



Thermo Scientific Prima PRO 700 process mass spectrometer

Precise, real time magnetic sector gas analyzer

The Thermo Scientific™ Prima™ PRO Process Mass Spectrometer is a highly reliable, precise, and versatile gas analyzer ideal for fast analysis that ensures efficiency and compliance in advanced process control across many applications and industries. Able to perform the work of 10 gas chromatographs, it is a powerful solution for industrial gas analysis.



Features

- Rapid Multi-Stream Sampler for up to 127 measurement points
- Superior analytical precision, accuracy and stability
- High speed analysis ideal for process control

Analytical platform

The principle feature of the Prima PRO mass spectrometer is its scanning magnetic sector analyzer. This field-proven technology delivers the highest performance for industrial on-line gas analysis, offering precision, accuracy, long calibration intervals, and superior resistance to contamination. This contamination resistance is particularly valuable in industrial processing, where the analyzer must withstand contamination from aggressive process samples.

The Rapid Multi-Stream Sampler (RMS) inlet system enables up to 127 streams, setting new standards for speed and reliability in multi-stream sampling while extending maintenance intervals. With a single Prima PRO, users can eliminate the need for multiple analyzers such as gas chromatographs, reducing maintenance demands without compromising sampling frequency. Additionally, an optional Variable Pressure Inlet allows direct sampling from processes ranging from 1000 mBar to 0.3 mBar, ensuring adaptability to diverse industrial applications.

Operating principles

The sample gas is introduced via a stream selector and a pressure reduction system. Using an electron emitting filament, the ionization chamber converts the sample molecules into ions which are positively charged molecules or parts of molecules. These ions are then separated according to their mass by a variable magnetic field. The different mass ions are then quantified by the detector.

Cross-industry applications

The Prima PRO analyzer can accurately report the compositions of process gas streams from a diverse range of applications including those in hydrocarbon processing, iron & steel production, clean energy and biotechnology. The combination of fast and precise gas analysis with advanced process control models drives higher yields and improved product quality while ensuring regulatory compliance.

Specifications

Ion source	Enclosed electron impact with dual filaments, temperature controlled (settable over range 120-200°C, to $\pm 0.1^\circ\text{C}$)
Analyzer type	Scanning, laminated electromagnet, 6 cm radius, 80° deflection
Mass range	1-200 amu
Resolution	Switchable between two collector resolving slits, resolving powers of 60 (1mm) and 20 (4 mm) are standard. Optionally 140/85 (0.36 mm/0.69 mm) or 100/45 (0.56 mm/1.45 mm) or 140/45 (0.36 mm/1.45 mm) may be fitted
Mass scale stability	Measured at mass 28 < 0.013 amu over 24 hours
Peak shape	At 60 resolution, the ratio of the width of the flat-top (99% height width) to the base peak width (5% height width) 0.5
Abundance sensitivity	<250 ppm for 27/28 amu
Detector	Faraday and optional Faraday/SEM dual detector
Inlet	Temperature controlled micro-capillary with Molecular leak and bypass (standard configuration). Variable Pressure Inlet available (optional).
Vacuum system	Turbo-molecular pump and external rotary pump
Sample flow	Digitally measured and recorded for each stream for any instrument with RMS option
Analysis time	0.3-1.0 sec/gas component
Ambient temperature	12-40°C
Lower Detection Double SEM	5 ppb typical (may vary with gas matrix)
Lower Detection Single SEM	0.1 ppm typical (may vary with gas matrix)
Lower detection faraday	10 ppm typical (may vary with gas matrix)
Precision	Better than 0.1% relative over 24 hours
Linearity	<1% relative over a decade change in concentration (typical, application dependent)
Dynamic range	1 ppm – 100% (theoretical, application dependent)
Stability	Better than 10% relative over one week
Power requirements	115/230 VAC, consumption ~ 2000 VA (GP Model) ~2500 VA (Ex Model)
Area classification options	General Purpose; ATEX/IECEX/UKEx pxb (Zone 1) : II 2 G Ex pxb IIC T3 Gb or II 2 G Ex op pr pxb IIC T3 Gb. Ex Div 2 (Z-Purge)
Physical dimensions	65 cm (26") L x 150cm (59") H x 70 cm (28in) W 300 kg (660lbs configuration dependent
Communications	Modbus (RTU or ASCII master or Slave , Modbus Ethernet TCP/IP Profibus DP, OPC UA (consult factory for all communications options)

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