MAX300-RTG

Industrial Process Mass Spectrometer

Extrel
www.extrel.com

PRODUCT NOTE

- Real-Time Gas Analysis
- Process Automation and Control
- Product Quality Analysis

Introducing the MAX300-RTG

Optimize Your Manufacturing

Mass spectrometry is a powerful tool for process automation. Rapid, accurate gas analysis enables high-precision reactor control and increased production efficiency.

The MAX300-RTG™ uses cutting-edge quadrupole mass spectrometer technology to deliver continuous online gas monitoring for industrial process control.

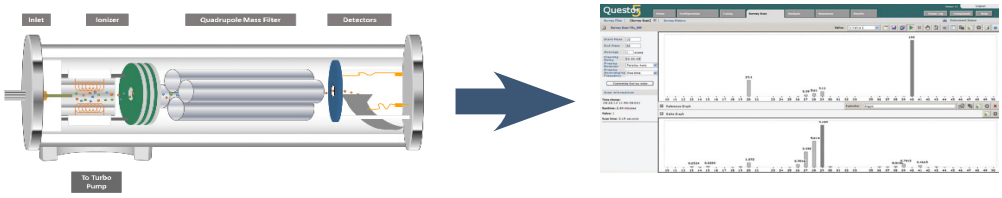
It has the speed necessary to analyze the total composition of a sample in seconds, and can be fully automated to measure several points in a process, or multiple production lines, with a single analyzer.

Industrial Process Gas Analyzer Features

- Automated online analysis and data delivery
- Control parameters reported in real-time
- Complete quantitative stream composition
- High precision and accuracy for exceptional process control
- Multiport sample systems for up to 160+ sample streams
- Low maintenance, utilities and calibration required
- Complete method scale-up
  - Lab, Pilot, Production

The mass spectrometer uses an ionizer to break sample molecules into charged fragment ions that are then separated based on their mass-to-charge ratio as they move through the electric fields generated by the quadrupole mass filter. The ions register a current at the detector, creating a set of peaks called a mass spectrum. Each compound has a unique spectrum, making mass spectrometry a highly selective, flexible technique.

MAX300-RTG Industrial Gas Analyzer



The MAX300's industry-leading 19mm quadrupole mass filter, combined with state of the art electronics, provides the user with an impressive list of **Extrel Advantages:**

- Near-zero mass scale drift for outstanding measurement precision and stability
- Uniform resolution across the entire mass range for ultra-high sensitivity to all compounds
- Extreme resistance to corrosion and contamination for long-term, continuous, low-maintenance operation
- Performance specifications that exceed those common to other mass spectrometers and process technologies

Reliable Data, Durable Performance

With over four decades of excellence in industrial automation and thousands of installations worldwide, Extrel process mass spectrometers provide the rugged stability and ease-of-use necessary for continuous operation in demanding manufacturing environments.

Hydrocarbon Processing

Ethylene Cracker Control
Polyethylene
Fuel Gas BTU
Ethylene Oxide
LNG
PVC and EDC
Benzene

Metals Manufacturing

Steel Carbon Content
Blast Furnace Off Gas
Coke Making
EAF Monitoring

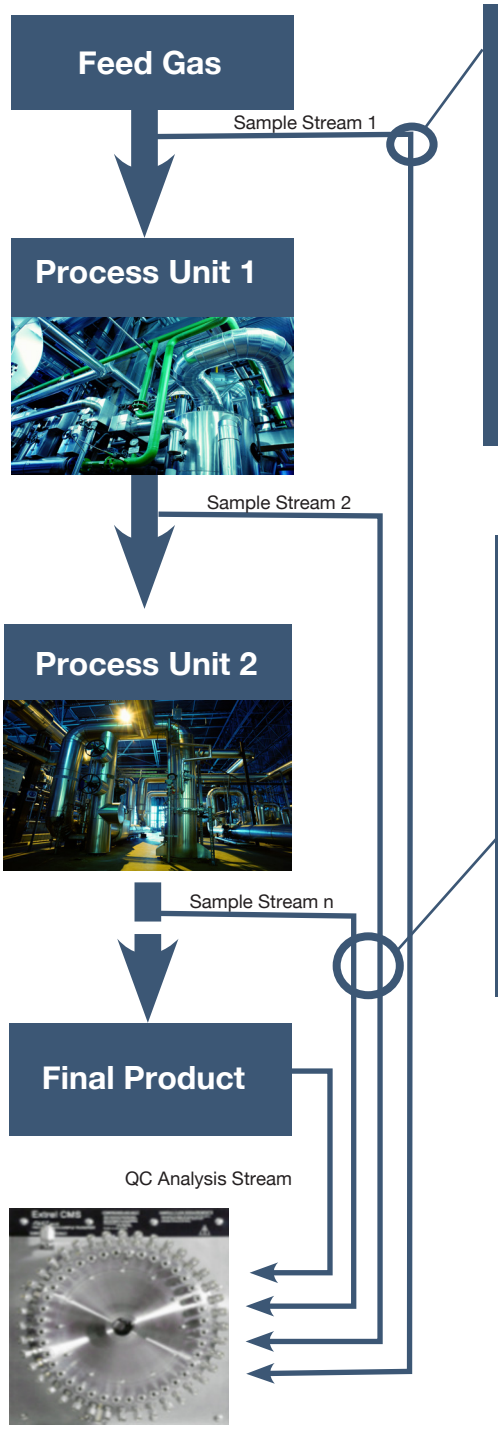
Syngas Manufacturing

Ammonia
Methanol
Hydrogen
Gasification
Acetic Acid
Low-Sulfur Diesel

Gas Purity

Trace Contamination
Pharmaceutical Solvents
Semiconductor Manufacturing
Scrubber Efficiency
Food and Beverage Gas

Rapid Online Analysis to Maximize Your Production



Accuracy and Flexibility

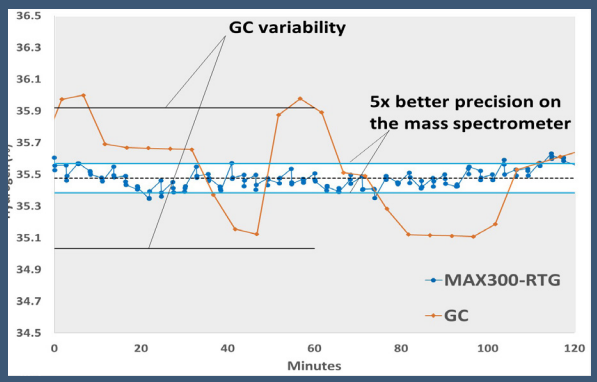
Component	% Molecular Concentration	Precision % Absolute
Hydrogen	16.5	0.006
Methane	77.9	0.007
Nitrogen	0.38	0.002
Propane	0.9	0.001
Ethane	2.35	0.002
N-pentane	0.16	0.001
Isobutane	0.27	0.001
Carbon dioxide	0.95	0.001
Isopentane	0.15	0.001
N-Butane	0.45	0.001
Hexane	0.01	0.0002
Hydrogen sulfide	0.001	0.00001

Example 1. Process Feed Gas

The MAX300-RTG measures all of the hydrocarbons in the feed gas stream as well as ppm contaminants, like H_2S. Control parameters, such as BTU value, Specific Gravity, and Wobbe Index, are instantly calculated and transmitted for use by the plant's process control system.

Precision and Control

Example 2. Polyethylene Reactor Control



Fast, high-precision data allows the plant to operate process units closer to optimum conditions

- GC Measurements
  - 1 reactor
  - 3 components
  - Cycle time: 5 min
- MAX300 Measurements
  - 4 reactors
  - 10 components
  - Cycle time: 29 sec

Consistent Ongoing ROI

- Fast online gas analysis for increased manufacturing efficiency, product yield, and equipment uptime
- The full stream composition provides additional information necessary for Advanced Process Control
- Lower capital cost compared to other technologies
- Reduced operation costs due to low maintenance and utility requirements
- By monitoring the operation of several process units, the MAX300-RTG is often used to replace multiple gas chromotograph (GC) systems

The 80 Port FASTvalve Sample Selector

The inlet system of the MAX300-RTG can be configured with any number of zero-dead-volume sample selector options.

System Specifications:

- Detectable compounds: Any gas or vapor sample
- Detection range:
  - Faraday detector: 100% - 5 ppm
  - Electron multiplier: 100% - 5 ppb*
  - Membrane inlet: 100% - 10 ppt*
- Number of sample streams: 16, 31,40, 80, 120, 160+
- Analysis rate: 0.1 - 16 seconds per component
  - User selectable
- Number of components: Unlimited
- Number of analysis routines: Unlimited
- Number of user configurable data tags: Unlimited
- Precision: <0.05% RSD over 24 hours**
- Stability: <0.5% RSD over 30 days**
- Filaments: Two, one active and one spare with automatic switchover
- Analyzer maintenance: 1-3 years†
- Roughing pump: 6-12 months†
- Manual or fully automated calibration and validation
  - 3-12 month calibration intervals
- Mass range options: 1-250, 300, 500 amu

* Matrix dependent. Documented on trace air components and benzene.

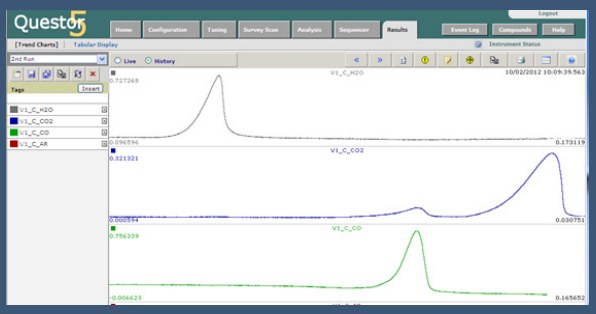
** Based on the analysis of 1% argon, scan speed 1 second per analysis.

†Application dependent.

Low Maintenance, Easy to Use

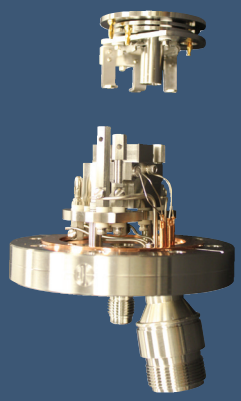
The Questor5 control software that drives the MAX300-RTG measures all sample points in a fully customizable sequence for site-specific, automated production control. The intuitive web-based interface allows the user to check instrument status, review data, or run a validation sequence from anywhere on the plant network, while maintaining government and industry security standards for login and electronic record keeping (21 CFR 11).

The MAX300-RTG is a 24-7 online gas analyzer with a documented uptime >99%.



Simultaneously trend high precision measurements of bulk components and ppm-level contaminants with the easy-to-use Questor5 control software

Extrel's 19 mm quadrupole next to a common 6 mm filter. The larger device provides greater ion transmission for unparalleled sensitivity and signal stability.



The MAX300 disposable, plug-and-play ionizer eliminates the cleaning requirement, and includes dual filaments, one active and one spare.

MAX300-RTG System Specifications

Power Supply Options:
- 110 VAC, 50/60 Hz, Two 15 Amp circuits
- 230 VAC, 50/60 Hz, One 20 Amp circuit

Power Consumption:
- Nominal 2740 Watts
- Heat Load: 2700 Watts (9215 BTU/h)

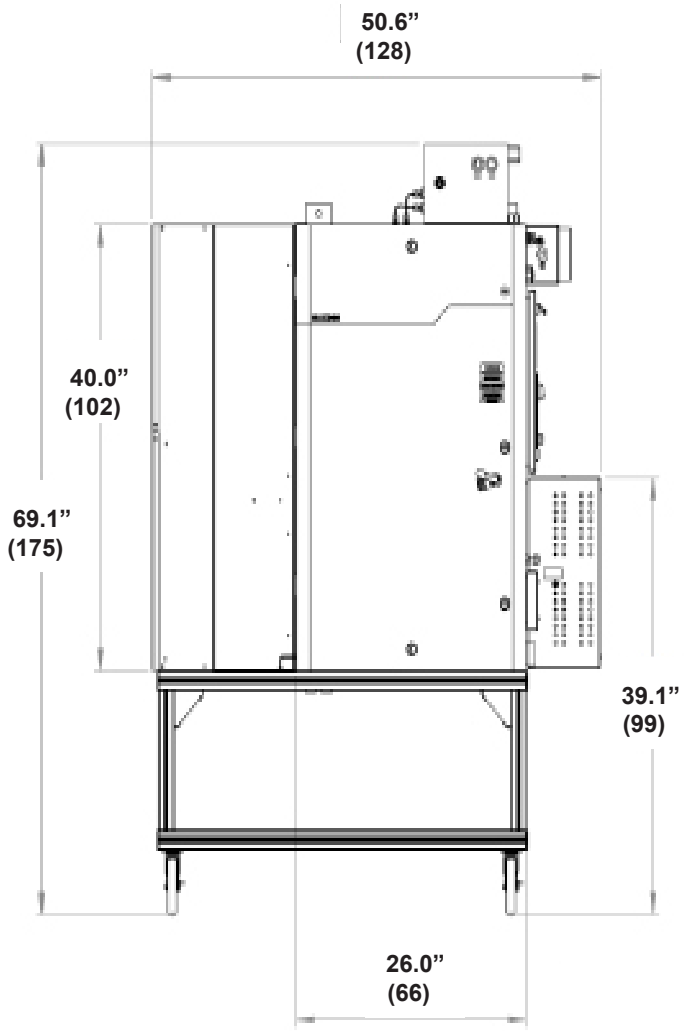
Weight:
- Standard Enclosure: 450 lbs (205 kg)
- Optional cart: 40 lbs (18 kg)

Ambient Requirements:
- Temperature: -4°F to 120°F (-20°C to 49°C)
- With A/C, cold start ≥54°F (12°C)
- Area Classification Options:
  - General Purpose
  - Class 1, Division 1 or 2, Groups B, C, D, T4
  - IEC/ATEX, Zone 1 or 2, Group IIC or IIB +H2*, T4

Additional Utilities:
- Purge gas (for hazardous area installations)
- Base calibration requirement: 2 gas bottles

Data System and Communications:
- System control interface options: Ethernet, RS-422 4-wire
- Login security levels: Administrator, User, Viewer
- External communications:
  - Ethernet, Modbus serial, digital I/O, analog I/O, OPC

*Configuration dependent



MAX300-RTG enclosure with A/C, Cart and X Purge Options. Dimensions shown in inches [mm]

Exceptional Worldwide Service and Support: For over 50 years, Extrel has been committed to providing the highest quality support services for the thousands of instruments installed worldwide. Factory trained and certified personnel offer industry-leading support to Extrel customers at every stage of process development and manufacturing.

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