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 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 In-line Ionizer 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 assure the cleanest, most compatible ionization available for critical semiconductor processes. By providing a continuous flow of nitrogen through the ionizer, this breakthrough technology meets Extended 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 (maintenance required), high voltage power supply failure, and 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 start up
- Eliminates calibration or difficult setup
- Prevents product damage
- Designed for in-tool applications with tight space constraints
- Connects to tool power for simple integration

* See Defining Extended ISO Class 1 Cleanliness on the back.

## Specifications

| | |
|---|---|
| **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 @ 36.5kPa (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 Class 1 (0.1 µm particles); Extended ISO Class 1 (0.01 µm particles) |
| **Ion Emitter** | Single crystal silicon (SCSi) |
| **Gas** | Nitrogen, minimum purity 99.999% |
| **Gas Flow Rate** | Minimum 40 lpm @ 36.5 kPa (5.3 psi); recommended 90 lpm @ 171 kPa (24.8 psi); maximum 100 lpm @ 197 kPa (28.5 psi) |
| **Gas Supply Temp** | 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** | Ionizing unit 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** | 6.0L x 2.85W x 1.26H in. (152.4 x 72.4 x 32 mm) without manifold |
| **Weight** | 0.64 kg (1.4 lbs) 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 RoHS 2 Compliant |

## Ordering Information

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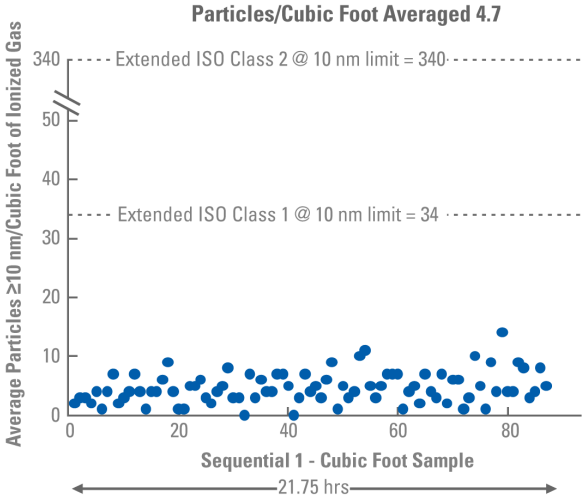
| **91-4214UN-04** | 4214 Ionizer with Silicon Emitter Points for Nitrogen, 24 VDC |
| **71-24219-04** | Silicon Emitter Point Kit for 4214 Ionizer |
| **33-24214-41** | Filter Cartridge Kit, 99.99998% efficient (filter cartridge, 2 O-rings) |
| **33-4214-05** | 4214 Power-Signal Distribution Box |
| **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 |

## 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*

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