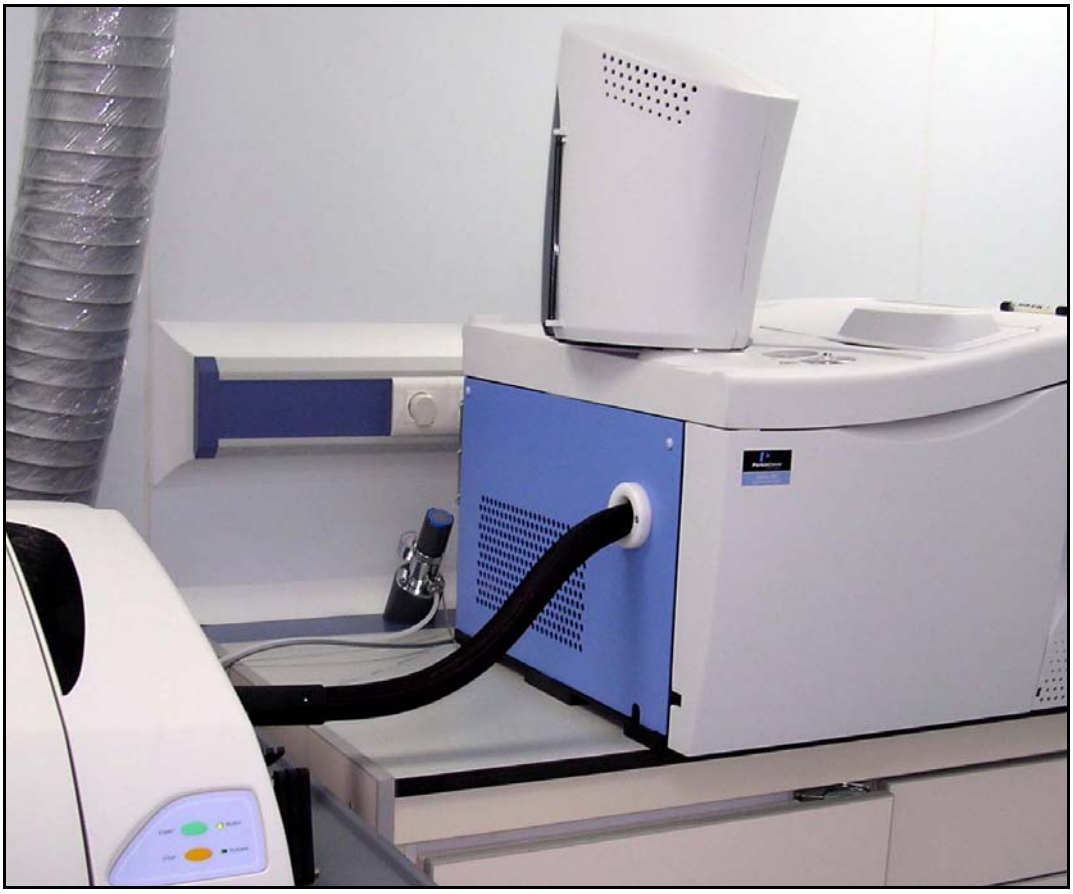
Heated GC-ICPMS Transfer Line for PerkinElmer GC's Clarus and AutoSystem



User manual, installation and maintenance

Document: User Manual for Heated GC Transfer Line
Release: August 2007 (revision 1.12)

Please read carefully the instructions reported in this manual to get the best performances and for your safety !

Thank you for having purchased this RedShift product.

This heated GC-ICPMS interface offers the high performances required for continuous operations on routine or research tests.

The manufacturer continues researches and development to increase products quality and performances, so it is possible that actual performances may be better than what is reported in this manual.

RedShift makes no warranty of any kind with regard to this device, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose.

Redshift shall not be liable for errors contained herein or for incidental consequential damages in connections with the furnishing, performance, or use of this device.

The information contained in this document are subject to change without any notice.

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Chapter 1 Safety and Regulatory Information

1.1 General safety.

Before setting up and operating this product, carefully read the safety information in order to ensure a correct and safe use.
Please consult this Heated GC Interface user manual and the PerkinElmer GC user manual before you start working with the Transfer Line and the GC.
Save this manual on a safety place near the instrument: the manual is part of the Heated GC Interface. If lost, please order immediately a new one.

Do not attempt to modify or override safety devices.
The Heated GC Interface is not designed for usage in dangerous or explosive environmental.
Heated zones must be treated with caution. Avoid direct contact with heated parts such as injectors, detectors, transfer line, metallic terminals. Always allows heated parts to cool down before attempting to work. Risk of burns

RedShift makes no warranty of any kind with regard to this device, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose.

RedShift shall not be liable for errors contained herein for incidental consequential damages in connections with furnishing, performance, or use of this device /material.

Connect this device to an AC line power outlet that has a protective ground connection. A true electrical ground is essential for safe operation.
Original power cord must be use in order to ensure safe operation and CE classification.
Never operate device with any parts or covers removed.

This device is designed for indoor use only.
Take all necessary precaution before trying to open or service parts of this GC Interface.
Always disconnect instruments power cords for AC line power and wait few minutes before removing any covers or parts.

1.2 Regulatory Info

This RedShift Heated GC Transfer Line complies with the following European CE norms:

- Electromagnetic Compliance 89/336 CEE;

- Electrical Safety Low Voltage compliance 73/23 CEE;

- Devices over pressure compliance 97/23 CEE.

1.3 Compressed Gases

Always ensure that the proper gas valves and gauges are installed on gas cylinders.

Gas connections to the GC instrument should be performed by using clean copper tubing or stainless steel tubing.

Gases should be stored outside the laboratory and gas cylinders should be firmly clamped in an upright position.

Explosive hazard
- Bottles of compressed gases should be handled with extreme care.

Explosive hazard
- When using hydrogen or methane a special care must be taken to avoid buildup of explosive gas mixtures in the GC oven.

Chapter 2 Installation Guide

The Heated GC-ICPMS Interface kit allows the coupling of a PerkinElmer GC chromatograph model Clarus 500 or AutoSystem XL to a PerkinElmer Elan ICP-MS spectrometer model 6x00 /9000 /DRC.
This allows the capability to use gas chromatography to separate volatile elemental species that can be selectively detected and quantified by the ICP-MS.
The heated GC interface provides a common carrier and sample output line from GC to PerkinElmer Elan ICP-MS.

The GC must have a free injection port to accommodate the gas heater block.

Materials used in this transfer line allow to use a working temperature up to 300 °C (being 320 °C the maximum recommended), even if GC oven accepts temperatures up to 450 °C.

2.1 Shipping List

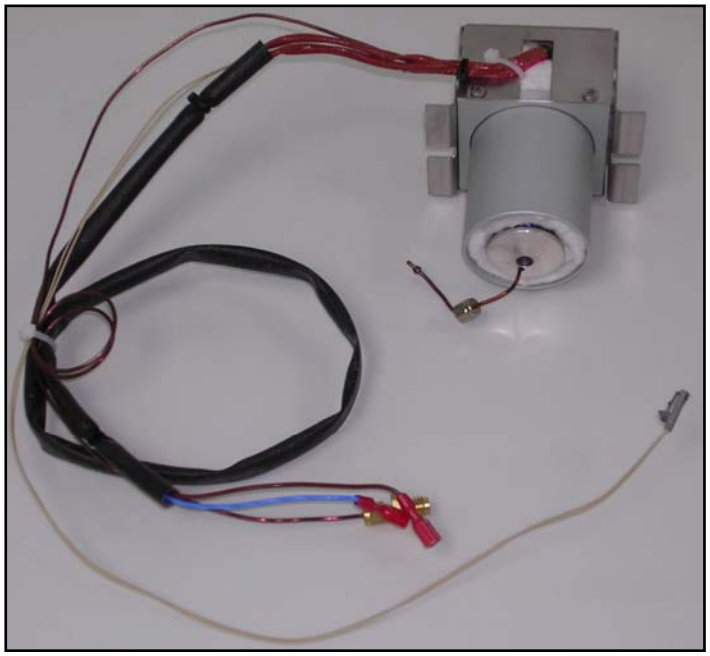
Materials are shipped in a single box that includes all items required to couple a PerkinElmer GC model Clarus 500 or AutoSystem XL to a PerkinElmer ELAN ICP-MS model 6x00 /9000/ DRC via a heated transfer line.

The kit is made up by the following items (an illustrated view of all items is reported in next two pages):

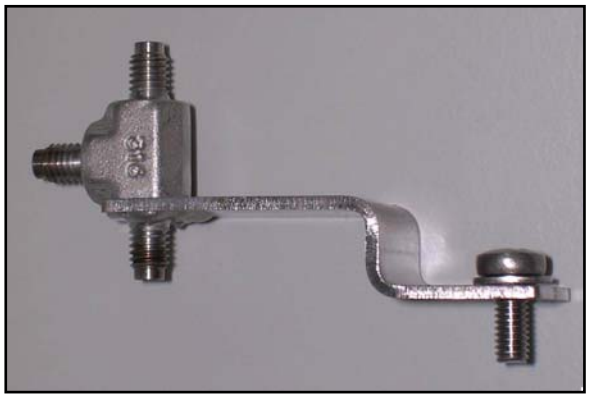
a) GC-ICPMS transfer line (includes heater and temperature sensor)
b) Dummy injector (make-up gas pre-heater)
c) “T” union to connect make-up gas to GC column and transfer line
d) Deactivated silica columns 0.25 mm x 150 cm and 0.32 mm x 150 cm. A glass terminal connector for columns is also supplied
e) GC Clarus left panel, modified to have transfer line passing through
f) Screws to mount interface on GC and to fix gas heater cover
g) Column guard fixing tube
h) PTFE tubing 1/8” x 150 cm, to connect nebulizer gas (make-up) to heather (dummy injector)
i) This manual

a) GC-ICPMS Heated Transfer Line

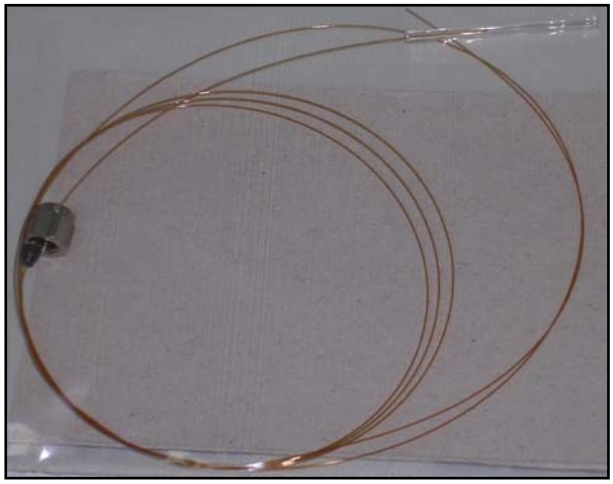
b) Dummy injector (make up gas preheat) 300 °C max operating temperature



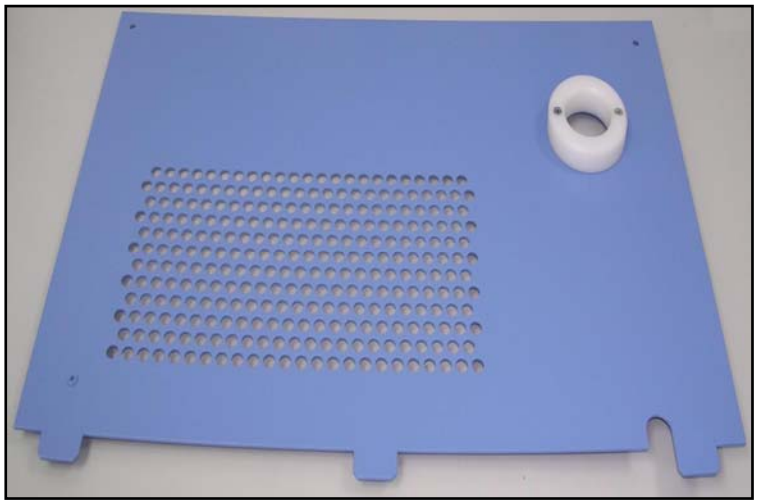
c) “T” union for connecting GC column to transfer line and make-up gas



d) two deactivated silica column terminals (one 0.25 mm x 150 cm; one 0.32 mm x 150 cm to cut on appropriate lenght), with glass column connector and 1/16" female with ferrule



e) GC Clarus 500 /AutoSystem XL left panel



f) Screws to mount interface in GC oven, and to fix cover gas heater

g) Column guard protection tube

2.2 Transfer Line Installation

The transfer line installation procedure here described is intended to be performed by a GC service engineer trained by PerkinElmer.

Step 1- Locate the transfer line side that has to be connected to GC.

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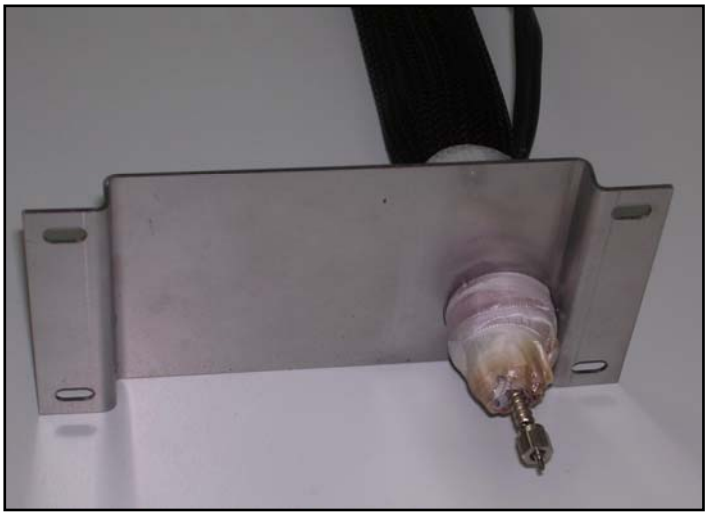
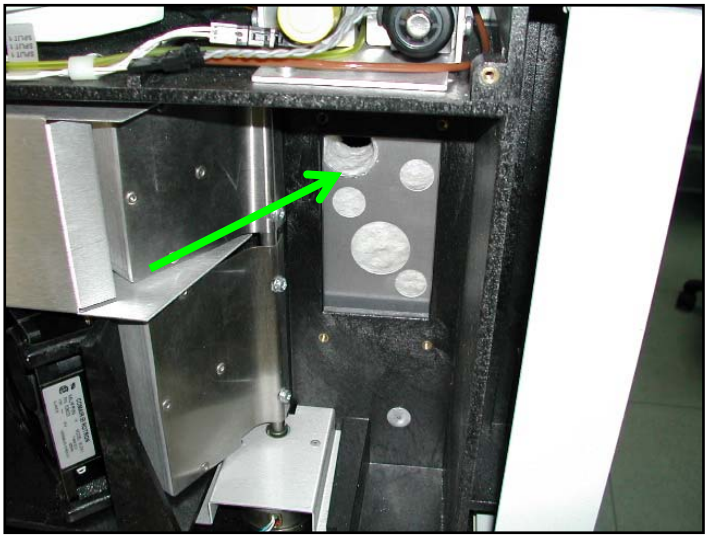
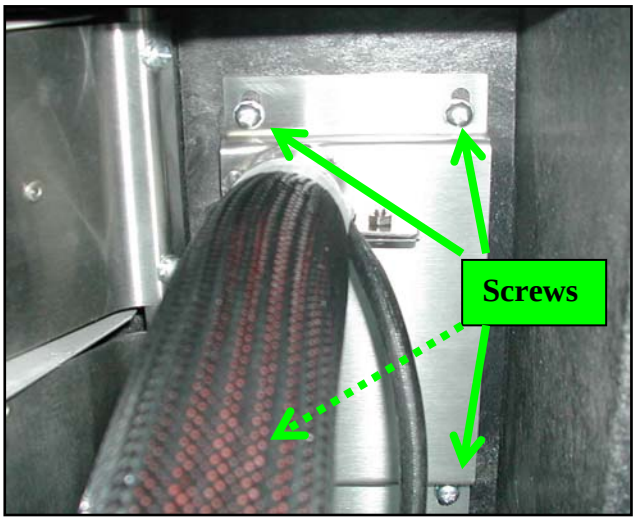


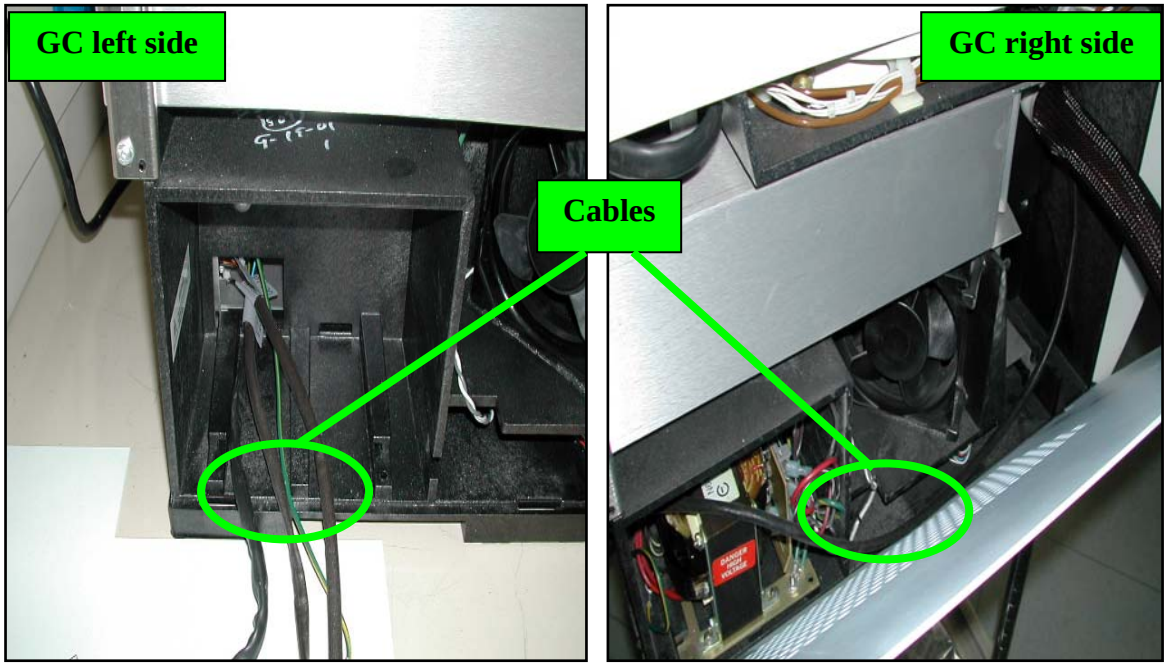
Step 2- Remove left side panel of Clarus 500 GC - or AutoSystem XL - and dig a hole in the glass wool in position shown in the picture below (a screwdriver could be used).



Step 3- Fix the transfer line support plate to GC by using the four screws provided (item “f” in the shipping list)



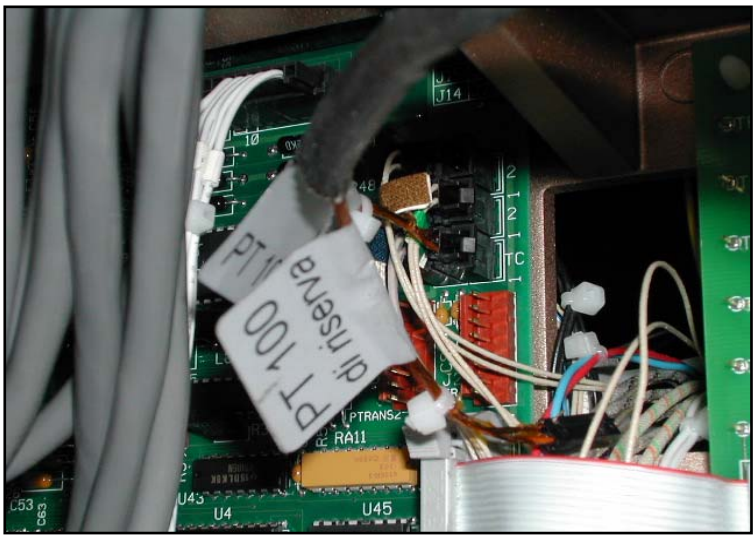
Step 4- Route transfer line cables through GC channels up to electronics compartment located into right side of GC.



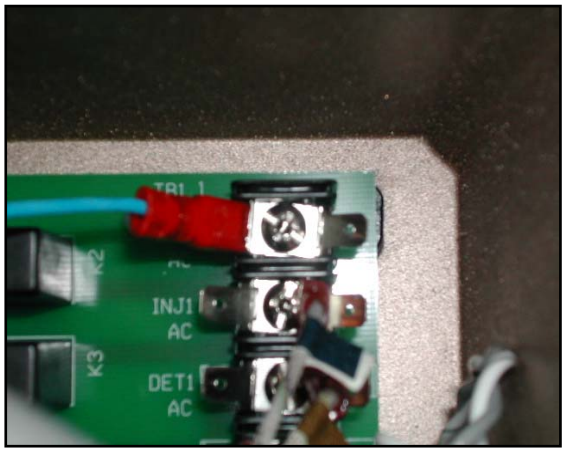
Step 5- Install the modified left GC panel to let transfer line passing through.

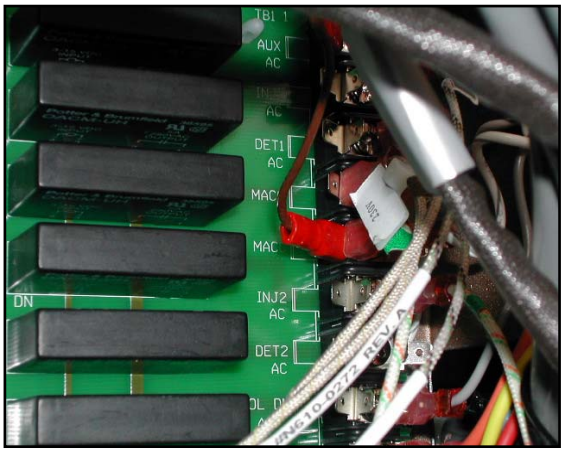
2.3 Transfer Line Electrical Connections

Step 6- Transfer line temperature is controlled via auxiliary GC port: connect one of the two temperature sensors, labelled PT-100, to auxiliary GC port identified as TC or J23 in the bottom right sensor connector on GC mother board.



Step 7- Connect transfer line power supply (220 V only) to distribution board TB1 – AUX AC (position 1) and the return to an available MACC connection (position 4 or 5). Ground has to be connected to GC chassis ground.





H- To activate temperature control of the interface the user has to enter in the GC configuration and then select Auxiliary device (please refer to Clarus 500 GC or AutosytemXL operator manual).

The Transfer Line is now electrically connected and ready to be controlled from GC keyboard and/or TotalChrom method program.

Normal working temperature for interface is up to 300 °C, while max. working temperature should be ≤ 320 °C, even if GC oven accepts temperatures up to 450 °C.

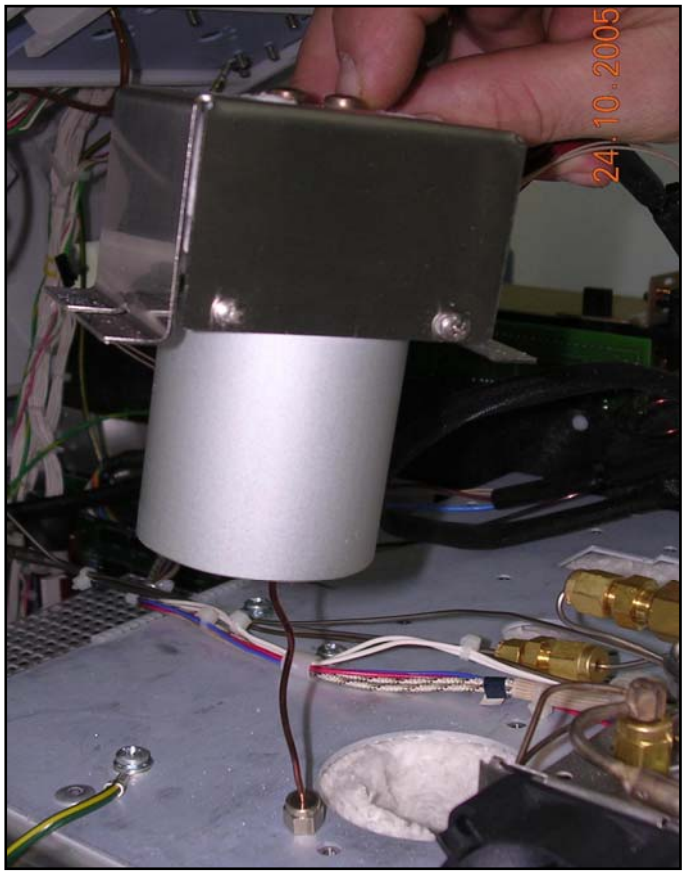
2.4 Gas Heater (Dummy Injector) Installation

This section reports how install the “dummy injector” used to pre-heat the argon make-up gas supplied by the ICP-MS nebulizer, gas that will be used to inject the carrier gas from GC column into plasma discharge.

The dummy injector is fully controlled by the GC method when configured as “Packed Injector” in the GC configuration menu (please refer to GC operator manual).

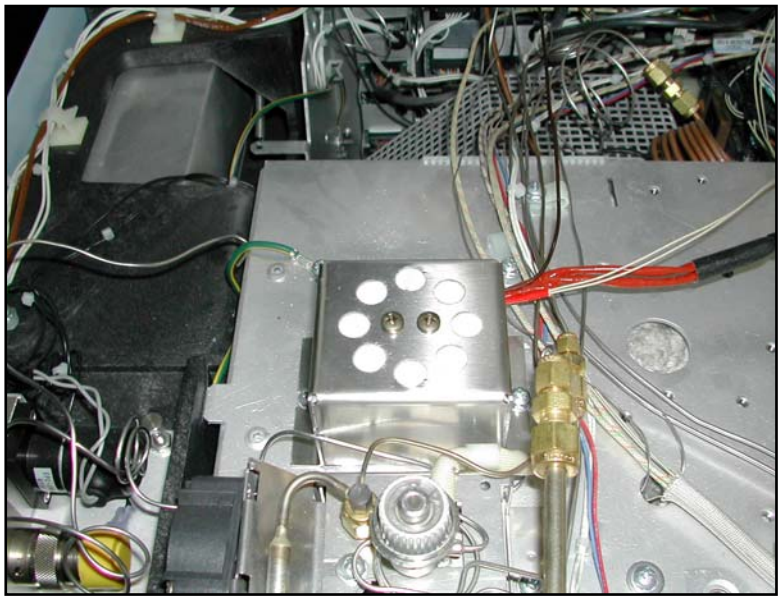
The GC must have a free injector port to allow the installation of this device

This device should be installed in position 1 or 2 of the GC injector port (normally in position 2).



The temperature sensor has to be connected to Inj1 or Inj2, J15 or J24 sensor connectors on the GC mother board, according to gas heater location position (A or B).
The 220 volts power supply cable has to be connected to distribution board TB1 Inj1 (position 2) or Inj2 (position 6) and return to MACC.

Fix the dummy injector by using two of the screws provided.



The inlet port of the dummy injector has to be connected to the nebulizer ICP-MS outlet using the provided Teflon tube and the 1/8” to ¼” reducing union, while the outlet has to be connected to the “T” junction of the transfer line.

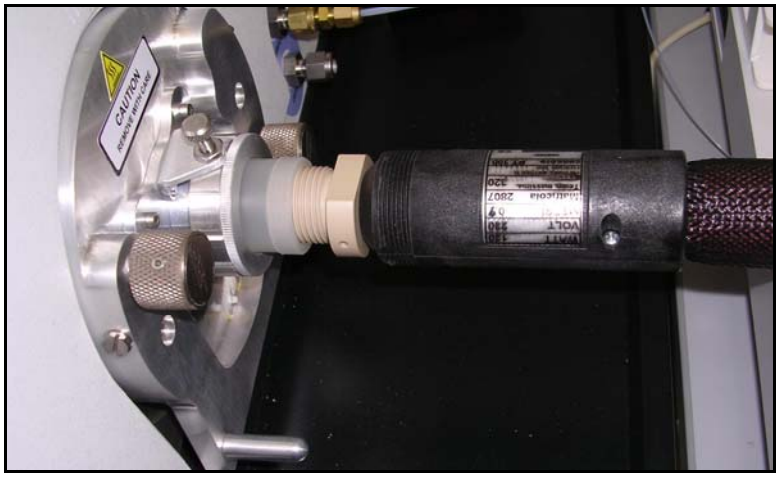
The analytical column has to be installed on the GC Injector port used to inject the liquid sample (refer to the GC operator manual for proper injector column installation), while the column outlet will be connected with the glass union (provided) to the terminal of the empty deactivated column (a 0.25 mm and 0.32 deactivated column are included in the kit). The deactivated column is then lead through the “T” connector (1/16”) up to the transfer line to the end of the ICPMS injector located in the plasma torch.

A 1/16” nut with a graphite/vespel or graphite ferula is used to tight the deactivate column to the desired length inside the transfer line.

Using a suitable quartz injector (1.2 or 1.5 mm) on the ICP-MS torch it is easy to align the deactivated outlet column which must be positioned 4-5 mm from the end of the injector (align the column to the injector end and than pull it back 4 - 5 mm).

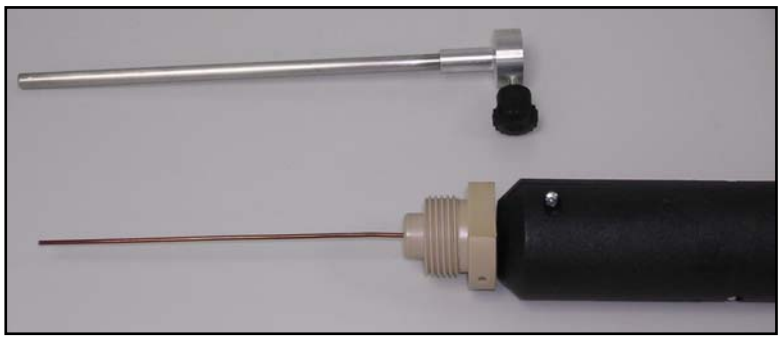
The figure below shows the 1/16” Silcosteel tube that is protruding from the transfer line close to the injector restriction. At the installation it may be possible that this tube should be shortened by cutting a little piece to properly fit in the ICP-MS injector.

This figure shows the transfer line already connected to ICP-MS and ready to be used.



The insulating mantel should be fitted over the transfer line to ICP-MS junction to help maintaining a high temperature in the connexion.

Column guard tube is only intended to protect the column end and the transfer line end when ICPMS injector is removed and transfer line is not in place.



Chapter 3 Maintenance and Warranty

3.1 Maintenance

This product does not require any special maintenance, excluding the chromatographic part (colums and unions, see GC manual). Please refer to this user's manual for a correct use the GC Heated interface.

3.2 Warranty

Limited Manufacturer's Warranty

RedShift srl warrants that this product is free from defects in materials, design and workmanship at the time of its original purchase.
The limited warranty is given to the Customer for twelve (12) months from the product purchase date.
During the warranty period RedShift -or its authorized service representatives- will repair or replace free of charge the defective parts at RedShift 's sole discretion.
The defective items must be sent to:

RedShift S.r.l
E-mail: vendite@redshift.it
www.redshift.it

RedShift will return the repaired product in good working condition. Product will not be given a prolonged warranty period.

The limited warranty shall not apply to deterioration due to normal use. The limited warranty shall further not apply if:
- *defect was caused by use in contradiction with user's manual instruction, rough handling, exposure to moisture or extreme thermal or environmental conditions;*
- *unauthorized modification, repair, or repair by use of unauthorized spare parts, improper installation, accident, spillage of liquid or chemical products;*
- *The product was not returned to RedShift or its authorized service representatives within thirty (30) days after the appearance of the defect within the warranty period.*

The limited warranty is the Customer's sole and exclusive remedy against RedShift and RedShift's sole and exclusive liability against the Customer for defects or malfunctions of the product.
This limited warranty replaces all other warranty and liabilities, oral, written, statutory, contractual, in tort or otherwise.
RedShift is in not events liable for any incidental, consequential or indirect damage, costs or expenses.
Any change or amendment to this limited warranty require RedShift's prior written consent.

Spare parts (ICP-MS)

- Quartz injector 1.6 mm. I.D.	00473292
- Quartz injector 1.2 mm. I.D.	N0681631
- Injector support adapter for twist type torch	N8122007
or	
- Injector support adapter for cassette type torch	W1013266
- O-Ring for injector support adapter (both types)	N8122010
- Ready start cable GC-ICPMS:	(W)1007493C

Spare parts (GC)

Depending on GC column type used 0.25 or 0.32 mm. id.:
N930 1356 Fused Silica capillary tube 0.25 mm. deactivated 5 mt.
N930 1357 Fused Silica capillary tube 0.32 mm. deactivated 5 mt.

For column to deactivated line connections:
N930 2149 Universal glass connectors Pcs. 5
N930 0059 Nut 1/16" stainless steel for union TEE Pcs. 5

Ferrule for column and deactivated line:
0992 0104 Graphite/Vespel Column ferrule 1/16" id 0.4 mm. for columns 0.25mm. id. Pcs. 10
0992 0105 Graphite/Vespel Column ferrule 1/16" id 0.5 mm. for columns 0.32mm. id. Pcs. 10

Manual syringes:
0023 0177 Syringe 1.0 ul needle gauge 22 needle 7 cm. for PE injectors
0023 0523 Syringe 10.0 ul needle 7 cm. for PE injectors