Thermo Scientific Prima PRO 710 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
- Touchscreen user interface for ease of use and advanced diagnostic functions
- 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.

The new touchscreen interface further enhances usability, providing intuitive in-person operation, simplified maintenance, and real-time data viewing. Multi-role user permissions ensure security and control, allowing operators to customize settings based on their specific needs.

Operating principles

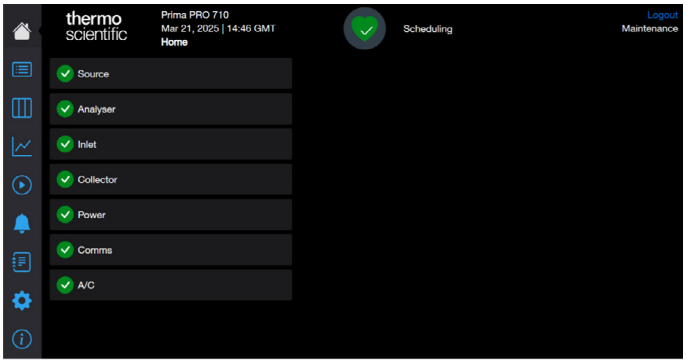
The sample gas is introduced via a stream selector and a pressure reduction system. Using an electron emitting filament, the ionization chamber converts the sample molecules into ions which are positively charged molecules or parts of molecules. These ions are then separated according to their mass by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

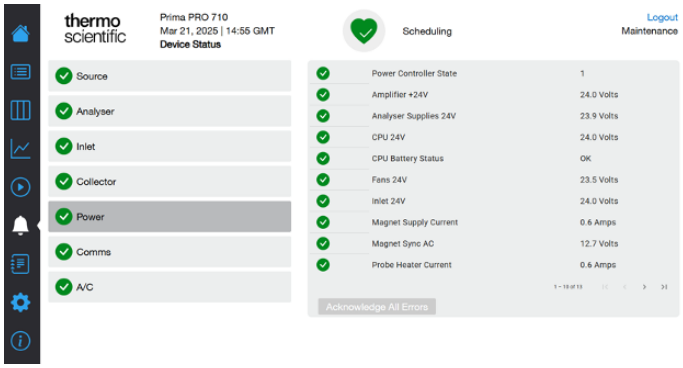
Home page

At the home page of the User Interface you can easily navigate to view or edit analyzer hardware, process data, configuration and alarm messages. The security settings will allow access according to the role of each user, maintaining the appropriate levels of access and security.



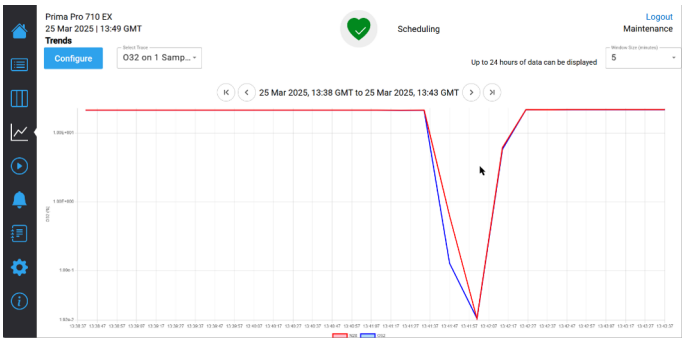
Device status

In real-time every critical analyzer hardware parameter is being monitored and can be viewed by users of the interface, if any device falls into an alarm condition its status colour changes to red giving an immediate visual indication of a pending fault situation prompting early intervention.



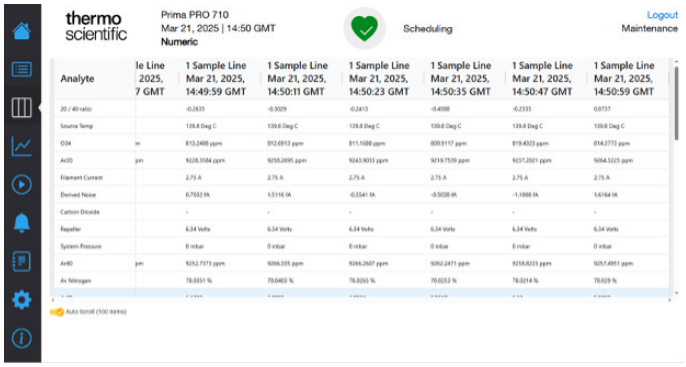
Trend display

A clear visual insight to the latest process data is at your fingertips, users can select which data to display and over what time period. Want to add another trace? Just click the configuration button to drop more data into the trend. Up to 24 hours of data can be displayed at this striking display screen.



Numerical display

A continuous scrolling display of the current data set from each process stream being sampled is just a click away, process gas composition can be augmented with analyzer device data and calculated values. Time, date and sample line name are shown with the latest set of process data.



Specifications

Ion source	Enclosed electron impact with dual filaments, temperature controlled (settable over range 120-200°C, to ± 0.1°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	12-42°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 month
Power requirements	115/230 VAC, consumption ~ 2000 VA (GP Model) ~2500 VA (Ex Model)
Physical dimensions	65 cm (26") L × 150cm (59") H × 70 cm (28in) W 300 kg (660lbs) configuration dependent
Area classification options	General purpose: ATEX/IECEx/UKEx Zone 1 and Zone 2 T3.
Communications	Modbus (RTU or ASCII master or Slave , Modbus Ethernet TCP/IP Profibus DP, OPC UA (consult factory for all communications options)
User interface	Touchscreen color graphical user interface enables access to analyzer functions
Local control	Front panel access for calibration, analysis, and data display

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