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Application Note

Ion Mobility Spectrometer as OEM-Detector Module

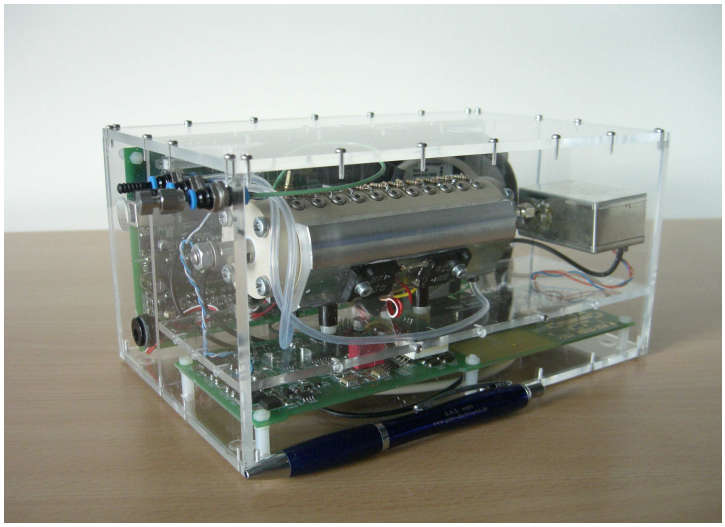


Figure 1: G.A.S. mbH stand alone module

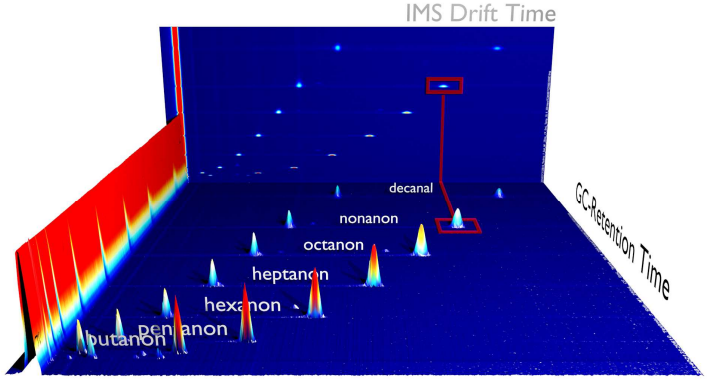
Advantages

- **Sensitive:** Detection limits in the low **ppb$_v$ (µg/m^3) range** for VOCs with heteroatoms like ketones, aldehyds, alcohols, amins or halogenated compounds.
- **Selective** due to specific analyte ion drift times.
- **Flexible:** Generates positive and negative ions.
- **No licence for H3 source required** according to EU directive 29/96 EURATOM.
- High **reproducibility < 3 %** for peak intensity and **< 1 %** for drift times
- Operation with **nitrogen or synthetic air**
- Works at **ambient pressure**
- **Compact**
- **Free of maintenance**
- Stand alone **data aquisition software** and software suite for **3D GC-IMS data analysis**

The stand alone plug-and-play IMS detector as OEM module by G.A.S. mbH enables different use of the technology according to individual application requirements. Besides the advantage of reasonable costs compared to fully equipped IMS instruments, this modular set-up allows to configure the analytical system around according to customer‘s needs. The OEM module can be coupled to standard GC systems or the user can alternatively use a membrane inlet system or even thermo desorption unit like SPME or needle trap.

Samples are ionized by using a tritium source with an intensity below the excemption limits of the EU directive 29/96 EURATOM. Power input is 24 V DC and digital USB 2.0 high speed digital interface is used for output.

Introduction of the sample is realized by using a 1/16“ sample line. The device can be heated up to 100 °C and has a resolution of ~ 100. Parameters of the IMS module are controlled by an external software.



Technical Specification

Electrical

DC Input:	24V DC +-10%,
	12 W (unheated IMS)
	30 W (heated IMS)
Signal output:	Analog conditioned sensor Signal (Range +-10 V)
	TTL Trigger Output for synchronisation or
	USB 2.0 High Speed digital interface
	14 bit, 150 kS/s Bulk data stream (up to
400 kS/s optional)	
Control interface:	USB 2.0, 2 Interrupt endpoints
	(RS232 optional)
	(TTL compatible inputs for mode selection
optional)	
Temperature controller (optional):	
	2 Channel PI Controller for PT100
	up to 100°C
	+-0.1 K accuracy
	+-1 K display accuracy

Gas connections

Driftgas In:	3 mm or 1/8" Swagelok (Other connectors available on
request)	
Gas output:	3 mm or 1/8" Swagelok (Other connectors available on
request)	
Sample In:	0.75 mm inner diameter PEEK tubing
	(1/16" Swagelok optional)

Mechanical

Full OEM demo kit	(height x width x depth) 120 x 140 x 224 mm
Smaller alternative	(height x width x depth) 120 x 85 x 224 mm
	(Note: need to place high voltage supply of
PCB outside the kit)	

IMS

Radiation source:		3H bound in metal, < 500 MBq ß-emission
Licence:		Not required in as in directive 96/29/ EURATOM countries
(<1GBq)		
Life time:		12.5 years half-life
Drift tube material:		Stainless steel and PEEK
Drift tube inner diameter:	15.2 mm	
Drift tube /lenght::		98 mm
Drift field strength:		500 V/cm
Drift voltage polarity:		positive and negative, switchable during operation
Amplifier transimpedance:	3 V/nA	
Temperature/Heating:		up to 100°C (optional)
Resolution:		typically >100 (positive RIP, 20°C)
Drift gas flow:		150 mL/min (N_2 or synthetic air 5.0 quality)
Sample gas flow:		10 to 100 ml/min (N_2, synthetic air or Helium 5.0 quality)
Spectra rate:		every 30 ms
Detection limits:		Typically low ppbv (Hexanone positive mode < 1 ppb -
others on request)		

Demo software

System requirements:	Windows XP or Windows 7
	1 High Speed USB2.0 port
Data:	Storage in "mea" format suitable for
Software suite	Laboratory Analytical Viewer (LAV)

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