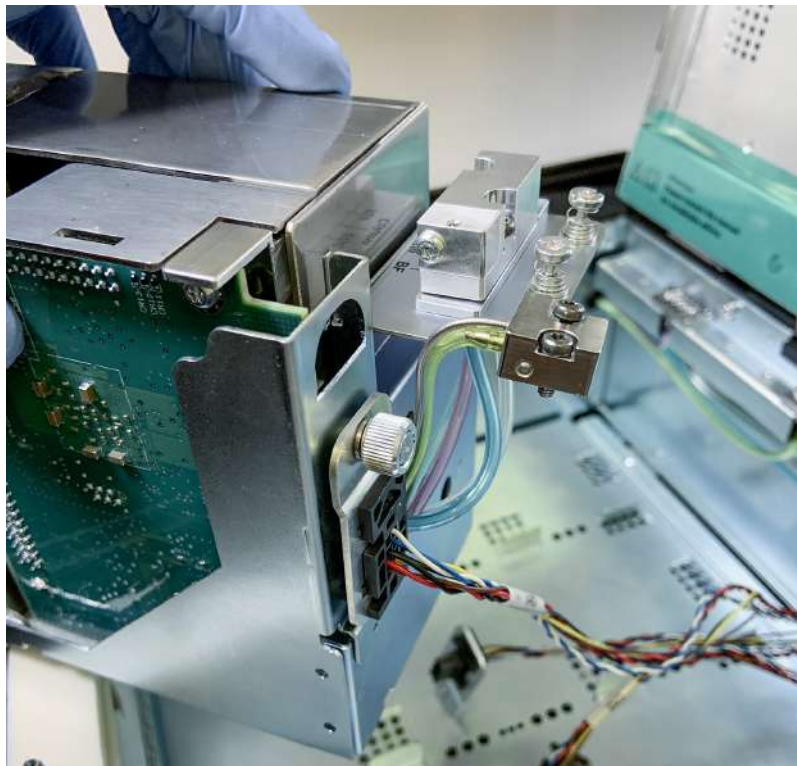
- 9 Lift the channel up and out from Mobile Micro GC.

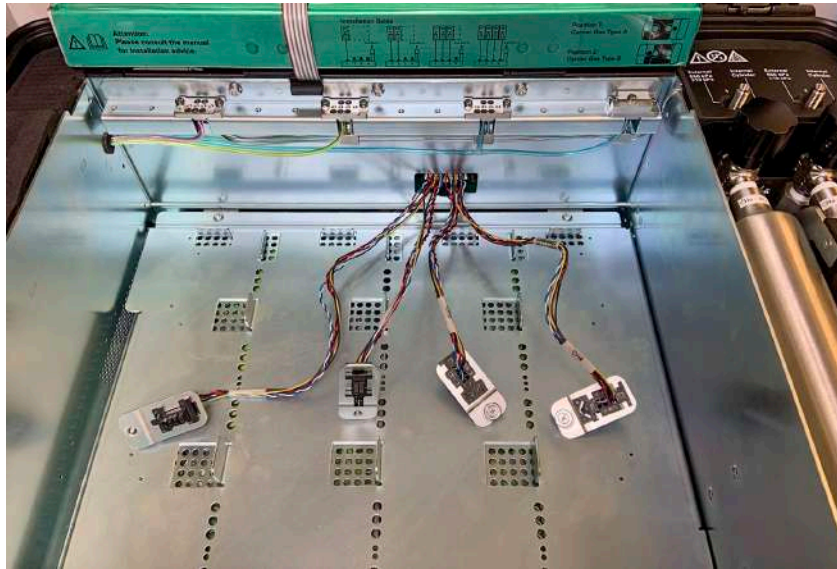


NOTE

The CCB channel cable is connected to the GC Channel. Do not move the channel away from the Mobile Micro GC before disconnecting the CCB cable.

- 10 Disconnect the individual CCB Channel connector from the Channel by loosening the thumb screw by hand.





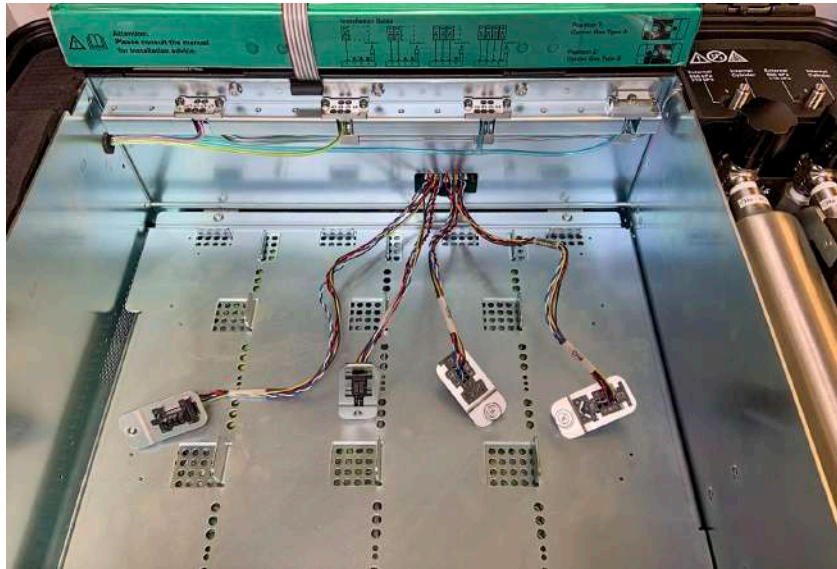
- 11 Close and fasten the internal cover.

Installing GC Channels

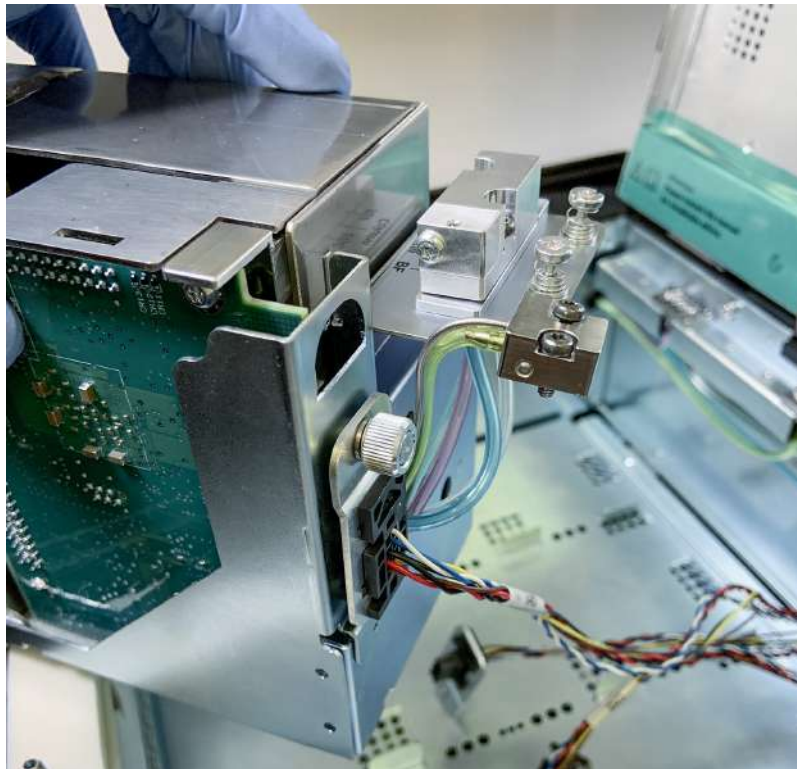
- 1 Ensure the Mobile Micro GC batteries are installed and connected, as the channels must be removed to install batteries. The Mobile Micro GC is shipped with the battery switched off. See [Access and toggle the battery switch](#) on page 37.
- 2 Before installing a Micro GC Channel into the Mobile Micro GC, prepare the channel. See [Install Sample Inlet Tubing](#) on page 57 and [Connecting the Channel Installation Bracket](#) on page 58.
- 3 Open the Mobile Micro GC, then open the Internal Cover. See [Opening the Mobile Micro GC Internal Cover](#) on page 44.
- 4 Install power/data cable harness (CCB).



4 Maintenance
Installing GC Channels



- 5 Connect the individual CCB Channel connector to the Channel and tighten the screws by hand. Connectors are labeled for each Channel, "CH 1", "CH 2", "CH 3", and "CH 4".



4 Maintenance

Installing GC Channels

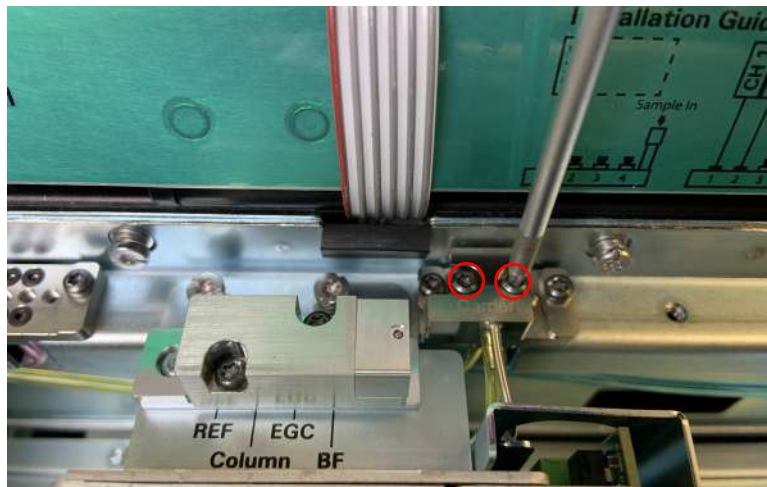
- 6 Place the channel in Mobile Micro GC.



CAUTION

When placing a GC channel into the Mobile Micro GC, do not damage or obstruct the data cable or carrier gas connections.

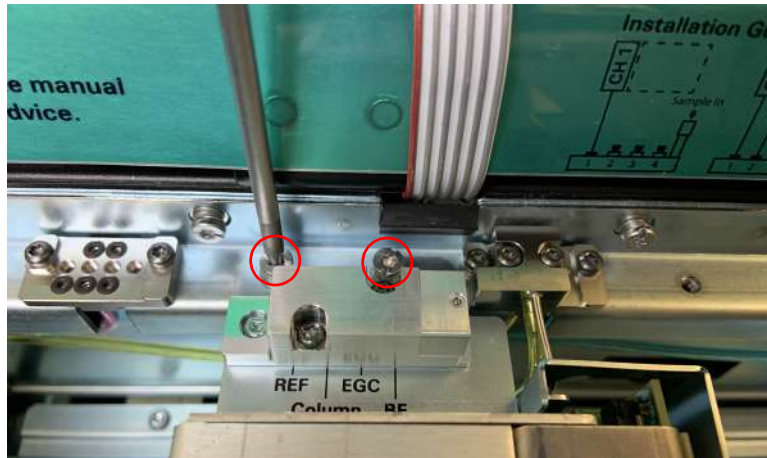
- 7 Connect the carrier gas inlet fitting with the two T-10 captive screws. See [Channel Carrier Gas Selection](#) on page 61 for details.



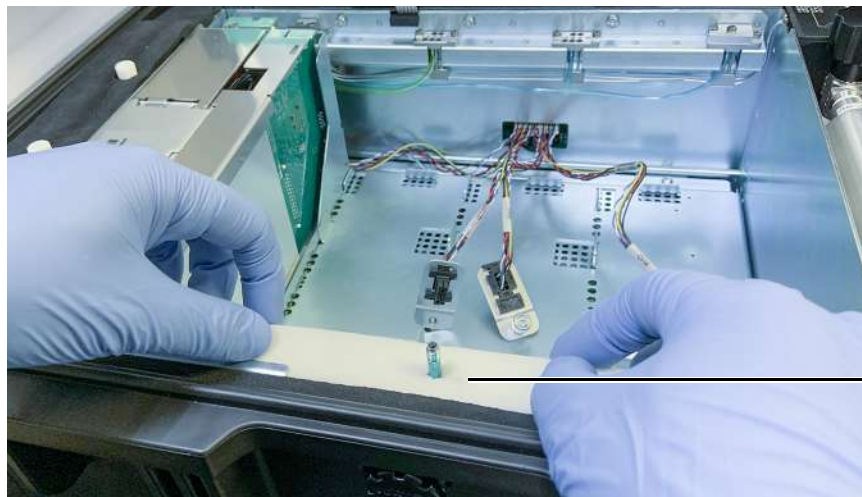
4 Maintenance

Installing GC Channels

- 8 Fasten the Channel to the Mobile Micro GC with the two captive bracket screws with a slotted screwdriver or Torx T-15 driver.



- 9 Remove the insulating foam covering the inlet tubing.



Insulating foam

4 Maintenance

Installing GC Channels

10 Connect the sample inlet tubing to the Mobile Micro GC.

- The tubing can only be fastened after the GC Channel is mounted in the Mobile Micro GC.
- Connect tubing assembly p/n G3588-60590 (or p/n G3588-60591) to the weldment p/n G3588-60513 (or p/n G3588-60512). Finger-tighten first, and then tighten the nut with a 3/16" open-end wrench.



NOTE

Connect channels to port 1 first, then port 2, then port 3, and port 4 last. This will minimize dead volume and avoid carry-over.

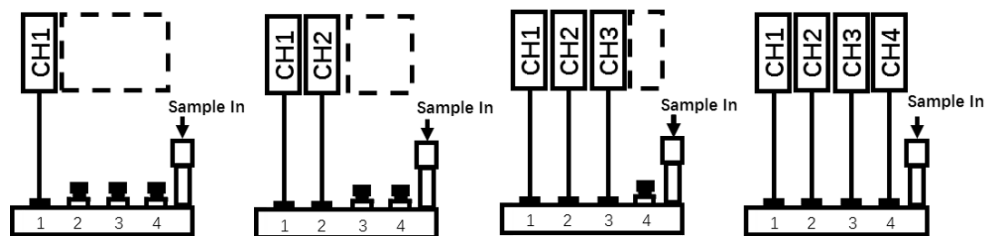


Figure 13. Sample inlet tubing connection rules

4 Maintenance

Installing GC Channels

11 Put the insulating foam back in place.



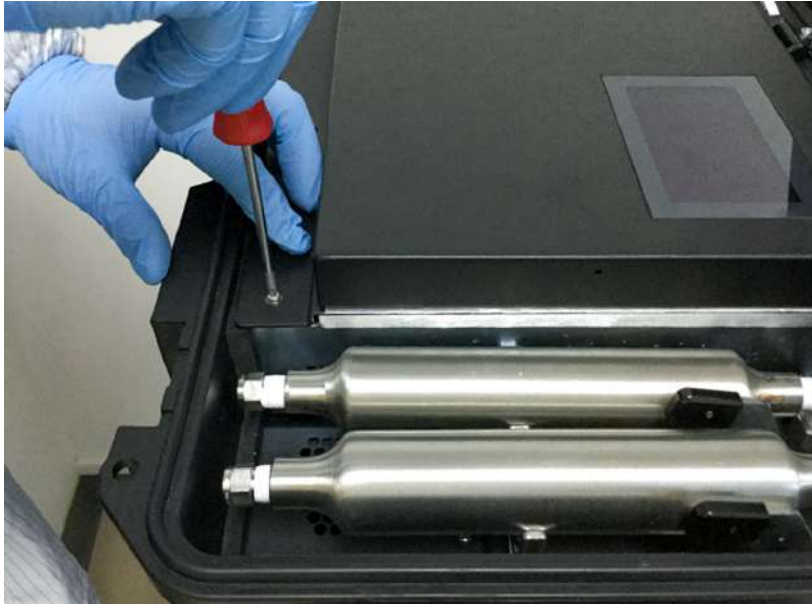
12 Close the internal cover.



4 Maintenance

Installing GC Channels

- 13 Fasten the internal cover in the closed position using the two Torx T-20 screws.



- 14 Connect the Mobile Micro GC to the sample source. For details, see **Connecting the Mobile Micro GC to the Sample Source** on page 22.
- 15 Turn on the power switch on the charge board.
- 16 Select the carrier gas source by using the LCD touch screen (See **LCD Touch Screen** on page 20). If using internal carrier, turn on the carrier gas cylinder.
- 17 Connect the Workstation PC to the Mobile Micro GC. For details, see **Connect the Workstation PC to the Mobile Micro GC** on page 23.
- 18 After a few minutes, the system should be ready for use.

Install Sample Inlet Tubing

Install the sample inlet tubing into the Micro GC Channel before installing it into the Mobile Micro GC.

Connect the sample inlet tubing to a Micro GC channel

Connect one end of the tubing assembly G3588-67019 (9cm) or G3588-67020 (26cm) to the channel, and fasten it using a 3/16" open-end wrench.



Figure 14. Sample inlet tubing connected

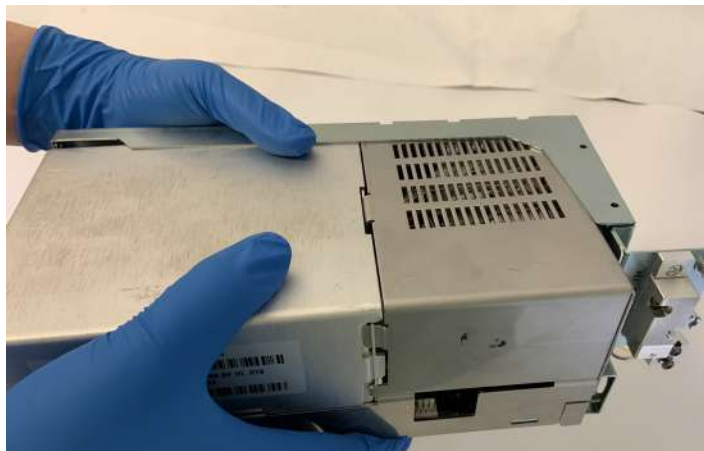
Connecting the Channel Installation Bracket

This section describes how to install the Mobile Micro GC Channel Installation bracket (p/n G3588-60525) on a Micro GC Channel.

- 1 Connect one end of sample line tube G3588-67019 (9cm) or G3588-67020 (26cm). See **Install Sample Inlet Tubing** on page 57. This step can be done before or after the bracket is connected.
- 2 Remove the Torx T-10 screw on the module.



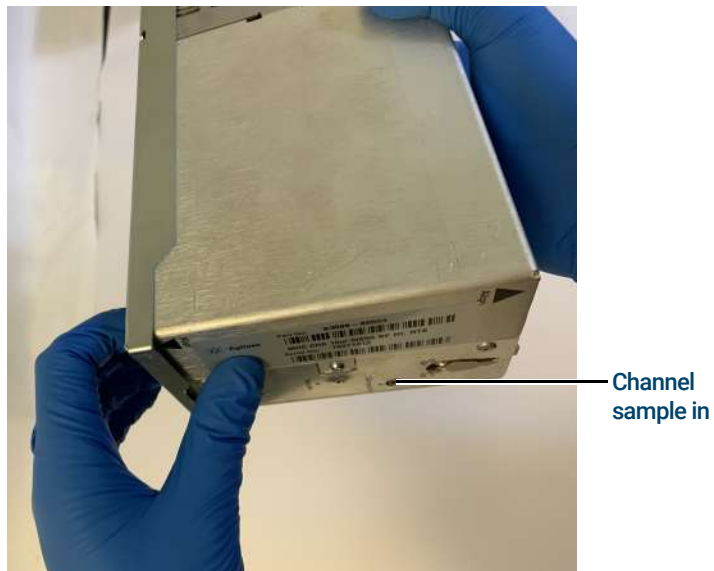
- 3 Align the bracket to the channel, carrier gas connector side first.



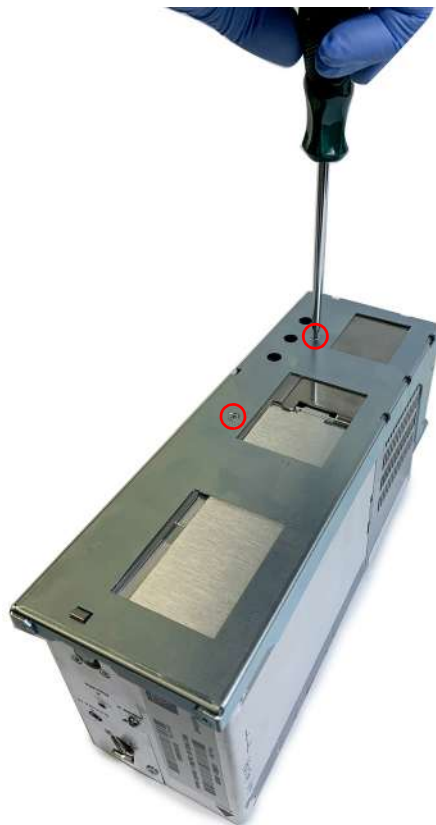
4 Maintenance

Connecting the Channel Installation Bracket

- 4 Align the bracket on the sample inlet connector side of the channel.



- 5 Fasten the two Torx T-10 screws.



4 Maintenance

Connecting the Channel Installation Bracket

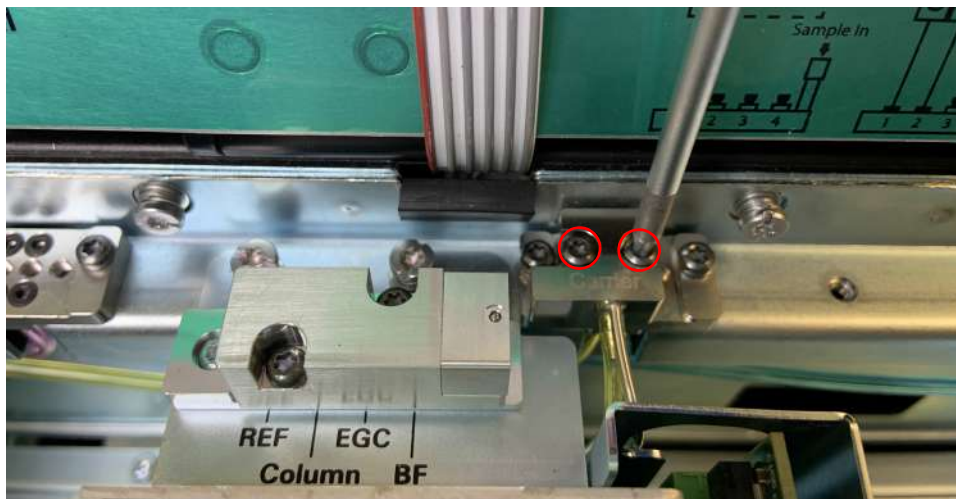
- 6 Fasten the rear Torx T-20 screw.



To remove the bracket, follow the above steps in reverse order.

Channel Carrier Gas Selection

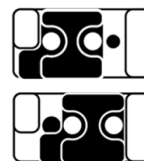
- 1 Loosen the two captive Torx T-10 screws to disconnect the channel carrier gas connector.



- 2 Select the carrier gas to be used with each channel by aligning the carrier gas connector with the gas outlet on the Mobile Micro GC. The connector can be moved left and right to select which carrier gas will be used.



Position 1:
Carrier Gas Type 1
Position 2:
Carrier Gas Type 2



- 3 Fasten with the two captive Torx T-10 screws.

Error Messages

If an error is detected, the system will show an error message on the LCD touch screen.

Follow the instructions to power off the micro GC:

- 1 Unplug the power adapter from Mobile Micro GC power connector.
- 2 Switch off the batteries.

Table 9 LCD touch screen error codes and messages

Error code	Message
155	Mobile Micro GC gas cylinder low pressure
156	Mobile Micro GC gas cylinder pressure restored
157	Mobile Micro GC switches to use gas cylinder
158	Mobile Micro GC switches to use external gas supply
159	Mobile Micro GC battery over temperature
160	Mobile Micro GC battery over current
161	Mobile Micro GC battery over voltage
162	Mobile Micro GC battery cell short
163	Mobile Micro GC battery cell open
164	Mobile Micro GC battery sensor open
165	Mobile Micro GC battery gauge failed
166	Mobile Micro GC battery fan open
167	Mobile Micro GC mainboard fan open

www.agilent.com

© Agilent Technologies, Inc. 2019

First edition, August 2019



G3588-90015

