

Agilent Reversed Flow Modulator

Capillary Flow Technology

Introduction

Two-dimensional GC, or GC \times GC, provides powerful separation capabilities in the analysis of complex mixtures such as those found in the petrochemical, environmental, and fragrance industries. The Agilent GC \times GC methodology uses two capillary columns in series coupled with a flow modulator. Like other components of Agilent's GC Inert Flow Path, Figure 1 shows the flow modulator treated with an proprietary coating, rendering it inert. The first column, usually nonpolar, separates compounds based on boiling point. The GC \times GC modulator CFT device quickly moves the effluent of column 1 to a second shorter column for additional separation based on polarity. Any separation that occurs on the first column is preserved during transfer to the second column.

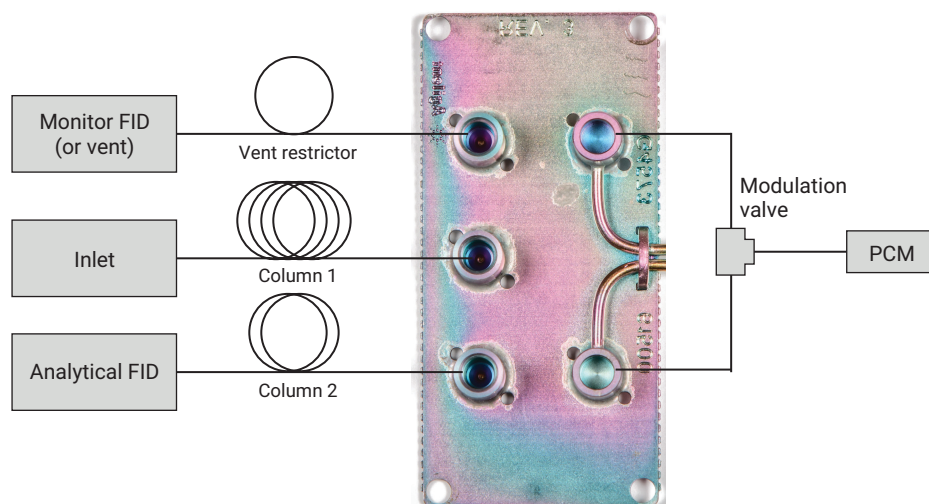


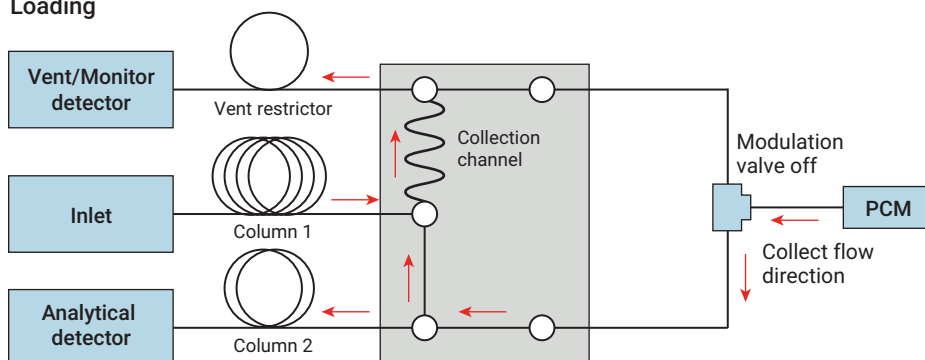
Figure 1. Configuration of GC \times GC flow modulator.

The key component in a GC \times GC system is the flow modulator. The second generation flow modulator improves usability in comparison to forward flow modulator. This device precisely transfers effluent from the first column to the second column with high repeatability. This takes place under a constrained range of carrier flow rates and temperatures without adding any extraneous chromatographic artifacts. The chemically inert modulator has low thermal mass, and its GC oven location allows precise temperature control without lag during programmed runs. It is based on Agilent capillary flow technology, and does not require cryogenics. A three-way solenoid valve receives a controlled supply of carrier gas from a pressure control module (PCM). The periodic switching of this three-way valve drives the modulator in the precisely timed and synchronized switching between the load and inject states (Figure 2).

Strengths of flow modulation

- Capillary flow device offers limited moving parts for robust, reliable operation
- The reversed inject flow modulator eliminates the need for cryogenic gases for lower cost of ownership
- High flow rate allows for full fractionation in the second dimension.
- Flow modulation removes limitations on sample volatility.

Loading



Injection

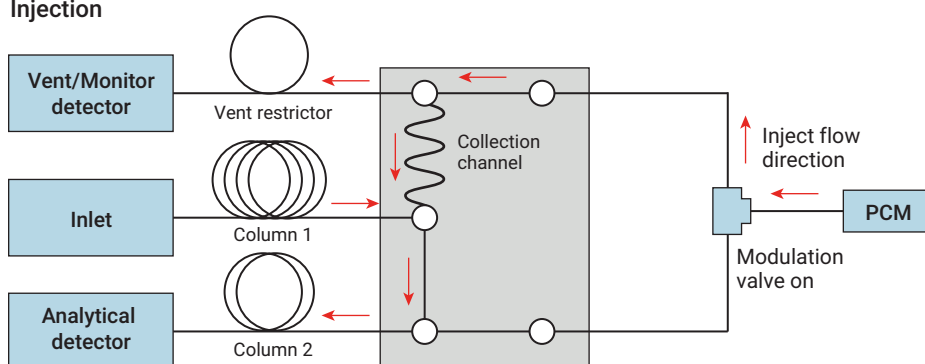


Figure 2. States of flow for Reversed Injection Flow Modulator.

Typical applications include

- Hydrocarbon analysis
- Fuel profiling
- Polymer analysis
- Metabolomics
- Flavor and fragrance

Requirements

What you need to get started with GCxGC:

- Agilent 7890B GC firmware version A.04.07 or greater
- G4573A reversed inject flow modulator kit option or accessory
- 200 Hz data collection rate FID
- Split/splitless inlet or MMI
- Helium or hydrogen carrier gas
- Auxiliary PCM
- Two-dimensional analysis software (Not provided by Agilent)

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