

# Product Flyer

**MotoSense**

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**V&F**  
Analyse- und  
Messtechnik  
GmbH

# Process Mass Spectrometer MotoSense

## A powerful tool for the automotive engineer

Today's challenges in developing high performance, low consumption and ultra-low emission engine and catalyst designs demand very fast, sensitive and detailed emission monitoring systems. The V&F MotoSense serves as a powerful tool to study organic HC as well as inorganic N and S gaseous emissions in raw exhaust gas and tail pipe by automotive and catalyst researchers. Fast gas response times of 20 msec and a high dynamic range of 1 to 10<sup>4</sup> enable detailed study of nonsteady processes.

## Proven technology

The MotoSense mass spectrometer with its patented Ion-Molecule Reaction (IMR) cell is used for the analysis of volatile HC, N and S components at trace levels. It offers an unmatched response time, a wide dynamic measurement range and lowest detection limits in combination with high selectivity. After 28 years of consistent further development excellent flexibility and user friendliness are guaranteed while operating costs are minimized. State-of-the-art manufacturing capabilities and the exceptional technological proficiency of V&F themselves ensure that the MotoSense is the perfect choice for demanding automotive and catalytic applications requiring highly dynamic measurements.

## High operating comfort

An easy-to-use software package - the V&F Viewer program - comprises system controls and measurement configurations, data acquisition from the analyzer via TCP/IP network using the Microsoft.NET framework. Alternatively, the analyzer can be operated via AK protocol. Functions for correlations, matrix correction and calibration are integrated in the V&F Viewer program. These features allow for a selective analysis with high accuracy and reproducibility. Graphical representation of all important data enables the user to quickly assess the quality of the measurement as well as the overall instrument performance.



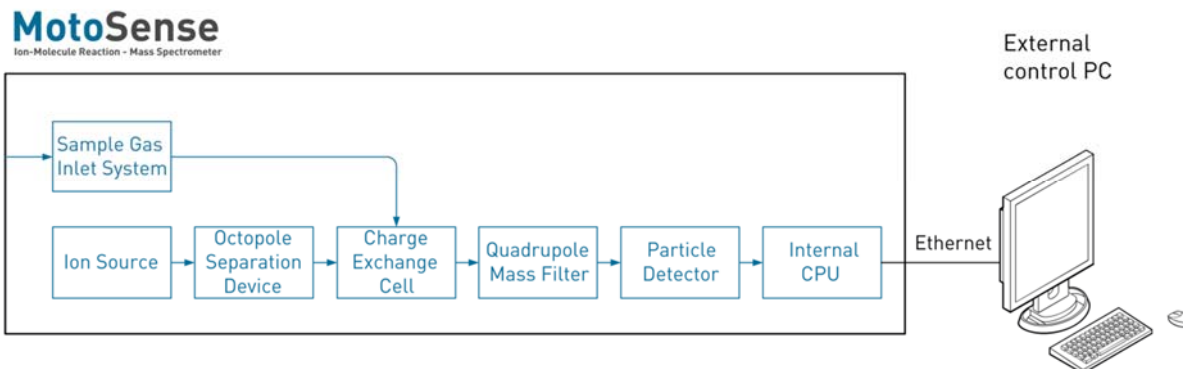
## Applications\*

- detection of non-limited HC gas components
- monitoring of desulfation strategies for catalytic devices
- Ammonia and NOx measurements on SCR catalysts

\* one application setup is included in the instrument price

## Function principle

The MotoSense is based on the patented Ion-Molecule Reaction – Mass Spectrometry (IMR-MS). The IMR technique elegantly combines the inherent advantages of online mass spectrometry such as the fast measuring speed with the selectivity needed for the quantification. Unlike other ionization techniques, IMR-MS causes significantly lower fragmentation of the analytes.



The V&F IMR-MS technology consists of a two-step ionization process followed by quadrupole mass spectrometry separation. In a first step the source gas (Hg or Xe) is ionized causing the formation of primary ions with “low” energy levels (10 eV to 12 eV). The second step is the “soft” ionization of the probe gas by charge transfer between the primary ions and the analytes. The signal-to-noise ratio is enhanced by the integrated octopole separator, focusing the primary ions and filtering out any interference. The quadrupole mass filter (7 - 160 amu) separates the molecules for subsequent detection by the channeltron detector. The temperature- and pressure controlled sample gas inlet assures high reproducibility and measurement accuracy. Any contamination due to condensation or presence of particulate matter is minimized by a filter system.

## Features, benefits

- wide dynamic range with lowest detection limits
- fast response time
- high selectivity for S components (H<sub>2</sub>S, SO<sub>2</sub>, COS, CS<sub>2</sub>)
- automatic pressure regulation ranging from 0.75 to 2 bar(a)
- integrated matrix – correction – calculation and auto-calibration
- temperature controlled gas inlet, no sample preparation (wet, ambient air) needed
- filter for particulates
- user friendly software package - operator interface with 4-button control
- minimized service- and operation costs

## Specification, technical data

Technical Data	IMR-MS	Technical Data	IMR-MS
Mass range	7 – 160 amu	Ambient temperature	20°C - 35°C
Resolution	< 1 amu	Humidity max.	80 % (non-condensing)
Analysis time	>= 1 msec/amu	Gas consumption	30 – 150 ml/min
Measuring range <sup>1</sup>	10 <sup>5</sup>	Gas inlet temperature	50°C – 190°C adjustable
Response time <sup>1</sup>	T90 < 20 msec	Gas inlet pressure <sup>2</sup>	0.75 – 2 bar(a)
Lower detection limit <sup>1</sup>	< 1 ppb	Power	230V/50Hz or 115V/60Hz 800 W
Concentration drift	< ± 5% over 24 h	Dimension (WxHxD)	534 x 743 x 639 mm
Reproducibility	< ± 3%	Weight	87 kg
Accuracy	< ± 2%		

<sup>1</sup> depending on the measured components, system setup and the settings



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