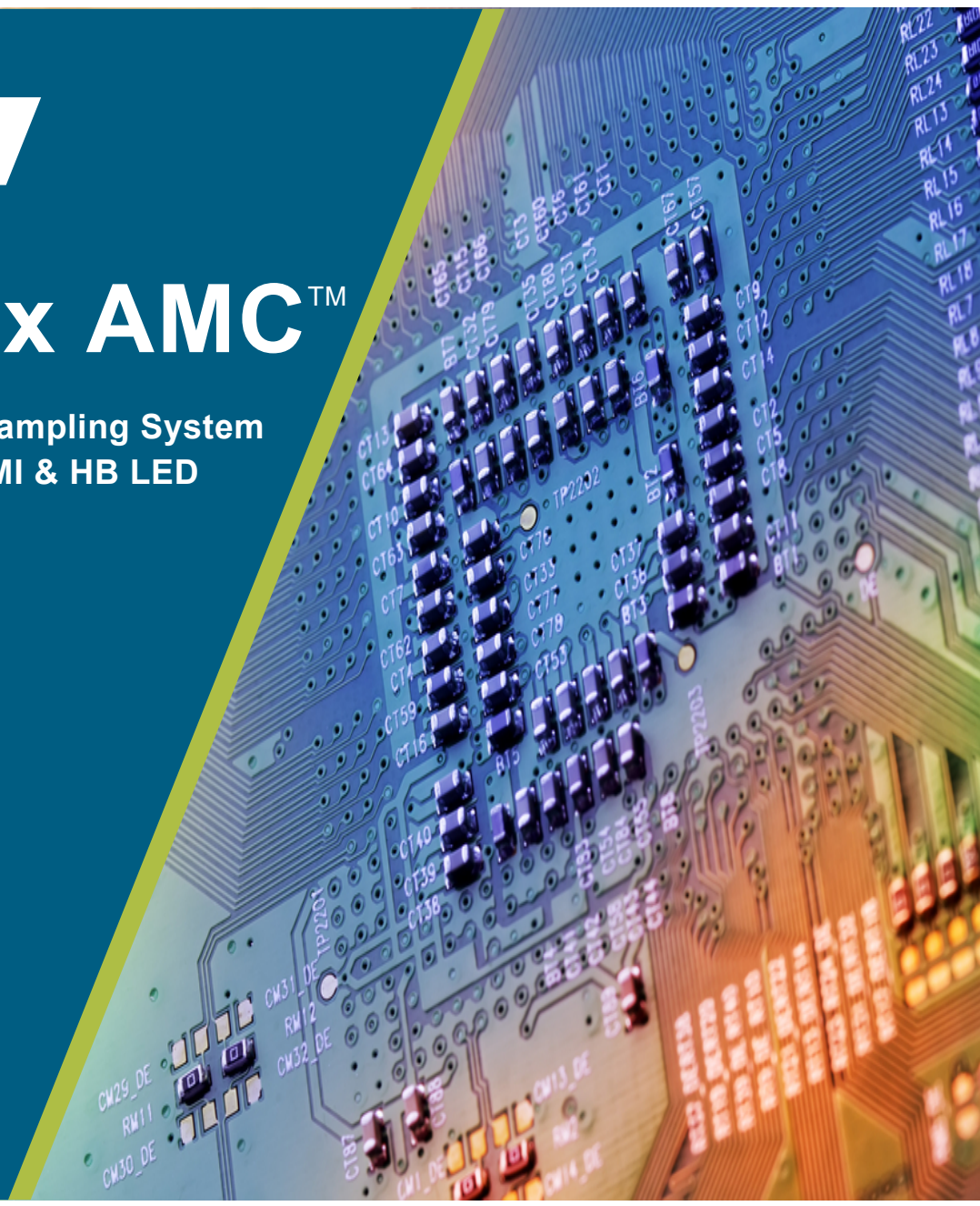


PRODUCT BROCHURE

Multi-Max AMC™

**Next-Generation AMC Sampling System
to Monitor Gases in SEMI & HB LED
Environments**



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Low Maintenance

- Sensitive, absolute measurement using Cavity Ring-Down Spectroscopy (CRDS)
- Drift-free, with calibration traceable to the world's leading reference labs
- Low cost of ownership

Multi-Max AMC Monitoring Solution

You can spend a long time looking for Airborne Molecular Contaminants (AMCs) when the catastrophic product performance or yield loss is discovered at your device final test stage; or you can deploy our **Multi-Max™ AMC Monitoring Solution** to locate and to monitor these invisible defect generators, commonly found lurking in and around equipment, personnel, wafer carriers, and cleanroom bays.

In today's advanced semiconductor processing, the residual gases, vapors and chemicals emanating from the various materials, accelerated processing operations, and substrate storage and transport have become a critical concern.

The **International Technology Roadmap for Semiconductors (ITRS)** now highlights AMC contamination as a key technical challenge in achieving and sustaining low defect rates on devices.

With a particular focus on the major contributors to the "chemical contamination" element of AMCs, our Multi-Max AMC Monitoring combines our **T-I Max series CRDS analyzers** that can detect and continuously monitor HF, HCl, and NH₃ with an unprecedented combination of sensitivity, selectivity, and speed of response. Our AMC Monitoring Solution delivers the flexibility, accuracy and reliability you need.

BENEFITS

- **Shortest distance of the sample gas flow path (reduced by more than 60% compared to the existing system)**
- **Minimize the use of contaminants such as fittings and tubing**
- **Various operation screens are provided for user convenience and can be programmed**
- **Minimization of contamination inside the sampler (automatic purge function when the system is stopped: CDA/PN2 required)**
- **Added reference function to check contamination**
- **Minimize preventive maintenance points (minimize internal inspections by making blocks)**



A Flexible Solution for AMC Monitoring

Surveying different micro-environments in a fab is now fast and easy with our safe, flexible, and easy to use Multi-Max AMC Monitoring Solution.

Our solution can be quipped with **any combination** of our **T-I Max CRDS analyzers** to monitor simultaneously and in real-time for the most critical contaminants in cleanroom air: NH₃, HCl, and HF (other analytes available as well). All our analyzers come with a compact, low-power, fanless vacuum pump optimized for cleanroom operation.



Multi-Max AMC Monitoring Solution



Our T-I Max series CRDS analyzers are robust, designed free of moving parts, resulting in a high mean time between failures (MTBF) and a very low cost of ownership (COO) delivering unprecedented performance including:

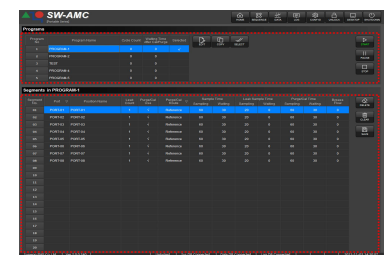
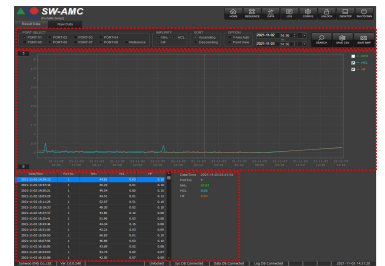
- Sensitive, absolute measurement technique, using Cavity Ring-Down Spectroscopy (CRDS)
- Parts-per-trillion detection limits
- Drift-free, with calibration traceable to the world's leading reference labs
- Lowest cost of ownership and maintenance
- High specificity - no interference
- No periodic sensor replacement/maintenance
- Unprecedented speed of response
- Wide dynamic range

User-Friendly Interface

The Multi-Max AMC Monitoring Solution user interface is easy to use.



- ① Basic Status
 - Open Valve#
 - Maintenance Status and PLC/UPS Communication status
- ② Analyzer Data Display and Control
 - Sequence Start and Stop
 - Sequence Status
 - Port status, Time and Data
 - Data Graph in each Port
- ③ Temperature and Flow
 - Pump Temperature
 - Analyzer Flow and Bypass Flow Display
- ④ Analyzer Status and Data
 - Data and Graph Display
 - Calibration Data and Concentration Display
- ⑤ System Log
 - Sampler Status and Sequence



Next-Generation AMC Monitoring Solution

Specifications

| Performance | |
|--|--|
| Operating range | See table below |
| Detection limit (LDL, 3 σ @100s) | See table below |
| Precision (1 σ @100s, greater of) | \pm 0.5% or 1/3 of LDL |
| Accuracy at span | \pm 4% of reading |
| Accuracy at zero | See table below |
| Speed of response @ 20ppb (T10/90 + T90/10) | See table below |
| Environmental conditions | 10°C to 40°C 10% to 90% RH (non-condensing) |
| Sample conditions | 17°C to 23°C 35% to 55% RH |
| Storage temperature | -10°C to 50°C |

| Gas Handling System and Conditions* | |
|-------------------------------------|---|
| Wetted materials | Optimized for ppt-level AMCs and fast speed of response |
| Gas connections | 1/4" PFA Swagelok® inlet & outlet |
| Inlet pressure | Atmospheric pressure† |
| Outlet pressure | Vacuum (<10 Torr) |
| Flow rate | ~3 slpm@1 atm pressure (NH ₃) ~2 slpm@1 atm pressure (HF, HCl) |
| Sample gases | Cleanroom air, CDA or N ₂ |
| Gas temperature | Up to 60°C |

| Dimensions | H x W x D |
|---------------|-------------------------------|
| Multi-Max AMC | 1,851(H) x 630(W) x 897(D) mm |

| Weight | |
|--------------------------|--------|
| T-I Max analyzer | 15 kg |
| Multi-Max AMC | 380 kg |
| (both excl. vacuum pump) | |

| Electrical and Interfaces | |
|---------------------------|------------------|
| Electrical | 220VAC, 50/60 Hz |
| Total Power Consumption | 1255 Watts |
| Running Power Consumption | 904 Watts |

| | |
|-----------------|---|
| User interfaces | LCD touchscreen 10/100 Base-T Ethernet USB, RS-232, RS-485 Modbus TCP (optional) |
| Data storage | Internal or external flash drive |

| Performance in cleanroom air: | Range | LDL (3 σ @100s) | Accuracy at zero | Speed of Response (T10/90+T90/10) |
|-------------------------------|------------|------------------------|------------------|-----------------------------------|
| T-I Max HF | 0 – 1 ppm | 20 ppt | \pm 20 ppt | < 3 minutes @ 20 ppb |
| T-I Max HCl | 0 – 4 ppm | 100 ppt | \pm 200 ppt | < 30 seconds @ 20 ppb |
| T-I Max NH ₃ | 0 – 40 ppm | 300 ppt | \pm 300 ppt | < 3 minutes @ 20 ppb |

*Vacuum source with >2 slpm @ 10 Torr required

†Contact us for details about operating the analyzer at elevated inlet pressure.

Contact us for additional analytes.

U.S. Patent # 7,277,177



Analyzer Performance Verification Program

- Simple, in-situ verification process
- Maximum analyzer uptime
- Cost-effective compliance
- No specialty calibration gas
- Fast completion



Get your analyzer verified every year!

You can expect the highest level of support with our Multi-Max AMC Monitoring Solution. Our **CRDS Analyzer Performance Verification Program** is a valuable annual health check that helps your analyzers perform within specifications, function at high factory standards and meet the requirements of regulatory agencies.

Your written certificate can be shared with auditors and leadership teams for compliance and quality management.

- Low cost and easy remote verification process, with no need to return the analyzer to the factory
- Annual verification ensures that your analyzer continues to meet its original specifications
- Up-to-date Verification Certificate to comply with your
- QA/QC standards

THE VERIFICATION PROGRAM IS EASY & CONVENIENT

Our Gas Laboratory and Final Testing Facility in Horsham, PA is equipped with state-of-the-art, NIST-certified calibration systems to perform analyzer test, calibration, and qualifications. Our deep knowledge, expertise and experience is well-known throughout the industry as a leader in gas analysis.

PREMIUM INSIGHTS – GAIN REAL-TIME INSIGHT INTO YOUR PROCESS

Process Insights' products and solutions deliver innovative and differentiated analysis and measurement solutions and technologies that add high value to our customers and protect the environment.

Our commitment is to deliver smart and affordable innovation that optimizes process, improves safety, and transforms our world.

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REVOLUTIONIZING MEASUREMENT

EVERYWHERE