



GC AND GC/MS

Your Essential Resource for Columns & Supplies

20
15/16



Agilent Technologies

GC/MS Parts and Supplies

Your mass spectrometer is a sensitive, specialized device that delivers a higher level of functionality than other GC detectors. To continue achieving optimal results, it is critical to maintain your system properly by performing the essential tasks within this section. Some of the benefits of maintaining your GC/MSD include:

- Less downtime for repairs
- Longer lifetime for your MSD system
- Reduction in overall operating costs

It is advisable to keep a log book of system performance, Autotune, and maintenance operations performed. This makes it easier to identify variations from normal performance and to take corrective action.



Maintenance Schedule

Task	Every week	Every 6 months	Every year	As needed
Tune the MSD				✓
Change injection port liners	✓			
Check the foreline pump oil level	✓			
Gas ballast the foreline pump				✓
Check the calibration vial		✓		
Replace the foreline pump oil		✓		
Check the diffusion pump fluid	✓			
Replace the diffusion pump fluid			✓	
Replace the dry pump tip seals (IDP3)			✓	
Replace the traps and filters			✓	
Clean the ion source				✓
Replace worn out parts				✓
Lubricate seals (where appropriate)				✓
Replace column				✓

MSD Contamination

Contamination is usually identified by excessive background in the mass spectra, which can come from the GC or MSD. The source of contamination can sometimes be determined by identifying the contaminants. Some contaminants are much more likely to originate in the GC, while others are likely to originate in the MSD.

Contamination Sources in the GC

- Column or septum bleed
- Dirty injection port
- Injection port liner
- Contaminated syringe
- Poor quality carrier gas
- Dirty carrier gas tubing
- Fingerprints
- Air leaks
- Cleaning solvents and materials

Contamination Sources in the MSD

- Air leaks
- Cleaning solvents and materials
- Fingerprints inside the manifold
- Diffusion pump fluid
- Foreline pump oil

The action required to remove contamination depends on the type and level of contamination. Minor contamination by water or solvents can usually be removed by allowing the system to pump (with a flow of clean carrier gas) overnight. Serious contamination by rough pump oil, diffusion pump fluid or fingerprints is much more difficult to remove and may require extensive cleaning.

Air Leaks

Air leaks are a problem for any instrument that requires a vacuum to operate. Leaks are generally caused by vacuum seals that are damaged or not fastened correctly.

Symptoms of leaks

- Higher than normal vacuum manifold pressure or foreline pressure
- Higher than normal background
- Peaks characteristic of air (m/z 18, 28, 32, and 44 or m/z 14 and 16)
- Poor sensitivity
- Low relative abundance of m/z 502 (this varies with the tune program and MSD used)

Remedy

- Check interface nut for tightness. Replace if necessary.
- Check and leak test the GC injection port.

Leaks can occur in other places in the MSD, including the following:

- GC/MSD interface column nut
- Side/top plate O-ring (all the way around)
- Vent valve O-ring
- Calibration valve
- High vacuum gauge tube/controller fitting
- Cracked ion gauge tube
- Front and rear end plate O-rings
- GC/MSD interface O-ring (where the interface attaches to the vacuum manifold)
- Diffusion pump co-seal
- Baffle adapter O-ring
- Turbomolecular pump O-ring
- Polyimide/graphite ferrules, when heated



Cleaning Solvents

It is common to see cleaning solvent peaks in the mass spectra shortly after the ion source is cleaned.

Remedy

- Dry all cleaned metal parts in the GC oven before reassembling and reinstalling them. Refer to specific cleaning procedures in your MSD Hardware Manual or MSD Maintenance and Troubleshooting Manual.
- Use a temperature above the boiling point of the solvent but below the limit of the column.

Fingerprints

Fingerprints contain hydrocarbons that can appear in mass spectra. Hydrocarbon contamination is characterized by a series of mass peaks 14 m/z apart. The abundance of these peaks decrease as peak mass increases. Fingerprint contamination is usually caused by the failure to wear clean, nylon gloves during ion source handling or cleaning, GC inlet maintenance, or from installing the column. Use special care to avoid recontamination of parts after you clean them. This typically occurs after some maintenance or part replacement.

Remedy

Reclean using clean, nylon gloves and proper cleaning techniques.

MSD Contamination Identification

The following table lists some of the more common contaminants, the ion characteristics of those contaminants, and the likely sources of those contaminants.

Common Contaminants		
Ions (m/z)	Compound	Possible Source
13, 14, 15, 16	Methane	Cl gas
18, 28, 32, 44 or 14, 16	H ₂ O, N ₂ , O ₂ , CO ₂ , CO ₂ or N, O	Residual air and water, air leaks, outgassing from Polyimide ferrules
31, 51, 69, 100, 119, 131, 169, 181, 214, 219, 264, 376, 414, 426, 464, 502, 576, 614	PFTBA and related ions	PFTBA (tuning compound)
31	Methanol	Cleaning solvent
43, 58	Acetone	Cleaning solvent
78	Benzene	Cleaning solvent
91, 92	Toluene or xylene	Cleaning solvent
105, 106	Xylene	Cleaning solvent
151, 153	Trichloroethane	Cleaning solvent
69	Foreline pump fluid or PFTBA	Foreline pump oil vapor or calibration valve leak
73, 147, 207, 221, 281, 295, 355, 429	Dimethylpolysiloxane	Septum bleed or methyl silicone column coating
77, 94, 115, 141, 168, 170, 262, 354, 446	Diffusion pump fluid	Diffusion pump fluid and related ions
149	Plasticizer (phthalates)	Vacuum seals (O-rings) damaged by high temperatures, use of vinyl or plastic gloves
Peaks spaced 14 amu apart	Hydrocarbons	Fingerprints, foreline pump oil

The easiest way to insure that you minimize background contamination and remove damaging oxygen from your carrier gas system is to use a carrier gas purifying trap right before the gas enters your GC system.

Column bleed generally appears as a continuous and increased rise in the baseline at higher column temperatures, especially at or near the upper temperature limit of the GC column. Septum bleed usually appears as discrete peaks, and can occur at any temperature.

A crude sign of a "leak-free" MS system is when the ion ratio of m/z 28 (nitrogen) over m/z 32 (oxygen) is approximately two or greater.

Even preconditioned ferrules can shrink slightly at very high temperatures. If leak problems persist upon a new column installation, check this fitting first.



5977A Series GC/MSD system



Cloths, lint-free, 05980-60051



Cotton swabs, 5080-5400

Cleaning and Maintenance Supplies

Description	Part No.
Nylon gloves, lint-free, large, 1 pair	8650-0030
Nylon gloves, lint-free, small, 1 pair	8650-0029
Lint-free industrial wipes, 100% cotton, 9 x 9 in, 300/pk	9310-4828
Ion source cleaning kit Includes lint-free cloths (15/pk), abrasive sheets (5/pk), cotton swabs (100/pk), lint-free nylon gloves, abrasive Alumina powder	5181-8863
Cloths, lint-free, 15/pk	05980-60051
Swabs for cleaning GC/MS, 100/pk	5080-5400
Abrasive sheets, aluminum oxide green lapping paper, 600 mesh, 5/pk	5061-5896
Alumina powder, abrasive, 100 g	393706201
PFTBA sample, certified, 10 g	8500-0656
Replacement glass bulb for PFTBA and PFDTD test sample	G3170-80002
Replacement glass vial for PFTBA and PFDTD test sample	05980-20018
Activated alumina, absorbent pellets for Edwards rough pump traps, non-LC/MS, 1 lb can	8500-1233
MSD Tool Kit Includes source hold tool, lint-free cloth, cotton swabs, lint-free nylon gloves, abrasive sheets, wrenches and driving tools	G1099-60566

(Continued)



TIPS & TOOLS

Self Tightening column nuts at the transfer line and inlet fitting, using short graphite/polyimide-blend ferrules, provide a leak-free seal at both column connections, without the need to retighten the fitting after hundreds of heat cycles.



Cleaning and Maintenance Supplies

Description	Part No.
MS Interface Supplies	
MS interface column installation tool for the 5973 series, 5975 A/B/C/C TAD/E, 5977 series, and 7000 series Not for the 5975T	G1099-20030
Column installation tool for 5975T	G3880-20030
Column insertion tool for the 7200 series	G3850-60014
Tools	
Screwdriver, 3 in Pozidriv shaft No. 1 pt, fits no. 2-4 screws	8710-0899
Screwdriver, 4 in Pozidriv shaft No. 2 pt, fits no. 5-10 screws	8710-0900
Open end wrench, 1/4 and 5/16 in	8710-0510
Hex nut driver, 5.5 mm	8710-1220
Screwdriver, Torx T20	8710-1615
Screwdriver, Torx T15	8710-1622
Screwdriver, Torx T10	5182-3466
Gas Filters	
Replacement Agilent Gas Clean carrier gas filter	CP17973
Gas Clean carrier gas starter kit for 7890 Includes carrier gas filter, 1/8 in single connecting unit with bracket that installs directly on the 7890	CP17988
GC/MS filter kit Includes 1 connecting unit 1/4 in and 2 carrier gas filters	CP17977
Chemical ionization gas purifier	G1999-80410



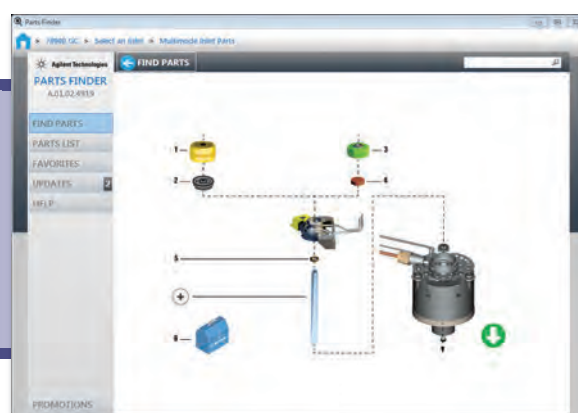
Column installation tool, G1099-20030



Replacement Agilent Gas Clean carrier gas filter, CP17973

TIPS & TOOLS

Download the Agilent Parts Finder Tool for simplified parts ordering and troubleshooting, www.agilent.com/chem/go2partsfinder



By using tools, supplies and best practices that provide a leak-free GC or GC/MS, analysts can improve performance and productivity of their system. The Agilent innovative Self Tightening column nuts using standard short polyimide/graphite ferrules eliminate the need to retighten GC column fitting at the mass spec transfer line, even after repeated heat cycling. Agilent UltiMetal Plus Flexible Metal ferrules provide robust leak-free column connections, along with an inert surface for fittings in the sample flow path.



Self Tightening column nut, for MS interface, 5190-5233



MS interface column nut, 05988-20066



UltiMetal Plus Flexible Metal ferrules, G3188-27501

Recommended MS Interface Connections

Description	Part No.
Recommended	
Nut	
Self Tightening column nut, for MS interface	5190-5233
Ferrule	
250 µm Polyimide/graphite ferrule, 10/pk	5181-3323
320 µm Polyimide/graphite ferrule, 10/pk	5062-3514
Tools	
MS interface column installation tool	G1099-20030
Column installation tool for 5975T	G3880-20030
Traditional	
Nut	
MS interface column nut, female	05988-20066
Ferrule	
0.4 mm Polyimide/graphite ferrule, 10/pk	5062-3508
0.5 mm Polyimide/graphite ferrule, 10/pk	5062-3506
Tools	
MS interface column installation tool	G1099-20030
Column installation tool for 5975T	G3880-20030
Alternative	
Nut	
Swaging nut, for MS interface with Flexible Metal ferrules	G2855-20555
Ferrule	
UltiMetal Plus Flexible Metal ferrule with 0.4 mm id, 10/pk	G3188-27501
UltiMetal Plus Flexible Metal ferrule with 0.5 mm id, 10/pk	G3188-27502
Tools	
Ferrule pre-swaging tool	G2855-60200

Ion Source

The ion source operates by electron ionization (EI) or chemical ionization (CI). The sample enters the ion source from the GC/MSD interface. Electrons emitted by a filament enter the ionization chamber, guided by a magnetic field. The high-energy electrons interact with the sample molecules, ionizing and fragmenting them. The positive voltage on the repeller pushes the positive ions into the lens stack, where they pass through several electrostatic lenses. These lenses concentrate the ions into a tight beam, which is directed into the mass filter.



Electron Impact (EI) Ion Source

Maintaining the Ion Source

Cleaning procedures for MSDs vary. Refer to your Troubleshooting and Maintenance Manual for specific ion source cleaning procedures.

Common Measures of Instrument Performance

- Abundance of certain ions
- Shape of lens ramps and the chosen voltages
- Sensitivity obtainable for a given analysis
- Ability to tune to a given reference compound (e.g., DFTPP)

Preparing to Clean

Prior to cleaning, the mass spectrometer must be vented and the ion source must be removed. Before venting the system, the following conditions must be met:

- Heated zones are less than 100 °C
- The diffusion pump is off and cool (if applicable)
- The turbo pump is off and not spinning (if applicable)
- The rough pump is off

Always allow the automatic venting routine to run its full course. Improper venting may cause diffusion pump fluid to be deposited into the analyzer (backstreaming). It can also reduce the life of the multiplier or other sensitive MS parts.

MSD Flow Rates (mL/min)

	Min	Max Diff Pump	Max Turbo Pump	Tuning Max
5977	0.1	2.0	4.0	2.0
5975	0.1	2.0	4.0	2.0
5973	0.1	2.0	4.0	2.0



WARNINGS & CAUTION

Important: Do not abrasively or ultrasonically clean the insulators.

Abrasively clean the surfaces that contact the sample or ion beam. Use an abrasive slurry of alumina powder and reagent-grade methanol on a cotton swab. Use enough force to remove all discoloration. Polishing the parts is not necessary; small scratches will not harm performance. Abrasively clean discoloration where electrons from filaments enter the source body.

Take care to avoid contaminating cleaned and dried parts. Put on new, clean gloves before handling the parts. Do not put the cleaned parts on a dirty surface. Place them only on clean, lint-free cloths.

TIPS & TOOLS



It is good practice to replace scratched lenses and other ion source parts regularly. Scratched source parts lead to poor performance.

El Source Selection Guide

Inert Ion Source

To ensure accurate quantification and high sensitivity, the entire GC/MSD flow path must be highly inert, including the detector surfaces. The inert ion source is made of the same inert material used in the Extractor EI Source and is programmable to 350 °C, enabling trace level detection and SVOC and VOC analyses (see Source Selection for Various Applications).

Aperture Diameters Available for the Agilent 5977A Series Ion Sources

Aperture Diameter	3 mm	6 mm	9 mm
Stainless Steel Source	05971-20134	G3136-20530	--
Inert Source	G2589-20100	G2589-20045	--
Extractor EI Source	G3870-20444	G3870-20448	G3870-20449

Having trouble selecting the appropriate aperture diameters for the Agilent 5977A Series Ion Sources? Download publication number 5991-2106EN at www.agilent.com/chem/library

Source and Tune Selection Guidance

Choosing the most appropriate source configuration and tune can have a significant effect on the success of an application (see, Source Configurations and Supported Tunes). The guidelines outlined here are meant to be general suggestions as starting points. Application-specific method development should be performed to ensure the best operating conditions. EI Tune Options gives a description of the various tune modes and their use.

TIPS & TOOLS

Read and understand "A Quick-Start Guide to Optimizing Detector Gain for GC/MSD", publication number 5991-2105EN, before attempting to optimize any method or configuration, www.agilent.com/chem/library



Stainless Steel Ion Source

The most cost-effective source for picogram to high nanogram sensitivity and for obtaining spectra most similar to legacy instruments is the stainless steel ion source, which is programmable up to 350 °C.

Source Selection for Various Applications

Application	Source(s)	Drawout/ Extractor Lens (mm)	Tune
Ultra-trace level (low fg-low ng)	Extractor EI	3	Etune
Trace level (fg-ng)	Extractor EI, Inert	3	Etune, Atune
Mid to high-level (pg-high ng)	Extractor, Inert, Stainless Steel	6, 9	Atune
Obtain spectra closest to older instruments	Stainless Steel	3	Stune
VOC P&T - (BFB)	Extractor EI, Inert	6	BFB Autotune
SVOC (DFTPP)	Extractor EI, Inert	6	DFTPP

Source Configurations and Supported Tunes

Source	Etune	Atune	BFB Autotune	Ion Mass	Stune	DFTPP	BFB
Stainless Steel	--*	✓	--	✓	✓	✓	✓***
Inert	--*	✓	✓**	✓	✓	✓	✓***
Extractor EI	✓	✓	✓**	✓	✓	✓	✓***

*Etune can be executed from the tune menu with a non-extractor source but will produce only an atune

**BFB Autotune requires the use of the 6 mm drawout plate/extraction lens

***BFB Autotune is the preferred tune. Download Application Note 5991-0029EN at www.agilent.com/chem/library

El Tune Options

In the Tune menu, and in the Tune and Vacuum Control view there are several options for tune selection. The top two options are mechanisms to run part or the entire active tune. The remaining menu options are tunes for specific purposes and are described below.

Description of the Tune Options for the Agilent 5977A Series Ion Source

Tune menu items

(default tune filenames as *.U)

Description

Tune MSD	Performs the type of tune that is embedded in the active tune.
QuickTune	Provides a fine tuning to ensure acceptable response, resolution and accurate mass assignment.
Autotun (Atune.U)	The standard repeller-based tune of the Agilent 5973 inert MSD and Agilent 5975 Series.
Extraction source tune (Etune.U)	Used with the Extractor EI Source to provide the highest sensitivity. Equivalent to Atune when used with inert or stainless sources.
BFB Autotune (BFB_Atune.U)	Used in conjunction with Atune to meet US EPA BFB tuning criteria. Requires the use of 6 mm drawout/extraction lens and operates in standard repeller-based tuning mode.
Low Mass Autotune (Lomass.U)	Identical to Autotune, except it tunes on masses 69, 131, and 219 instead of 69, 219, and 502. Intended for low molecular weight applications and natural gases under 250 daltons.
Standard Spectra Tune (Stune.U)	Ensures standard response over the full mass range. Specifically, PFTBA mass 69 is the base peak, mass 219 is between 35 and 99%, and mass 502 is >1%. This is a lower sensitivity tune used to better match legacy libraries created using the Agilent 5971 or 5972 MSDs.
DFTPP	A specific target tune used for US EPA semivolatile analysis (8270 methods).
BFB	A specific legacy target tune used for VOC analysis. It does not provide the same sensitivity and stability as BFB Autotune. Provides continuity for established SOPs and for users with a preference for target tuning. See Application Note 5991-0029EN for a description of the recommended procedure for VOC analysis at www.agilent.com/chem/library

Available EI Sources for the Agilent 5977A Series GC/MS

Source	Benefit	Part No. (spare parts)
Stainless	Inexpensive	G2591D
Inert	Reduced activity	G2591B
Extractor EI Source	Reduced activity Highest sensitivity	G2591C



Electron Impact (EI) Ion Source

Electron Impact (EI) Ion Source

The recommended cleaning material for the EI ion source is abrasive, aluminum oxide powder.

Do not immerse filaments or lens insulators in solvent. If insulators are dirty, clean them with a cotton swab dampened with reagent-grade methanol. If that does not clean the insulators, replace them.

! WARNINGS & CAUTION

Important: Do not abrasively or ultrasonically clean the insulators.

Abrasively clean the surfaces that contact the sample or ion beam. Use an abrasive slurry of alumina powder and reagent-grade methanol on a cotton swab. Use enough force to remove all discoloration. Polishing the parts is not necessary; small scratches will not harm performance. Abrasively clean discoloration where electrons from filaments enter the source body.

Take care to avoid contaminating cleaned and dried parts. Put on new, clean gloves before handling the parts. Do not put the cleaned parts on a dirty surface. Place them only on clean, lint-free cloths.

5977/5975/5973 MSD Electron Impact Ion Source Parts (EI)

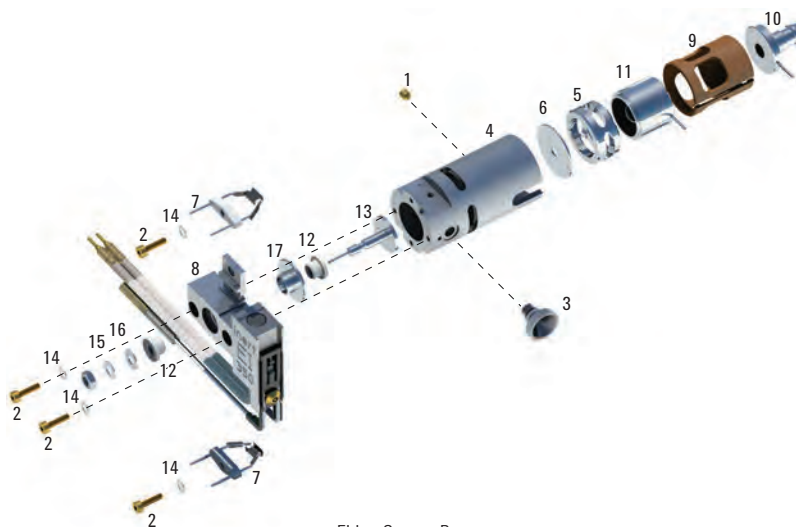
Item	Description	Part No.
1	Set screw for lens stack	G1999-20022
2	Cap screw, gold plated	G1999-20021
3	Transfer line socket	G1099-20136
4	Ion source body	G1099-20130
5	Drawout cylinder	G1072-20008
6	Drawout plate, 3 mm	05971-20134
	Drawout plate, 6 mm	G3163-20530
7	Filament assembly, high temperature (EI)	G7005-60061
8	Repeller assembly, Agilent 5977 MSD, stainless steel EI 350 ion source	G3870-60172
9	Lens insulator	G3170-20530
10	Entrance lens assembly	G3170-20126
11	Ion focus lens	05971-20143
12	Repeller insulator	G1099-20133
13	Repeller	G1099-20132
14	Washer, SPR CRVD, 1.6 to 1.8 mm id, 4 mm od, SS	3050-1375
15	Washer, SPR BLVL 4 .125 in id .25 in od	3050-1301
16	Washer, for Repeller M3	3050-0891
17	Repeller block insert	G3870-20135



Lens insulator, G3170-20530



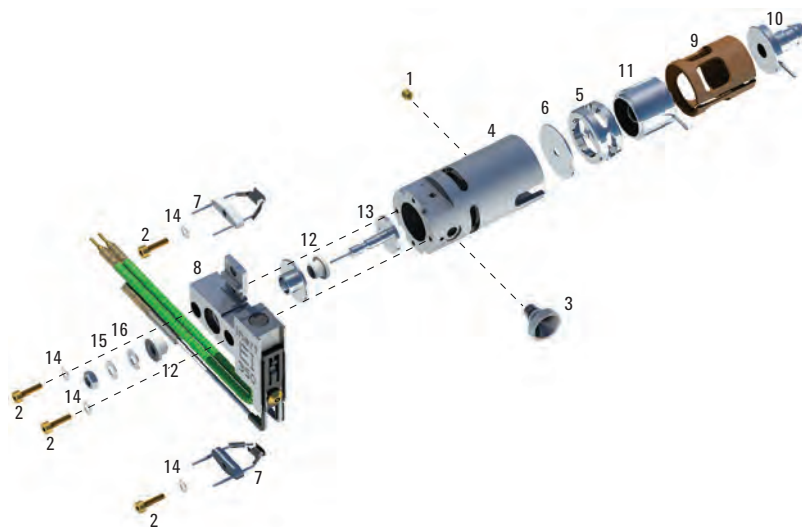
Repeller insulator, G1099-20133



EI Ion Source Parts

5977/5975/5973 MSD Electron Impact Inert Ion Source Parts (EI)

Item	Description	Part No.
1	Set screw for lens stack	G1999-20022
2	Cap screw, gold plated	G1999-20021
3	Transfer line socket	G1099-20136
4	Inert ion source body	G2589-20043
5	Drawout cylinder	G1072-20008
6	Drawout plate, 3 mm	G2589-20100
	Drawout plate, 6 mm	G2589-20045
7	Filament assembly, high temperature (EI)	G7005-60061
8	5977 Inert EI 350 repeller block	G3870-60179
9	Lens insulator	G3170-20530
10	Entrance lens assembly	G3170-20126
11	Ion focus lens	05971-20143
12	Repeller insulator	G1099-20133
13	Inert repeller	G2589-20044
14	Washer, SPR CRVD, 1.6 to 1.8 mm id, 4 mm od, SS	3050-1375
15	Washer, SPR BLVL 4 .125 in id .25 in od	3050-1301
16	Washer, for Repeller M3	3050-0891



5977/5975/5973 Inert Ion source parts (EI)



Extractor EI Source

Extractor EI Source

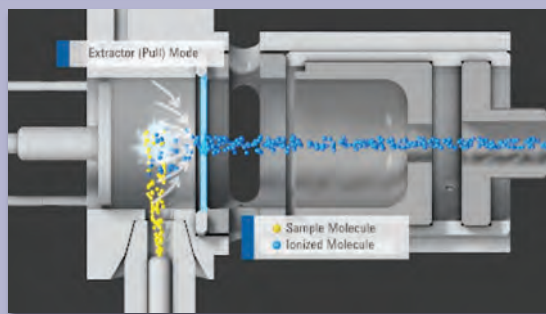
This innovative ion source has an extractor lens in place of the drawout plate used in the other EI sources and it is made of an inert material. It is programmable up to 350 °C to deliver enhanced response for active compounds and late eluters. These unique features provide maximum, ultratrace level sensitivity for a wide variety of compounds. The extractor lens provides additional focus to the ion beam into the mass analyzer. A potential is applied to the extractor lens which pulls the ions out of the ionization chamber, adding to the push provided by the repeller voltage. The result is a significant increase in the number of ions analyzed, improving the true sensitivity of the instrument. There are three available aperture sizes for the Extractor EI Source, as well as the two other sources: 3, 6, and 9 mm. Generally, the 3 mm aperture provides the best sensitivity. Selecting one of the larger aperture sizes enables analysis of higher concentrations of target compounds. Increasing aperture diameters also reduces the residence or interaction time and provides higher effective inertness for fragile compounds.

The Extractor EI Source can be operated in the higher sensitivity mode of extraction tuning or in standard mode in which it behaves in the same way as the standard stainless and inert sources. The ability to change between extractor and repeller-only mode is controlled by the software and does not require any physical changes.



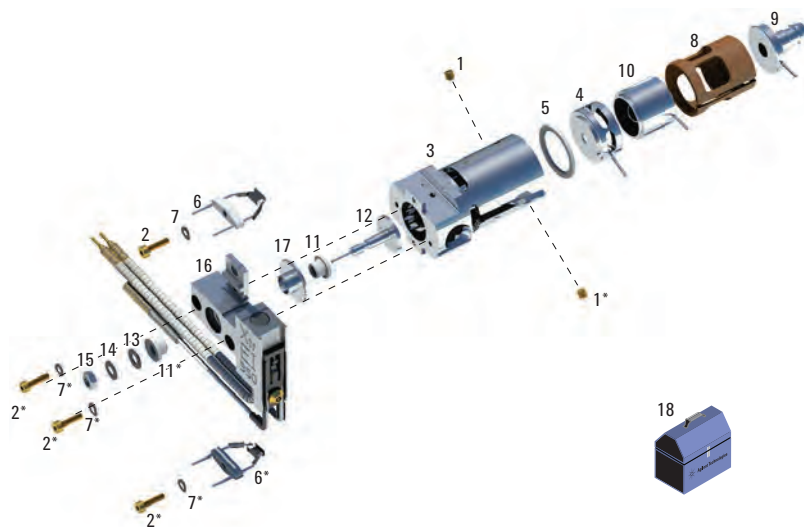
TIPS & TOOLS

A video description of the Extractor EI Source is available at www.chem.agilent.com/chem/resolve

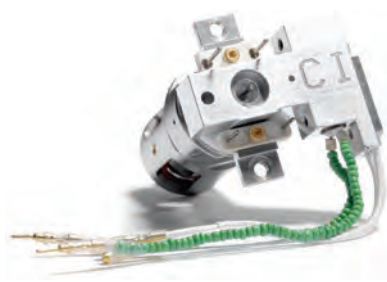


5977/7000C Extractor Ion Source Parts

Item	Description	Part No.
1	Set screws	G3870-20446
2	Screws	G3870-20021
3	Extraction source body	G3870-20440
4	Extractor lens	G3870-20444
5	Extractor lens insulator	G3870-20445
6	Filaments, 4-turn	G3170-60053
7	Spring washer	3050-1374
8	Lens insulator	G3870-20530
9	Entrance lens assembly	G3170-20126
10	Ion focus lens	05971-20143
11	Repeller insulator	G1099-20133
12	Inert repeller	G2589-20044
13	Washer, for Repeller M3	3050-0891
14	Washer, SPR BLVL 4 .125 in id .25 in od	3050-1301
15	Nut, 5.5 mm	0535-0071
16	5977 Extraction 350 repeller block assembly	G3870-60171
17	Repeller block insert	G3870-20135



Extractor Ion Source Parts



5977/5975/5973/7000 Ion Source

Chemical Ionization (CI) Ion Source

Because the CI ion source operates at much higher pressures than the EI ion source, it will probably require more frequent cleaning than the EI ion source.

The source should be cleaned whenever there are performance anomalies that are associated with a dirty ion source. Let analytical performance be your guide.

When cleaning the CI ion source, concentrate on the CI repeller, ion source body, and drawout plate. Be sure to clean the 0.5 mm diameter holes in the ion source body and drawout plate.

Cleaning the ion source is very similar to cleaning the EI ion source. Use the same EI cleaning procedure with the following exceptions:

- The CI ion source may not look dirty, but deposits left by chemical ionization are very difficult to remove. Clean the CI ion source thoroughly.
- Use a round wooden toothpick to gently clean out the electron entrance hole in the source body and the ion exit hole in the drawout plate.
- Do not use halogenated solvents. Use hexane for the final rinse.

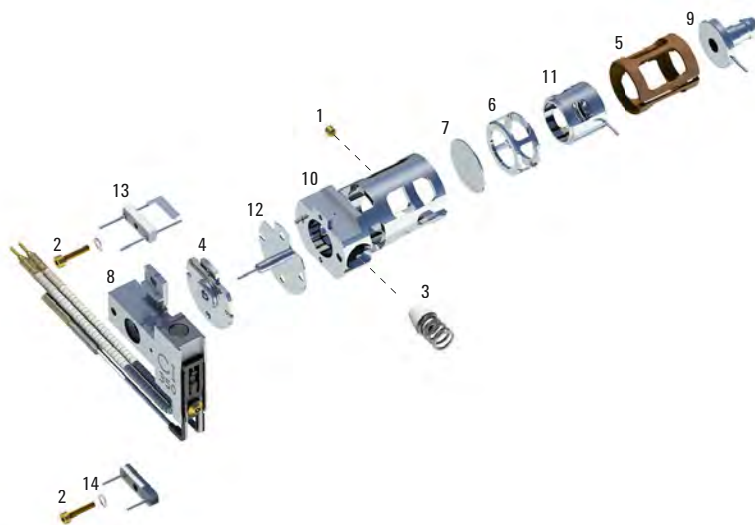
TIPS & TOOLS



Visual appearance is not an accurate guide to cleanliness of the CI ion source. The CI ion source can show little or no discoloration, yet still need cleaning.

5977/5975/5973/7000 MSD Chemical Ionization Ion Source Parts (CI)

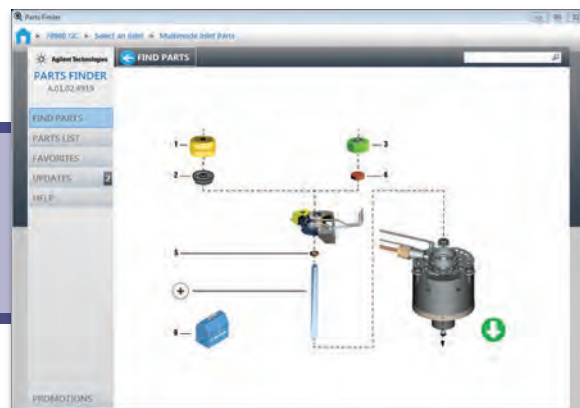
Item	Description	Part No.
1	Set screw for lens stack	G1999-20022
2	Cap screw, gold plated	G1999-20021
3	Interface tip seal/spring	G1999-60412
4	Repeller insulator	G1999-20433
5	Lens insulator	G3170-20540
6	Drawout cylinder	G1999-20444
7	Drawout plate	G1999-20446
8	5977 CI 350 repeller assembly	G3170-60416
9	Entrance lens assembly	G3170-20126
10	Source body	G1999-20430
11	Ion focus lens	G1999-20443
12	Repeller	G1999-20432
13	Filament assembly (CI), 2/pk	G7005-60072
14	Washer, SPR CRVD, 1.6 to 1.8 mm id, 4 mm od, SS	3050-1375



5977/5975/5973/7000 MSD Chemical Ionization (CI) Ion Source Assembly

TIPS & TOOLS

Download the Agilent Parts Finder Tool for simplified parts ordering and troubleshooting, www.agilent.com/chem/go2partsfinder



Installing a Capillary Column in the GC/MSD Interface

1. Condition the column.
2. Vent the MSD and open the analyzer chamber. Be sure you can see the end of the GC/MSD interface.
3. If the CI interface is installed, remove the spring-loaded tip seal from the MSD end of the interface.
4. Slide an interface nut and conditioned ferrule onto the free end of the GC column. The tapered end of the ferrule must point towards the nut.
5. Slide the column into the GC/MSD interface until you can pull it out through the analyzer chamber.
6. Score the column using a glass scribing tool. The score must be square to ensure a clean break.
7. Trim 1 cm off the end of the column. Do not let any column fragments fall into the analyzer chamber. They could damage the turbo pump.
8. Clean the outside of the free end of the column with a lint-free cloth moistened with methanol.
9. Adjust the column.
 - 5977/5975 – Push the column through, and then let it pass the end of the transferline by 1-2 mm. With the analyzer door partially open, view through the glass plate to see the column protrude.
 - 5973 – Push the column through, and then let it pass the end of the transferline by 1-2 mm as seen with the analyzer door open from that side.
 - 5972 – Push the column in all the way and then pull it back about 1-2 mm.Use the flashlight and magnifying glass if necessary to see the end of the column inside the analyzer changer. Do not use your finger to feel for the column end.
10. Hand-tighten the nut. Make sure the position of the column does not change as you tighten the nut. Reinstall the spring-loaded tip seal if it was removed earlier.
11. Check the GC oven to be sure that the column does not touch the oven walls.
12. Tighten the nut 1/4 to 1/2 turn. Check the tightness after one or two heat cycles.

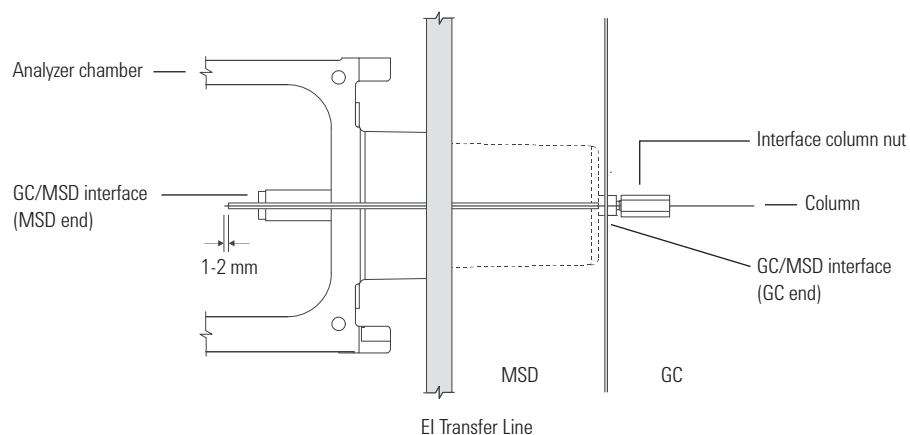
TIPS & TOOLS



View recommended MS interface connections.

Turn to page 38.

Installing a capillary column in the GC/MSD interface



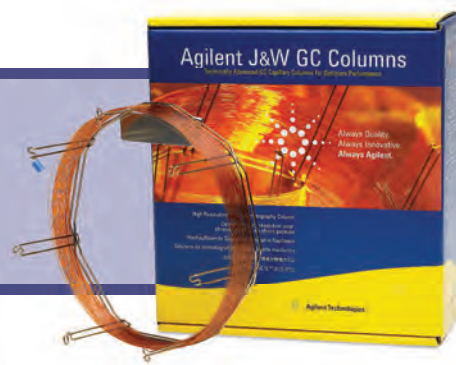
TIPS & TOOLS

The column installation procedure for 5977 MSDs is different from that for most previous MSDs. Using the procedure from another instrument may result in poor sensitivity and possible damage to the MSD.



TIPS & TOOLS

Agilent J&W GC Columns offer the lowest bleed levels, the best inertness for acids/bases/mixed functional compounds, and the tightest column-to-column reproducibility. Learn more at www.agilent.com/chem/mygccolumns



MSD Filaments

Like the filaments in an incandescent light bulb, the ion source filaments will eventually burn out. Certain practices will reduce the chance of early failure.

- When setting up data acquisition parameters, set the solvent delay so that the analyzer will not turn on while the solvent peak is eluting
- When the software prompts 'Override solvent delay at the beginning of a run' always select 'No'
- Higher emission current will reduce filament life
- If you control your MSD from the Edit Parameters screen, always select 'MS Off' before changing any of the filament parameters

MSD Filaments

Description	7200 Series	7000 Series	5977 Series	5975 Series	5975T Series	5973 Series
Filament assembly, high temperature (EI)	G7005-60061	G7005-60061	G7005-60061	G7005-60061	G7005-60061	G7005-60061
Filament assembly (CI), 2/pk	G7005-60072	G7005-60072	G7005-60072	G7005-60072		G7005-60072
Micro ion vacuum gauge	G3170-80001	G3170-80001	G3170-80001	G3170-80001		
Triode gauge tube for measuring vacuum						0960-0897
Ion gauge controller			G3397B	G3397A	G3880-80010	
Ion gauge tube					G3880-80011	



Filament assembly, high temperature (EI), G7005-60061



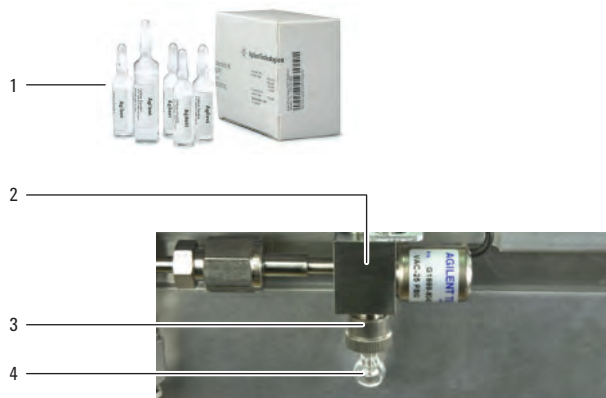
Filament assembly (CI), G7005-60072

TIPS & TOOLS



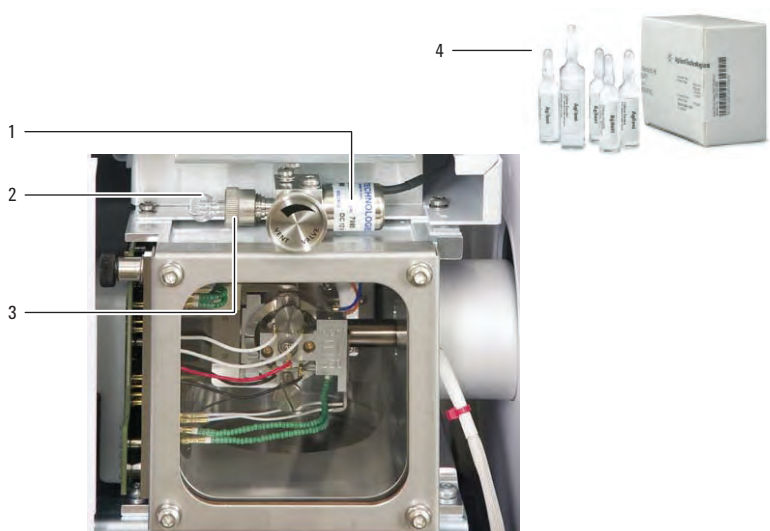
It is very useful to switch from one filament to the other every three months so that when a filament fails, you know the other will fail soon. This will allow you to change both filaments at the same time. Since the GC/MS system is already vented, it's a good idea to replace other supplies in the flowpath at the same time as the filaments.

Vent Valve Supplies



CI Valve Supplies

Item	Description	Unit	Part No.
1	PFDTD calibrant, for GC/MS, perfluoro-5,8-dimethyl-3, 6,9-trioxidodecane	1 mL	8500-8510
2	CI Cal valve assembly		G1999-60452
3	Certified non-stick fluorocarbon O-ring	10/pk	5188-5365
4	5975 Calibrant bulb		G3170-80002



Vent Valve Supplies

Item	Description	Unit	Part No.
1	5975 EI CalVal turbo		G3170-60204
2	5975 Calibrant bulb		G3170-80002
3	Certified non-stick fluorocarbon O-ring	10/pk	5188-5365
4	PFTBA MS sample kit	0.5 mL	05971-60571



Replacement Agilent Gas Clean carrier gas filter, CP17973

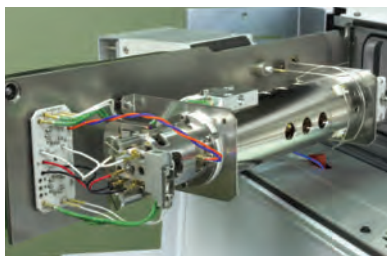
Gas Clean Filters

The Agilent Gas Clean Filter System delivers clean gases, reducing the risk of column damage, sensitivity loss and instrument downtime. Inserting a Gas Clean Filter System in the gas line immediately before the instrument inlet greatly reduces the level of impurities, thus improving trace analysis. Contaminants entering your GC column will also be reduced, which is critical for high temperature analysis and essential for longer column lifetime.

- Deliver clean gases for accurate analyses
- Fast, leak-free filter replacement reduces downtime
- Economical, with immediate payback
- Highly sensitive filter indicators provide maximum instrument protection

Gas Filters

Description	Part No.
Chemical ionization gas purifier	G1999-80410
Gas Clean carrier gas starter kit for 7890	CP17988
Replacement Agilent Gas Clean carrier gas filter	CP17973
Big universal trap, 1/8 in fittings, nitrogen, for 7000 and 7200 Series	RMSN-2



Quadrupole Mass Filter

The mass filter does not require periodic maintenance. It should not be removed from the radiator or disturbed in any way.

- Never put the quadrupole in an ultrasonic cleaner.
- Never change the physical orientation of the quadrupole mass filter.
- The fused-quartz quadrupole is fragile and will break if dropped or handled roughly.
- The material in the cusps of the quadrupole is very hygroscopic. If exposed to water, the quadrupole must be dried very slowly to prevent damage.
- Cleaning techniques that are appropriate for other manufacturers' instruments are not suitable for Agilent MSDs – and may actually harm the mass filter.
- To save time and effort, use only Agilent MSD mass filters, which do not require periodic cleaning or maintenance.
- In case of extreme contamination, contact a trained Agilent service representative to perform the mass filter cleaning.

MSD Electron Multipliers and Replacement Horn

The lifetime of an electron multiplier is directly related to the current that flows through it and the extent of contamination or condensation that it experiences. Replace the electron multiplier or replacement horn when voltage is over 2500 V. To maximize electron multiplier life:

- Maintain the best possible vacuum, especially in the analyzer manifold
- Use extreme caution and be conservative with venting, pumpdown, and all vacuum system procedures to keep pump fluid background to a minimum
- After venting, allow four hours for pumpdown and thermal equilibration before scanning
- Actively look for background contamination and leaks and repair them immediately
- Don't tune excessively – PFTBA can result in higher background over an extended period of time
- Replace the electron multiplier if vacuum is poor or voltage is over 2600 V



Triple axis electron multiplier, G3170-80103

MSD Electron Multipliers and Replacement Horn

Description	7000A Series	7000B/C Series	5975 Series	5973 Series	5977 Series
Electron multiplier replacement horn Use with electron multipliers with "straight" horns			05971-80103	05971-80103	
Triple axis detector assembly*	G3170-80100		G3170-80100		G3170-80100
Triple axis electron multiplier	G3170-80103	G3170-80103	G3170-80103		G3170-80103
EM signal wire, low noise detector			G3170-80008		G3170-80008

*Included on 5975 triple axis detector systems

TIPS & TOOLS

The Agilent multipliers and horns listed are recommended for your MSD. Other manufacturers' products may be incompatible with Agilent instruments and can result in reduced sensitivity, lifetime, and noise problems.

