

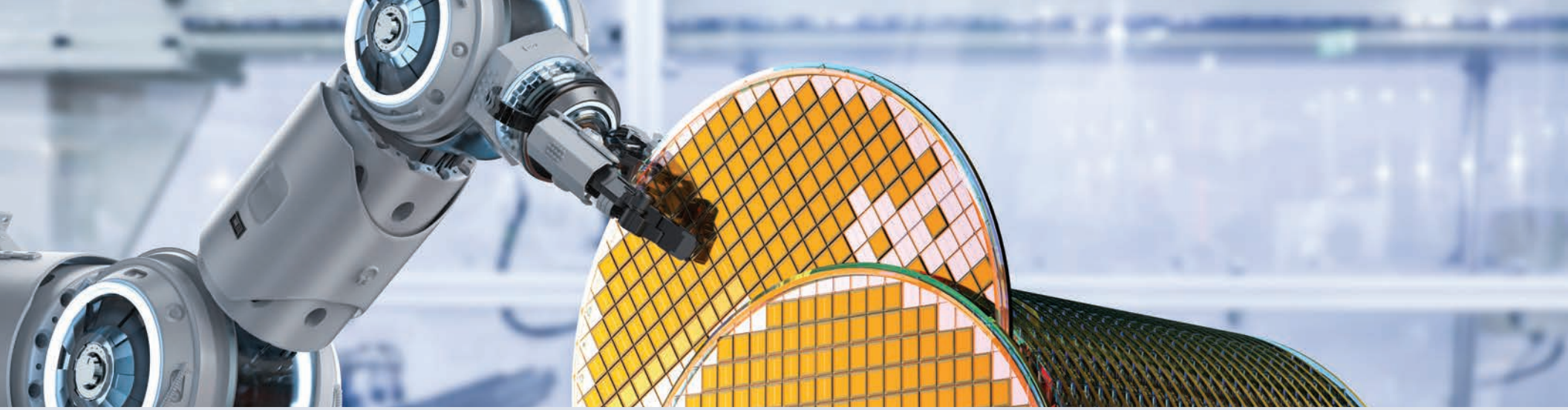


ULTRA-CLEAN ELECTROSTATIC CONTROL

In-Tool and Cleanroom
for Front-End
Semiconductor
Manufacturing



SIMCO ION™
An ITW Company



STATIC CHARGE

in Semiconductor Manufacturing

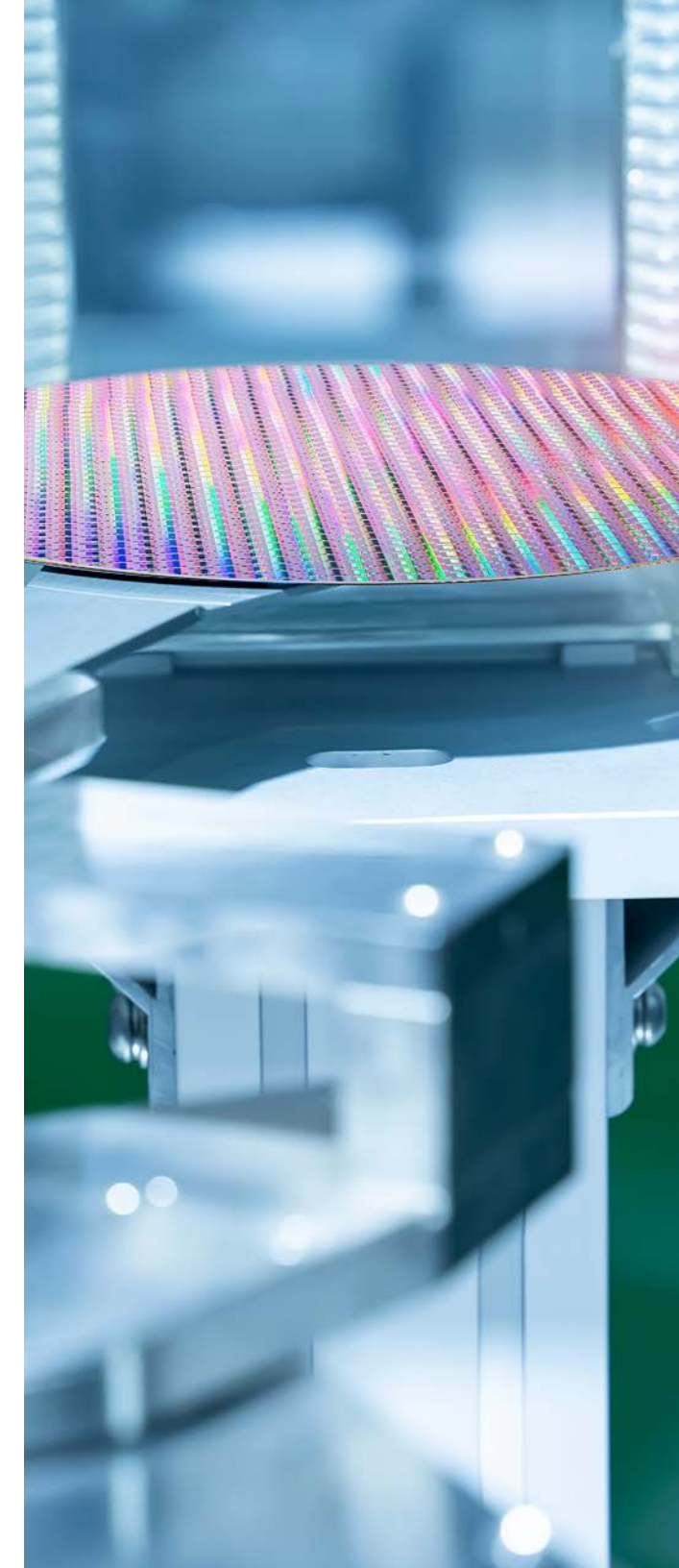
Static charge, generated throughout the semiconductor manufacturing process, is caused primarily by the contact and separation of materials. Static charge affects productivity and yield in three ways.

Electrostatic Attraction (ESA): Static charge electrostatically attracts particles from the air causing potential yield loss on wafers and reticles.

Electrostatic Discharge (ESD): Electrostatic discharge (ESD) causes instant or latent defects on reticles, wafers, or packaged chips.

Electromagnetic Interference (EMI): The electromagnetic interference (EMI) generated by electrostatic discharges can trigger microprocessor lockup and robotic malfunctions that lead to product flow interruptions and costly tool downtime.

In front-end semiconductor manufacturing, there are various potential ESD hazards that can arise during specific operations to ensure the device's functionality. These include processes like wafer fabrication, photolithography on sensitive materials, ion implantation, and etching. As advanced manufacturing techniques and smaller, more complex chip designs continue to evolve, the sensitivity to electrostatic charges has increased significantly, making ESD control even more critical.



Simco-Ion, Technology Group, a Worldwide Leader in Advanced Ionization and Monitoring Solutions for Ultra-clean and ESD Control applications, is renowned for...

QUALITY. PERFORMANCE. RELIABILITY.

Simco-Ion, Technology Group delivers **ULTRA-CLEAN** ionization solutions designed for in-tool and cleanroom applications. The product range includes ionizing bars and blowers, room systems, and in-line ionizers, all engineered to achieve exceptional performance at the micrometer level.

These advanced solutions exceed customer requirements for Electrostatic Attraction (ESA) and airborne particle control while setting new standards in Electrostatic Discharge (ESD) management. By reducing contamination-related yield losses, they play a vital role in ensuring product quality and reliability for the Front-end Semiconductor industries.



ESSENTIAL REQUIREMENTS

For Today's Manufacturing Industries

Ultra-Clean Environment

In ultra-clean environments where airborne particle control is critical, minimizing Electrostatic Attraction (ESA) is essential. Without proper control, particulates can lead to latent failures, contamination, reduced product quality, and significant yield loss.

Voltage Control

Achieving tighter voltage control is vital to eliminating or reducing Electrostatic Discharge (ESD) in electronics manufacturing. ESD can cause active device damage and latent defects. Maintaining precise offset voltage, combined with faster decay times, ensures optimal protection for devices and products during processing in ultra-clean environments.

Advanced Monitoring

Aligned with Industry 4.0 standards, the Novx Electrostatic Control Management System offers real-time monitoring with active feedback and control. This innovative system enhances traceability, ensures compliance, optimizes process management, and provides advanced notifications, empowering manufacturers to maintain peak performance.



ULTRA-CLEAN PERFORMANCE

Advanced Room Ionization System for Wide Area Coverage

Recognized with numerous patents, this room system stands as the market's most effective and reliable solution.

Exceptional Performance: Delivers high ion output for extended durations with unmatched stability.

Precision Control: Advanced, robust software featuring programmable parameters that can be tailored on-site or adjusted remotely.

Optimized Design for Any Ceiling: The ceiling emitter is compact at 17.7" (450 mm) wide and has multiple rod lengths to accommodate varying ceiling heights and target distances. It is lightweight at only 16.4 oz (645 g).



ADVANCED IONIZING BAR

Modulated Pulse Technology with Active Feedback and Control

Achieve industry-leading ionization performance with unmatched $\pm 5V$ balance precision.

Exceptional Performance

- Industry-leading offset voltage performance with $\pm 5V$ balance.
- Real-time monitoring and feedback control using Novx technology.
- Low swing voltage ensures safe placement as close as 150 mm from wafers or reticles.

Convenient Software Control

- User-friendly interface for easy setup and adjustments.
- Centralized power control with full remote management via PC.

Design Options

- Choose from 3 versions and 14 different lengths to fit your specific application.



IN-LINE NITROGEN IONIZER

High-Frequency AC Ionization Technology

Designed to ionize 99.999% pure nitrogen for ultra-clean semiconductor and high-purity processes, this ionizer ensures fast static charge neutralization and seamless in-tool integration. Its internal particle containment system guarantees ISO Class 1+ cleanliness, making it ideal for advanced technology nodes.

EXTREME TEMPERATURE SYSTEM

Specially designed to handle extreme temperature processes such as testing in environmental chambers or oven applications. The system consists of the extreme temp ionizers, along with its Controller and extremely temp passive sensor use closed-loop control to ensure the ionizer's output is balanced at the product location. Available in 526 mm, 210 mm and the latest mini length at 114 mm.

STATIC CHARGE PROTECTION

Our comprehensive portfolio of static charge control solutions address all stages of wafer manufacturing from in-tool requirements and room environments to test, assembly, and packaging applications.

Typical front-end semiconductor applications where ionization and monitoring solutions are essential in improving productivity:

Wafer Manufacturing Cleanroom	In-tool
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- | | |
|---|---|
| <ul style="list-style-type: none"> • EFEM • Photolithography • Reticle Storage • Wafer Handling/Transfer • FOUP Wash • Wafer Starts | <ul style="list-style-type: none"> • Wet Process • Thermal Process • Implant • Etch • Deposition • Wafer Sort |
|---|---|



FRONT-END SEMICONDUCTOR ENVIRONMENTS

CLEANROOM

The **Model 5515 Room Ionization System** provides comprehensive protection for cleanrooms, gowning rooms, and entire manufacturing areas. This state-of-the-art system includes advanced ceiling emitters, a centralized controller, and robust monitoring software.

Powered by digital technology, each ceiling emitter's parameters—such as ion output, pulse timing, and digital address—can be precisely configured at its location. This fine-tuning capability ensures optimal ionization performance across various airflow conditions and applications, delivering maximum efficiency and reliability throughout the manufacturing environment.



IN-TOOL

Inside tools' mini-environments and EFEMs, the cutting-edge **Model 5645 AeroBar MP** sets a new standard in cleanliness, exceeding the rigorous requirements of ISO 14644-1 Class 1 (10 particles or fewer per m³ for 0.1-micron particles and larger). It goes even further by achieving Extended ISO Class 1 cleanliness, effectively addressing particles as small as ≥10 nm. This advanced bar ionization system delivers unparalleled cleanliness, making it the ideal solution for leading-edge wafer technologies in ultra-clean semiconductor manufacturing environments.

HIGH TEMPERATURE

The **Model 4612 Extreme Temperature Ionization System** is engineered to perform in extreme environments, operating reliably in temperatures from -50°C (-58°F) to 150°C (302°F). It effectively eliminates electrostatic charges in test chambers designed for next-generation devices, which demand greater miniaturization, speed, precision, and reliability. With these advancements, robust thermal management has become increasingly critical.

This cutting-edge system includes the 4062e Controller and a remote sensor for precise feedback and control. To accommodate diverse applications, it is available in three lengths: 526 mm, 210 mm, and 114 mm. The newest addition to the product line, the 4612 Mini, provides enhanced versatility for compact setups.



NITROGEN

In the core of process equipment, where space is limited or sensitive products are nearby, the **Model 4210 In-Line Gas Ionizer** offers an ideal solution. It delivers compressed ionized gas or nitrogen for balanced charge neutralization, ensuring precision and reliability.

For ultra-clean environments, the **Model 4214** takes ionization to the next level by utilizing 99.999% pure nitrogen to produce ionized gas. This advanced solution is specifically designed for drying and chemically harsh conditions, making it indispensable for leading-edge processes that require nitrogen.





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