

In-line Ultra-clean Environment Gas Ionizer

# Model 4210

Most high technology manufacturers rely on air ionization to control problems associated with static charge—thus increasing yields, minimizing downtime and microprocessor lock-up and reducing the cost of ownership. Unfortunately, mini-environments and process equipment prevent traditional ionizers from reaching one of the most important production areas—the inside of process equipment.

In the heart of process equipment, where limited space or proximity to sensitive products makes ionizing bars impractical, the Model 4210 In-line gas ionizer pipes compressed ionized gas for balanced charge neutralization. Either Clean Dry Air (CDA) or N<sub>2</sub> can be ionized, depending on process requirements. The ionized gas can be plumbed to the static-sensitive product or fixture using ultra-clean Teflon<sup>TM</sup> tubing, bathing the area in ions. Manifolds can be custom designed which provide ions to the desired area, while staying clear of moving products and robotics.



## Features

- Easily connects to delivery manifolds
- Ionizes either Clean Dry Air or Nitrogen
- IsoStat technology
- Steady-state DC ion emission
- Ultra-clean emitter points (u/un models)
- Ultra-clean construction with carefully controlled current and geometry

## Benefits

- Precise delivery of balanced ionization to confined areas; ideal for use in caustic environments where emitter points cannot be exposed
- Can be used in a variety of applications
- No calibration needed
- Fast discharge times
- Provide ISO 14644 Class 3 cleanliness
- Maintenance-free for two years



Model 4210 In-line Gas Ionizer

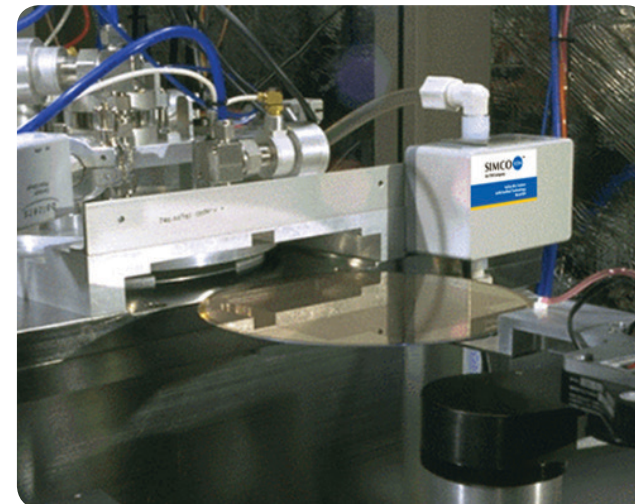
The 4210 comes in three versions. The 4210un is an ultra-clean nitrogen ionizer. The 4210u is an ultra-clean air ionizer. The 4210 is for ionizing air (CDA) and nitrogen in Class 100 environments or environments not requiring clean standards better than Class 100.



Model 4210UN In-line Gas Ionizer

## Model 4210 Product Family

Features	4210	4210u	4210un
Environment	ISO Class 5	ISO Class 3	ISO Class 3
Gas Ionization	CDA/Nitrogen	CDA	Nitrogen
Emitter Point Materials	Tungsten Wire	Silicon	Silicon



## 4210 Specifications

Balance*	±25V @ 6" from CPM
Discharge	4210: 10 sec, 4210u: 6 sec, 4210un: 10 sec measured through 6" long, 1/4" ID Teflon tube held 6" from CPM airflow rate of 120 scfh (2 scfm)
Cleanliness	4210: ISO 14644 Class 5 (Fed. Std. 209e Class 100 equivalent) 4210u: ISO 14644 Class 3 (Fed. Std. 209e Class 1 equivalent) 4210un: ISO 14644 Class 3 (Fed. Std. 2093 Class 1 equivalent)
Emitter Points	Tungsten or single-crystal silicon
Gas	<b>Connection:</b> 1/4" NPT female Teflon fittings at both gas input/output <b>Flow:</b> 1.5 cfm (min), max set by manifold back pressure <b>Supply:</b> Clean dry air (CDA) or nitrogen (N <sub>2</sub> )
Manifold	Teflon tubing with flare fittings for interconnects, nitrogen 3/8" (9.5 mm) ID tubing, CDA 1/4" (6 mm) ID tubing
Pressure	<b>Input:</b> 10-50 psi safe range <b>Manifold:</b> Model 4210 0-50 psi, Model 4210u 0-50 psi Model 4210un 0-15 psi to achieve ionization
Technology	Steady-state DC
Temperature	Operating Env: Ambient -4 to -140°F (-20-60°C) max Inlet Gas Supply: 250-73°F (120-23°C)
Voltage	Input: 120 VAC, 50-60 Hz, approximately 2W (100/230 VAC available)
Mounting	Four 6/32 threaded holes provided (wall & bulkhead mount brackets available)
Enclosure	Power-coated white aluminum
Dimensions	2.4"D x 4.75"L x 3.13"W (6.1 x 12.1 x 8.0 cm)
Weight	37 oz (1.04 kg) including fittings and power cord
Certifications	CE, ATEX, IECEx, UL

\* Tested in accordance with ANSI/ESD STM3.1-2015.

## Ultra-clean Ionization

When provided with gas from an ultra-clean source, the 4210u and 4210un operate 10 times better than Class 3 cleanroom requirements. Careful material selection and control of internal geometry ensure ultra-clean ionized gas delivery.

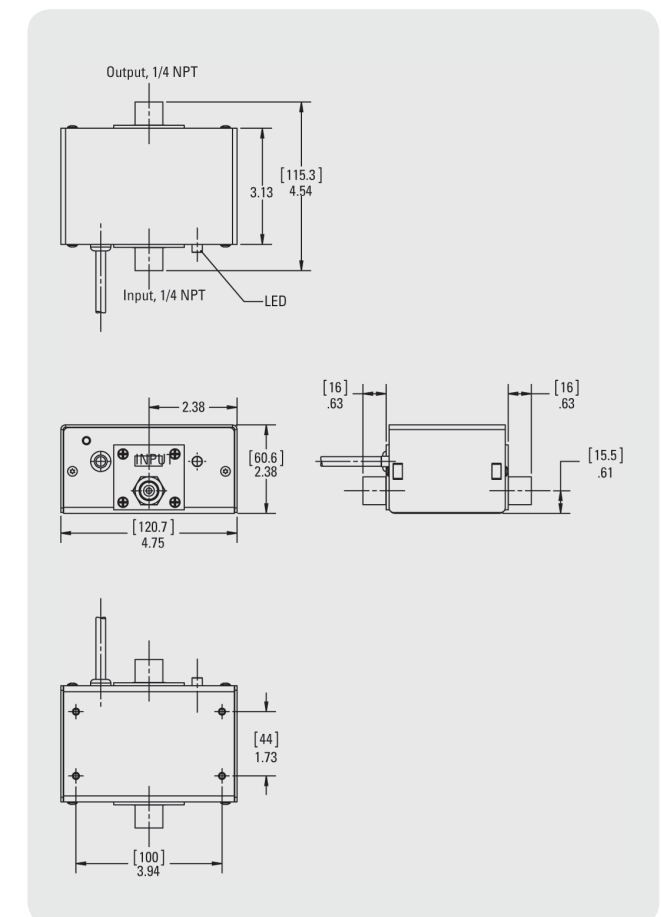
## Applications

The 4210 has been used to solve static charge problems in a variety of wafer fab applications, including steppers, spin rinser dryers, load and unload stations, disk certifiers, wafer management systems and furnaces.

## Emitter Point Technology

**Single Crystal Silicon:** Simco-Ion's patented single crystal silicon emitter points represent the cleanest option available in the industry. Far exceeding Class 1 cleanliness requirements, these non-metallic points produce no particle bursts and emit an average of less than 5 particles per cubic foot (less than 0.05 microns in size verified with condensation nucleus (CNC) and optical particle counters).

**Tungsten Alloy:** The most common material in industrial ionization applications, tungsten alloy, offers long emitter point life and low maintenance requirements. Simco-Ion's tungsten alloy emitter points will not erode as quickly as conventional tungsten wire, and fewer particle bursts result in cleaner operation.



## Ultra-clean Nitrogen In-line Gas Ionizer Model 4214

Simco-Ion's In-line Ultra-clean Nitrogen Ionizer Model 4214 is specifically designed to ionize 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.

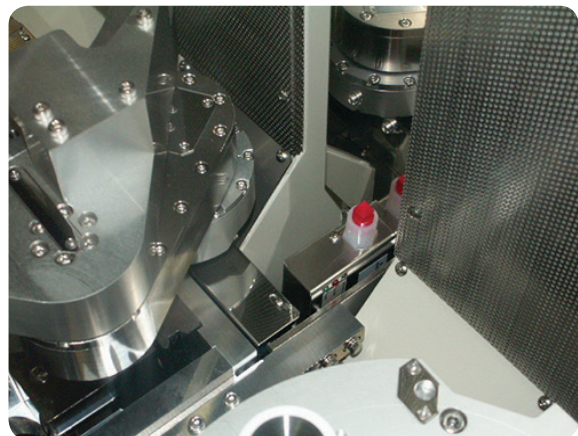


### Features

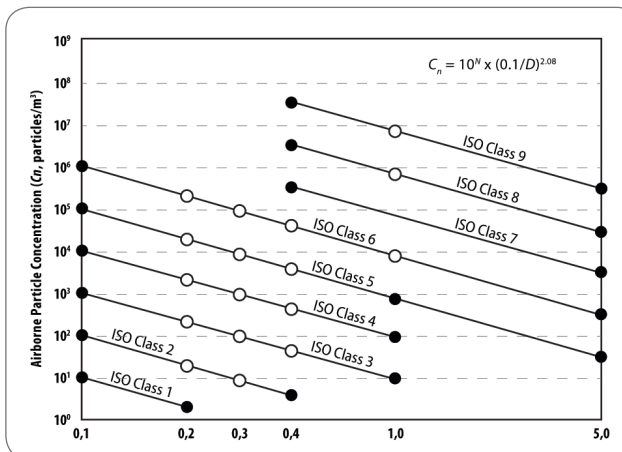
- ISO 14644 Class 1 (0.1 µm particles) and ISO 14644 Class 12 (2018) (0.01 µm particles)
- Alarms indicating low ion output, high voltage power supply failure, low gas flow
- Standby mode
- Auto shut-off with low gas flow
- Compact size
- +24 VDC input power

### 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



The small size of the in-line ultra-clean gas ionizer Model 4214 provides superior static neutralizing ionization for semiconductor device manufacturing vertical furnaces.



## 4214 Specifications

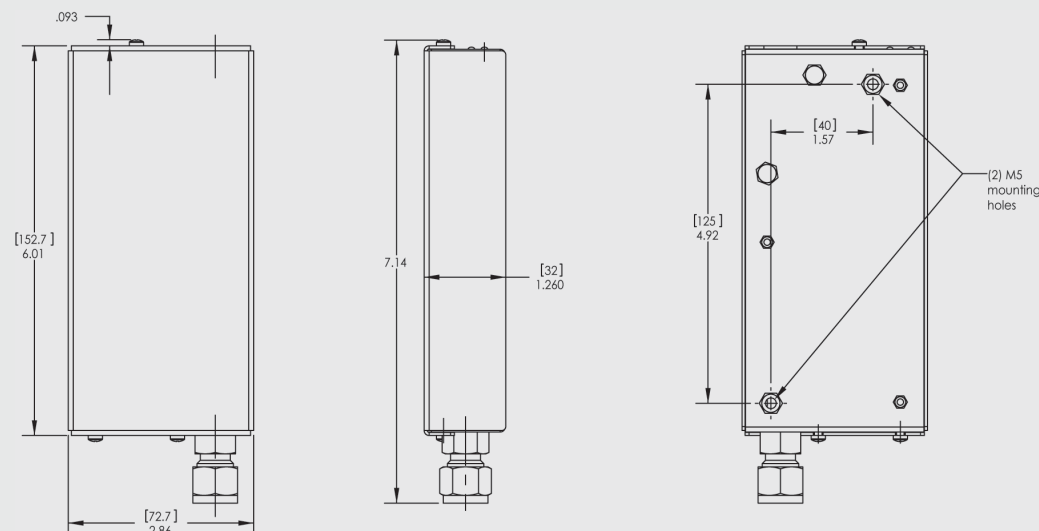
<b>Alarms</b>	HV alarm, low ions alarm, low gas flow alarm
<b>Balance</b>	±25V or less range with no output manifold, measured @ 150 mm (6") from CPM
<b>Cleanliness</b>	ISO 14644 Class 1 (0.1 µm particles) & ISO 14644 Class 12 (2018) (0.01 µm particles)
<b>Discharge</b>	<b>Without Manifold:</b> ±1000-100V, 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) <b>With Manifold:</b> 1000-100V, 100 sec or less (typ), measured @ 500 mm (19.6") with custom manifold
<b>Emitters</b>	Single crystal silicon (SCSi)
<b>Filter</b>	Disposable cartridge, 99.999% filtration efficiency for 0.01 micron particles
<b>Gas</b>	<b>Connection:</b> Inlet Swagelok® 316L SST 1/8" FNPT adapter to 3/8" OD tubing, outlet internal 1/4 NPT female threaded in ionizer block (optional manifold 1/4 NPT male)\
	<b>Flow:</b> 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
	<b>Supply:</b> Nitrogen (N <sub>2</sub> ), min purity 99.999%
<b>Technology</b>	High frequency AC corona discharge
<b>Temperature</b>	<b>Operating Env:</b> 59-140°F (15-60°C) max <b>Gas:</b> 140°F (60°C) max
<b>Status Relays 1/2</b>	±60V @ 0.2A (max)
<b>Voltage</b>	Input: +24 VDC, ±5% @ 0.25 A, 6W (typ)
<b>Mounting</b>	Two M5 threaded inserts provided on bottom of unit
<b>Enclosure</b>	Stainless steel
<b>Dimensions</b>	6.0"L x 2.85"W x 1.26"H (152.4 x 72.4 x 32 mm) without manifold
<b>Weight</b>	1.4 lbs (0.64 kg) without manifold
<b>Certifications</b>	CE, RoHS



Power-Signal Distribution Box

### 4214 Power Distribution Box

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.





## High Temperature Ionizer

# Model 4610TF

Simco-Ion's High Temperature Ionizer Model 4610TF neutralizes static charge in environments with extreme conditions. Together with the High Temperature Controller Model 4052E, the High Temperature Ionizer Model 4610TF creates a uniquely capable ionization system that can withstand high heat and extreme cold, two challenging environments that cannot support other means of static elimination.

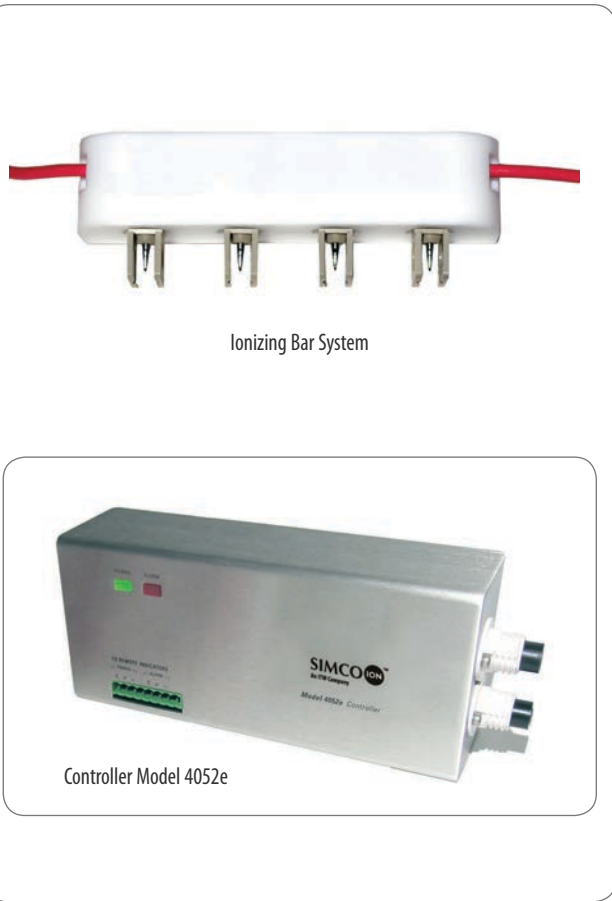


### Features

- Withstands temperatures up to 302°F (150°C) and down to -94°F (-70°C)
- IsoStat technology
- Available with tungsten alloy or single-crystal silicon emitter points
- Unique ion guides help direct airflow towards the target

### Benefits

- Eliminates static charge in extreme environments that cannot sustain any other static elimination method
- Self-balanced; no calibration needed
- Ensures safe operation and static elimination in confined, high temperature areas
- The industry standard for semiconductor processing offering ideal compatibility and ISO 14644 Class 2 cleanliness
- Ions are directed using existing airflow toward any point inside the smallest areas while protecting emitter points from dirt and buildup



### 4052e Controller

The 4052e Controller powers and provides alarm indications (high voltage output failure) for the 4610TF ionizer. A green LED lights when power is applied to the controller, and a red LED provides visual notification of an alarm. An additional eight-pin connector is provided on the front of the box for connection to a remote indication system.

### Emitter Point Technology

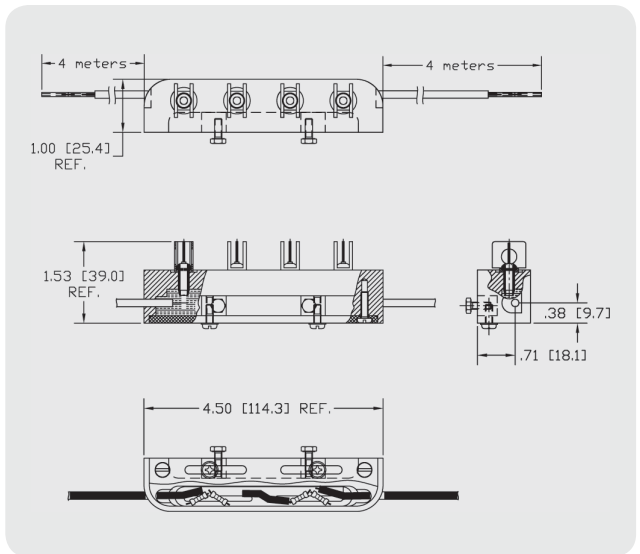
**Single Crystal Silicon:** Simco-Ion's patented single crystal silicon emitter points represent the cleanest option available in the industry. Far exceeding ISO Class 3 (Fed Std 209e Class 1) cleanliness requirements, these non-metallic points produce no particle bursts and emit an average of less than 5 particles per cubic foot (less than 0.05 microns in size verified with condensation nucleus (CNC) and optical particle counters).

**Tungsten Alloy:** The most common material in industrial ionization applications, tungsten alloy, offers long emitter point life and low maintenance requirements. Simco-Ion's tungsten alloy emitter points will not erode as quickly as conventional tungsten wire, and fewer particle bursts result in cleaner operation.

### 4610TF Specifications

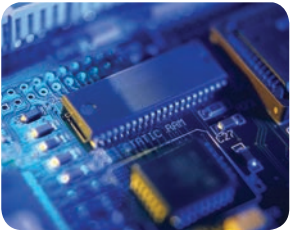
<b>Airflow</b>	60-100 fpm (18.3-30.5 mpm) recommended
<b>Cabling</b>	30 kV, 13.3' (4m) / 21.7' (6m)
<b>Discharge*</b>	<3 sec @ 6" (15 cm) distance between ionizer and CPM <5 sec @ 10" (25 cm) <10 sec @ 18" (45.7 cm)
<b>Emitter Points</b>	Four Tungsten alloy or single-crystal silicon points
<b>Power</b>	Powered by 4052E controller (connects to the controller via interchangeable HV cable connectors)
<b>Temperature</b>	Operating Env: -94°F to 302°F (-70°C to 150°C), max 85% RH (non-condensing)
<b>Voltage</b>	Output: 8 kVDC
<b>Mounting</b>	Two slots (methods varies depending on environment)
<b>Enclosure</b>	Teflon body, fins/rivet PEEK
<b>Dimensions</b>	1.5"H x 1.2"W x 4.5"L (3.8 x 3.5 x 11.4 cm)
<b>Weight</b>	4 oz (117g)
<b>Certifications</b>	CE, RoHS, ISO 14644 Class 2, ISO 10370

\* ±1000-100V with 90 fpm hood airflow velocity (tested in accordance with ANSI/ESD STM3.1-2000).



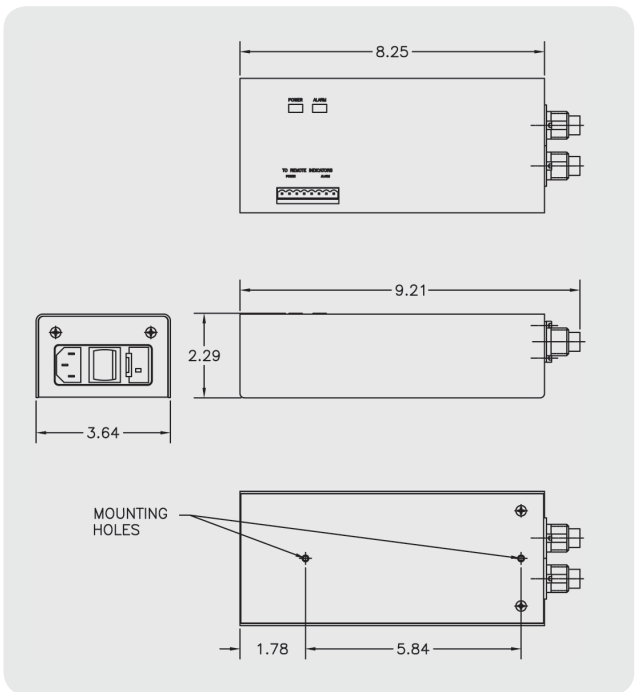
### Target Applications

The back-end semiconductor industry uses a series of extensive reliability testing that will ensure the conformance of integrated chips and modules. Testing of the product at extreme high and low temperatures will ensure the conformance of integrated chips and modules; designed to accelerate real life conditions where the product will be used.



### 4052e Specifications

<b>Controls</b>	On/off power switch
<b>Current</b>	<20 µA
<b>Fuse</b>	250 VAC, 250 mA, 5 x 20 slow blow
<b>Indicators</b>	Green power, red alarm (indicates HV power supply failure)
<b>Temperature</b>	Operating Env: -20 to 104°F (-29 to 40°C), max 85% RH (non-condensing)
<b>Voltage</b>	<b>Input:</b> 110/200/220/240 VAC, 50/60 Hz, 3.6W, 30 mA @ 120 VAC <b>Output:</b> 9 kVDC
<b>Enclosure</b>	Stainless steel
<b>Dimensions</b>	2.3"H x 3.8"D x 8.3"L (5.7 x 9.5 x 21 cm)
<b>Weight</b>	3 lb (1.6 kg)
<b>Certifications</b>	CE, RoHS, ISO 14644 Class 2, ISO 10370



## Extreme Temperature Ionizer System Model 4612

Simco-Ion's new Extreme Temperature Ionization System provides  $<\pm 10V$  balance in extreme environments from  $-50^{\circ}C$  to  $+150^{\circ}C$ . The 4612 Ionizer, along with its 4062e Controller and 550 Extreme Temperature Antenna use closed-loop control to ensure the ionizer's output is balanced at the location that's critical—the product location itself.

The compact size of the 4612 Precision Ionizer, 4062e Controller and 550 Antenna are the perfect answer to maintain tightly-controlled ionization in small test chambers with active robotics moving parts under extreme environments. The 4612 Precision Ionizer uses high voltage DC technology with tungsten emitters so it can be used in ISO 14661 Class 6 cleanliness environments.



### Features

- Operates in temperatures as high as  $150^{\circ}C$  ( $310^{\circ}F$ ) and as low as  $-50^{\circ}C$  ( $-58^{\circ}F$ )
- Balance control of better than  $<\pm 10V$  standard meets the new stringent requirements for S20.20
- 550 Antenna to measure balance at the device location
- Optional feedback control using Novx Active Antenna with the Model 3362

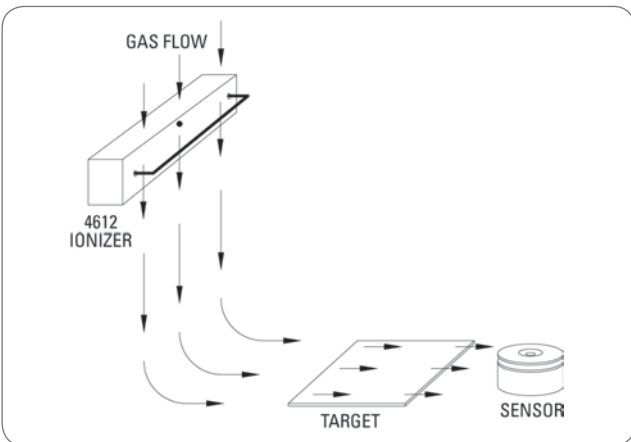
### Benefits

- Eliminates static charge in extreme environments that cannot sustain any other static elimination method
- Self-balancing ionization eliminates calibration in the tight confines of the test chamber
- Ensures that balance is maintained at the target where it matters, not just at the ionizer itself
- Eliminates the need for two antennas for process monitoring



### Model 4062e Controller

The 4062e Controller is a physically small unit, to allow it to be mounted almost anywhere inside a tool within a few meters of the Precision Ionizer itself.



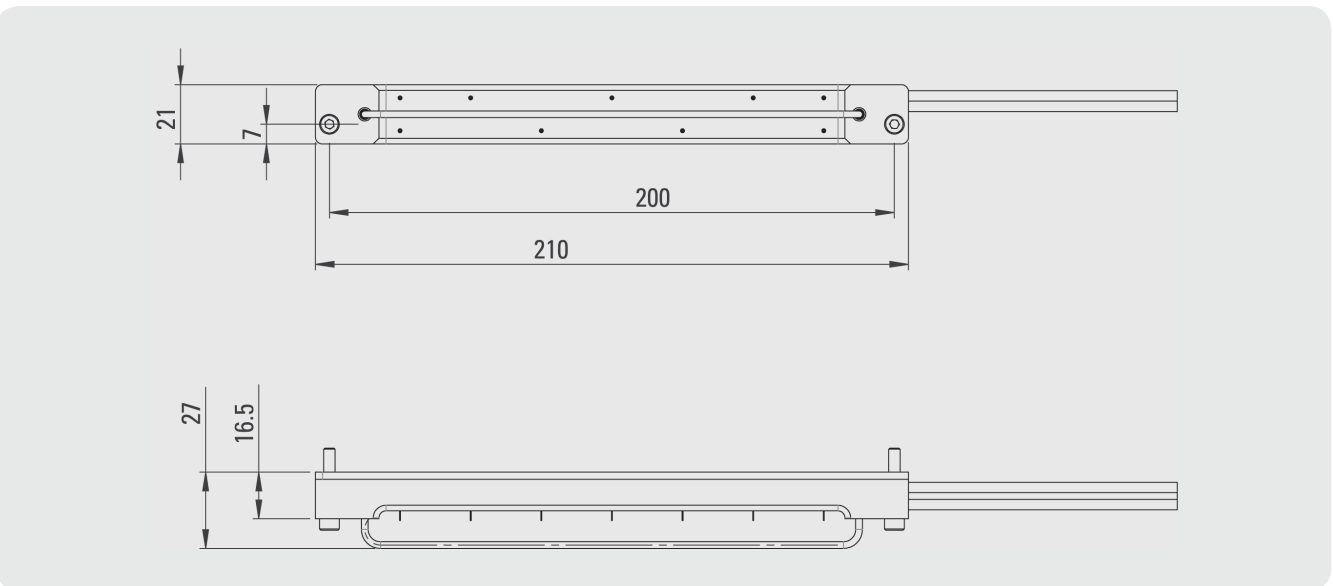
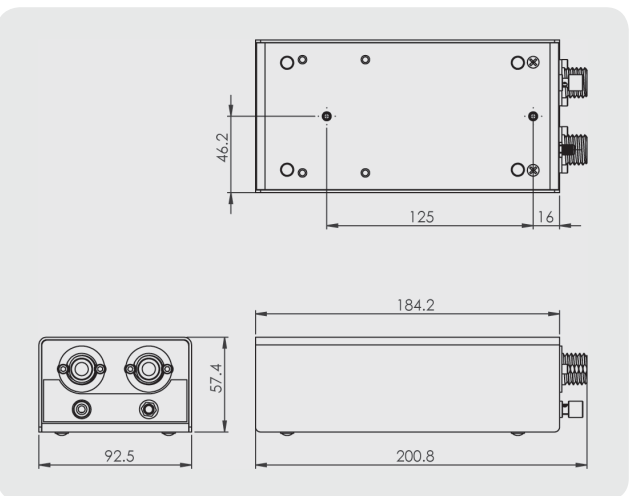
### 4612 Specifications

<b>Alarms</b>	Low input voltage, HV output fault, antenna signal too variable/noisy and/or out of range
<b>Balance</b>	$\pm 10V$ (typ) around initial set-point
<b>Cleanliness</b>	ISO 14644 Class 6
<b>Control System</b>	Microprocessor-controlled closed-loop feedback
<b>Discharge*</b>	10 sec (depending on environment) @ 12" (300 mm) with 100 fpm gas velocity (decay time for $\pm 1000$ -100V)
<b>Emitter Points</b>	Tungsten
<b>FMS</b>	Relay contact, rated $\pm 24 VDC$ @ 0.2A, max 4-20 mA current output
<b>Gas</b>	<b>Flow:</b> 100 fpm (min) velocity past 4612 Ionizer <b>Supply:</b> Clean dry air (CDA) or nitrogen ( $N_2$ ) with min purity 99.99%
<b>Technology</b>	DC corona discharge
<b>Temperature</b>	<b>Operating Env:</b> $-50^{\circ}C$ to $+150^{\circ}C$ (max) <b>Gas:</b> $150^{\circ}C$ (max)
<b>Voltage</b>	Input: $+24 VDC$ , $\pm 5\%$ @ 0.25A, 6W (max)
<b>Mounting</b>	4612-210: Two M4 holes 4612-526: Four M4 holes
<b>Enclosure</b>	4612 Ionizer: PEEK, 550 Antenna: PTFE and stainless steel
<b>Dimensions</b>	4612-210 mm Ionizer: 8.3"L x 0.8"W x 1.2"H (210 x 21 x 30 mm) 4612-526 mm Ionizer: 20.7"L x 0.8"W x 1.2"H (526 x 21 x 30 mm) 550 Antenna: 1.7" dia x 0.9"H (44 dia x 22 mm)
<b>Weight</b>	4612-210 mm Ionizer: 12 oz (365g) 4612-526 mm Ionizer: 18 oz (515g) 550 Antenna: 0.3 lbs (0.14 kg) including cables
<b>Certifications</b>	CE, UL, IEC, RoHS

\* Tested in accordance with ANSI/ESD STM3.1-2015.

### 4062e Specifications

<b>Controls</b>	Balance adjust
<b>Connectors</b>	RJ-11 connector for 24 VDC input, two HV connectors, RJ-9 connector for FMS output (relay closure & 4-20 mA), SMA connector for antenna
<b>Indicators</b>	Green power, red alarm (indicates instability or HV power failure)
<b>Temperature</b>	Operating Env: $50$ - $95^{\circ}F$ ( $10$ - $35^{\circ}C$ ), 30-60% RH (non-condensing)
<b>Voltage</b>	<b>Input:</b> $24 VDC \pm 5\%$ @ 1.0A to 4062 Controller (optional external power supply to convert from 100-240 VAC to 24 VDC) <b>Output:</b> $\pm 6.5 kV$ max, peak-to-peak
<b>Mounting</b>	Two M4 holes
<b>Enclosure</b>	Stainless steel
<b>Dimensions</b>	7.9"L x 3.6"W x 2.2"H (201 x 92 x 57 mm)
<b>Weight</b>	1.1 kg (2.4 lb)
<b>Certifications</b>	CE, UL, IEC, RoHS



# QuadBar™ 4630

Simco-Ion's QuadBar Ionizer Model 4630 is the first corona ionizer to provide safe, effective static charge control in the ambient air inside a process chamber. Its unique quadrupole configuration ensures effective ionization as close as 3 inches (7.6 cm) from the product. The 4630's compact size is designed to fit easily into the tight confines of any process equipment, and its ability to run on 24 VDC input power means it can connect to a tool's power source. In the rare event of a system failure, the QuadBar's status output notifies the process tool controller or a Facilities Monitoring System (FMS).

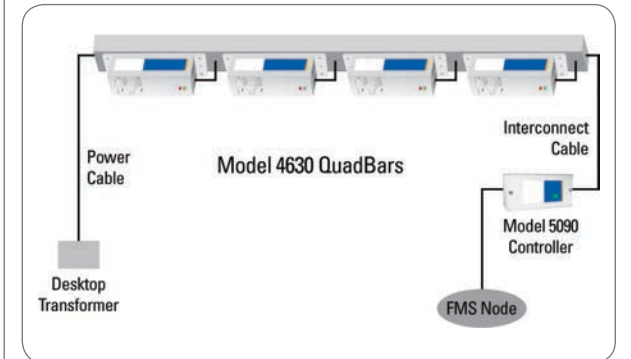


## Features

- Quadrupole configuration with IsoStat technology
- Compact size
- 24 VAC or 24 VDC operation
- Available with single crystal silicon emitter points
- Alarm output to FMS or process tool controller

## Benefits

- Provides fast discharge and stable balance at distances as close as 3 inches (7.6 cm) from the product
- Fits into the tight confines of any process tool
- Connects to a 24 VAC or 24 VDC power supply or operates with ion controller or small transformer
- Emitter points provide the cleanest emitter point material for ionization, meeting ISO 14644 Class 1 standards when operated with 24 VDC power, and ISO 14644 Class 2 standards when operated with 24 VAC power
- Ensures immediate notification of catastrophic system failure



QuadBar ionizers placed above and below the wafer accelerate discharge times on the front and back surfaces, regardless of airflow.

## 4630 Specifications

<b>Airflow</b>	80-100 fpm recommended
<b>Balance</b>	±50V @ 6" & 12" (30.5 cm) directly under emitter points with airflow (80-100 fpm)
<b>Cleanliness</b>	ISO Class 1 when powered with 24 VDC, ISO Class 2 when powered with 24 VAC with 33-1421-01 transformer or Model 4030 controller
<b>Coverage</b>	12" x 12" (30.5 x 30.5 cm) area
<b>Daisy-chain</b>	Up to 4 units via transformer, up to 16 units via Model 4030 controller
<b>Discharge</b>	<30 sec @ 12" (30.5 cm) directly under the emitter points with airflow (80-100 fpm)
<b>Emitter Points</b>	Single crystal silicon standard, field-replaceable, 2-3 year est. life
<b>Indicators</b>	Green power, red alarm
<b>Maintenance</b>	Emitter point cleaning monthly or quarterly
<b>Status Output</b>	Model 5090 FMS interface Model 4030 controller signals OK or system failure
<b>Technology</b>	Steady-state DC
<b>Temperature</b>	Operating Env: 15-50°C (59-122°F), 20-65% RH (non-condensing)
<b>Voltage</b>	24 VAC 35 mA via 33-1421-01 or 33-1431-01 transformer, Model 4030 controller or properly grounded 24 VAC power supply or 24 VDC power from tool power supply (but with reduced ion output)
<b>Mounting</b>	Any process tool or flow hood
<b>Enclosure</b>	ABS
<b>Dimensions</b>	1.3"H x 1.3"W x 4.5"L (33 x 33 x 114 mm)
<b>Weight</b>	3.44 oz (100.3g)
<b>Certifications</b>	CE, UL, RoHS, ISO 14644

## Power Flexibility

A number of different options exist for powering the QuadBar. These include the QuadBar Controller Model 4030, which powers up to sixteen QuadBars at once, connection to a properly grounded 24 VAC power supply, or connection to a 24 VDC tool power supply (although with reduced ionization output). The power choices available for the QuadBar are designed to accommodate varying installation sizes and power needs, making the QuadBar a versatile and effective ionizer.

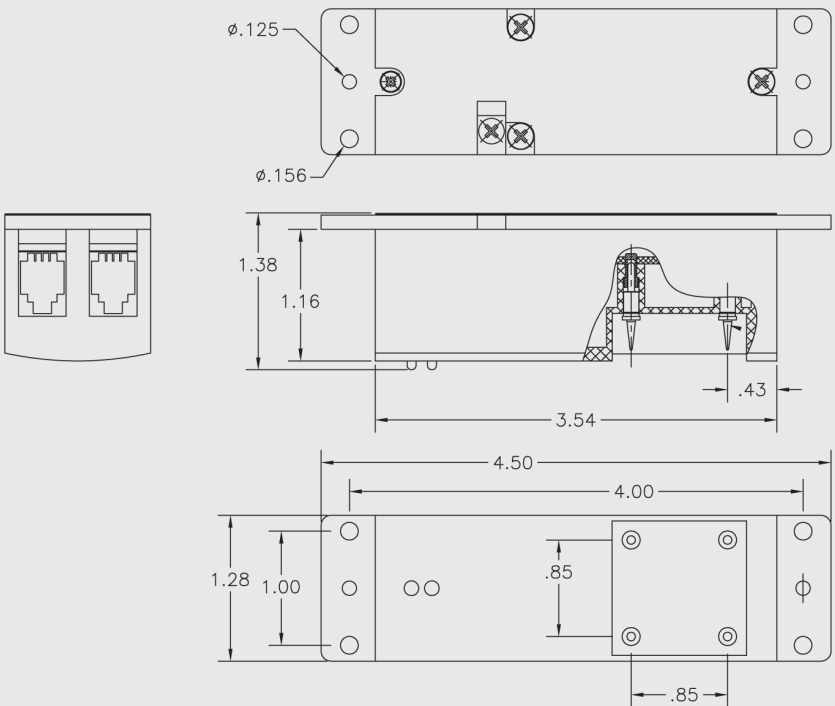
## Model 4030 Controller

The Model 4030 QuadBar Controller is a convenient solution for powering and monitoring multiple QuadBar installations. Four alarm LEDs provide fast and easy identification of the alarming ionizer, reducing tool downtime.



## 4030 Specifications

<b>Alarm</b>	4 red LED indicators, FMS built-in
<b>Capacity</b>	16 QuadBars (4 per line), 2 AeroBar Model 5685 ionizers
<b>Indicators</b>	Green power LED, 4 red alarm LEDs
<b>Voltage</b>	Input: 100/120/230 VAC, 50/60 Hz, 18W max Output: 24 VAC, 50/60 Hz, 30W max
<b>Dimensions</b>	9.25"L x 2.87"D x 2.5"H (23.5L x 7.3D x 6.4H cm)
<b>Weight</b>	2.9 lb (1.33 kg)





## In-tool Ionizer

# QuadBar™ 4635

Simco-Ion's QuadBar™ Ionizer with Air Assist Model 4635 provides effective static charge control in a small format. The unique Quadpole emitter point configuration enables the ionizer to be as close as 3 inches (7.6 cm) to the product. The Model 4635's compact size is designed to fit easily into the tight confines of any process equipment. With its independent air delivery system, the Model 4635 provides ionization where airflow is limited or unavailable.

The Model 4635 offers two air assist cartridge design options. Each utilizes a cross-channel air cartridge built around the emitter points that provides optimal air distribution with minimal field voltage.

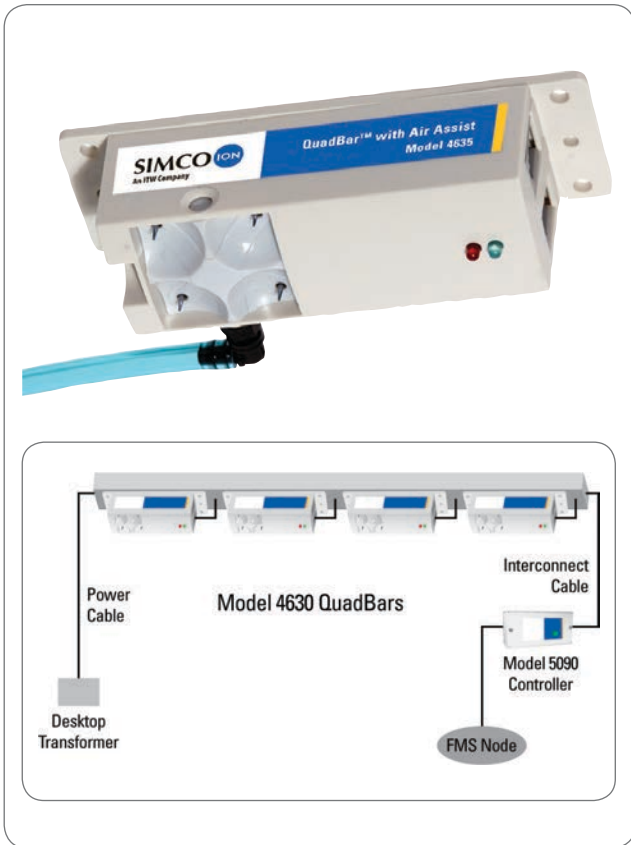


## Features

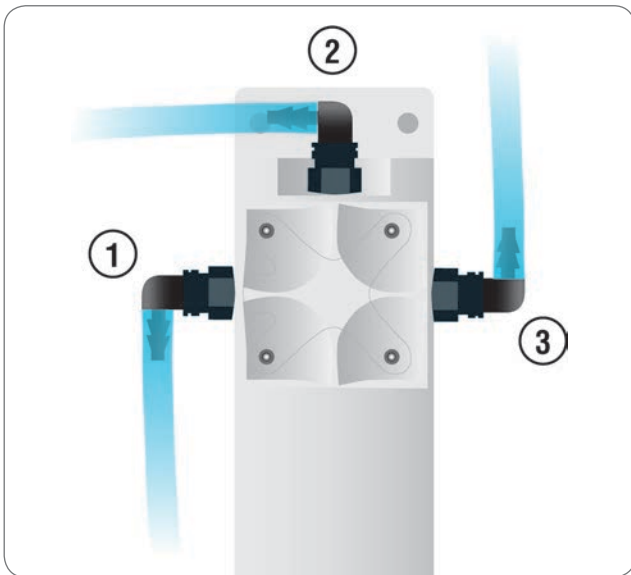
- Air assist cartridge design with cross-channel air delivery; two cartridge design options
- Rotatable cartridge design
- Quadpole configuration with IsoStat technology
- Compact size
- Single Crystal Silicon emitter points
- Alarm output to FMS or process tool controller

## Benefits

- Choice of a Standard cartridge with sheathed emitter point for extended cleaning periods or a high velocity Jet cartridge for extremely fast discharge times
- Allows positioning of air inlet line on either side or the end for installation flexibility
- Provides stable balance at distances as close as 3 in. (7.6 cm) from the product
- Small format fits into the tight confines of process equipment
- Semi standard for emitter point material provides ISO 14644 Class 1 or Class 2 cleanliness depending on input power
- Ensures immediate notification of catastrophic system failure



## Air Line Location Choices



## 4635 Specifications

<b>Balance</b>	±50V @ 6" & 12" (15.2 & 30.5 cm) directly under the emitter points
<b>Cleanliness</b>	ISO Class 1 when powered with 24 VDC, ISO Class 2 when powered with 24 VAC with 33-1421-01 transformer or Model 4030 Controller
<b>Coverage*</b>	12" x 12" (30.5 x 30.5 cm) area @ distance of 12"
<b>Daisy-chain</b>	Up to 4 units via transformer, up to 16 units via Model 4030 controller
<b>Discharge**</b>	Standard cartridge <15 sec @ 12" (30.5 cm) jet cartridge <6 sec @ 12" (30.5 cm)
<b>Emitter Points</b>	Single crystal silicon standard, 2-3 year est life
<b>Gas</b>	<b>Connection:</b> 0.15" (4 mm) OD tubing with 2 micron filter or better <b>Flow:</b> 0-25 lpm @ 0-7 psi <b>Supply:</b> Clean dry air (CDA) or nitrogen (N <sub>2</sub> )
<b>Indicators</b>	Green power, red alarm
<b>Maintenance</b>	Emitter point cleaning monthly or quarterly
<b>Status Output</b>	FMS Model 5090 interface with 33-1421-01 transformer or direct wire; Controller Model 4030 signal OK or system failure
<b>Technology</b>	Steady-state DC
<b>Temperature</b>	Operating Env: 15-50°C (59-122°F), 20-65% RH (non-condensing)
<b>Voltage</b>	24 VAC ±5% @ 0.10A, 50/60 Hz, 2.4W 24 VDC ±5% @ 0.025A, 0.6W (typ)
<b>Mounting</b>	To any process tool or flow hood
<b>Enclosure</b>	ABS, polycarbonate air assist cartridges, mylar & stainless steel labels
<b>Dimensions</b>	1.3"H x 1.3"W x 4.5"L (33 x 33 x 114 mm) air connection elbow on side, width 1.92" (4.88 cm), air connection elbow on the end, ionizer body length 3.9" (10 cm)
<b>Weight</b>	3.8 oz (108g)
<b>Certifications</b>	CE, UL, ISO 9001, ISO 14001

\* Directly under emitter points with 15 lpm (min) purging gas airflow.

\*\* Measurements were taken with an airflow rate of 100 fpm using a charged plate monitor in accordance with ANSI/ESD STM3.1-2015.

## Model 4030 Controller

The Model 4030 QuadBar Controller is a convenient solution for powering and monitoring multiple QuadBar installations. Four alarm LEDs provide fast and easy identification of the alarming ionizer, reducing tool downtime.



## 4030 Specifications

<b>Alarm</b>	4 red LED indicators, FMS built-in
<b>Capacity</b>	16 QuadBars (4 per line), 2 AeroBar Model 5685 ionizers
<b>Indicators</b>	Green power LED, 4 red alarm LEDs
<b>Voltage</b>	Input: 100/120/230 VAC, 50/60 Hz, 18W max Output: 24 VAC, 50/60 Hz, 30W max
<b>Dimensions</b>	9.25"L x 2.87"D x 2.5"H (23.5 x 7.3 x 6.4 cm)
<b>Weight</b>	2.9 lb (1.33 kg)

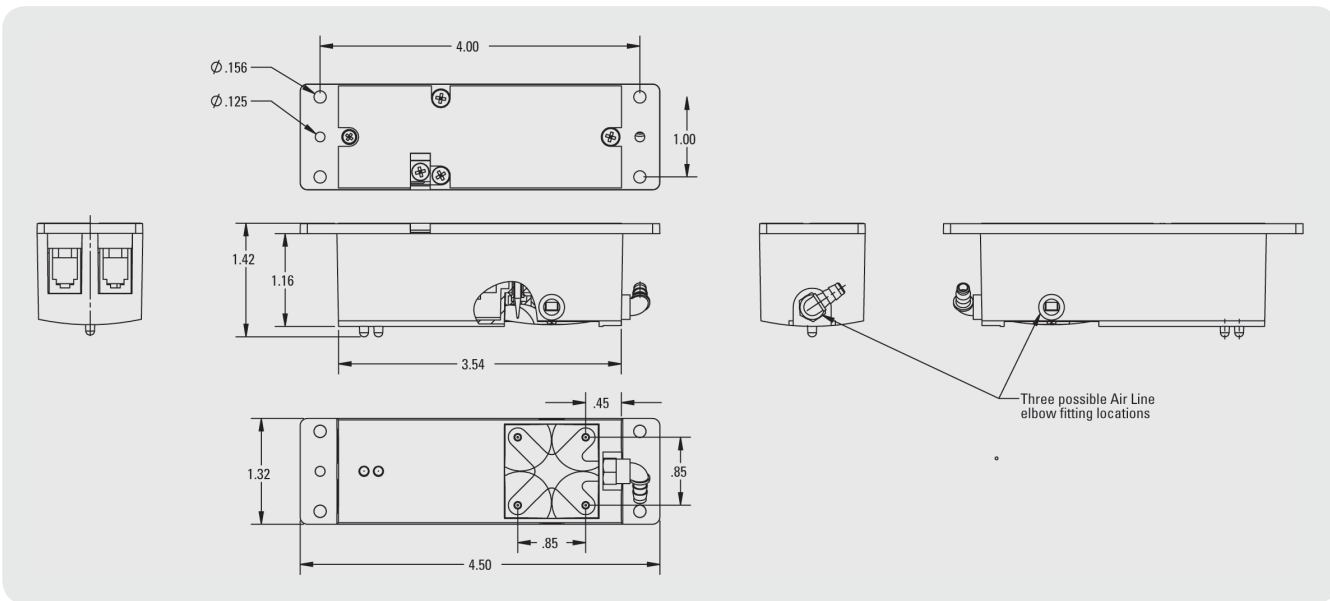
## Insert Cartridge Options



Standard cross-channel cartridge with airflow sheath around the emitter points extends cleaning periods.



Jet cross-channel cartridge with center orifice produces high velocity for fast discharge times.



## Local Area Ionizer fusION™

Simco-Ion's fusION Ionizer is capable of controlling electrostatic charge in the local area. Applications for fusION are those found inside process equipment and mini-environments in the semiconductor, flat panel display, pharmaceutical, and medical device industries. It is especially well suited for applications with tight space constraints and low clearance.



### Features

- Compact design
- Auto balancing technology
- Visual ionizer status indicator and digital level remote alarm output
- Single power source for multiple fusION ionizers
- Optional Fan assembly

### Benefits

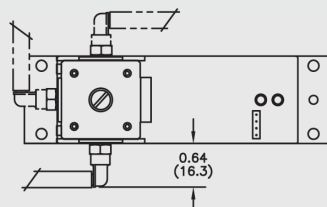
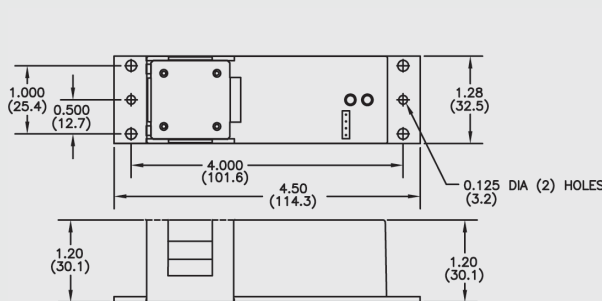
- Fits into the tight confines of any process tool
- No adjustments needed to maintain the required balance
- Standard features for convenient user operation
- Daisy-chain, up to 5 fusIONs, perfect for layered in-tool ionization protection
- Improved performance with extended coverage area



### fusION Specifications

<b>Balance</b>	<±50V
<b>Discharge*</b>	Without fan: <15 sec @ 6" (15.2 cm) with airflow (50 fpm/m) With fan: <10 sec @ 12" (30.4 cm)
<b>Cleanliness</b>	ISO 14644 Class 4
<b>Connectors</b>	DC power in/out: 4 position modular, 4-pin "handset type"
<b>Coverage</b>	12" x 12" area @ 6" spacing
<b>Current</b>	5 µA output
<b>Emitter Points</b>	Tungsten
<b>Indicators</b>	Green power on, red fault (TTL level alarm output)
<b>Technology</b>	Steady-state DC
<b>Temperature</b>	Operating Env: 59-122°F (15-50°C), 20-65% RH (non-condensing)
<b>Voltage</b>	Input: 24 VDC, 0.2A
<b>Enclosure</b>	White polycarbonate
<b>Dimensions</b>	1.3"H x 1.3"W x 4.5"L (3.3 x 3.3 x 11.4 cm)
<b>Weight</b>	Without fan: 0.25 lb (113g), with fan: 0.30 lb (136g)
<b>Certifications</b>	CE 230V, 50 Hz cULus 120V, 60 Hz

\*. Tested in accordance with ANSI/ESD STM3.1-2015.



## Local Area Ionizer with Air Assist fusION™ AA

Simco-Ion's fusION AA Ionizer is capable of controlling electrostatic charge in the local area. The fusION AA delivers powerful electrostatic charge control independent of ambient airflow conditions. Using CDA (clean dry air) at low flow rates the fusION AA will enjoy extended maintenance intervals. fusION AA incorporates miniature power and control circuitry in a compact package. No adjustments or calibration are necessary with Simco-Ion's patented auto balancing technology



### Features

- Air assist connection
- Compact design
- Auto balancing technology
- Visual ionizer status indicator and digital level remote alarm output
- Single power source for multiple fusION ionizers

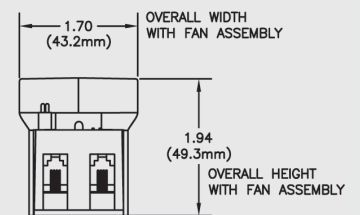
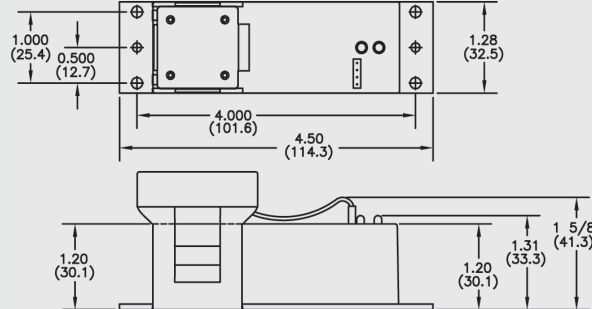
### Benefits

- Provides independent airflow, increasing performance and extending cleaning periods
- Fits into the tight confined spaces of any process tool
- No adjustments needed to maintain the required balance
- Standard features for convenient user operation
- Daisy-chain up to 5 fusION ionizers, ideal for providing ionization protection at multiple locations within a tool

### fusION AA Specifications

<b>Balance</b>	<±50V
<b>Discharge*</b>	<5 sec @ 6" (15 cm) @ 10 psi gas pressure
<b>Distance</b>	Minimum 3" (76 mm) from target surface, application dependent
<b>Cleanliness</b>	ISO 14644 Class 4
<b>Coverage</b>	12" x 12" area @ 6" spacing
<b>Current</b>	5 µA output
<b>Emitter Points</b>	Tungsten
<b>Gas</b>	Clean dry air (CDA) or nitrogen (N <sub>2</sub> ), 0.13" (3.3 mm) ID tubing 5 scfm @ 5 psi to 4 scfm @ 50 psi
<b>Indicators</b>	Green power on, red fault (TTL level alarm output)
<b>Technology</b>	Steady-state DC
<b>Temperature</b>	Operating Env: 59-122°F (15-50°C), 30-65% RH (non-condensing)
<b>Voltage</b>	Input: 24 VDC, 0.075A
<b>Enclosure</b>	White polycarbonate
<b>Dimensions</b>	1.3"H x 1.3"W x 4.5"L (3.3 x 3.3 x 11.4 cm)
<b>Weight</b>	0.25 lb (113g)
<b>Certifications</b>	CE 230V, 50 Hz cULus 120V, 60 Hz

\*. Tested in accordance with ANSI/ESD STM3.1-2015.



## In-line Local Area Ionizer

# In-line fusION™

Simco-Ion's In-Line fusION Ionizer is capable of controlling electrostatic charge in the local area. Applications for In-Line fusION are those found inside process equipment and mini-environments in the semiconductor, flat panel display, pharmaceutical, and medical device industries. It is especially well suited for longer length delivery line applications.

Simco-Ion has developed a DC in-line ionizer that can provide fast decay times through output tubes up to six feet in length. Since the ion-to-ion recombination down the output tube is so limited, the single output tube can be split into multiple tubes each with excellent performance allowing the fusION ionization source to service multiple locations from a single ionization source. Multiple units can be linked together from one 24 VDC power source allowing up to 5 units to be daisy-chained. In-Line fusION can be powered directly from a process tool's 24 VDC power source or by the Simco-Ion fusION power supply kit. This unit comes equipped for use with clean dry air (CDA); however, a nitrogen (N<sub>2</sub>) kit is available.



## Features

- Delivers ions through long tubes
- Compact Design
- Visual ionizer status indicator and digital level remote alarm output
- Single power source for multiple fusION ionizers
- Optional air knife, air ring and N<sub>2</sub> attachments available

## Benefits

- Convenient static control in difficult to access target locations
- Fits into the tight confines of any process tool
- Standard features for convenient user operation
- Daisy-chain, up to 5 In-line fusIONS, perfect for layered in-tool ionization protection



Nitrogen (N<sub>2</sub>) Kit

## Typical Discharge Times

1/8" - Single Output Tube (inside diameter)				
Tube Length	30 psi	15 psi	5 psi	2 psi
6" Tube	0.5 sec	0.8 sec	1.4 sec	2.5 sec
12" Tube	0.8 sec	1.4 sec	2.2 sec	4.0 sec
18" Tube	1.0 sec	2.1 sec	3.5 sec	6.2 sec
24" Tube	1.8 sec	3.2 sec	5.2 sec	9.6 sec
36" Tube	6.0 sec	6.8 sec	10 sec	18 sec
48" Tube	9.5 sec	13 sec	22 sec	40 sec

Offset voltage and discharge time determined as per ANSI/ESD STM3.1 ionization using a 6" x 6", 20 pF plate (charge plate monitor).  
Discharge times are in seconds from 1000-100V.

## In-line fusION Specifications

<b>Balance</b>	<±50V
<b>Coverage</b>	12" x 12" area @ 6" spacing
<b>Cleanliness</b>	ISO 14644 Class 4
<b>Connectors</b>	DC power in/out: 4 position modular, 4-pin "handset type"
<b>Current</b>	5 µA output
<b>Discharge</b>	See discharge times table
<b>Emitter Points</b>	Tungsten
<b>Gas</b>	<b>Connection:</b> In-line gas input/output 1/4" OD, 1/8" ID insulative tubing <b>Flow:</b> 0.8 scfm @ 5 psi to 3.6 scfm @ 50 psi <b>Supply:</b> Clean dry air (CDA) or nitrogen (N <sub>2</sub> )
<b>Indicators</b>	Green power on, red FAULT (TTL level alarm output)
<b>Technology</b>	Steady-state DC
<b>Temperature</b>	Operating Env: 59-122°F (15-50°C), 20-65% RH (non-condensing)
<b>Voltage</b>	Input: 24 VDC, 0.075A Output: ±3500 VDC, 50 mW, 5 µA, Steady-state
<b>Mounting</b>	Integrated mounting flanges accept four #4 or #6 screws
<b>Enclosure</b>	White polycarbonate
<b>Dimensions</b>	2.5"H x 1.5"W x 4.5"L (6.4 x 3.8 x 11.4 cm) includes air connectors
<b>Weight</b>	0.3 lb (136g)
<b>Certifications</b>	CE 230V, 50 Hz UL 120V, 60 Hz

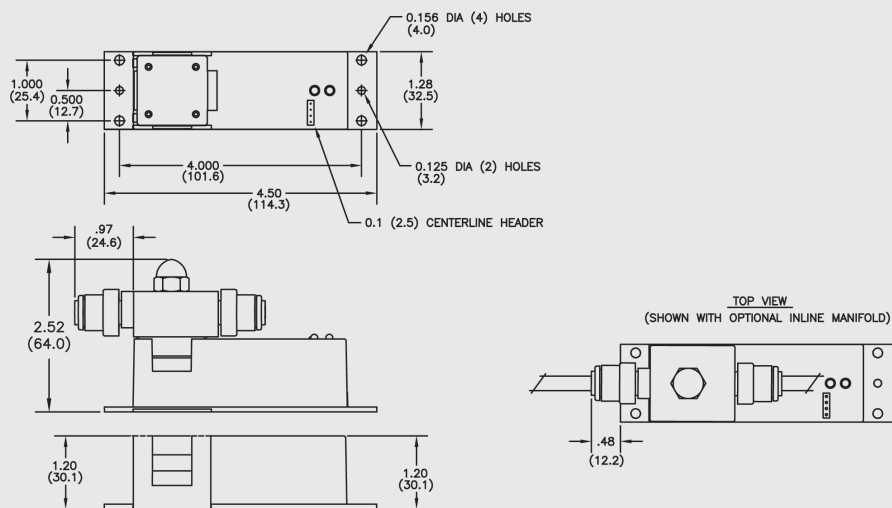
## Other Applications



Air Knife Output Application



Air Ring Output Application





# Micro S / Micro SA

Simco-Ion's ionONE Spot Ionizers are designed for the control of static electricity and charge neutralization for small areas. Typical applications include inside production tools, inspection stations, and conveyor lines when the product to be protected is 3-12" (7-30 cm) distant. The Model Micro S Spot Ionizer is suited for applications where airflow from HEPA filters or fans is present, or when the area to be protected is in close proximity. The Model Micro SA Spot Ionizer uses compressed dry air (CDA) to provide the airflow necessary to ionize a nearby confined area when there is no existing airflow.

Both the Model Micro S and Micro SA provide excellent self-calibrating ion balance. An LED conveniently mounted on the ionizer will indicate the device is powered on.



## Features

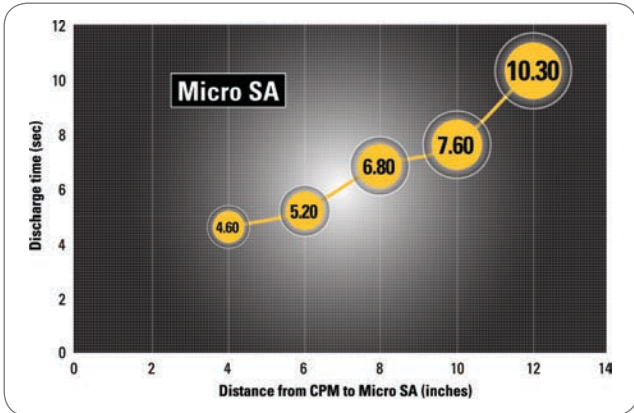
- Compact design
- Self-balancing technology
- Easy maintenance
- Power Indicator status LED
- Air assist version for precise ionized air delivery

## Benefits

- Fits into the tight confines of any process tool or application
- No adjustments needed to maintain the required balance
- Only occasional cleaning of the emitter points is required
- Convenient indication of power applied to the ionizer
- Efficiently delivers ionization to target area

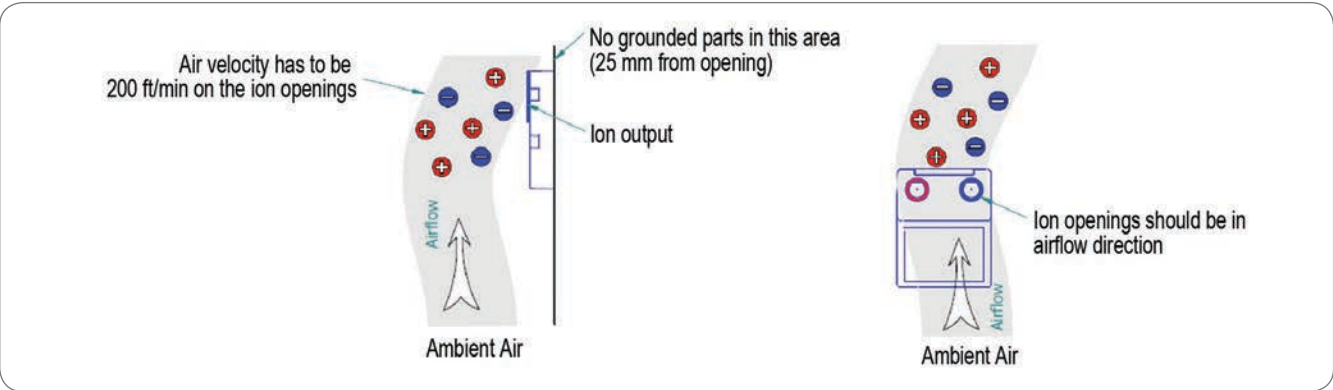


Typical Discharge Times (sec)



Results are for a static charge reduction of 1000-100V, 17 lpm air flow into Micro SA. Testing in accordance with ionization standard ANSI/ESD STM3.1-2006 of the ESD Association. Results may vary depending upon application and environment.

## Placement Recommendation



## ionONE Micro S/SA Specifications

Air	<b>Flow:</b> Ambient 200 ft/min (1.0m/sec) minimum recommended
	<b>Consumption:</b> Micro SA: 10-30 liters/min
Audible Noise	<b>Fitting:</b> 4 mm OD, barbed
	<b>Supply:</b> Clean dry air (CDA)
Balance	Micro S: <±30V, Micro SA: <±20V
Cleanliness	Meets ISO 14644 Class 5 (Fed. Std. 209E Class 100)
Connectors	3 pin modular
Coverage	Micro S: 6" x 6" (150 x 150 mm) @ 3" Micro SA: 6" x 6" (150 x 150 mm) @ 6"
Discharge*	Micro S: <10 sec @ 3" (76 mm) Micro SA: <8 sec @ 6" (150 mm), 20 lpm airflow (min)
EMI	Below background levels (recommended 2" minimum distance)
Emitter Points	Stainless Steel
Indicators	Blue on power, blue off no power
Ozone	<0.05 ppm
Status Output	Facility Monitoring System (FMS) capable
Temperature	Operating Env: 40-122°F (5-50°C), 30-70% RH (non-condensing)
Voltage	Input: Isolated 12 VDC, 30 mA
Mounting	0.24" (6 mm) flange on top & bottom with 2.5 mm mounting holes spaced 1.3" (33 mm) apart (hook & loop adhesive fastener provided)
Enclosure	Polycarbonate-ABS plastic blend
Dimensions	2"L x 1.6"W x 0.65"H (52 x 41 x 16.5 mm) flange adds 0.24" (6 mm) to length on each end, air fitting connection on Micro SA adds 0.40" (10 mm) to length of chassis
Weight	Micro S: 0.56 oz (16g) Micro SA: 0.67 oz (19g)
Certifications	CE cRUUS

\* Tested in accordance with ANSI/ESD STM3.1-2015.

## AC Adaptor Kit



Includes interchangeable US, UK, Europe and China electrical connectors (P/N 14-21244)

