Process Insights
Premium Insights Into Process

TigerOptics

REAL-TIME
GAS ANALYZERS

PRODUCT BROCHURE

VeraSpec™ APIMS

Trace Atmospheric Pressure
Ionization Mass Spectrometer

Continuous monitoring Ultra High Purity gases

Stable Analyzer with High Sensitivity

24-7 Process Protection

Real-time Contamination Alerts

Protect your process from ppt-level contamination with the VeraSpec APIMS

With over 60 years of mass spectrometer experience, Process Insights designed this atmospheric pressure ionization (API) mass spectrometer for speed, sensitivity, and ease-of-use. Continuously monitor nitrogen, argon, helium, oxygen, and hydrogen supply streams, and rapidly report contamination from a ppt to percent level.

Fast, accurate ultra-trace analytical technology

Atmospheric pressure ionization (API) is an ionization technique that gives a mass spectrometer the very highest sensitivity for trace gas analysis in UHP samples.

A corona discharge needle is used to ionize the molecules of the bulk gas sample (Figure 1). These ions readily transfer this charge to contaminant molecules with lower ionization potentials. The approach yields ionization efficiencies approaching 100%, ensuring exceptional detection limits (Table 1).

While API allows for high ion currents, resulting in low detection limits, the technique is limited to species whose ionization energy is less than that of the bulk gas, or components with sufficient proton affinity to be ionized. The VeraSpec APIMS system combines both EI and API ionization sources. Having two ionization techniques allows for the complete analysis of all components in the pure gas sample with one analyzer.

Table 1. Typical VeraSpec APIMS Low Detection Limits by Contaminant and Bulk Gas

Trace Impurity*	Bulk Gas				
	N2	Ar	He	H_2	O_2**
Hydrogen (H_2)	150 ppt	100 ppt	50 ppt	n/a	500 ppb
Oxygen (O_2)	10 ppt	10 ppt	10 ppt	10 ppt	n/a
Methane (CH_4)	10 ppt	10 ppt	10 ppt	10 ppt	100 ppb
Water (H_2O)	10 ppt	10 ppt	10 ppt	10 ppt	100 ppb
Carbon Monoxide (CO)	50 ppt	10 ppt	10 ppt	50 ppt***	100 ppb
Carbon Dioxide (CO_2)	10 ppt	10 ppt	10 ppt	10 ppt	100 ppb
Nitrogen (N_2)	n/a	<1 ppb†	10 ppt	150 ppt***	100 ppb
Argon (Ar)	<1 ppb†	n/a	10 ppt	<1 ppb	75 ppb

*Additional impurities are available. ** Impurities in O_2 are measured using the included EI source. ***Typically reported as a sum of (N_2+CO) concentrations. †Gas purity dependent.

Designed to maximize uptime and performance

The innovative design of the VeraSpec APIMS provides stability, flexibility and ease-of-use.

✓ New 4 Sample Inlet Option Available

✓ Improved precision and long-term stability

- Uses larger 19mm, quadrupole mass filter
- Transmits more sample ions to the detector than a smaller quadrupole
- Long intervals between maintenance

✓ Interference-Free

- No overlap from neighbouring peaks
- Precise removal of spectral interferences

✓ Fast Speed of Response

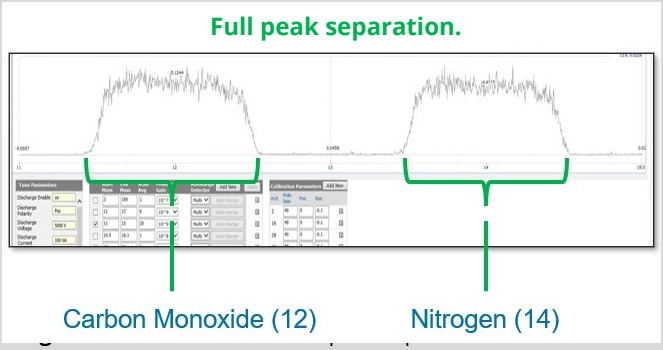
- Detect upset conditions faster
- Tighter process control

✓ Electron Ionization (EI) source

- Investigation of components at concentrations up to 100%
- Full sample characterization – including "unknowns"
- Leak checking

✓ Optimized Maintenance

- Low calibration frequency
- Automated validations
- Streamlined maintenance schedule and procedures
- Easy-change needle flange



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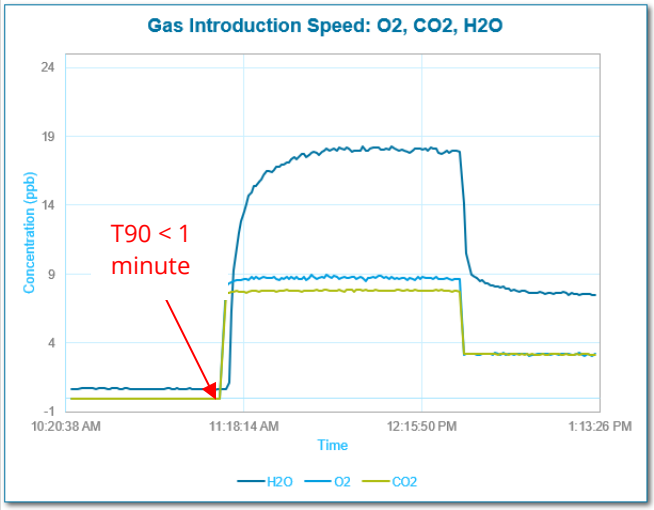
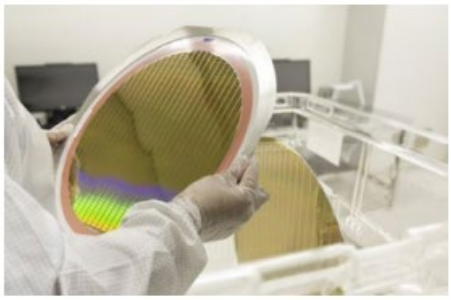


Figure 2. Fast speed of response T90 <1 minute for reaction of contaminants.

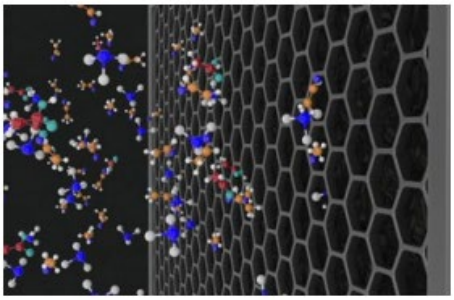
Applications

Electronic Gas Production

Semi Process Gas Monitoring



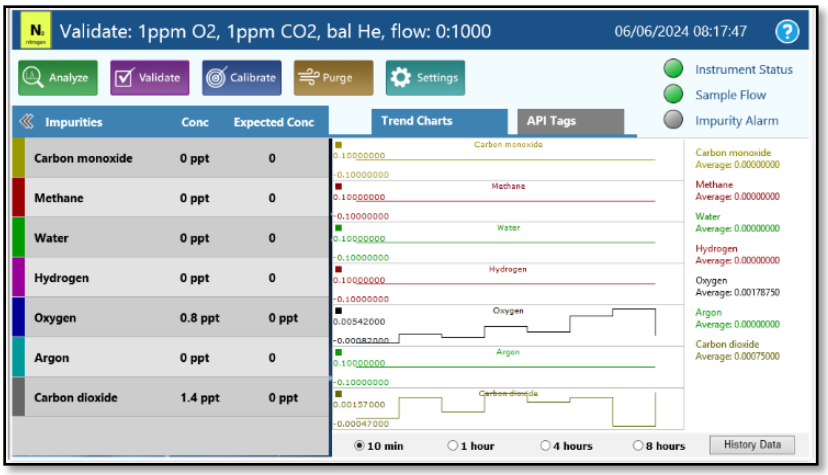
Purifier Performance



Easy-to-Operate User Interface

with included Questor5 Process Control Software

- Analyze, Validate or Calibrate at the touch of a button
- Automated
  - Multipoint calibrations
  - Validations
  - Analyzer performance checks
- 1, 2, 4 sample selector option available
- Built-in report generation
- Configurable data tags and alarms
- External device control triggers
- Network accessibility



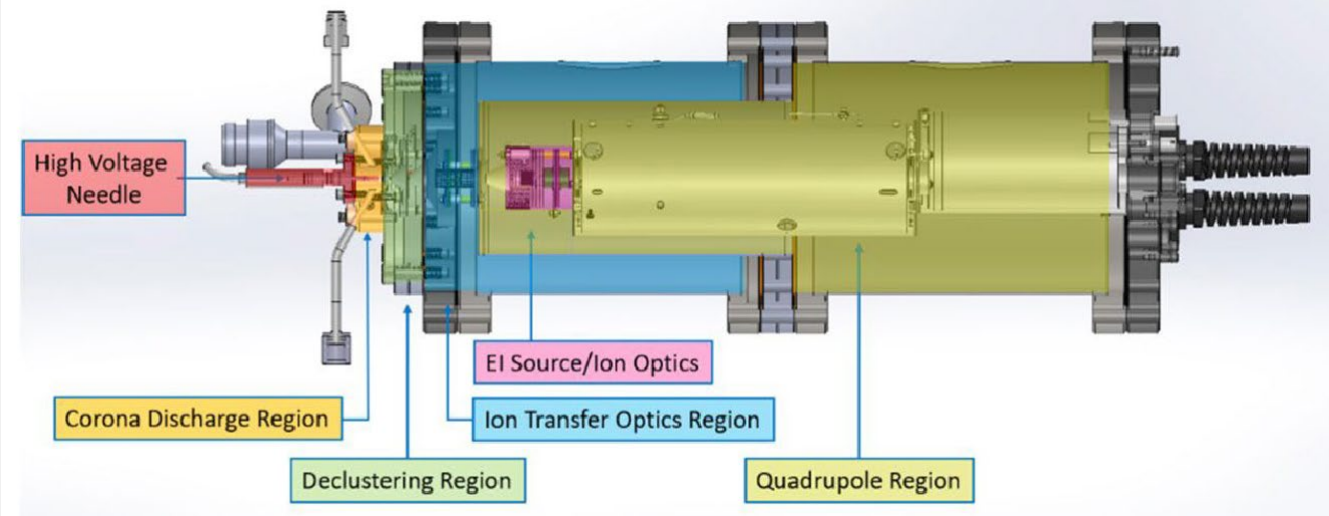


Figure 3. The critical components of APIMS

Analyzer Specifications	
Dual Ionization Technique:	Atmospheric Pressure Ionization (API) and Electron Ionization (EI)
API Source Background	< 1 ppt
Detection limits:	<5 ppt*
Detection range:	<5 ppt to 100% (API and EI)
Speed of analysis:	≤ 1 minute
Speed of response:	≤ 1 minute
Sample Switching Time:	15 minutes to < 1 ppb
Gas Handling System and Conditions	
Sample Inlet(s):	¼" VCR with 30 +/- 10 PSIG
Calibration Gas Inlet:	¼" VCR with 30 +/- 10 PSIG
Number of Sample Lines:	1, 2 or 4 stream
Bulk Gas Types:	H2, N2, He, O2, Ar – other bulk gases are available
Impurities Monitored:	H2, N2, O2, Ar, CO, CO2, H2O, O2, CH4, Kr, NH3, Xe (other impurities available)
Utilities	
Compressed Air Inlet:	¼" VCR with 60-100 PSIG
Sample Exhaust:	¼" VCR to Atmospheric Conditions
Power requirements:	230 (+/- 10%) VAC, 50/60 Hz, single phase, one 20-amp circuit
Power consumption:	Nominal 1600 Watt
Enclosure Ventilation:	3-7/8"
Ventilation Flow:	Minimum 150CFM
Dimensions, Weight and Conditions	
H x W x D:	73" (H) x 28" (W) x 36" (D) (1.8 m x 0.7 m x 0.8 m)
Weight:	550 +/-50 lbs. (226 kg +/- 22 kg)
Room operating conditions:	Max: 80°F (27°C) - non-condensing atmosphere Min: 55°F (13°C) - non-condensing atmosphere Variation should be less than +/- 5°F (2.78°C)
Storage conditions:	(-4)°F to 140°F (-20°C to 60°C) - non-condensing atmosphere
Electrical and Interfaces	
Signal output:	Standard: Ethernet Modbus TCP/IP Optional: 4-20mA, Digital Outputs
User interface:	15" (38.1 cm) touch screen, UBS 2.0
Login security levels:	Administrator, Viewer
Software Compliance:	21 CFR Part 11
Data storage:	Internal
Certification:	CE Compliant, UL 61010-1

*Component dependent

ProcessInsights™
Premium Insights Into Process

GAIN REAL-TIME INSIGHT INTO YOUR PROCESS

Process Insights delivers premium analytical sensors, analyzers, instrumentation, software and solutions that are mission-critical to keep your operations, personnel, and the environment safe. Our commitment to customer satisfaction is evident through our diverse range of products, programs, and services, designed to accommodate various budgets and application needs.

CENTERS OF EXCELLENCE

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