thermoscientific

How to gain process understanding and control

Highly precise mass spectrometers with easy to use software

ThermoFisher SCIENTIFIC

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Overview

Process mass spectrometers with GasWorks® interface

Process mass spectrometers are engineered to meet a number of challenging process applications in the petrochemical, iron and steel, and biotechnology industries. Highly reliable and easy-to-own, Thermo Scientific™ process mass spectrometers deliver faster, more complete, lab-quality online gas composition analysis.

Lab Scale: Thermo Scientific™ Prima BT bench top process mass spectrometer
Production Scale: Thermo Scientific™ Prima PRO process mass spectrometer or Thermo Scientific™ Sentinel PRO environmental Mass spectrometer

The Thermo Scientific™ GasWorks software provides an intuitive, information rich and flexible window into the operation of the Prima PRO, Prima BT and Sentinel PRO. The 21 CFR Part 11 compliant software was produced in a certified ISO 9001 environment. GasWorks is designed for rapid installation and to facilitate ongoing operation while providing a secure, stable platform for process analytics.

Designed for simple configuration, operation and maintenance without the need for specialist knowledge of mass spectrometers.

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Process mass spectrometers with GasWorks interface (cont.)

The suite includes a wide range of functions and features, allowing it to be matched exactly to the needs of the user. Whether the requirement is for simple alarm indication in the event of a manufacturing process failure, or for complex data presentation for process understanding and control, GasWorks is well equipped to offer an effective solution. Regular updates ensure that users are able to access the latest enhancements as soon as they become available.

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The technology and software

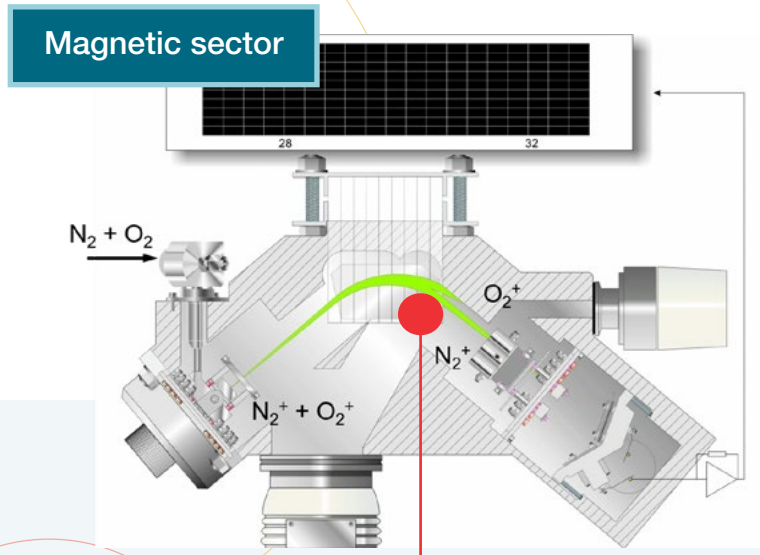
Optimal performance

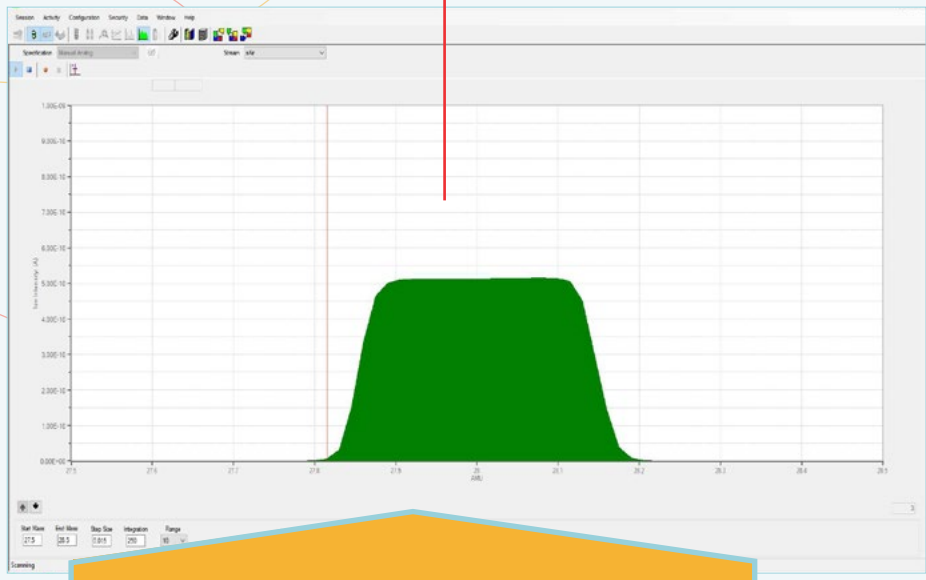
Scanning magnetic sector technology | Analog scans

The primary feature of the process analyzer is the scanning magnetic sector technology. This field-proven technology has demonstrated the highest performance for on-line gas analysis.

Scanning magnetic sector technology offers precision, accuracy, long intervals between calibrations, and resistance to contamination. Typically, analytical precision is between 2 and 10 times better than a quadrupole analyzer, depending on the gases analyzed and complexity of the mixture. This resistance to contamination is essential to ensure continued operation without any requirement to interrupt the analyzer for mass filter cleaning.

The signal intensity at any specific mass position on a scanning magnetic sector analyzer appears as a flat top peak, negating the need to measure the exact middle of the peak. This means that any small drift in the mass scale will not result in a change in signal intensity.





Analog scan: GasWorks software

Fault tolerant design to increase uptime.

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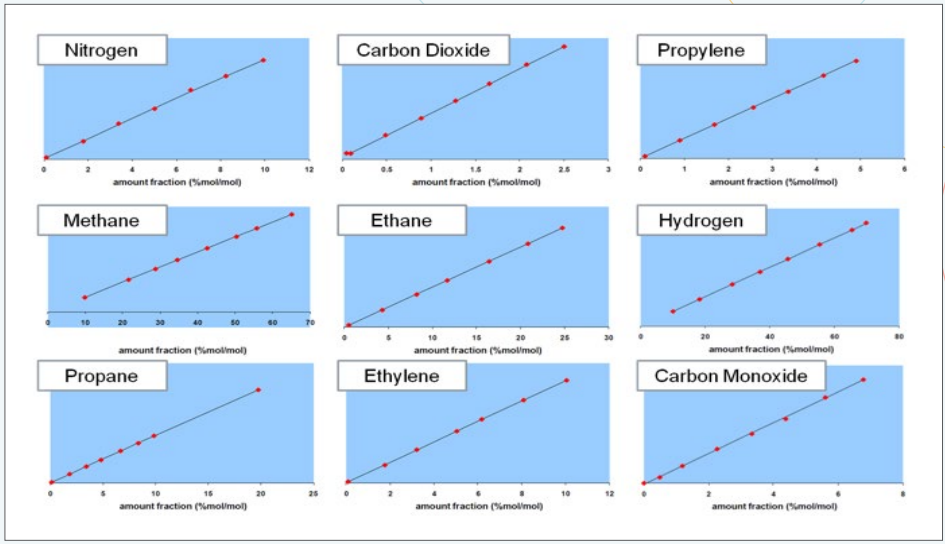
The scanning magnetic sector in the Prima PRO, Prima BT and Sentinel PRO is laminated to scan at speeds equivalent to that of quadrupole analyzers, offering the unique combination of rapid analysis and high stability of an unlimited number of user defined gases.

Independent testing at the world renowned and accredited test authority EffecTech validated the unrivaled accuracy of the Prima PRO for a range of common gas species over wide dynamic ranges.



The performance benchmarks of this instrument were calculated over the following maximum expected composition range when used in combination with an ISO 17025 accredited calibration gas.

component	calibration gas (%mol/mol) [1]			sample composition range [2] (%mol/mol)	
				minimum	maximum
nitrogen	9.000	±	0.015	0.10	9.94
carbon dioxide	5.000	±	0.015	0.05	2.50
methane	9.000	±	0.02	9.85	64.90
ethane	5.000	±	0.013	0.50	24.75
propane	10.000	±	0.025	0.11	19.72
ethene	5.0000	±	0.0015	0.10	10.06
propene	5.0000	±	0.0130	0.10	4.90
hydrogen	43.0000	±	0.0700	10.01	68.69
carbon monoxide	9.0000	±	0.0150	0.10	6.79

[1] The quoted expanded uncertainty is based upon a standard uncertainty multiplied by a coverage factor of (k=2) providing a level of confidence of approximately 95%

[2] These ranges correspond to the maximum reference gas range

Proven to have linearity superior to gas chromatography, the Prima PRO scanning magnetic sector is the only process MS to be independently verified for linearity and precision by the internationally renowned and ISO accredited laboratory.

EffecTech **Click here** to visit EffecTech website

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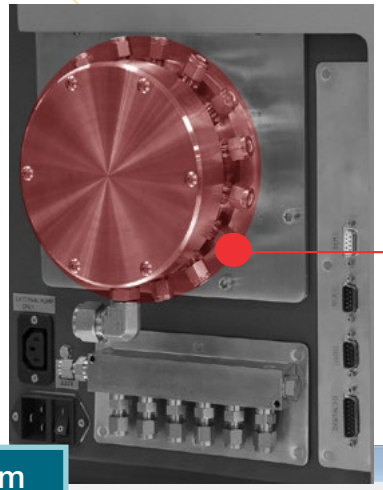
Rapid Multi-Stream (RMS) sampling | Stream status

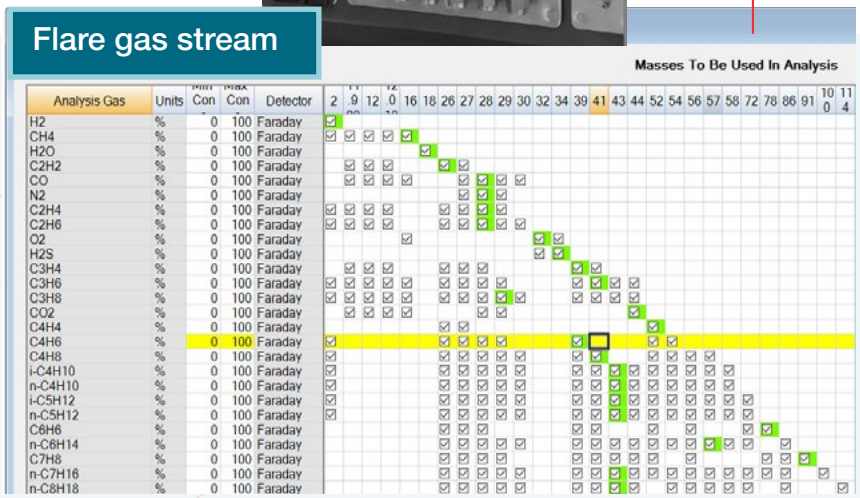
The unique Rapid Multi-Stream (RMS) inlet system allows for the selection of 16 to 64 streams and sets new standards for speed and reliability of multi-stream sampling and maintenance intervals. Avoid multiple gas chromatographs, extra maintenance of multiple instruments, and rely on one process mass spectrometer to analyze up to 64 sample gas points. Combining two RMS enables sampling from more than 100 points.

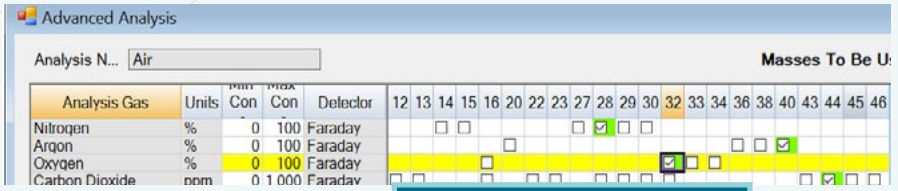
The RMS is not a rotary valve allowing all gas streams to flow continuously. The position of the rotating arm is optically encoded for reliable computer controlled stream selection.

Downstream of the RMS is a digital flow sensor to report sample flow for each selected sample point.



Flare gas stream





Process gas stream

Stream status: GasWorks software

Flare and process gas streams are two of the many analysis methods. A simple analysis of six gases has a 10 second completion time. A more advanced analysis of 40 gases has a 30 second completion time. The user has the ability to select the most efficient peak measurements for each analysis as well as the appropriate speed depending on the process control requirements. The software's stream status keeps the user informed of the analysis.

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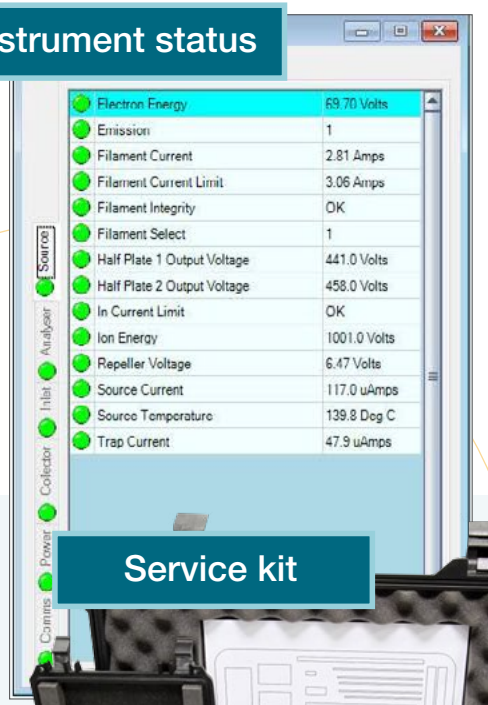
Instrument status: GasWorks software

The local data historian is used to record instrument diagnostics throughout the life of the mass spectrometer. The data is designed to provide a comprehensive health profile for the system giving the maintenance engineers the best possible chance of identifying the root cause of any failure.

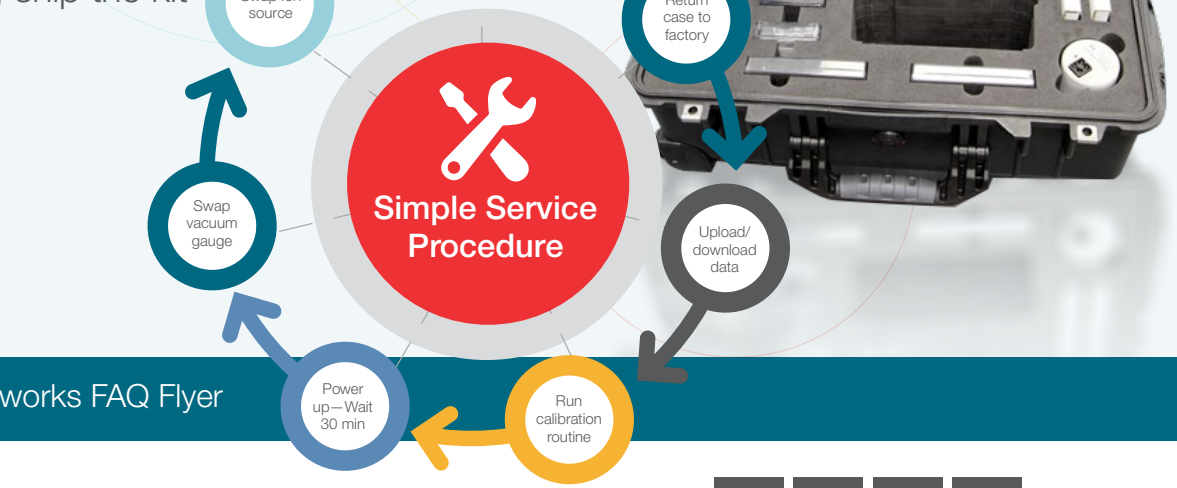


Simplified procedures

Simple maintenance

The standard service kit ships with all Prima PRO and Sentinel PRO systems and is an option with Prima BT. The kit includes all the components and tools necessary to complete the routine maintenance to simplify maintenance procedures.

Rather than changing filaments or cleaning the source, users now simply change the entire source, replacing it with the fully tested spare. Similarly, with the vacuum gauge, there is no need to disassemble for cleaning. Once the service has been completed, ship the kit to your nearest service center for refurbishment.



Click here to download the full gasworks FAQ Flyer

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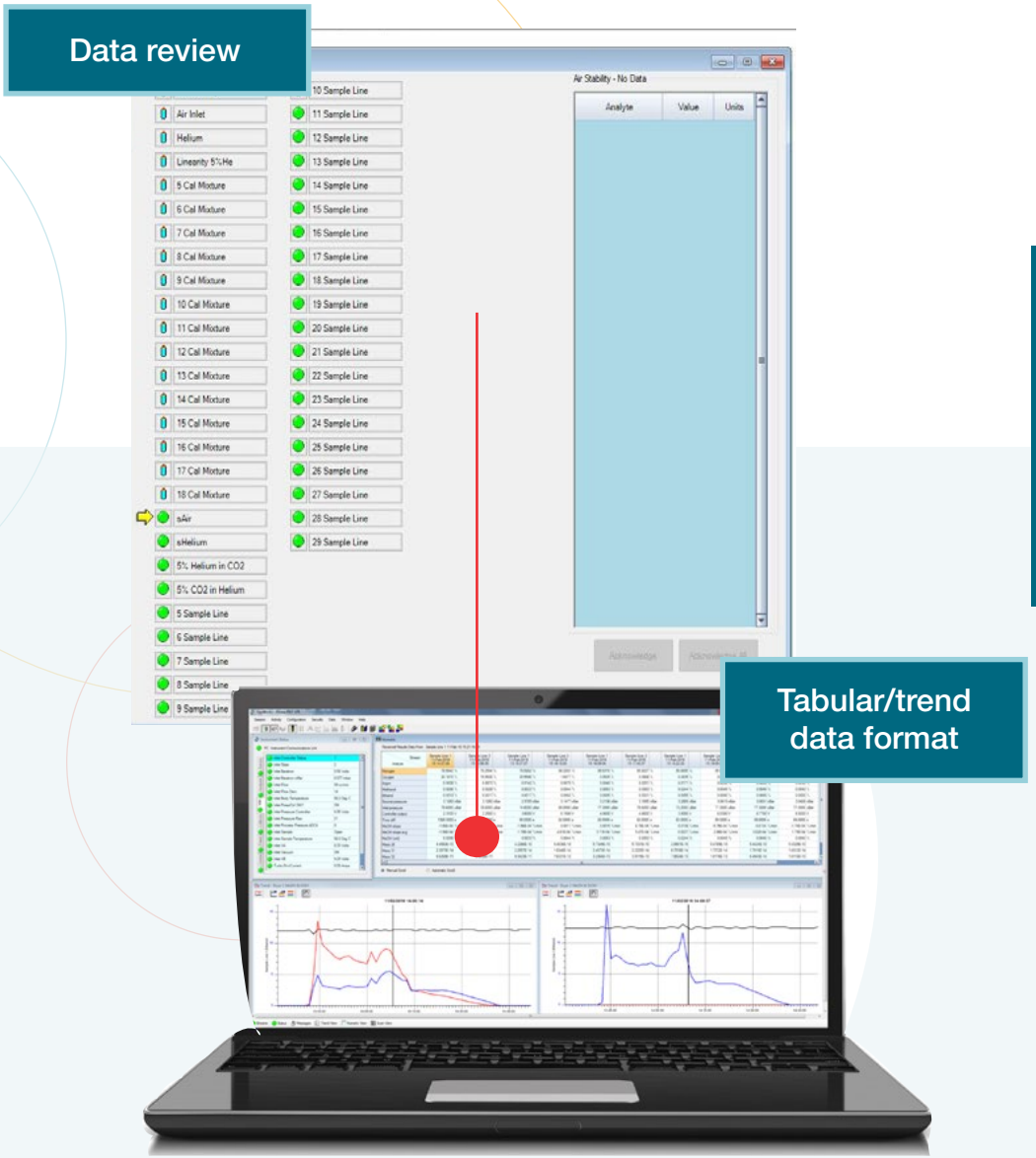
Simple operation

GasWorks has a data review program that a user can install on an office PC to access data offline. For ease of analysis, the data can be reviewed in tabular or trend format from a .CSV or other common file.

Simple configuration

Watch **Gasworks How to Video Series**: Analysis and Calibration Configuration.



Click here to view the Process Mass Spectrometry product comparison guide

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Additional resources

1. Gas Analysis Mass Spectrometry Applications in Fermentation and Cell Culture Processes
2. Improving Low Carbon Steel Production in Specialty Steel Processes
3. Gas Analysis Mass Spectrometry in Catalysis Research and Development

watch now to view video

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About Thermo Fisher Scientific

Thermo Fisher Scientific is the world leader in serving science. Our mission is to enable our customers to make the world healthier, cleaner and safer. We help our customers accelerate life sciences research, solve complex analytical challenges, improve patient diagnostics, deliver medicines to market and increase laboratory productivity. Through our premier brands – Thermo Scientific, Applied Biosystems, Invitrogen, Fisher Scientific and Unity Lab Services – we offer an unmatched combination of innovative technologies, purchasing convenience and comprehensive services.

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