

Product Flyer

LubeSense

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V&F
Analyse- und
Messtechnik
GmbH

Process Mass Spectrometer LubeSense

Online Oil Consumption Measurement

Engine oil loss is a severe problem in today's engine development. Downsizing engines together with turbocharging, reducing piston ring thickness in combination with increased cylinder pressures result in engine oil loss. Minimizing oil loss requires knowledge of the engine states in which it occurs. Especially for transient engine operation real-time measurement instrumentation is obligatory in order to obtain time resolved oil consumption profiles. The V&F LubeSense has been specifically designed for this task. In combination with the V&F GasOxidizer oil consumption rates can now be determined online by means of the SO₂ tracer method.

Proven Technology

The LubeSense mass spectrometer with its patented Ion Molecule Reaction (IMR) cell is derived from the renowned AirSense IMR-MS. 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 itself ensure that the LubeSense in combination with the V&F GasOxidizer is the perfect choice for online oil consumption 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 matrix correction and calibration are integrated in the V&F Viewer program. These features allow for 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.



Application

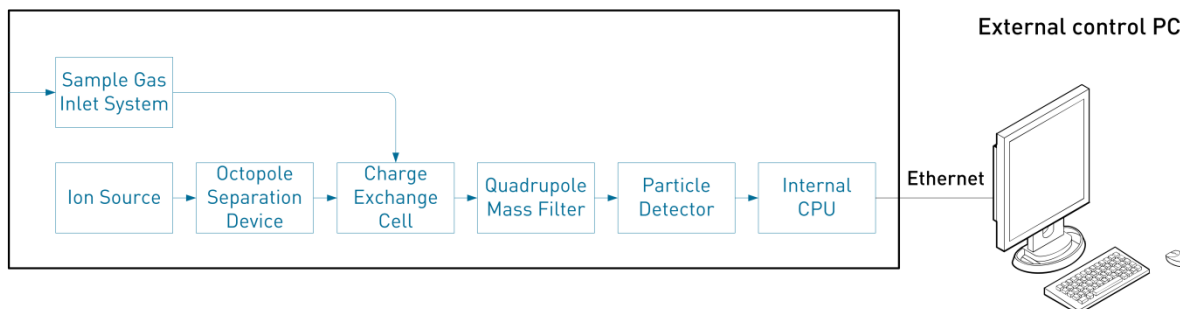
- online oil consumption measurement

Function principle

The LubeSense is based on the patented Ion-Molecule Reaction Mass Spectrometry (IMR-MS) concept. 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.

LubeSense

Ion-Molecule Reaction - Mass Spectrometer



The V&F IMR-MS technology inside the LubeSense consists of a two-step ionization process followed by quadrupole mass spectrometry separation. In a first step the source gas Xe is ionized causing the formation of primary ions with “low” energy levels (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.

Features, benefits

- wide dynamic range with lowest detection limits for SO₂
- robust and reliable
- online oil consumption measurements on diesel, gasoline and CNG engines
- high in sensitivity and selectivity
- automatic pressure regulation ranging from 0.1 to 1 bar
- integrated matrix – correction – calculation and auto-calibration
- temperature controlled gas inlet
- 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	>= 100 msec/amu	Gas consumption	30 – 150 ml/min
Measuring range ¹	10 ⁴	Gas inlet temperature	50°C – 190°C adjustable
Response time ¹	T90 < 20 msec	Gas inlet pressure	0.75 – 2 bar(a)
Lower detection limit ¹	<= 10 ppb	Power	230V/50Hz or 115V/60Hz 800 W
Concentration drift	< ± 5% over 24 h	Dimension (WxHxD)	534 x 806 x 639 mm
Reproducibility	< ± 3%	Weight	87 kg
Accuracy	< ± 2%		

¹ depending on the measured components, system setup and the settings



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