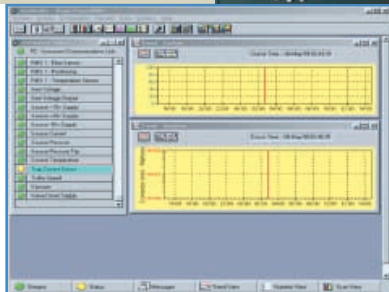


The combination of superior analytical performance, a powerful software suite and our application knowledge has established the Thermo Scientific Prima  $\delta$ B as the world's top selling process mass spectrometer. The Prima  $\delta$ B sets new standards in the field of fast, reliable and flexible process analytics.

## Thermo Scientific Prima $\delta$ B

### Process Mass Spectrometer for the Biotechnology and Pharmaceutical Industries



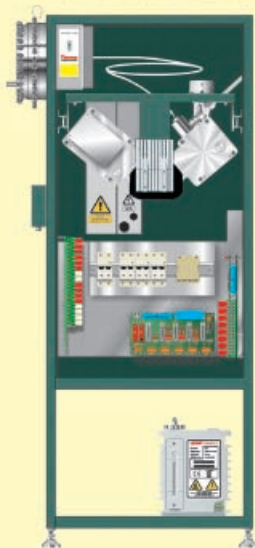
#### Gas Analysis Applications

- Autoclavable Fermentors
- Pilot Scale Fermentors
- Production Scale Fermentors
- Bioreactors
- Seed Tanks

The Thermo Scientific Prima  $\delta$ B is the latest in the Prima series of process mass spectrometers, building on more than 25 years of proven magnetic sector success. Several independent tests at leading petrochemical, pharmaceutical and steel companies have confirmed that the analytical performance of the Prima  $\delta$ B is unmatched by any other process mass spectrometer. Whether the requirement is to make precise RQ measurements, to confirm sterility prior to inoculation or to provide complex measurements for training neural networks, the Prima  $\delta$ B will fulfill those requirements. With over 100 systems operating in biotechnology research and production facilities worldwide, we are uniquely placed to provide application support in all aspects of the installation.

#### Features and Benefits

- Fast and precise analysis for improved biomass calculation
- Fault-tolerant design for maximum uptime
- Ultra-low maintenance 32 or 64-port RMS inlet system
- Support for 21 CFR Part 11 and cGMP validation
- Flexible communications to ensure DCS compatibility
- Comprehensive, intuitive ISO 9001 Thermo Scientific GasWorks® software
- Rugged design supported by industry best warranty
- Ergonomic design for ease of maintenance



### GasWorks Software

The Thermo Scientific GasWorks software suite provides an intuitive, information rich and flexible window into the operation of the process analyzer. Initial setup uses the remote computer which can then be used to display process measurement and diagnostic data, or it can be unplugged leaving the Prima  $\delta B$  to operate in full stand-alone mode. From conceptual design through several generations of production, we have rigorously enforced fully-accredited ISO 9001 quality procedures, resulting in a software package that is generally regarded to be the best in the industry.

### Inlet Bay

A variety of sample inlet systems are available depending upon the process being monitored. The illustration shows the variable vacuum inlet that draws sample directly from VOD and RH vacuum degas processes. Because the measurement is made at process pressure, the response is rapid and the measurement is accurate. Alternative multi-port inlets are available where an atmospheric pressure process requires more than one sample port.

### Analyzer Bay

The analyzer is a fast and highly stable scanning magnetic sector mass spectrometer that generates a high-energy ion beam from the sample gas. This ion beam is separated into its constituent molecular fragments by the electromagnet and the signal intensity is measured by the auto-zeroing amplifier. A series of distributed microcontrollers provide complete automatic control of the process without requiring any manual interventions.

### Communications Bay

Data communication is provided by a series of fully redundant gateways that can be independently configured for optimum communication with the DCS or SCADA system. Many data highway protocols can be supported by use of an integral protocol converter and discrete contacts, or analog signals can be connected to PLCs for various control purposes.

### Pump Bay

The Prima  $\delta B$  enclosure is available with a variety of temperature control and purge options to ensure that the analyzer provides reliable service in the most demanding environments. The entire system has been designed with the maintenance engineer in mind. The analyzer bay slides forward for all-around access and the pumps are situated for easy inspection and oil changing.

## Thermo Scientific Prima $\delta B$

### General Specifications

Measurement Method	Scanning Magnetic Sector Mass Spectrometer
Mass Range	1 – 200 atomic mass units
Lower Detection Faraday	20 ppm — typical, may vary with gas matrix
Lower Detection Single SEM	0.1 ppm — typical, may vary with gas matrix
Lower Detection Double SEM	10 ppb — typical, may vary with gas matrix
Precision (typical)	Better than 0.1% relative over 24 hrs
Stability (typical)	Better than 1% relative over 1 month
Analysis Time (typical)	0.3 – 1.0 seconds per gas component
Ambient Temperature	+12°C to +25°C (+12°C to +35°C optional)
Dimensions (standard configuration)	1.5 m x 0.7 m x 0.65 m (300 Kg approximately)
Power (standard configuration)	115 / 230 VAC, consumption 1500 VA
Area Classification Options	General Purpose; Z-purged division 2 (optional); X-purged division 1 (optional); CENELEC / ATEX Zone 1, IIC T3 (optional)
Maximum Number of Components	Not limited by software
Maximum Number of Peaks per Component	Not limited by software
Maximum Number of Derived Values	Not limited by software
Maximum Number of Methods	Not limited by software
Maximum Number of Sequences	Not limited by software
Maximum Number of Analog Inputs & Outputs	No fixed limit
Maximum Number of Digital Inputs & Outputs	No fixed limit
Maximum Number of Trend Windows	No fixed limit
Maximum Number of Sample Streams	250
Directly Supported Protocols	Modbus, Siemens® 3964, Siemens 3964R, VGCP, PVGCP, DDE, OPC
Additional Available Protocols	Modbus+, Allen-Bradley® DH, Allen-Bradley DH+, PROFIBUS
Serial Connections	RS232/422/485

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