SIMCO ION™
An ITW Company

Ionization Solutions

WWW.SIMCO-ION.COM

In-line Ultra-clean Nitrogen Ionizer

MODEL 4214

Simco-Ion's In-line Ultra-clean Nitrogen Ionizer Model 4214 is specifically designed to ionize a nitrogen (99.999%) gas flow in ultra-clean semiconductor or other high purity processes. Unlike other nitrogen ionizers which depend on the trace gases in the nitrogen stream to produce ionization, this state-of-the-art product ionizes nitrogen molecules using a small but efficient power supply.

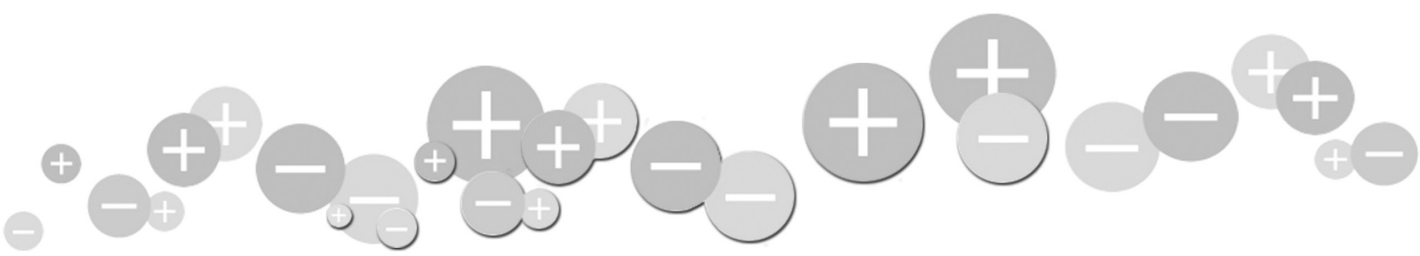
The Model 4214 utilizes high-frequency AC ionization technology to provide a fast discharge time for optimal static charge neutralization. The microprocessor controls and small form-factor, make it an ideal nitrogen ionizer for in-tool integration. The ultra-clean design, utilizing an internal particle containment system assures the cleanest ionization for critical semiconductor processes. By providing a continuous flow of nitrogen through the ionizer, this breakthrough technology meets ISO Class 1 cleanliness requirements, making it ideal for 22 nm and below technology nodes.

Features

- Extended ISO Class 1 cleanliness
- Alarms indicating low ion output, high voltage power supply failure, low gas flow
- Standby mode
- Self-balanced ionization
- Auto shutoff with low gas flow
- Compact size
- +24 VDC input power

Benefits

- Provides clean ionization for any ultra-clean process; ideal for 22 nm and below technology nodes
- Constant ionizer status monitoring for continued continuous optimal performance
- Nitrogen saving Standby mode that reduces gas flow while maintaining fast ionization startup
- Eliminates calibration or difficult setup
- Prevents product damage
- For in-tool applications with tight space constraints
- Connects to tool power for simple integration



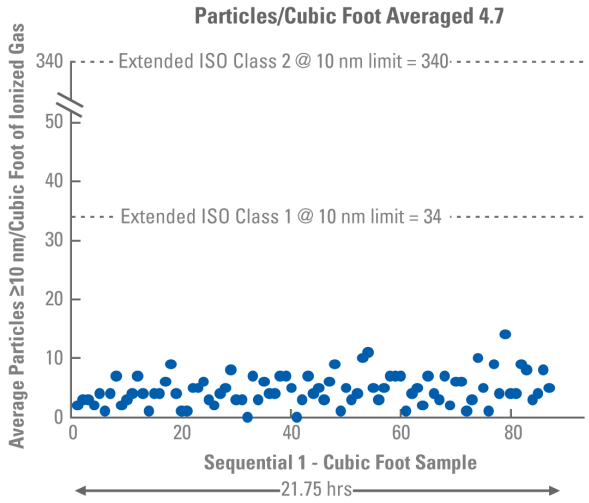
Model 4214	
Input Voltage	+24 VDC, ±5% @ 0.25 A, 6W (typ)
Discharge	Without manifold: ±1000-100V, 10 sec or less (typ), measured @ 6" (15.2 cm) to CPM, nitrogen flow rate 1.4 cfm @ 5.3 psi (40 lpm @ 36.5 kPa) With manifold: 1000-100V, 100 sec or less (typ), measured @ 19.6" (49.8 cm) with custom manifold
Balance	±25V or less range with no output manifold, measured @ 6" (15.2 cm) from CPM
Ion Emission	High Frequency AC Technology
Emitter	Single-crystal Silicon
Cleanroom Class	ISO 14644-1 Class 1 (0.1 µm particles) & Extended ISO Class 1 (0.01 µm particles)
Control System	Microprocessor-controlled ionization, self balancing
Air Supply	Input: Nitrogen, minimum purity 99.999% Flow: 40 lpm @ 36.5 kPa (5.3 psi) min; recommended 90 lpm @ 171 kPa (24.8 psi); 100 lpm @ 207 kPa (3.5 cfm @ 30 psi), max Temperature: 140°F (60°C) max Connection: Inlet: Swagelok® 316L SST 1/8" FNPT Adapter to 3/8" OD tubing (#SS-600-7-2); Outlet: Internal 1/4" NPT female threaded in ionizer block; optional manifold 1/4" NPT male Filter: Disposable, 99.999% filtration efficiency for 0.01 micron particles
Alarm	HV alarm, low ions alarm, low gas flow alarm
Status Relays 1 & 2	±60V @ 0.2A (max)
Operating Env	59-140°F (15-60°C) max (custom manifold per individual specification)
Mounting	Two M5 threaded inserts provided on bottom of unit; M5 screws should not exceed 10 mm in length
Enclosure	Stainless Steel
Dimension	6.0"L x 2.85"W x 1.26"H (15.2 x 7.2 x 3.2 cm) without manifold
Weight	1.4 lb (0.64 kg) without manifold
Warranty	Two-year limited warranty
Certification	CE RoHS2 UKCA

Ordering Information

91-4214UN-04	4214 ionizer with silicon emitter points for nitrogen, 24 VDC
91-4231-02	PEEK manifold kit with 9" SST tube
91-4232-01	PEEK manifold kit with 2.75" SST tube
71-24219-04	Silicon emitter point kit for 4214 ionizer
33-24214-41	Filter cartridge kit, 99.99998% efficient (filter cartridge, 2 O-rings)
33-4214-05	4214 power-signal distribution box
33-4214-15	4214 power-signal distribution kit (distribution box, cable, 24 VDC universal input power supply) (IEC power cord required, contact Sales Services for detail)

Defining Extended ISO Class 1 Cleanliness

To meet current technology node cleanliness requirements, Simco-Ion utilizes an in-house standard that extrapolates ISO 14644-1 down to >0.01 micron (>10 nm) particles. Greater than 10 nm particle size is typically measured using a condensation nucleus counter (CNC). The result is defined as "Extended ISO Class 1". The basis of the extrapolation employs the formula which was used to define the existing ISO 14644-1 class limit lines. The formula is provided in ISO Standard 14644-1, and when extrapolated the permitted number of particles sized 0.01 micron and larger = 1200 particles/m^3 (or 34 particles/ft^3). The Simco-Ion in-house standard makes no changes to ISO 14644-1, it only extrapolates ISO 14644-1 to smaller particle sizes. Additional information regarding the ISO 14644-1 standard can be found at www.iso.org.



Easy Tool Integration

The Model 4214 is a stand-alone unit providing a high voltage power supply, an ultra-clean ionization cell, and I/O connections for remote status and control of ionization all within a small footprint package. The end-user's nitrogen is plumbed through the unit where it is ionized and then delivered to the tool's static-sensitive product or process area. Custom manifolds or nozzles can be attached to shape the area of coverage to the customer's requirements.

Power-Signal Distribution Box

SIMCO ION™
An ITW Company

Simco-Ion, Technology Group
1141 Harbor Bay Parkway, Suite 201
Alameda, CA 94502
Tel: +1 (800) 367-2452 (in USA)
Tel: +1 (510) 217-0460
ioninfo@simco-ion.com
www.simco-ion.com/technology

DS-4214_V9 - 2/23