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

- ISO 14644-1 Class 1 (0.1 µm particles) and ISO 14644-12 Class 12 (0.01 µm particles)
- 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

Input Voltage	+24 VDC, ±5% @ 0.25 A, 6W (typ)
Balance	±25V or less range with no output manifold, measured @ 150 mm (6") from CPM, standard nitrogen flow rate 40 lpm @ 36.5 kPa (1.4 cfm @ 5.3 psi)
Discharge	Without manifold ±1000-100V, 10 sec or less (typ), measured @ 150 mm (6") to CPM, nitrogen flow rate 40 lpm @ 36.5 kPa (1.4 cfm @ 5.3 psi) With manifold 1000-100V, 100 sec or less (typ), measured @ 500 mm (19.6") with custom manifold
Ion Emission	High frequency AC corona discharge
Cleanliness	ISO 14644 Class 1 (0.1 µm particles) & ISO 14644 Class 12 (0.01 µm particles)
Emitters	Single crystal silicon (SCSi)
Gas	Nitrogen, minimum purity 99.999%
Gas Flow Rate	40 lpm @ 36.5 kPa (5.3 psi) min; recommended 90 lpm @ 171 kPa (24.8 psi); 90 lpm @ 197 kPa (28.5 psi) max
Gas Supply Temp	140°F (60°C) max
Gas Connections	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
Operating Temp	59-140°F (15-60°C) max (custom manifold per individual specification)
Control System	Microprocessor controlled ionization, self balancing
Alarms	HV alarm, low ions alarm, low gas flow alarm
Status Relays 1 & 2	±60V @ 0.2A (max)
Filter Cartridge	Disposable, 99.999% filtration efficiency for 0.01 micron particles
Dimensions	6.0"L x 2.85"W x 1.26"H (152.4 x 72.4 x 32 mm) without manifold
Weight	1.4 lbs (0.64 kg) without manifold
Enclosure	Stainless steel
Mounting	Two M5 threaded inserts provided on bottom of unit; M5 screws should not exceed 10 mm in length
Certifications	CE RoHS2

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; power cord must be specified separately, see below)
25-20660	Northern America power cord
25-20710	UK power cord
25-20735	Europe power cord
25-20750	China power cord

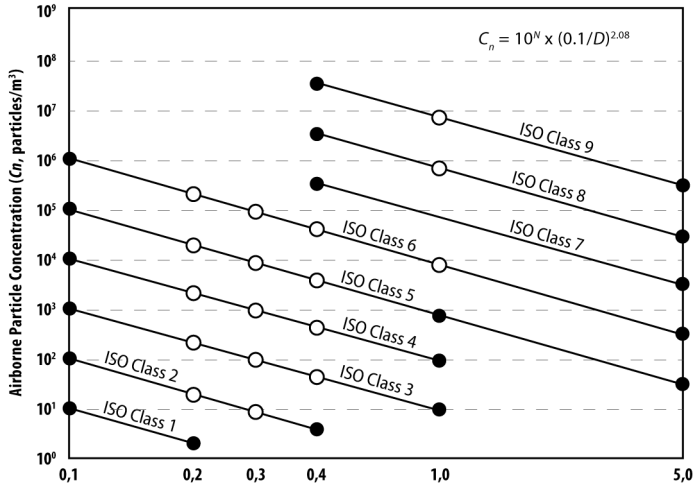
ISO Class 1 Cleanliness

To meet current technology node cleanliness requirements, Simco-Ion adhere to the formula defined by ISO Class 1: Cleanrooms and associated controlled environments for 0.1 and 0.01 micron particles.

- ISO 14644-1 (classification of air cleanliness by particle concentration)
- ISO 14644-12 (specifications for monitoring air cleanliness by nanoscale particle concentration)

The formula extrapolated the permitted number of particles sized 0.01 micron and larger = 1200 particles/m^3 (or 34 particles/ft^3). Greater than 10 nm particle size is typically measured using a condensation nucleus counter (CNC).

The following graph summarizes the class limit lines for particles between 0.1 micron and 5 microns. Additional information regarding the ISO standards 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

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