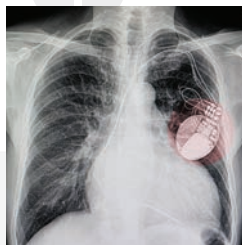
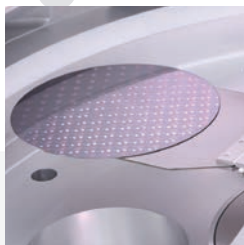
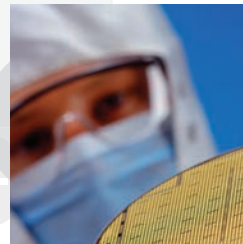
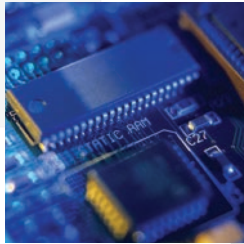


# PRODUCT CATALOG





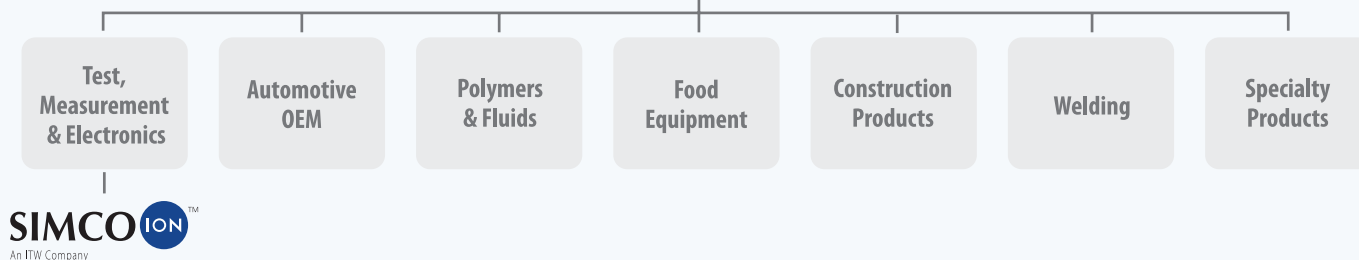
An ITW Company

## WORLDWIDE LEADERS IN STATIC CONTROL



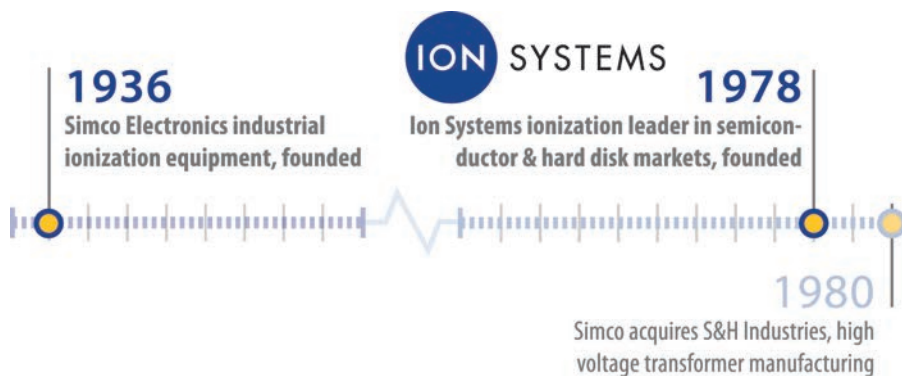
Serving both Industrial and Technology markets and applications, our product lines consist of Static Neutralizing Systems and Bars and Power Supplies, Benchtop and Overhead Blowers, Air Guns and Nozzles, Electrostatic Charging, Sheet/Web Cleaners, Teknek Contact Cleaning Machines, Electrostatic Sensing and Process Environment Monitoring Products, Room Systems and Metering devices.

Simco-Ion is a division of ITW (Illinois Tool Works), a Fortune 200 global diversified industrial manufacturer of value-added consumable and specialty equipment with related service business. ([www.itwinc.com](http://www.itwinc.com), NYSE: ITW)



## OUR HISTORY

Simco-Ion, the world's largest manufacturer of static control components and systems, has been providing solutions to electrostatic issues in a wide range of industries since 1936. Simco-Ion's comprehensive product line incorporates years of research, engineering and field experience.

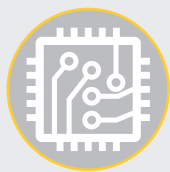




## KEY TECHNOLOGY MARKET SEGMENTS



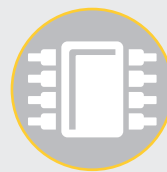
Flat Panel  
Display



Semiconductor  
Front-end



Semiconductor  
Back-end



General  
Electronics



Life  
Sciences

## KEY OFFERINGS

### EXPERTISE

Expert workflow  
analysis to compliance  
process reviews

### NETWORK

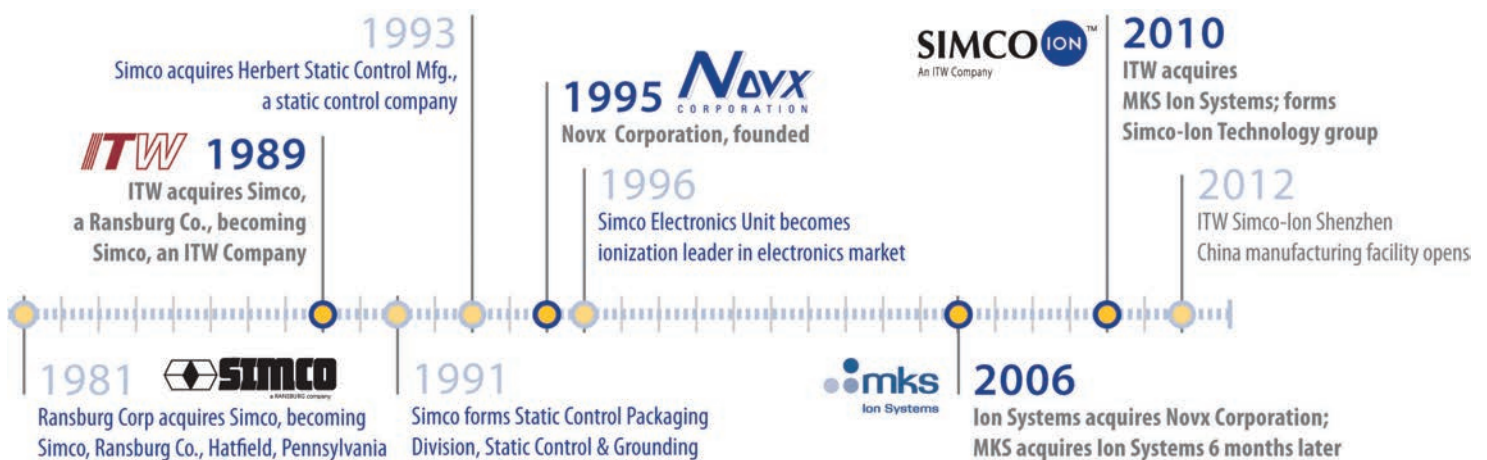
Worldwide  
distribution network

### TURNAROUND

Fast 24-hour  
shipping of stocked  
products

### R&D

Continuing  
commitment to new  
product development



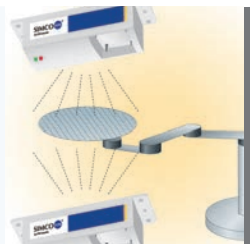
# Contents



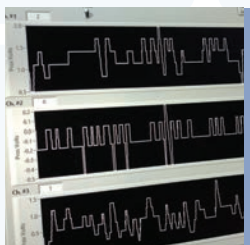
**IONIZING BLOWERS**  
**1 – 26**



**IONIZING BARS**  
**27 – 38**

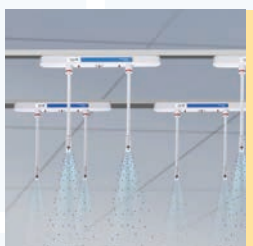


**SPECIAL APPLICATION IONIZERS**  
**39 – 56**



**ELECTROSTATIC MONITORING**  
**57 – 64**





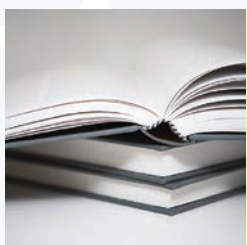
**ROOM SYSTEM**  
**65 – 68**



**INSTRUMENTATION**  
**69 – 72**



**CARTRIDGES, GUNS, NOZZLES**  
**73 – 80**



**REFERENCE & INDEX**  
**81 – 88**

## Critical Environment Benchtop Blower

# Model 5802i

The Simco-Ion Critical Environment Benchtop Blower Model 5802i provides reliable, fast static charge control for benchtop work areas and small spaces, allowing optimal electrostatics management that minimizes cost and maximizes protection for ESD-sensitive areas. An internal automatic balance correction system ensures ionization continues to reach the target with complete accuracy presenting a significant time and cost savings.

Model 5802i can operate with external sensors to maintain better than  $\pm 1V$  balance by altering ion output and adapting to environmental changes. With the optional sensor and collimator, it delivers precisely balanced and directed ionized air to the target without taking up valuable room in the environment.

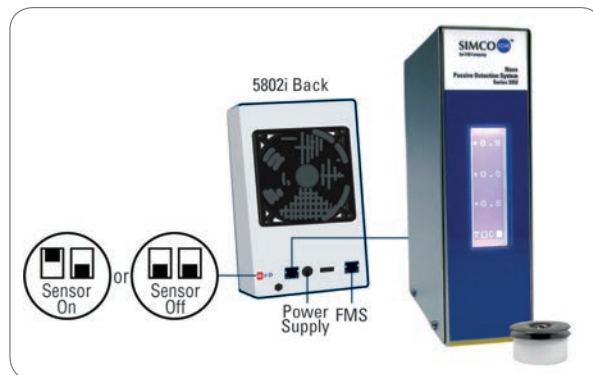


### Features

- $\pm 3V$  or better balance  $\pm 1V$  with the optional external feedback system
- Cleanliness rated at ISO 14644 Class 4 (Fed Std. 209E Class 10)
- Options for sensor input, FMS connection, alarms, and management control
- Unique airflow directing collimator option
- Auto-clean system option
- Provides the best corona-based ESD protection for maximizing yields

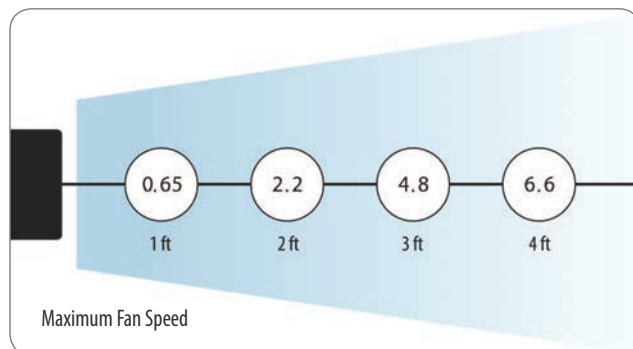
### Benefits

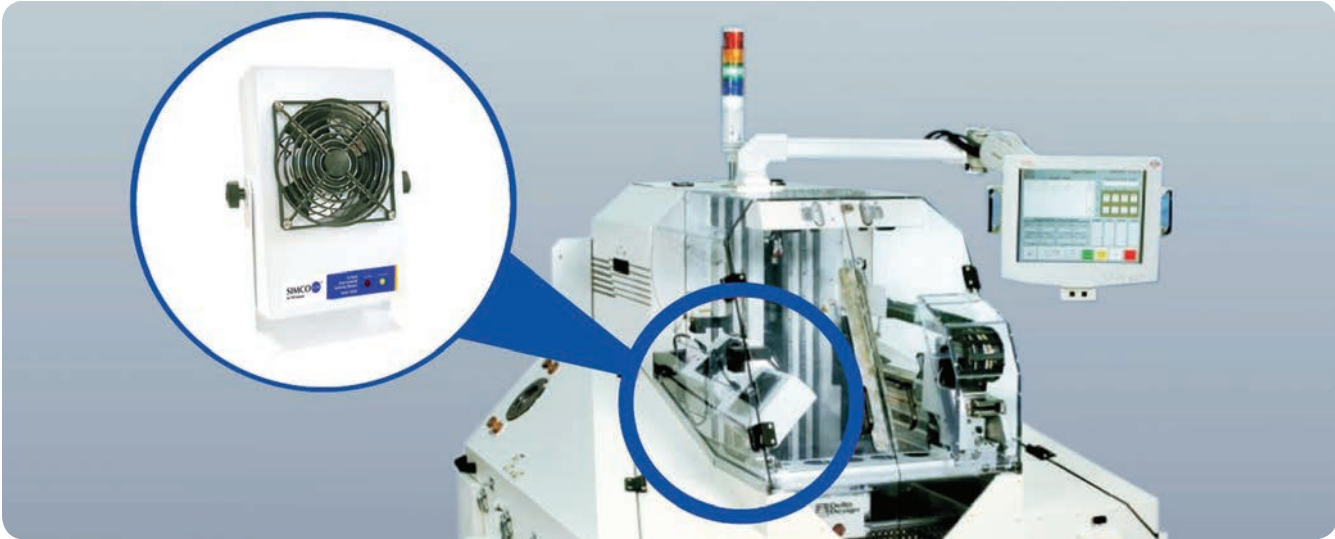
- Designed for use in an environment with a controlled level of contamination
- Increased control with immediate notification of alarms; prevention of unauthorized adjustment power/fan speed
- Significantly improves airflow delivery with faster discharge times from greater distances
- Automates emitter point cleaning, reducing maintenance costs and time



5802i can operate with a Novex 3352, 3362 or 7000 to control its offset voltage at  $\pm 1V$  or better performance

### Typical Discharge Times (sec)





## 5802i Specifications

|                       |  |
|-----------------------|--|
| <b>Airflow</b>        | 108 cfm (typ)  |
| <b>Audible Noise</b>  | 61 dB (typ) fan high, 52 dB (typ) fan low (measured 1' front of blower)  |
| <b>Balance</b>        | Better than $\pm 1V$ (typ) with external sensor, $\pm 3V$ (typ) without sensor   |
| <b>Cleanliness</b>    | Meets ISO 14644 Class 4 (Fed Std. 209E Class 10)   |
| <b>Controls</b>       | Power/fan speed slide switch with off/low/high (optional preset fixed high speed), balance adjust, optional sensor gain adjust, sensor type selection, FMS connections |
| <b>Discharge*</b>     | Better than 1 sec @ 1' (1000-100V) with collimator, better than 2 sec @ 1' (typ) without collimator (measured in-line from center of fan)                              |
| <b>Emitters</b>       | Titanium (8 per fan), ISO 14644 Class 4 (Fed. Std. 209E Class 10)  |
| <b>Indicators</b>     | Green power, red fault with optional audible alarm   |
| <b>Technology</b>     | Steady-state DC  |
| <b>Temperature</b>    | Operating Env: 50-90°F (10-32°C), 30-70% RH (non-condensing)   |
| <b>Options</b>        | External sensor inputs with FMS connection, audible alarm, collimator, internal preset fan speed on high, power cord bracket, auto-clean system                        |
| <b>Ozone</b>          | 0.008 ppm (typ)  |
| <b>Voltage</b>        | 24 VDC   |
| <b>Enclosure</b>      | Aluminum chassis with epoxy-polyester powder coat  |
| <b>Mounting</b>       | Tilt lock mounting stand with optional wall mount bracket  |
| <b>Dimensions</b>     | 10.5"H x 7.6"W x 5"D (26.7 x 19.3 x 12.7 cm)   |
| <b>Weight</b>         | 3 lbs (1.36 kg)  |
| <b>Certifications</b> | CE, RoHS, REACH, UL, IEC   |

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

### Directed Airflow

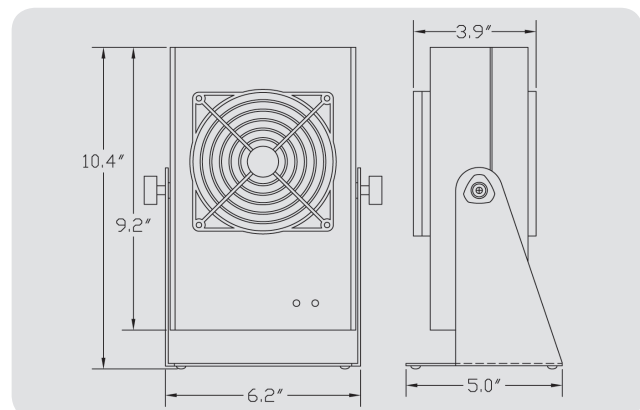
The optional collimator fits over the fan stack of the blower and directs ionized air straight to the target so that it can be placed further away from the target with continued excellent discharge times. This significantly improves discharge times by removing common ion disbursement and recombination problems.

### $\pm 1V$ Balance Performance

The Model 5802i ionizer's optional external feedback sensor operates with the Novx 7000 Process Monitor and with the Novx 3352 Passive or Novx 3362 Active Closed-loop Ionizer Controllers to detect and automatically correct the balance. With the antenna placed at the target area, feedback is sent to the Model 5802i blower's internal control system. This ensures that your target maintains a  $\pm 1V$  or better balance at all times.

### Adaptable Options

- An internally preset fan speed on high, ensuring uninterrupted delivery of ionization in critical work areas
- An audible alarm can operate with the visible red LED on the blower to indicate operational failures including a stopped fan or loss of ionization
- The auto-clean system reduces maintenance periods by sweeping the emitter points when the blower is turned off and on, allowing the blower to continually perform at optimum ion output and balance



## Critical Environment Overhead Ionizer

# Model 5810i

The Simco-Ion Critical Environment Overhead Ionizer Model 5810i is designed to provide industry-leading balanced ionization performance in cleanroom environments. It is certified for use in ISO 14644 Class 4 cleanrooms. It can operate with external sensors to maintain precise balance (better than  $\pm 1V$ ) by altering ion output and adapting to environmental changes. With the reliability of steady-state DC and the established method for eliminating the effects of ESD and ESD-induced electromagnetic interference (EMI) in high-tech facilities, it delivers maximum ion output where and when needs it.

Designed with silicone-free air bearing fans to ensure complete compatibility with the operating conditions in today's cleanrooms. Each fan inside is engineered for cleanliness and sealed off from the rest of the chassis to meet critical cleanroom requirements. Ionizers that don't match these quality standards risk contaminating manufacturing processes and possibly reducing product yields.

Model 5810i is daisy-chainable in series, up to 10 units, using the female AC outlet provided on one end.



### Features

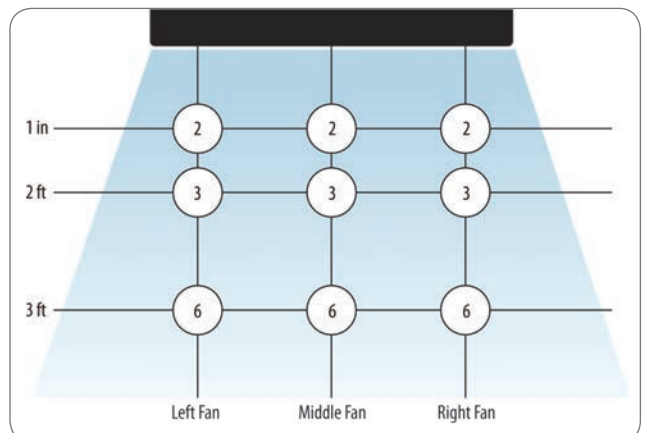
- $\pm 3V$  or better ( $\pm 1V$  with the optional external feedback system)
- Cleanliness rated at ISO 14644 Class 4 (Fed. Std. 209e Class 10)
- Options for sensor input, FMS connection, alarms, and management control
- Auto-Clean System option

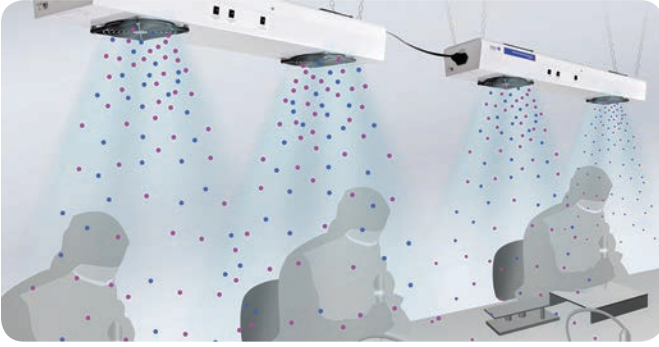
### Benefits

- Provides the best corona-based ESD protection for maximizing yields
- Designed for use in an environment with a controlled level of contamination
- Increased control with immediate notification of alarms and the prevention of unauthorized adjustment to power or fan speed
- Automated emitter point cleaning for reduced maintenance cost and time



### Typical Discharge Times (sec)





## 5810i Specifications

|                       |  |
|-----------------------|--|
| <b>Airflow</b>        | 108 cfm per fan (typ)  |
| <b>Audible Noise</b>  | 61 dB (typ) fan high, 52 dB (typ) fan low (measured 1' below fan)  |
| <b>Balance</b>        | ±3V or better balance (±1V with optional external feedback system)   |
| <b>Cleanliness</b>    | Meets ISO 14644 Class 4 (Fed Std. 209E Class 10)   |
| <b>Controls</b>       | Balance adjust trimpot (1/fan), 3-position fan switch (high/low/off)/fixed speed, sensor gain trimpot (optional 1/fan), sensor type/no sensor slide switch |
| <b>Discharge*</b>     | ±1000-100V @ <3 sec fan high measured 18" from blower  |
| <b>Emitters</b>       | ISO 14644 Class 4 (Fed. Std. 209e Class 10) titanium, 8 per fan  |
| <b>Indicators</b>     | Green power, red fault with optional audible alarm   |
| <b>Ozone</b>          | 0.02 ppm or less   |
| <b>Technology</b>     | Steady-state DC  |
| <b>Temperature</b>    | Operating Env: 50-90°F (10-32°C), 30-70% RH (non-condensing)   |
| <b>Voltage</b>        | Input: 100-240 VAC (±10%), 50/60 Hz<br>Output: 100-240 VAC, 50-60 Hz unfused, 5A max   |
| <b>Enclosure</b>      | Aluminum chassis with epoxy-polyester powder coat  |
| <b>Mounting</b>       | Eye-bolts/S-hooks provided (U-shape bracket available)   |
| <b>Dimensions</b>     | 3.8"H x 6.1"D x 32"L (9.6 x 15.5 x 81.3 cm), 3.8"H x 6.1"D x 40"L (9.6 x 15.5 x 101.6 cm), 3.8"H x 6.1"D x 44"L (9.6 x 15.5 x 111.8 cm)                    |
| <b>Weight</b>         | Aluminum 44" blower 10.3 lbs (4.6 kg)  |
| <b>Certifications</b> | CE, ATEX, IECEx, UL, ENEC  |

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

## ±1V Balance Performance

The Model 5810i ionizer's optional external feedback sensor operates with the Novx 7000 Process Monitor and with the Novx 3352 Passive or Novx 3362 Active Closed-loop Ionizer Controllers to detect and automatically correct the balance. With the antenna placed at the target area, feedback is sent to the Model 5810i blower's internal control system. This ensures that your target maintains a ±1V or better balance at all times.



## Fan Speed Choices

The 5810i was designed specifically for use in cleanrooms up to and including ISO 14644 Class 4 (Fed. Std. 209(e) Class 10) in cleanliness. To minimize disruption of laminar airflow, the unit has a 3-position fan setting that optimizes static discharge performance with the smallest volume and velocity of airflow.

## Factory Monitoring System

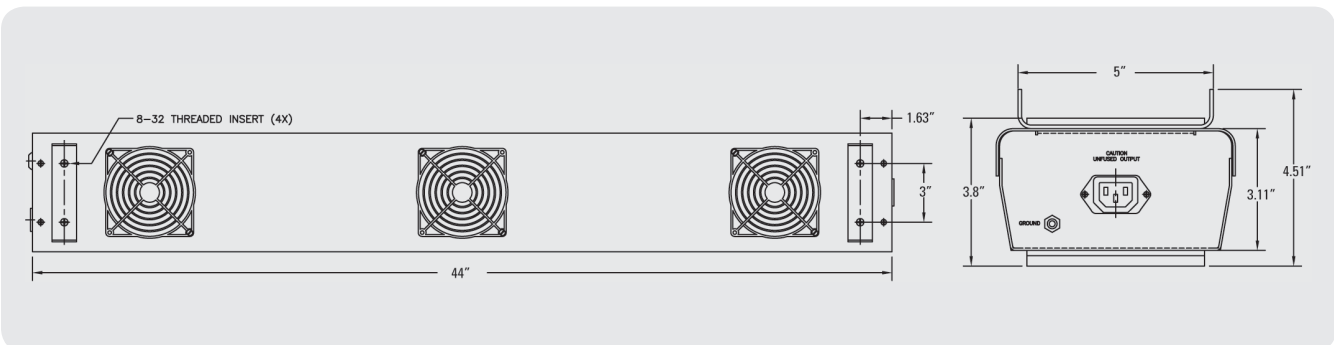
The blower includes an LED alarm light that indicates a range of possible conditions, including the absence of ionization or a stopped fan. An optional audible alarm is available. The optional Facility Monitoring System (FMS) feature provides an industry-standard 4-20 mA signal output for remotely monitoring error detection.

## Auto-clean System

The optional Auto-clean System is an automated feature that provides reduced operating costs due to lower maintenance. It features a brush mechanism that sweeps the emitter points when the blower is turned off and on, allowing the Model 5810i to continually perform at optimum ion output and balance.

## Daisy-chain Connections

The Model 5810i blower may connect with up to 10 other Model 5810i blowers (daisy-chain) in series using the female AC outlet provided on one end of the blower. Up to 10 blowers may be connected together.





## Critical Environment In-tool Ionizer

# Model 5822i

The compact design of the Critical Environment In-tool Ionizing Blower Model 5822i is designed to meet small-footprint ionizer requirements in automated process tools, offering exceptional performance in hard disk drive manufacturing and back-end semiconductor environments. The ionizer maintains a  $\pm 3V$  or better balance standard and exceptional  $\pm 1V$  with the optional external feedback system. An internal, automatic balance correction system ensures the target is ionized accurately, presenting significant reduction in calibration and maintenance time resulting in cost savings. A collimator installed over the fan directs precisely balanced ionized air to the target without taking up valuable room in the environment.

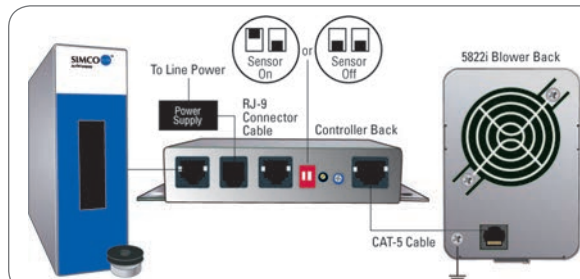


### Features

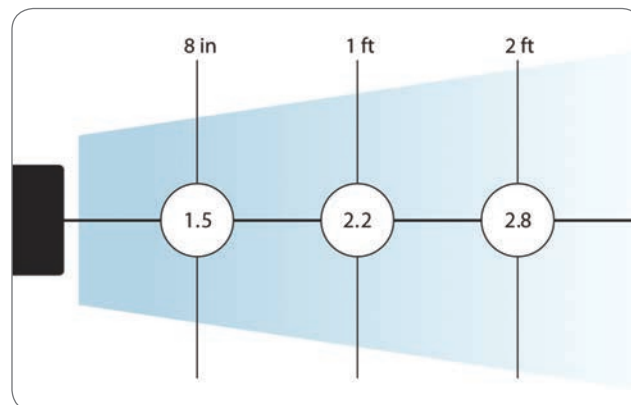
- $\pm 3V$  or better  $\pm 1V$  with the optional external feedback system
- Facility Monitoring System (FMS) connection and audible alarm
- Separate control box
- Cleanliness rated at ISO 14644 Class 4 (Fed. Std. 209e Class 10)

### Benefits

- Provides the best corona-based ESD critical environment protection available for maximizing yields
- Faster response to ionization failure with notification through tool or FMS
- Allows the blower to be situated close to the target area for fast electrostatic discharge
- Designed for use in an environment with a controlled level of contamination



### Typical Discharge Times (sec)







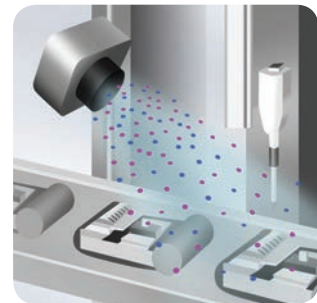
## ±1V Balance Performance

The Model 5822i ionizer's optional external feedback sensor operates with the Novx 7000 Process Monitor and with the Novx 3352 Passive or Novx 3362 Active Closed-loop Ionizer Controllers to detect and automatically correct the balance. With the antenna placed at the target area, feedback is sent to the Model 5822i blower's internal control system. This ensures that your target maintains a  $\pm 1V$  or better balance at all times, no matter what environmental variables exist.



## Directed Airflow

The collimator fits over the air outlet of the blower and directs ionized air straight to the target. This means that the blower can be placed further away from the target with continued excellent discharge times and good performance at extended distances. This faster, directed airflow method improves ion and static elimination, significantly minimizing ion recombination.



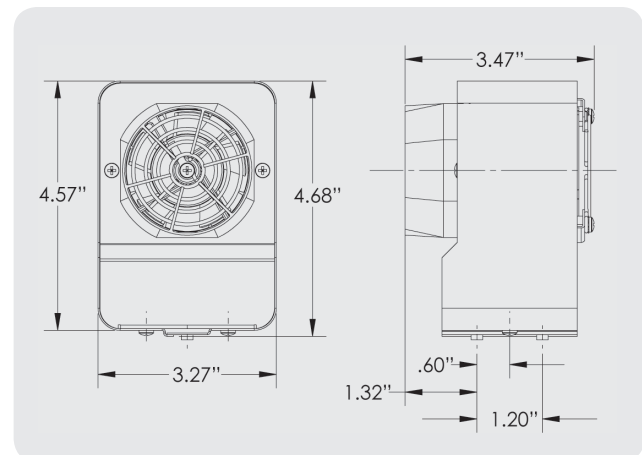
## 5822i Specifications

|                       |   |
|-----------------------|---|
| <b>Airflow</b>        | 20.5 cfm (typ)  |
| <b>Audible Noise</b>  | <56 dB (typ), measured 1' from blower   |
| <b>Balance</b>        | $\pm 3V$ or better balance ( $\pm 1V$ with optional external feedback system)                                   |
| <b>Cleanliness</b>    | Meets ISO 14644 Class 4 (Fed Std. 209E Class 10)  |
| <b>Controls</b>       | Balance adjust, sensor gain adjust, slow/off/fast fan switch, variable slow fan speed                           |
| <b>Discharge*</b>     | 2-2.5 sec @ 1' ( $\pm 1000V$ -100V) measured in-line from center of fan   |
| <b>Emitters</b>       | Tungsten alloy, 8 per blower (titanium optional)  |
| <b>Indicators</b>     | Control Box: green power, red fault   |
| <b>Technology</b>     | Steady-state DC   |
| <b>Temperature</b>    | Operating Env: 50-95°F (10-35°C), 30-65% RH (non-condensing)  |
| <b>Voltage</b>        | 24 VDC @ 1A ext power supply (100-240 VAC 50/60 Hz) or tool power   |
| <b>Enclosure</b>      | Stainless steel   |
| <b>Mounting</b>       | 2 mounting screw holes bottom of blower 1.20" (3.05 cm) apart   |
| <b>Dimensions</b>     | Blower: 4.5"H x 3.3"W x 2.4"D (11.5 x 8.3 x 6.1 cm)<br>Control Box: 1.0"H x 5.2"W x 2.4"D (2.5 x 13.2 x 6.0 cm) |
| <b>Weight</b>         | Blower: 1.14 lbs (0.51 kg)<br>Control Box: 0.56 lbs (0.25 kg)   |
| <b>Certifications</b> | CE, RoHS, REACH   |

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

## Control Box

The modular remote control box was developed to accommodate limited tool footprints. The control box connects to the optional Novx 7000 Process Monitor and with the Novx 3352 Passive or Novx 3362 Active Closed-loop Ionizer Controllers and common FMS (Facility Monitoring System) interfaces. This allows the ionizer to be installed into tight, hard-to-reach spaces.



## Critical Environment Benchtop Blower Model 5832

Model 5832 Critical Environment Benchtop Blower provides reliable, fast static charge control for benchtop work area and small spaces, allowing optimal electrostatics management that minimizes cost and maximizes protection for ESD-sensitive areas. The ionizer can operate with an external sensor to maintain precise balance (better than  $\pm 1V$ ) by altering ion output and adapting to environmental changes. With the optional remote sensor or Novx feedback/control, the Model 5832 delivers precisely balanced and directed ionized air to your target without taking up valuable room in your environment. A greater concentration of emitter points and internal circuitry suited for high humidity applications makes the Model 5832 the standard choice for environments that need quality ESD protection with a solid design.

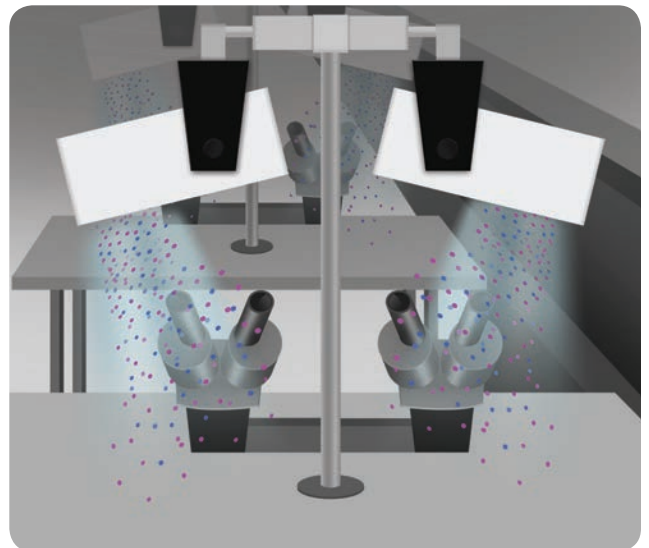


### Features

- $\pm 3V$  or better balance ( $\pm 1V$  with the optional external feedback system)
- Cleanliness rated at ISO 14644 Class 4 (Fed. Std. 209e Class 10)
- Options for sensor input, FMS connection, alarms, and management control
- Auto-Clean System

### Benefits

- Provides the best corona-based ESD protection for maximizing yields
- Designed for use in an environment with a controlled level of contamination
- Increased control with immediate notification of alarms and the prevention of unauthorized adjustment to power or fan speed
- Automates emitter point cleaning, reducing maintenance costs and time



## 5832 Specifications

|                       |   |
|-----------------------|---|
| <b>Airflow</b>        | 129 cfm (typ)   |
| <b>Audible Noise</b>  | High fan speed 61 dB (typ), low fan speed 52 dB (typ), measurements taken 12" (30.5 cm) from fan                      |
| <b>Balance</b>        | <±1V (typ) with external sensor, ±3V (typ) without sensor   |
| <b>Cleanliness</b>    | Meets ISO 14644 Class 4 (Fed Std. 209E Class 10)  |
| <b>Controls</b>       | Power/fan speed DIP switch with 4 speed/velocity settings, balance adjustment, sensor type selection, FMS connections |
| <b>Discharge*</b>     | (±1000-100V) <2 sec @ 1 ft (typ), taken in-line from the center of the fan  |
| <b>Emitter Points</b> | Titanium, 8 per fan   |
| <b>Indicators</b>     | Green power on, red fan stall, red fault with optional audible alarm  |
| <b>Temperature</b>    | Operating Env: 50-90°F (10-32°C), 30-70% RH (non-condensing)  |
| <b>Options</b>        | External sensor inputs with FMS connection, audible alarm   |
| <b>Ozone</b>          | 0.005 ppm (typ)   |
| <b>Mounting</b>       | Tilt lock mounting stand  |
| <b>Technology</b>     | Steady-state DC (corona discharge)  |
| <b>Voltage</b>        | Input: 24 VDC (470 mA max)  |
| <b>Enclosure</b>      | Aluminum chassis with epoxy-polyester powder coat   |
| <b>Dimensions</b>     | 7.27"H x 5.12"W x 2.76"D (18.5 x 13 x 7.0 cm)   |
| <b>Weight</b>         | 2.2 lb (1 kg)   |
| <b>Certifications</b> | CE, UL, IEC, RoHS   |

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

## Adaptable Options

### ±1V Balance Performance

The Model 5832's optional external feedback sensor operates with the Novx 7000 Process Monitor and with the Novx 3352 Passive or Novx 3362 Active Closed-loop Ionizer Controllers to detect and automatically correct the balance. With the antenna placed at the target area, feedback is sent to the Model 5832 blower's internal control system (RJ Connector). This ensures that your target maintains a ±1V or better balance at all times.



### Remote Antenna

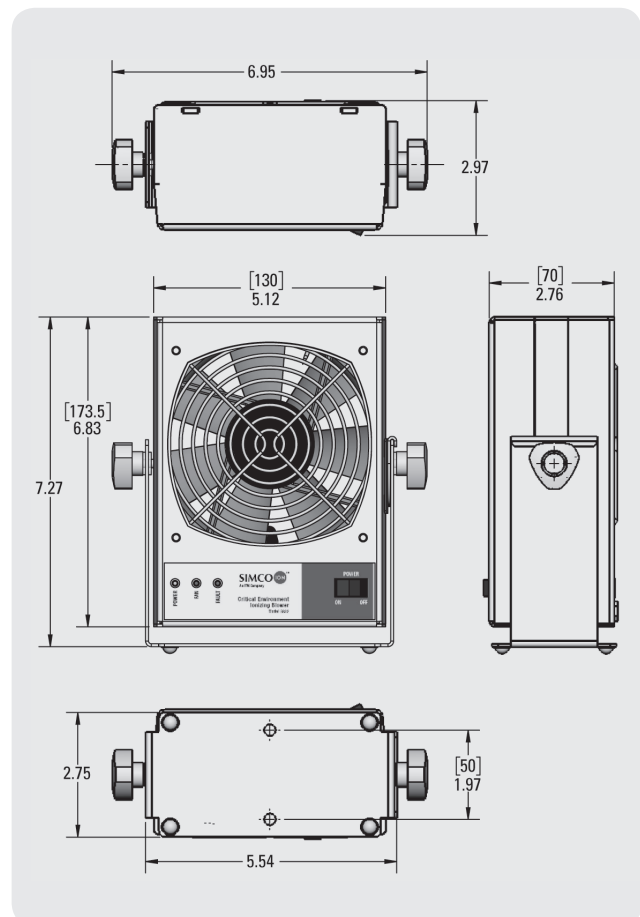
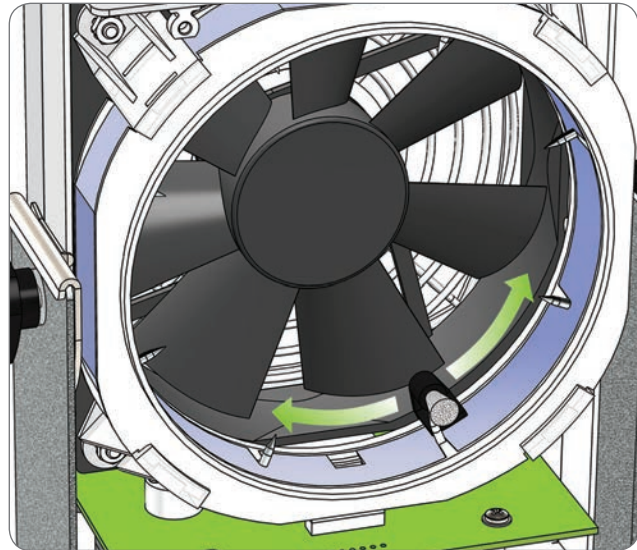
The Model 5832 can be ordered and operated with the remote antenna option which allows any of the standard Novx Passive Antenna assemblies to be connected directly to the 5832 (SMA connector).

### Audible Alarm Option

An audible alarm that operates in addition to the visible array of 3 each LED's on the front of the blower indicate operational failures including a stalled fan or loss of ionization.

## Auto-Clean System

The Auto-clean System reduces maintenance periods by sweeping the emitter points in both directions when the blower is turned on and off or on a preset time interval or user activated through the Facility Monitoring System (FMS).



## Point-of-Use, In-tool Ionizing Blower

# Model 6422e / 6422e-AC

The Simco-Ion's Point-of-Use Ionizing Blower Model 6422e is the most efficient small blower of its kind for controlling static discharge in hard-to-reach areas. In the tight confinement of process tools, ionization must be easy and cost-effective but carry the same level of sophistication found in larger ionizers. The model 6422e meets the challenge of cost and features that process demands by delivering worry-free ionization. It utilizes IsoStat® technology, making it the most reliable blower of its kind.

The Model 6422e-AC incorporates our auto-clean system that cleans the emitter points each time the unit power down. Automated cleaning reduces maintenance time, extends emitter point life and assures balanced performance.

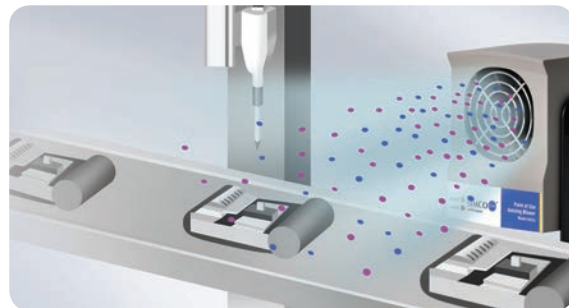


### Features

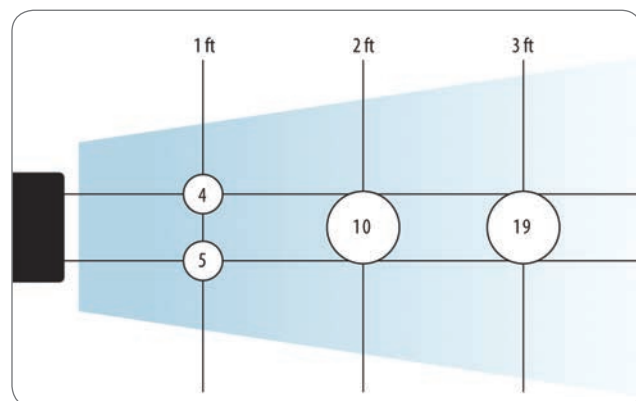
- IsoStat technology
- Small form factor available in Steady-state DC ion emission blowers
- 24 VDC or 24 VAC input
- Fan-stall indication and alarm output
- Facility Monitoring System (FMS) interface
- Operational failure alarm
- U-bracket mounting
- Auto-clean system

### Benefits

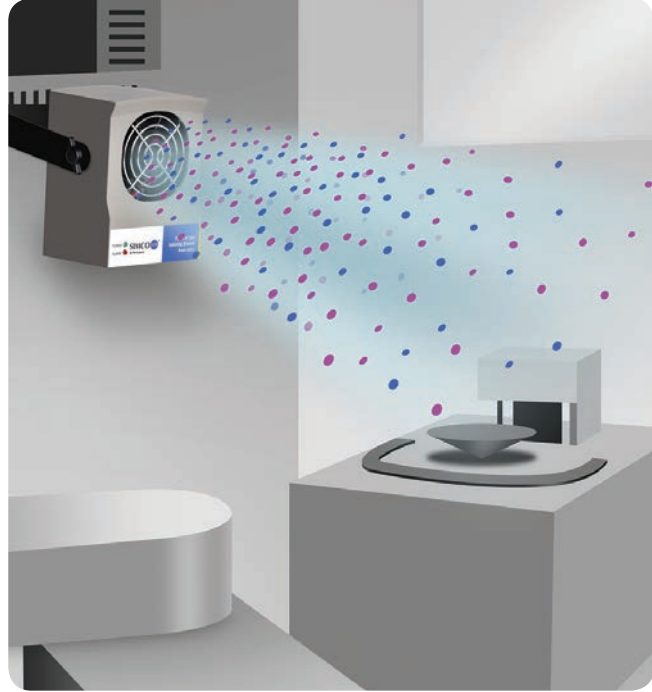
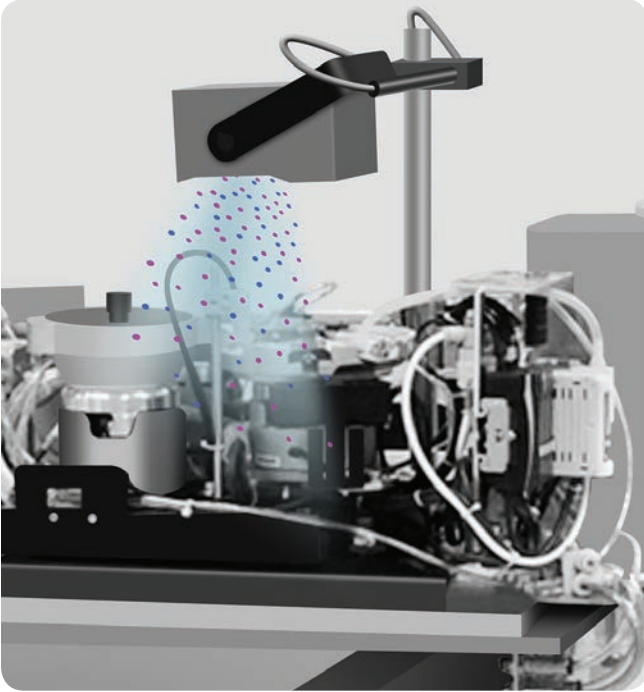
- Intrinsically balanced; no calibration needed
- Offers fast discharge times in confined areas
- Can connect directly to either equipment's power source or wall power
- Faster response to failure with notification
- Immediate notification if the fan stops rather than continue operations without ionization
- Flush or angled mounting means the blower will reach constrained spaces
- Reduced maintenance time, longer emitter point life, and assured balanced performance



### Typical Discharge Times (sec)







## Power Options

The Model 6422e blower may be powered by 24 VAC or 24 VDC, from power supplies or directly from process equipment to fit your application.

- 24 VAC or 24 VDC Input power
- DC or with other 24 VDC source

## 6422e / 6422e-AC Specifications

|                       |  |
|-----------------------|--|
| <b>Airflow</b>        | 23 cfm (typ)   |
| <b>Balance</b>        | ±20V @ 1' (30 cm)  |
| <b>Cleanliness</b>    | Meets ISO 14644 Class 5 (Fed Std. 209E Class 100)  |
| <b>Discharge*</b>     | <4 sec @ 1' (1000-100V) 24 VAC (<5 sec @ 1' 24 VDC)  |
| <b>Emitters</b>       | Tungsten wire, internally shielded   |
| <b>Indicators</b>     | Green power, red alarm   |
| <b>Technology</b>     | Steady-state DC  |
| <b>Temperature</b>    | Operating Env: 50-95°F (10-35°C), 20-60% RH (non-condensing)   |
| <b>Ozone</b>          | <0.004 ppm (typ)   |
| <b>Voltage</b>        | Input: 24 VDC (±10%) 6W max or 24 VAC (±10%) 50-60 Hz 6W max<br>Output: 5-6 kV at emitter points                         |
| <b>Mounting</b>       | U-bracket, factory installed   |
| <b>Dimensions</b>     | 4.95"H x 4.10"W x 2.48"D (125 x 104 x 63 mm) with bracket<br>4.36"H x 3.26"W x 2.48"D (111 x 83 x 63 mm) without bracket |
| <b>Weight</b>         | 12.7 oz (357g) with bracket, 11.2 oz (314g) without bracket  |
| <b>Certifications</b> | CE, RoHS, REACH, IEC, UL   |

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

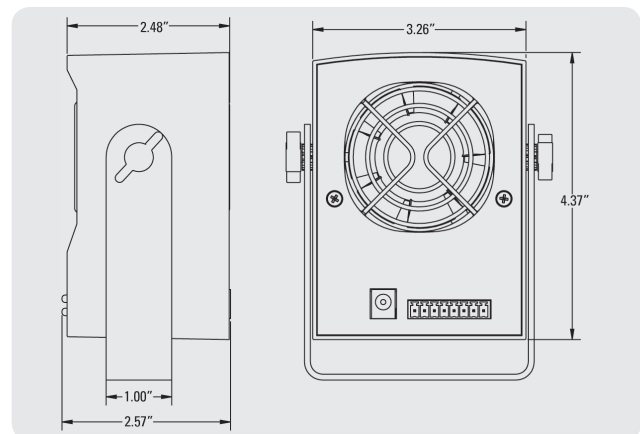
## Auto-Clean System

The Auto-Clean System features a brush mechanism that sweeps the emitter points when the blower is turned off and on, which significantly reduces the need for manual cleaning. Simco-Ion recommends activating the Auto-Clean System at least once a week. Cleaning schedules will vary depending on environmental conditions.



## Enhanced Capabilities

An alarm LED on the front indicates a high voltage circuitry failure and a five-pin facility monitoring system (FMS) interface is on the rear of the blower, which provides a 4-20 mA current loop and relay output connection. With a 24 VDC input connection, the FMS output is situated on a convenient terminal block, designed for easy integration.



## Compact, In-tool or Focused Coverage Blower

# Model 6432e

Simco-Ion's Point-of-Use Ionizing Blower Model 6432e controls static discharge in assembly, inspection and packaging areas. The Model 6432e can also be used in-tool to control static build-up problems such as product contamination, material mishandling or microprocessor lock-up.

IsoStat technology provides several useful benefits for the 6432e blower. It's small size and ability to operate in balance without grounding wires or cables allows easy and quick installation and setup. The blower's internal emitter points are electrostatically shielded to eliminate field-induced charging. Steady-state DC operation provides fast discharge with low airflow for greater operator comfort.

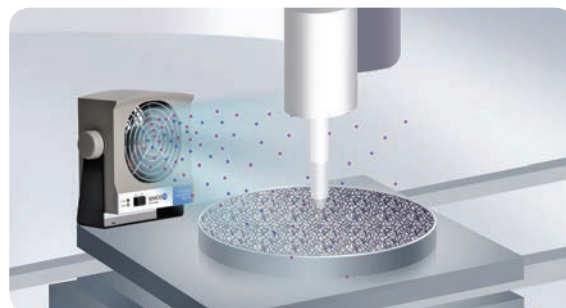


### Features

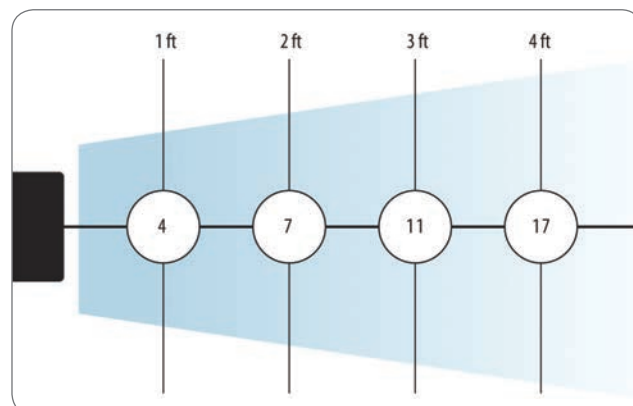
- IsoStat technology
- Steady-state DC ion emission
- 24 VDC or 24 VAC input power
- Facility Monitoring System (FMS) interface
- Operational failure alarm
- Small footprint design with in-tool stand or benchtop stand

### Benefits

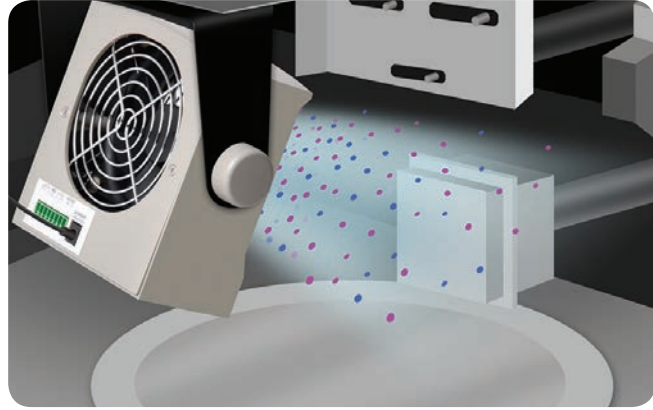
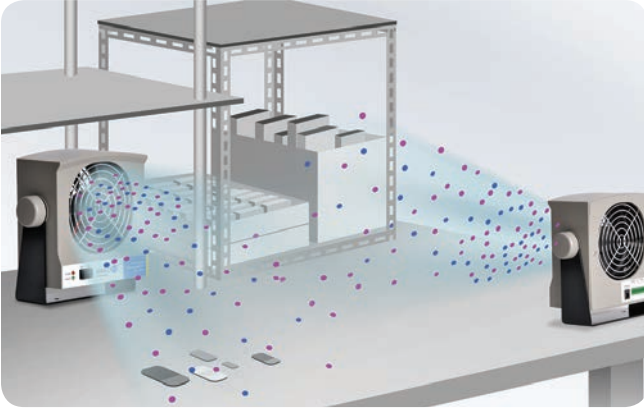
- Intrinsically balanced; no calibration needed
- Minimum ion recombination provides maximum static control
- Convenient power options, well-provided AC or tool-provided DC
- Faster response to ionization failure with notification through tool or facility monitoring system
- Provides visual notification of any operational failures
- Occupies little work or tool space, cleanroom-compatible (minimizes disruption of laminar flow)



### Typical Discharge Times (sec)



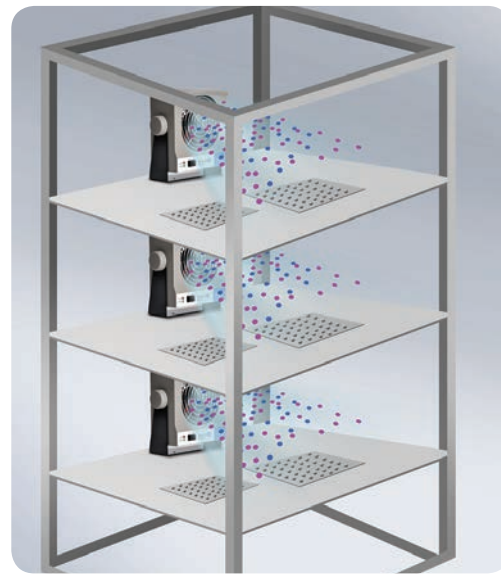




## 6432e Specifications

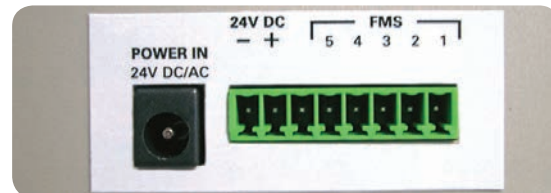
|                       |  |
|-----------------------|--|
| <b>Airflow</b>        | 49 cfm (typ)   |
| <b>Balance</b>        | ±20V @ 1' (30 cm)  |
| <b>Cleanliness</b>    | Meets ISO 14644 Class 5 (Fed Std. 209E Class 100)  |
| <b>Discharge*</b>     | <4 sec @ 1' (1000-100V) 24 VAC (<5 sec @ 1' 24 VDC)  |
| <b>Emitters</b>       | Tungsten wire, internally shielded   |
| <b>Indicators</b>     | Power green, red fault   |
| <b>Ozone</b>          | <0.005 ppm (typ)   |
| <b>Technology</b>     | Steady-state DC  |
| <b>Temperature</b>    | Operating Env: 150-95°F (10-35°C), 20-60% RH (non-condensing)  |
| <b>Voltage</b>        | 24 VDC (±10%) 6W max, 24 VAC (±10%) 50-60 Hz 6W max  |
| <b>Mounting</b>       | 1.8" x 5.1" (45 x 129 mm) small bracket, 4.1" x 5.1" (108 x 129 mm) large bracket (both with 1/4" mounting hole & 10-32 truss head screws) |
| <b>Dimensions</b>     | 5.3"H x 5.0"W x 2.5"D (133 x 127 x 63 mm), 1.8" (45 mm) small bracket, 1.8" (45 mm) small bracket, 4.1" (108 mm) large bracket             |
| <b>Weight</b>         | 21 oz (595g) with stand  |
| <b>Certifications</b> | CE, ATEX, IECEx, UL, ENEC  |

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



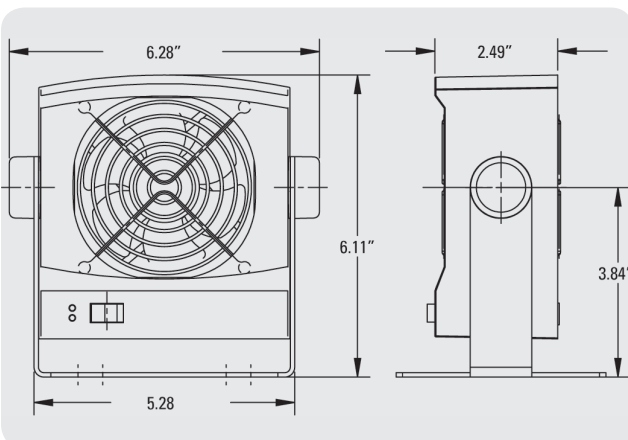
## Enhanced Features

An alarm LED on the front indicates a high voltage circuitry failure and a five-pin facility monitoring system (FMS) interface is on the rear of the blower, which provides a 4-20 mA current loop and relay output connection. With 24 VDC input connection, the FMS output is situated on a convenient terminal block, designed for easy integration.



## Power Options

For increased flexibility, the Model 6432e Blower can be directly powered by process equipment or 24 VDC/VAC power to fit the needsof your environment. Input power: for 100-120 VAC, use transformer #14-1420-01; for 230 VAC, use #14-1430-01; for DC, use #14-1322 (with other 24 VDC source (performance may be reduced).



## General Electronics Benchtop Blower

# Model 6832

The Simco-Ion General Electronic Blower Model 6832 provides reliable, fast static charge control for benchtop work areas or mounted in confined spaces, allowing optimal electrostatics management that minimizes cost and maximizes protection for ESD-sensitive areas. An internal automatic balance control system ensures ionization continues to reach your target with complete accuracy presenting a significant time and cost savings.

Model 6832 delivers precisely balanced and directed ionization to your target without taking up valuable room in your environment. A greater concentration of emitter points and internal circuitry suited for high humidity applications makes the Model 6832 the standard choice for environments that need quality ESD protection with a proven design.



### Features

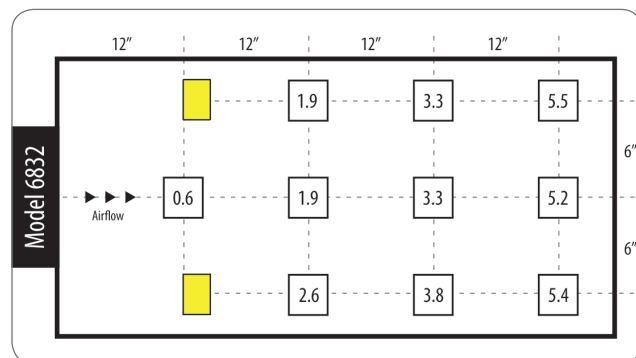
- IsoStat technology
- Cleanliness rated at ISO 14644 Class 4 (Fed. Std. 209e Class 10)
- FMS connection and alarms for management control
- Manual emitter point cleaning system
- Small footprint @ 60 mm depth

### Benefits

- Provides the best corona-based ESD protection for maximizing yields
- Designed for use in an environment with a controlled level of contamination
- Increased control with immediate notification of alarms
- Reducing maintenance costs and improved performance
- Designed for confined space applications



### Typical Discharge Times (sec)



(1000-100V) fan speed set to high, blower 12" from charge plate monitor (CPM).  
CPM test plate 7.2" from table.  
Discharge times slightly longer for 230 VAC, 50 Hz unit.  
Yellow cell without value = decay time over 30 seconds.

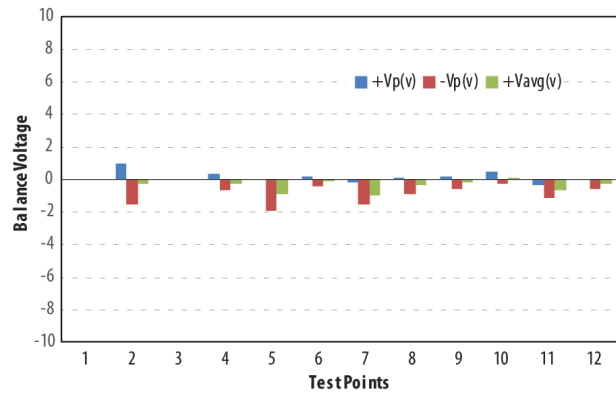
## 6832 Specifications

|                       |  |
|-----------------------|--|
| <b>Airflow</b>        | 129 cfm (typ)  |
| <b>Audible Noise</b>  | 61 dB (typ) fan high, 52 dB (typ) low fan; measured @ 12" (30.5 cm) from fan   |
| <b>Balance</b>        | <±10V (typ)  |
| <b>Cleanliness</b>    | Meets ISO 14644 Class 4 (Fed Std. 209E Class 10)   |
| <b>Controls</b>       | Power/fan speed DIP switch with 4 speed/velocity settings, balance adjustment, sensor type selection and FMS connections |
| <b>Discharge*</b>     | <2 sec @ 1' (30 cm) (typ), taken in-line center of fan (±1000-100V)  |
| <b>Emitter Points</b> | Titanium, 8 per fan  |
| <b>Indicators</b>     | Green power on, red fan stall, red fault with optional audible alarm   |
| <b>Mounting</b>       | Tilt lock mounting stand   |
| <b>Options</b>        | External sensor inputs with FMS connection, audible alarm  |
| <b>Ozone</b>          | 0.005 ppm (typ)  |
| <b>Technology</b>     | Steady-state DC (corona discharge)   |
| <b>Temperature</b>    | Operating Env: 50-90°F (10-32°C), 30-70% RH (non-condensing)   |
| <b>Voltage</b>        | 24 VDC (470 mA max)  |
| <b>Enclosure</b>      | Powder-coated aluminum   |
| <b>Dimensions</b>     | 7.33"H x 5.12"W x 2.36"D (18.6 x 13 x 6.0 cm)  |
| <b>Weight</b>         | 2.03 lb (0.92 kg)  |
| <b>Certifications</b> | CE, UL, IEC, ENEC  |

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

### Balance Performance

Performance test results for **high fan** speed per ANSI/ESD STM3.1-2015 standard are shown below. High fan speed is one of four high, medium-high, medium-low and low fan speed.



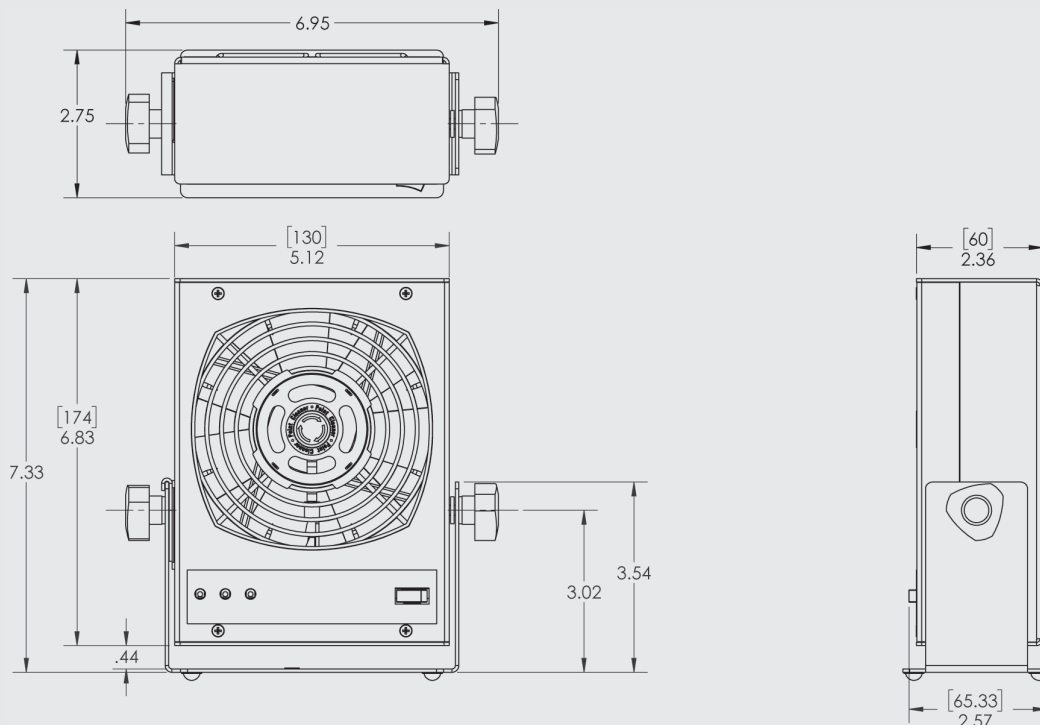
### Fan Speed DIP Switch Settings

The 2 dip switches control the fan speed (4 speeds are available). The switch settings for each fan speed are shown in the table on the right.

| Fan Speed Selection |             |
|---------------------|-------------|
| Switch Setting      | Fan Speed   |
|                     | Low         |
|                     | Medium-Low  |
|                     | Medium-High |
|                     | High        |

### Options

An audible alarm that operates in addition to the visible array of 3 each LEDs on the front of the blower indicate operational failures including a stalled fan or loss of ionization.



## Wide Coverage Overhead/Benchtop Blower

# AEROSTAT® FPD

The Aerostat FPD series of products has been designed to control electrostatic charges in flat panel assembly and electronics manufacturing applications requiring stable operation with exceptionally fast discharge time performance. The FPD ionizing blowers are built for reliability and simplicity.

Aerostat FPD utilizes reliable, low maintenance AC corona technology with high flow rate fans to provide fast static discharge performance. The inherent stability of the Aerostat FPD reduces maintenance frequency, and a built-in emitter cleaner reduces maintenance time. Our unique geometry and airflow control provides consistent performance, meeting the demands of product assembly operations.

The Aerostat FPD's self-monitoring feature assures the user of controlled, consistent ion output. A light indicates both that power is applied to the unit and that ions are being produced. Performance is enhanced by the use of Simco-Ion's industry-leading and highly reliable AC technology.

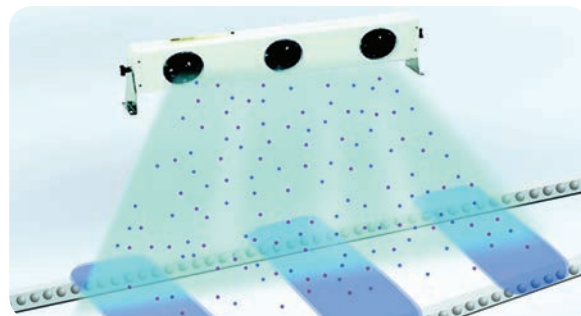


### Features

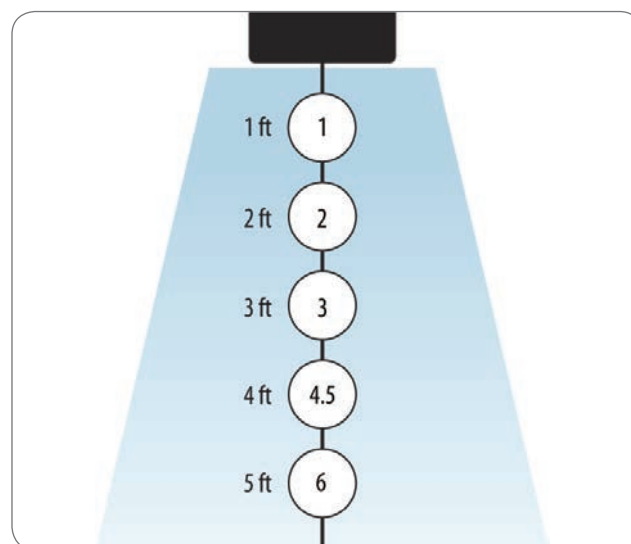
- High output, high-velocity fans
- Inherently balanced ionization
- Ionization indicator light
- Built-in emitter point cleaner
- Optional fan air filter

### Benefits

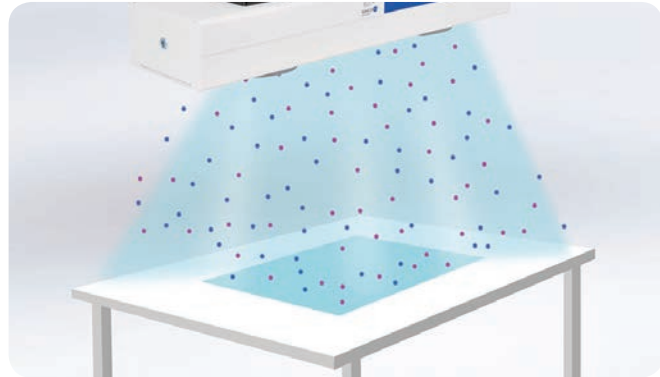
- Extremely fast static charge neutralization over a wide horizontal or vertical application area
- Offers consistent performance with low maintenance frequency
- Visual indication that the target product is being neutralized
- Continued blower operation will require little maintenance
- Protection for internal components from environmental contamination




### Typical Discharge Times (sec)



Direct Downward, Maximum Fan Speed



## FPD Specifications

|                |  |           |           |           |           |           |
|----------------|--|-----------|-----------|-----------|-----------|-----------|
| Air Filter     | 30 ppi open cell polyurethane foam   |           |           |           |           |           |
| Air Velocity*  |  | 1' (0.3m) | 2' (0.6m) | 3' (0.9m) | 4' (1.2m) | 5' (1.5m) |
|                | Fan low  | 500       | 350       | 250       | 200       | 150       |
|                | Fan high   | 1000      | 700       | 500       | 400       | 300       |
| Audible Noise  | 59-69 dBA (measured @ 2' (0.6m) in in front of blower)                                 |           |           |           |           |           |
| Balance        | 0 ±10V   |           |           |           |           |           |
| Controls       | Power on/off switch, recessed variable fan speeds ionization                           |           |           |           |           |           |
| Discharge**    | 1.0 sec @ 1' (0.3m) (1000-100V) high fan   |           |           |           |           |           |
| Indicators     | Orange ionization light  |           |           |           |           |           |
| Technology     | AC ionization  |           |           |           |           |           |
| Temperature    | Operating Env: 50-90°F (10-32°C), 30-70% RH (non-condensing)                           |           |           |           |           |           |
| Ozone          | Equilibrium concentration <0.02 ppm  |           |           |           |           |           |
| Voltage        | 120 VAC 60 Hz 0.3A (2-fan), 0.4A (3-fan), 0.5A (4-fan)                                 |           |           |           |           |           |
|                | 230 VAC 50 Hz 0.2A (2-fan), 0.2A (3-fan), 0.3A (4-fan)                                 |           |           |           |           |           |
| Enclosure      | Powder-coated white enamel aluminum  |           |           |           |           |           |
| Mounting       | Stainless steel bracket  |           |           |           |           |           |
| Dimensions     | 2-fan: 23.25"L x 4.0"H x 6.25"D (590 x 100 x 160 mm)                                   |           |           |           |           |           |
|                | 3-fan: 35.50"L x 4.0"H x 6.25"D (900 x 100 x 160 mm)                                   |           |           |           |           |           |
|                | 4-fan: 47.75"L x 4.0"H x 6.25"D (1215 x 100 x 160 mm)                                  |           |           |           |           |           |
| Weight         | 2-fan: 10 lbs (4.5 kg), 3-fan: 13 lbs (5.9 kg), 4-fan: 16 lbs (7.3 kg)                 |           |           |           |           |           |
| Certifications | CE  |           |           |           |           |           |

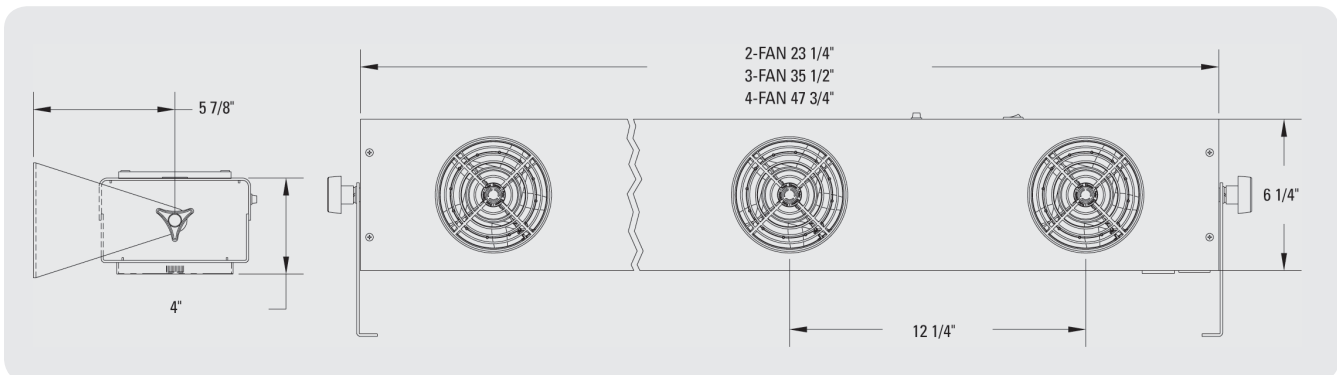
\* Velocity in fpm and (m/s) measured at center of air stream.

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

## FPD Coverage Areas

The Aerostat FPD ionization blower comes in either 2-fan, 3-fan or 4-fan chassis lengths. Each length is designed for optimal coverage area and a variety of applications:

| Blower | Overhead Applications    | Benchtop Applications    |
|--------|--------------------------|--------------------------|
| 2-fan  | 2'W x 2' L (0.6m x 0.6m) | 2'W x 5' L (0.6m x 1.5m) |
| 3-fan  | 2'W x 3' L (0.6m x 0.9m) | 3'W x 5' L (0.9m x 1.5m) |
| 4-fan  | 2'W x 4' L (0.6m x 1.2m) | 4'W x 5' L (1.2m x 1.5m) |





## Overhead Ionizing Blower

# AEROSTAT® GUARDIAN

Simco-Ion's Aerostat Guardian Overhead Ionizing Blower provides superior static charge decay over an entire work surface area. Equipped with task lighting and an integrated heater, the Guardian offers user-friendly operation while effectively protecting sensitive components from ESD damage.

The Guardian operates on AC Technology to provide stable balance performance over long periods of use. It is available with airflow diffusers for superior static charge decay efficiency over a large work surface area. Without diffusers, the Guardian provides fast charge decay directly under the unit for targeted work surface coverage.

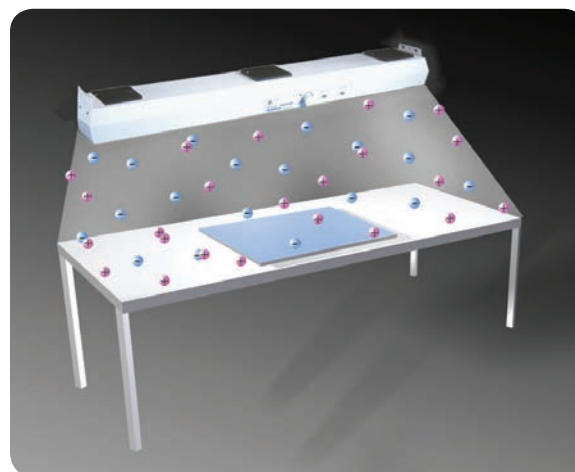


### Features

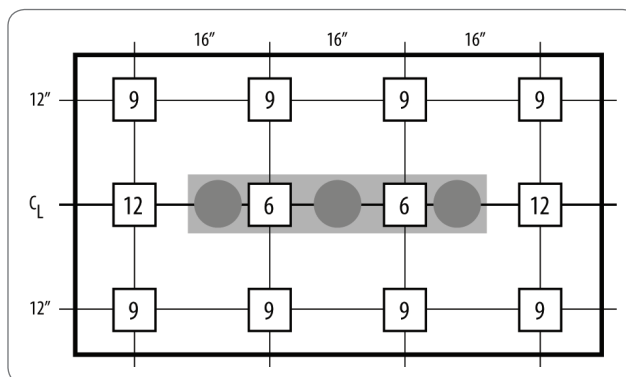
- Inherently balanced to  $0 \pm 10V$
- Integrated heater and task lights
- AC Technology
- Ionization light
- Integrated manual emitter point cleaner

### Benefits

- Protects even the most sensitive electronic components
- User-friendly—enhances operator comfort and efficiency
- Stable balance over extended periods of use
- Verifies that the unit is ionizing
- Easy to maintain



### Typical Discharge Times (sec)

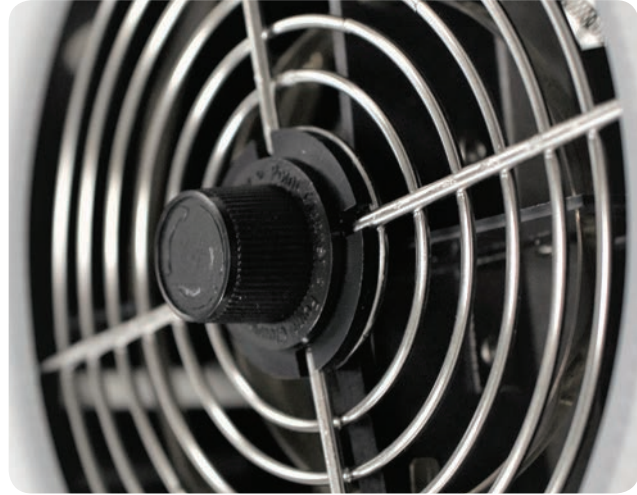


(1000-100V), high fan 18" from charge plate monitor (CPM).  
CPM test plate 1" from table.  
Discharge times slightly longer for 230 VAC, 50 Hz unit.





Robust grill with diffuser

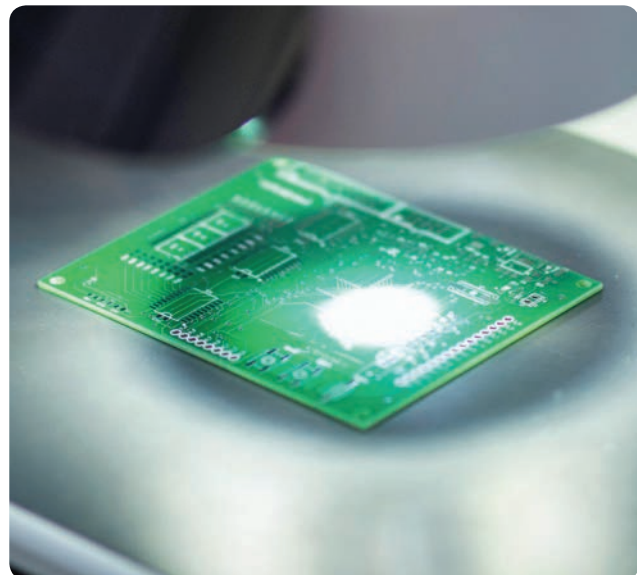


Build-in manual emitter point cleaner with each fan

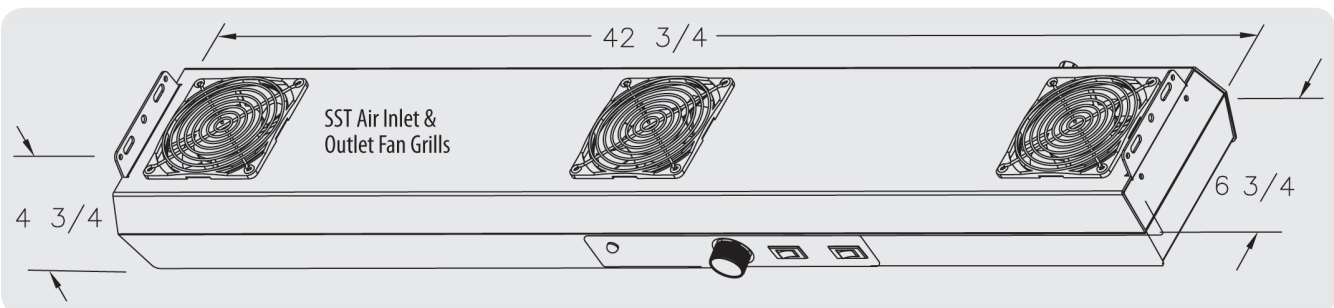
## Guardian Specifications

|                       |  |
|-----------------------|--|
| <b>Airflow</b>        | 150-300 cfm (low to high), combined 3-fan output   |
| <b>Audible Noise</b>  | 50 dBA fan low, 60 dBA fan high  |
| <b>Balance</b>        | 0 ±10V, measured 18" (45.7 cm) from blower   |
| <b>Cleanliness</b>    | Meets ISO 14644 Class 5 (Fed std. 209E Class 100)  |
| <b>Controls</b>       | Blower on/fan speed control knob, heater/task light on/off switch  |
| <b>Coverage</b>       | 2' x 4' (61 x 122 cm) area   |
| <b>Discharge*</b>     | 3 sec @ 18" (1000-100V), measured center of blower, fan high-no diffusers  |
| <b>Emitter Points</b> | Stainless Steel  |
| <b>Indicators</b>     | Orange ionization status, orange on/off, heater/task light   |
| <b>Temperature</b>    | Operating Env: 32-122°F (0-50°C), 30-70% RH (non-condensing)<br>Warm Air: 25°F (14°C) fan low, 11°F (6°C) fan high |
| <b>Voltage</b>        | 2-fan: 120 VAC, 0.2A, 230 VAC, 0.1A<br>3-fan: 120 VAC, 0.3A, 230 VAC, 0.15A  |
| <b>Enclosure</b>      | Powder-coated white enamel aluminum  |
| <b>Dimensions</b>     | 42.75"W x 4"H x 6.75"D (108 x 10.2 x 17.1 x 108 cm)  |
| <b>Weight</b>         | 16 lbs (7.3 kg)  |
| <b>Certifications</b> | CE cULus ENEC  |

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



Designed for use with sensitive electronic components; provides fast static charge decay efficiency over an entire work surface area.



## Benchtop Ionizing Blower

# AEROSTAT<sup>®</sup> PC2

Simco-Ion's new Aerostat PC2 is designed and built for reliable, long-term static control for a variety of electronic, semiconductor, flat-panel display and life science assembly applications. It offers outstanding charge neutralization for targeted mini-environments and provides static control up to 4 feet (1.2m) across a benchtop work surface. The combination of size and its lightweight design allows easy mounting inside process tools.

Aerostat PC2 offers inherent balance to  $0 \pm 10V$ , loaded with usability features including an adjustable locking stand, fan speed control, separate balance and fan stall alarm LED with an optional audible alarm. These features make the Aerostat PC2 the ideal mini-environment ionization blower for assembly, test and packaging area.

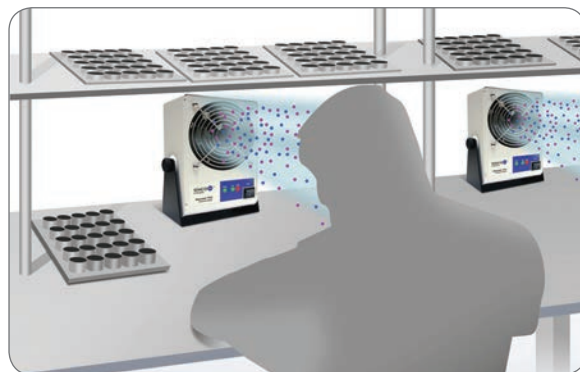


### Features

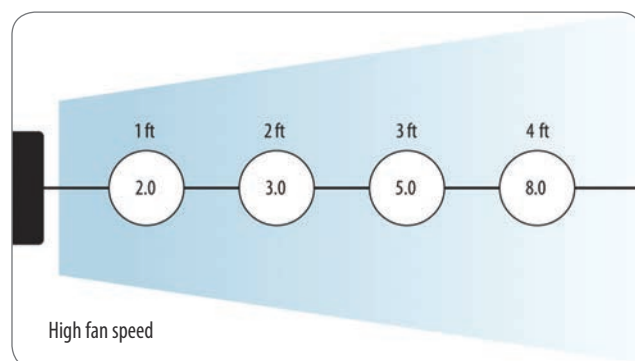
- Discharge time of <2 seconds at 1 foot (30 cm)
- Lightweight, compact and quiet for unobtrusive use
- Local alarm LEDs, Facility Monitoring System (FMS) connection and optional audible alarm
- $\pm 10V$  self-balancing (Micropulse) technology
- Built-in manual emitter point cleaner
- Integrated heater for warm airflow

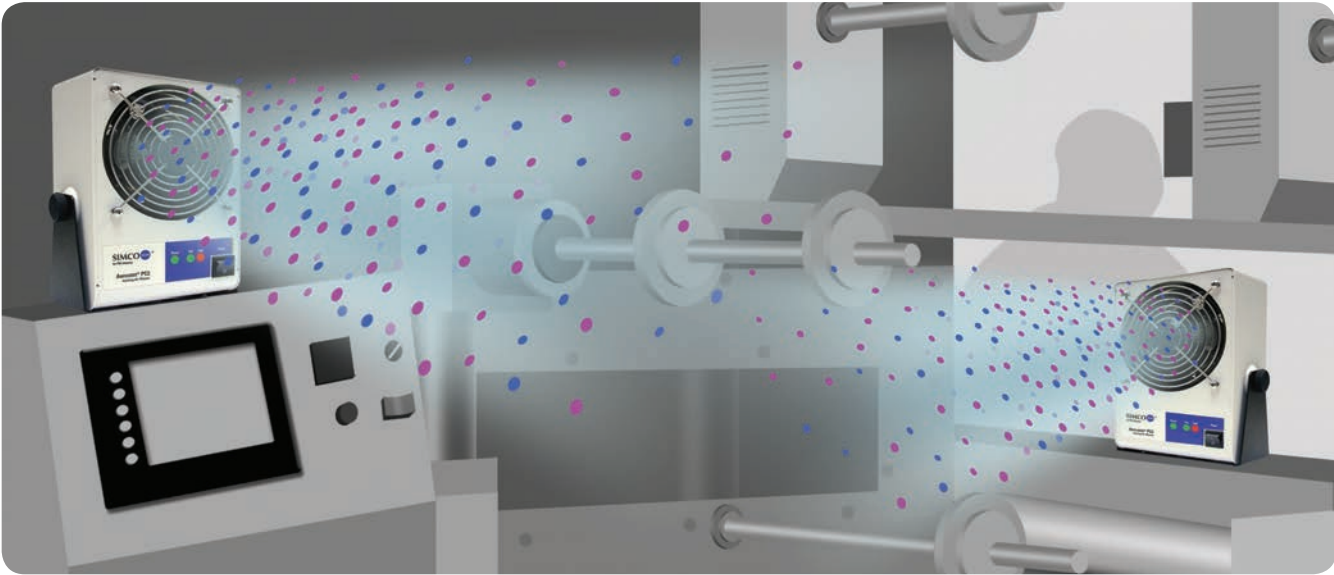
### Benefits

- Fast, targeted neutralization of static charges
- Directed ionization designed for workbench or in-tool areas
- Worry-free ionization status can easily be locally monitored and at a remote location
- High precision balance ensures controlled and consistent ion output
- Minimizes the time required to perform normal maintenance
- Ensure a user-comfort environment



### Typical Discharge Times (sec)





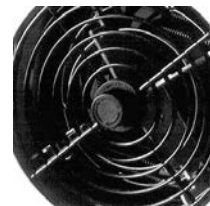
## PC2 Specifications

|                      |  |
|----------------------|--|
| <b>Air Filter</b>    | 30 ppi open cell polyurethane foam (optional)                            |
| <b>Air Velocity</b>  | 400 fpm fan high, 325 fpm fan med, 275 fpm fan low (typ)                 |
| <b>Air Volume</b>    | Cubic feet per minute, 130 scfm max (high speed, typ)                    |
| <b>Airflow</b>       | cfm, 130 scfm max (fan high)   |
| <b>Alarm</b>         | Fault and fan stall (standard), audible alarm (optional)                 |
| <b>Audible Noise</b> | 65 db @ 1' (30 cm) down centerline, 1' off center (fan high)             |
| <b>Balance</b>       | 0 ±10V   |
| <b>Connectors</b>    | IEC320/C14 AC power cord outlet, FMS fault alarm output connector (RJ-9) |
| <b>Controls</b>      | Power on/off, fan speed low/med/high, emitter point cleaner knob         |
| <b>Coverage</b>      | 1'W x 4'L (30 x 122 cm) area   |
| <b>Current</b>       | 140 mA   |
| <b>Discharge*</b>    | 2 sec @ 1' (1000-100V) fan high  |
| <b>Emitters</b>      | Stainless steel  |
| <b>Indicators</b>    | Green power on, red fault alarm, red fan stall alarm                     |
| <b>Ozone</b>         | <0.05 ppm (measured 1' in front of blower)                               |
| <b>Technology</b>    | Micropulse AC ionization   |
| <b>Temperature</b>   | Operating Env: 50-95°F (10-35°C), 30-60% RH (non-condensing)             |
| <b>Voltage</b>       | 100-240 VAC 50/60 Hz   |
| <b>Enclosure</b>     | Powder-coated aluminum chassis   |
| <b>Mounting</b>      | Metal stand with skid resistant rubber feet                              |
| <b>Dimensions</b>    | 9.1"H x 6.8"W x 3.3"D (23.1 x 17.3 x 8.4 cm) with stand                  |
| <b>Weight</b>        | 2.8 lbs (1.25 kg) with stand   |
| <b>Certification</b> | CE cULus KC  |

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

## Emitter Point Cleaner

The Aerostat PC2 features a built-in emitter point cleaner which takes only seconds to clean the emitter points. This prevents the build-up of airborne debris and the PC2 keeps working in top form for the life of the unit

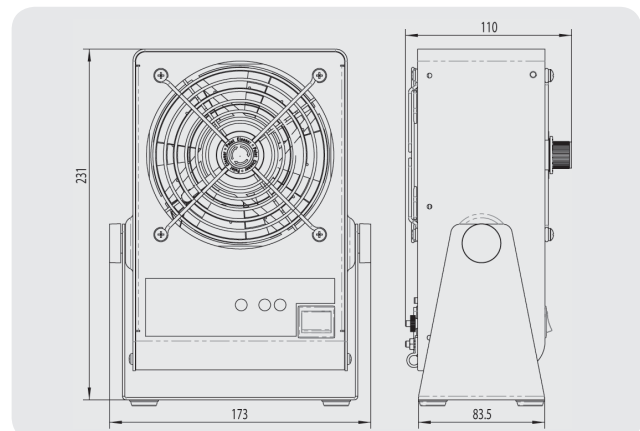


## Alarm Capabilities

Separate alarm LEDs on the front of the blower for ionization balance fault and fan stall plus a facility monitoring system (FMS) interface for remote alarm status (accessible on the rear of the blower) offers worry-free static control for the production area.



Heater Version





## Extended Coverage Ionizing Blower

# AEROSTAT<sup>®</sup> XC2

Simco-Ion's new Aerostat XC2 provides complete wide area ionization protection. As with its predecessor, the Aerostat XC Ionizing Blower, the Aerostat XC2 is designed and built for reliable, long-term static control for a variety of electronic, semiconductor, flat-panel display and medical assembly applications. The XC2 offers outstanding coverage for larger areas with <12 second discharge times at 6 feet (1.8m) distance from the face of the blower. The lightweight design allows the Aerostat XC2 to be mounted above the work surface, which is especially effective for flat panel display module assembly.

The Aerostat XC2 offers inherent balance to  $0 \pm 10V$  (with manual adjustment capability) for protection of sensitive electronic components. The XC2 is loaded with usability features including a built-in emitter point cleaner, adjustable locking stand, fan speed control, optional airflow heater, separate balance and fan-stall alarm LEDs with an optional audible alarm. These features, plus its stylish design, make the Aerostat XC2 the ideal extended coverage ionization blower for assembly, test and packaging areas.

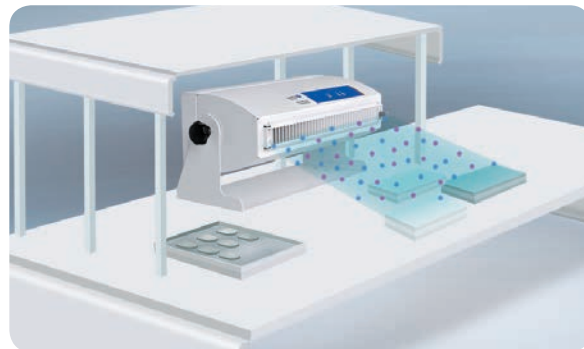


## Features

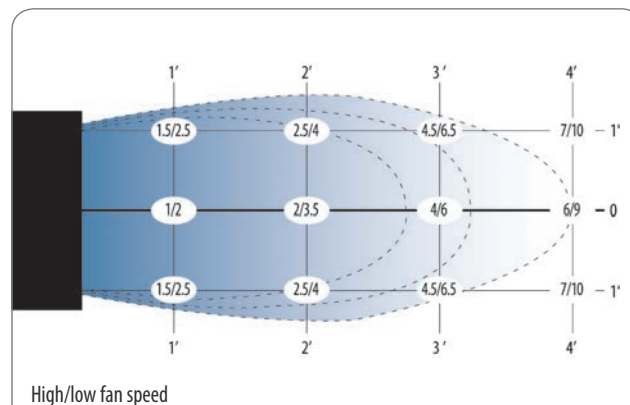
- Large, near symmetric ionization area coverage
- Weight saving design
- Easy to use, built-in emitter cleaner
- $\pm 10V$  self-balancing (Micropulse) technology
- Local alarm LEDs, Facility Monitoring System (FMS) connection and optional audible alarm
- Integrated heater for warm airflow

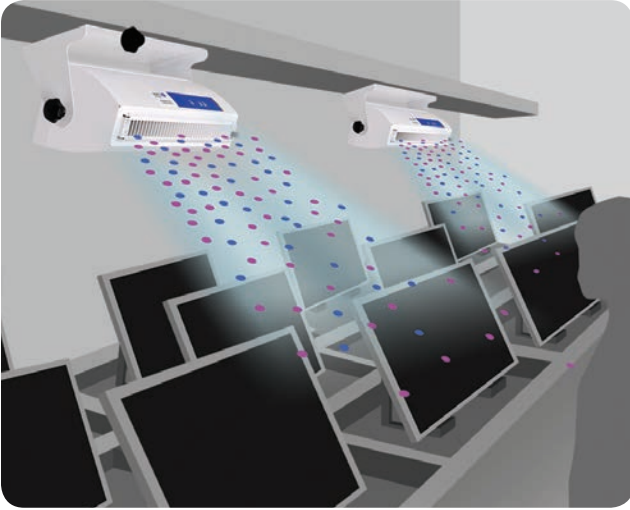
## Benefits

- Designed for complete static neutralization across the entire work surface area
- Light enough to be easily mounted on or above the work surface
- Ensures consistent, balanced performance over a long time
- Long-term balance stability
- Ionization status can easily be monitored locally and at a remote location
- Ensure a user-comfort environment



## Typical Discharge Times (sec)





## Low Maintenance

The Aerostat XC2 utilizes micropulse technology which reduces ion recombination at the emitter, thus increasing production efficiency and performance. Using this breakthrough technology, the Aerostat XC2 maintains long-term peak-performance and balance stability for extended periods between cleanings.

The only maintenance required for the Aerostat XC2 is periodic cleaning of the emitter points using the easy, built-in pushbutton to remove any debris and ensuring balanced, continuous ion output.

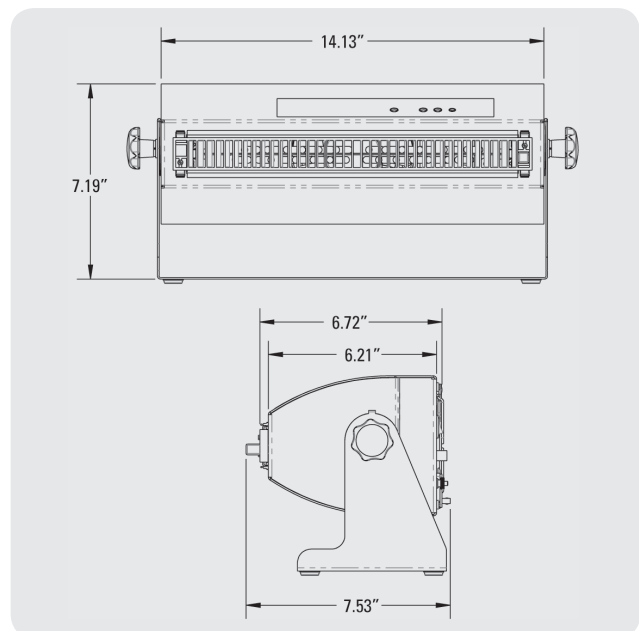


## XC2 Specifications

|                       |   |
|-----------------------|---|
| <b>Air Velocity*</b>  | 620 fpm @ 12", 435 fpm @ 24", 325 fpm @ 36", 265 fpm @ 48" fan high   |
| <b>Airflow</b>        | 95 cfm fan low, 150 cfm high fan  |
| <b>Alarm</b>          | Fault and fan stall (optional)  |
| <b>Audible Noise</b>  | 58 dB fan low, 70 dB fan high (measured 2' in front of blower)  |
| <b>Balance</b>        | 0 ±10V  |
| <b>Cleanliness</b>    | Meets ISO 14644 Class 6 (Fed Std. 209E Class 1000)  |
| <b>Connectors</b>     | IEC AC power cord outlet, FMS fault alarm output connector  |
| <b>Controls</b>       | Power on/off, fan speed control low/med/high, emitter point cleaner pushbutton, balance adjust, heater on/off (optional)    |
| <b>Coverage</b>       | 3'W x 6'L (91 x 183 cm) area  |
| <b>Current</b>        | Input: 0.5A, 55W max (no heater); 3.5A, 420W (with 100-120 VAC heater); 1.9A, 460W (with 220-240 VAC heater)                |
| <b>Discharge**</b>    | 1.0 sec @ 1' (1000-100V) high fan   |
| <b>Emitters</b>       | Stainless steel   |
| <b>Indicators</b>     | Green power on, red fault alarm, red fan stall alarm  |
| <b>Ozone</b>          | <0.05 ppm (measured 1' in front of blower)  |
| <b>Technology</b>     | Micropulse AC ionization  |
| <b>Temperature</b>    | Operating Env: 50-95°F (10-35°C), 30-60% RH (non-condensing)  |
| <b>Temperature</b>    | Warm air: 4-5°F (2-3°C) measured 1' in front of blower  |
| <b>Voltage</b>        | 100-240 VAC 50/60 Hz 0.5A 55W max (no heater)<br>3.5A 420W (with 100-120 VAC heater)<br>1.9A 460W (with 220-240 VAC heater) |
| <b>Mounting</b>       | Powder-coated steel stand with skid resistant rubber feet   |
| <b>Enclosure</b>      | Powder-coated aluminum chassis  |
| <b>Dimensions</b>     | 14.13"W x 7.2"H x 6.55"D (35.9 x 18.3 x 16.6 cm) with stand   |
| <b>Weight</b>         | 7 lbs (3.2 kg) with stand   |
| <b>Certifications</b> | CE cULus ENEC   |

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

\*\* Velocity in fpm measured at center line of air stream; all values ±10%.



## Overhead Cleanroom-rated Ionizing Blower

# GUARDIAN CR2000

Simco-Ion's Guardian CR2000 Cleanroom-rated Overhead Ionizing Blower is designed specifically for use in cleanroom applications. The Guardian CR2000 features a patented circuit that results in a balanced delivery of positive and negative ions, which ensures that the unit will maintain an ion balance of  $0 \pm 10V$ . Balance stability is further enhanced by the use of Simco-Ion's unique "ion shields" at the fan outputs to reduce parasitic ion loss.

The Guardian CR2000 ensures cleanroom compatibility with all fan and air bearing silicone free surfaces. Fan assemblies are particle-tested to ISO 14644 Class 4 (Fed Std. 209E Class 10) particle limits.

Unlike some overhead ionizers which link to an external device to provide real-time monitoring, the Guardian CR2000 has sophisticated internal monitoring circuitry which assures that the unit is ionizing and that the balance circuit is functioning.



### Features

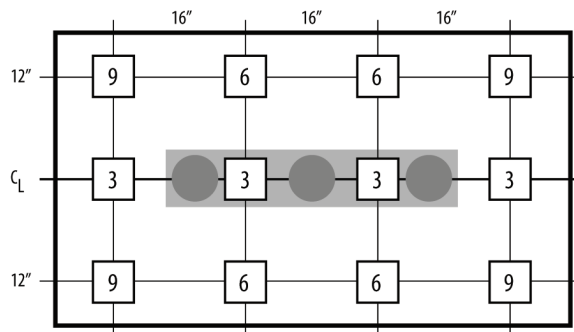
- Inherently balanced to  $0 \pm 10V$
- Ion balance and ion output monitors
- Lockout key switch
- Silicone-free component surfaces
- Integrated emitter point cleaner

### Benefits

- Protects even the most sensitive electronic components
- Verifies that the unit is ionizing and balanced
- Helps maintain desired ionization performance level
- ISO 14644 Class 4 (Fed Std. 209E Class 10) cleanroom compatibility
- Provides fast, easy maintenance



### Typical Discharge Times (sec)



(1000-100V) fan speed set to high 18" from charge plate monitor (CPM).  
CPM test plate 6" from table.  
Discharge times slightly longer for 230 VAC, 50 Hz unit.





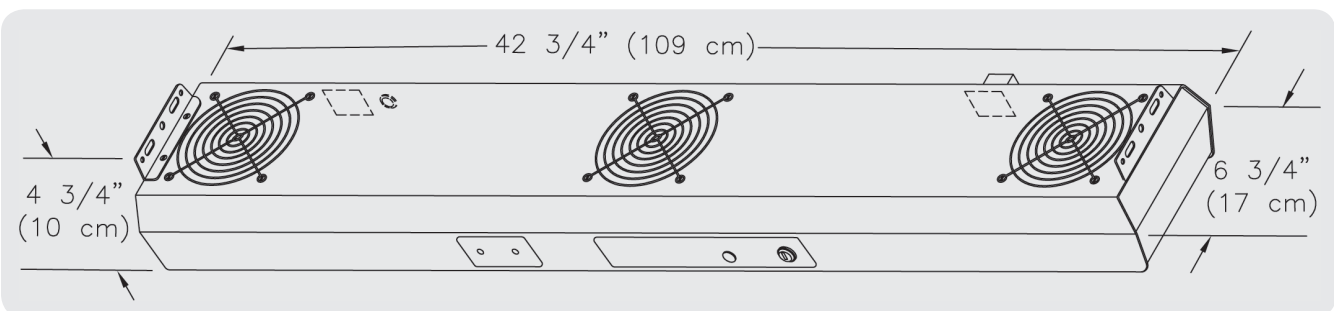
## Guardian CR2000 Specifications

|                       |  |
|-----------------------|--|
| <b>Airflow</b>        | 2-fan 90 cfm low, 180 cfm high, 3-fan 135 cfm low, 270 cfm high  |
| <b>Air Velocity</b>   | 200 fpm (1 m/s) low, 400 fpm (2 m/s) high (measured 18" from blower)                                       |
| <b>Audible Noise</b>  | 48 dBA fan low, 58 dBA fan high (measured 2' from blower)  |
| <b>Balance</b>        | 0 ±10V (measured 18" from blower)  |
| <b>Cleanliness</b>    | Meets ISO 14644 Class 4 (Fed std. 209E Class 10)   |
| <b>Controls</b>       | 3-position key switch off/adjustable/high, recessed fan speed control                                      |
| <b>Coverage</b>       | 2-fan: 2' x 3' (61 x 91cm) area, 3-fan: 2' x 4' (61 x 122 cm) area   |
| <b>Discharge*</b>     | (1000-100V) 3 sec (measured 18" center of blower position fan high)  |
| <b>Emitter Points</b> | Stainless Steel  |
| <b>Indicators</b>     | Ionization status green normal, red maintenance  |
| <b>Voltage</b>        | 2-fan 120 VAC 50/60 Hz 0.2A, 230 VAC 50/60 Hz 0.1A<br>3-fan 120 VAC 50/60 Hz 0.3A, 230 VAC 50/60 Hz 0.15A  |
| <b>Temperature</b>    | Operating Env: 32-122°F (0-50°C), 30-70% RH (non-condensing)   |
| <b>Enclosure</b>      | Aluminum with glossy white polyurethane finish   |
| <b>Dimensions</b>     | 2-fan: 31.75W x 4"H x 6.75"D (80 x 10.2 x 17.1 cm)<br>3-fan: 42.75"W x 4"H x 6.75"D (108 x 10.2 x 17.1 cm) |
| <b>Weight</b>         | 2-fan: 12 lbs (5.5 kg), 3-fan: 16 lbs (7.3 kg)   |
| <b>Certifications</b> | CE cULus   |

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



Build-in manual emitter point cleaner with each fan



## Compact Ionizing Blower minION™2

Simco-Ion's minION2 Ionizing Blower is designed to control electrostatic charges in sensitive electronics assembly and automated tool applications requiring stable operation with fast discharge time performance. The minION2 is built to deliver big performance and reliability in a compact package with a practical feature set.

A combination of unique, patented features incorporated in this product makes it possible for the minION2 to deliver industry-leading performance. Simco-Ion's steady-state DC corona ion technology provides a patented control circuitry to deliver consistent performance. Performance is enhanced by the use of patented radial ion emitter design.

minION2 uses a modular wiring system that allows power delivery by "daisy-chaining" up to 3 units on one standard, modular power supply. Hardwiring of power can be accommodated by the use of a terminal block located on the back of the unit. The terminal block also features a relay contact output of the fault signal to enable remote monitoring.

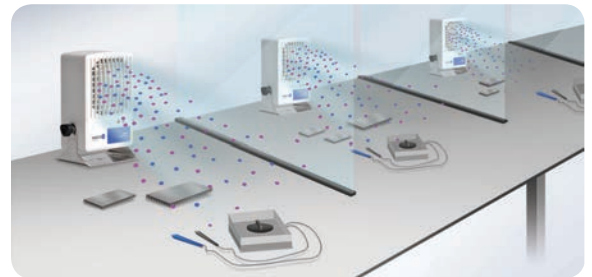


### Features

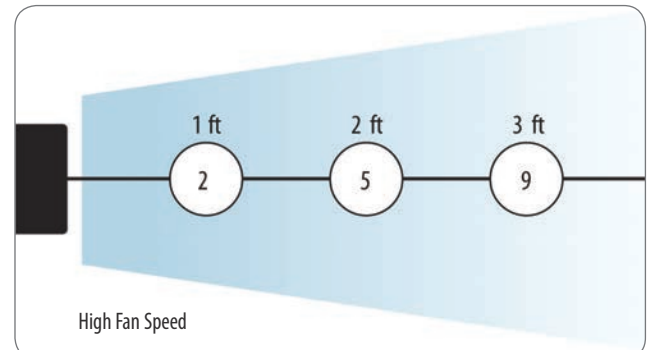
- Compact design
- Self-balancing control circuit technology
- Modular wiring system
- Local LED and relay contact alarm signal

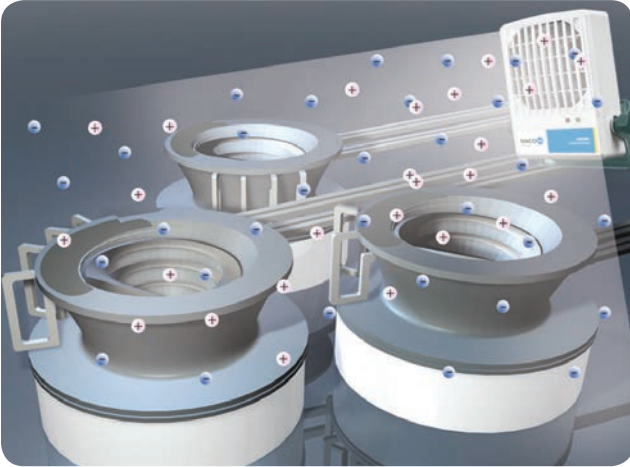
### Benefits

- Portable enough for field service applications; large enough for permanent benchtop or in-tool operation
- Self-monitoring to ensure controlled and consistent ion output
- 24 VDC input power supplied by wall AC adapter or by local tool power; up to 3 units daisy-chained from one power source
- Convenient indication of fault ionization operation



### Typical Discharge Times (sec)





## Optional Articulating Arm for Convenient Mounting

The minION2 ionizer is designed for portable or permanent operation. The stand provided can be used in a permanent operation by bolting it to a sturdy flat surface such as a wall or shelf. The optional Articulating Arm offers flexibility for directed ionization into hard to reach target areas.



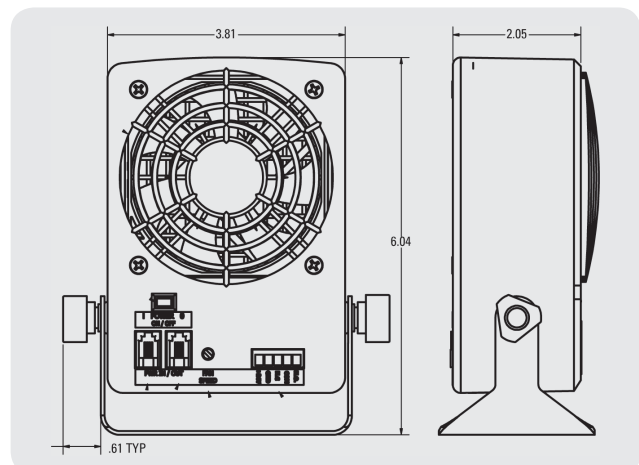
## minION2 Specifications

|                       |  |
|-----------------------|--|
| <b>Airflow</b>        | 21-42 cfm  |
| <b>Audible Noise</b>  | 52 dBA (max) fan high measured 2' from blower  |
| <b>Balance</b>        | ±10V using auto-adjust   |
| <b>Connectors</b>     | Two 4P4C "handset" modular/power   |
| <b>Controls</b>       | Two position off/on  |
| <b>Coverage</b>       | 1' x 3' (30 x 91 cm) area  |
| <b>Discharge*</b>     | 2 sec @ 1' (1000-100V) fan high  |
| <b>Emitters</b>       | Six stainless steel  |
| <b>Indicators</b>     | Green power, red fault   |
| <b>Power Supply</b>   | Universal 100-240 VAC input (IEC-320)/24 VDC, 1.66A output (suitable to power up to 3 units) |
| <b>Temperature</b>    | 1.66A output (suitable to power up to 3 units)   |
| <b>Voltage</b>        | 24 VDC 250 mA 6W   |
| <b>Enclosure</b>      | White reinforced polycarbonate   |
| <b>Mounting</b>       | Stainless steel (optional articulating arm)  |
| <b>Dimensions</b>     | 3.875"W x 5.375"H x 2.375"D (98 x 136 x 60 mm)   |
| <b>Weight</b>         | 1.1 lbs (0.5 kg)   |
| <b>Certifications</b> | CE cUL US  |

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



Blower is designed to control electrostatic charges in sensitive electronics assembly and automated tool applications requiring stable operation with fast discharge time performance.





## Critical Environment In-tool Ionizing Bar with Software Control

# AEROBAR® 5225

Simco-Ion's Digital AeroBar with Software Control Model 5225 is designed to handle the demanding requirements of **in-tool ionization**. With high ion output providing fast neutralization of electric charge on wafers, E78 compliance at the most stringent levels can be achieved. An aerodynamic design and cleanroom compatible materials allow the Model 5225 to deliver complete and efficient ionization in mini-environments without disrupting laminar airflow. The AeroBar can be easily and seamlessly integrated with your tool mean a less costly solution to ionization, in addition to the benefits of reduced maintenance cost and better alarm handling. System alerts and messages are displayed at the tool controller for easy notification. Alternatively, simple FMS alarm output is available.

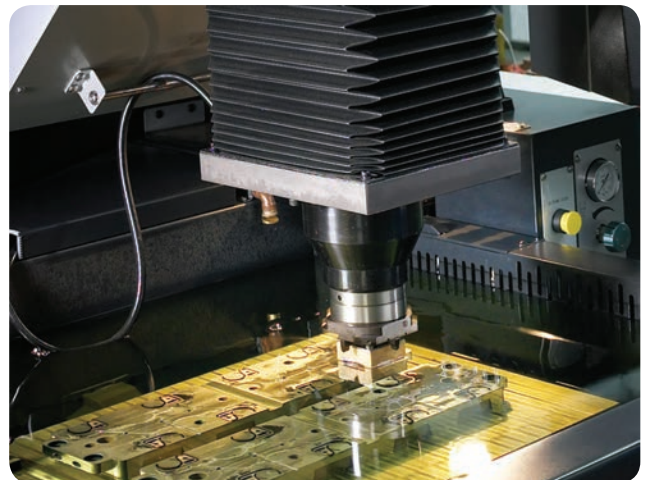


### Features

- Complete integration with tool control system
- Fully adjustable parameters for each AeroBar
- Ion current monitoring
- Several lengths available including three specifically designed for Equipment Front End Modules (EFEM)
- Single-crystal silicon emitter points





### Benefits

- Setup, operation and maintenance are controlled using existing tool or IonMonitor software GUI
- Fine-tune ionization for individual process requirements in each area of the tool
- More consistent ion output and stable performance
- Flexible lengths allow versatility for a variety of application designs
- Industry's proven cleanest emitter material, with no risk of wafer contamination from dopants or metals







Designed for front-end and back-end semiconductor manufacturing to control electrostatic discharge and particle contamination in mini-environment and workstations

## 5225 Specifications

|                       |  |
|-----------------------|--|
| <b>Alarm</b>          | Alarm activates when the bar is no longer able to maintain the preset ion output level, alarm is displayed visually by a red LED in the middle of the ionizer chassis as well as on GUI, settable threshold alarm limits for predictive maintenance  |
| <b>Cleanliness</b>    | ISO 14644 Class 1  |
| <b>Connectors</b>     | RJ-11 modular jack receptacles   |
| <b>Control Signal</b> | RS-485 from the Interface Module   |
| <b>Current</b>        | Output: <15 $\mu$ A, current and voltage limited   |
| <b>EMI</b>            | Below background level   |
| <b>Emitter Points</b> | Single crystal silicon, replaceable  |
| <b>Indicators</b>     | Individual red LEDs flash on for each polarity, middle red LED flashes rapidly when in alarm, all 3 LEDs blink at once when communication occurs, alarm relayed to tool GUI  |
| <b>Regulation</b>     | Output and balance stability is achieved by independently regulating the ion emission current of each polarity at each ionizer   |
| <b>Technology</b>     | Pulsed DC, Steady-state DC or standby  |
| <b>Timing</b>         | Both on and off timing for each polarity are settable from 0-10 sec @ 0.1 sec increments, LEDs on the bar indicate the polarity of the ion emission  |
| <b>Voltage</b>        | <b>Input:</b> 24 VAC, 50/60 Hz, 1W (typ), received from the Interface Module<br><b>Output:</b> 0-20 kVDC, $\pm$ 10% for each polarity on an individual AeroBar; positive or negative output levels can be adjusted separately through GUI  |
| <b>Enclosure</b>      | ABS plastics, fire retardant   |
| <b>Dimensions</b>     | 2.1"H x 1.2"W x 22.4, 28.4, 35.7, 44.4, 55.6, 64.4, 75.5, 84.4"L<br>(53 x 30.5 x 569, 721, 907, 1128, 1412, 1636, 1918, 2144 mm)   |
| <b>Weight</b>         | 1.5 lb (1.02 kg) for a 22" (56.9 cm) bar (approx 6 oz per additional ft/0.17 kg per additional 30 cm)  |
| <b>Certifications</b> | SEMI-F47     |

## 5200-IM6T Specifications

|                       |   |
|-----------------------|---|
| <b>Alarm Output</b>   | FMS, relay closure to ground (available on V4.0 and above)  |
| <b>Communication</b>  | Ethernet (RJ-45) or serial (RS-232/DB9)   |
| <b>Indicators</b>     | Green power on, yellow communication, red alarm   |
| <b>Output Ports</b>   | Six RJ-11 ports connect to up to six Model 5225 AeroBars  |
| <b>Voltage</b>        | 24 VDC, 1.0A, $\pm$ 5%  |
| <b>Dimensions</b>     | 2.9"H x 2.8"W x 12.4"L (7.4 x 7.1 x 31.5 cm)  |
| <b>Weight</b>         | 4 lb (2 kg)   |
| <b>Certifications</b> |     |

## Intelligent Integration

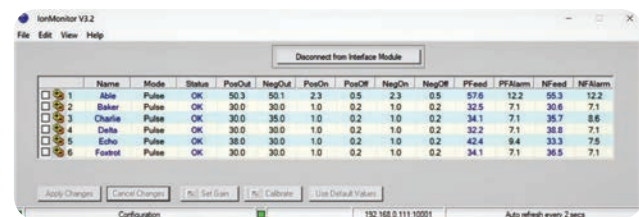
Simco-Ion's specially developed software eases integration into your system. Three different components are available to best suit your needs:

- A fully documented Application Programming Interface (API) minimizes integration time and cost.
- The library file provided in C/C++ can be used in developing your tool control software or can be used as a stand-alone application on your tool controller or laptop.
- An ionizer hardware simulator allows for easy software development in the absence of ionizer hardware.

Simco-Ion's powerful software provides complete control over the ionization system. Settings include adjustments for operating modes (including pulsed DC, Steady-state DC or standby), synchronization, on-times, off-times, power output levels and alarm thresholds for both positive and negative emitters, with independent control over each AeroBar. Sophisticated alarm and maintenance detection mean less downtime and costly diagnostic activity.

## IonMonitor Software

IonMonitor is industry-first graphical user interface (GUI) that monitors and controls the AeroBar Model 5225 and connects to the Interface Model 5200-IM6T. This software package centralizes all control and monitoring operations, simplifying operation and saving valuable time.



## Interface Module Model 5200-IM6T

This interface module powers up to six AeroBars. Model 5200-IM6T features an Ethernet port and an RS-232 port for communication with process equipment or EFEM controllers.





## Critical Environment Standalone Ionizing Bar

# AEROBAR<sup>®</sup> 5225S

Simco-Ion's Standalone Digital AeroBar Model 5225S ionizing bar is specifically designed to provide high performance with simple integration and operation. Adjustable and precise, easy-to-use digital settings allow the AeroBar to be used in a multitude of applications, ranging from inside tools to workstations and cleanroom areas. A choice of ionization modes, output voltage and timing provide versatility to meet static charge neutralization requirements. An aerodynamic design and cleanroom-compatible materials allow the Model 5225S to deliver complete and efficient ionization in mini-environments and cleanrooms without disrupting laminar airflow. Designed to operate as a standalone system, the Model 5225S AeroBar internally maintains critical settings, thereby ensuring continued optimal performance each time the system is powered up. AeroBar setup and adjustment is easy using the infrared Handheld Remote. An FMS output allows easy hardwired integration to a facility alarm system.

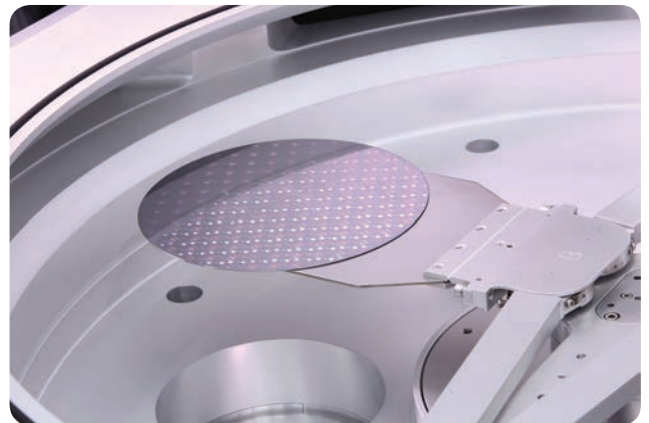
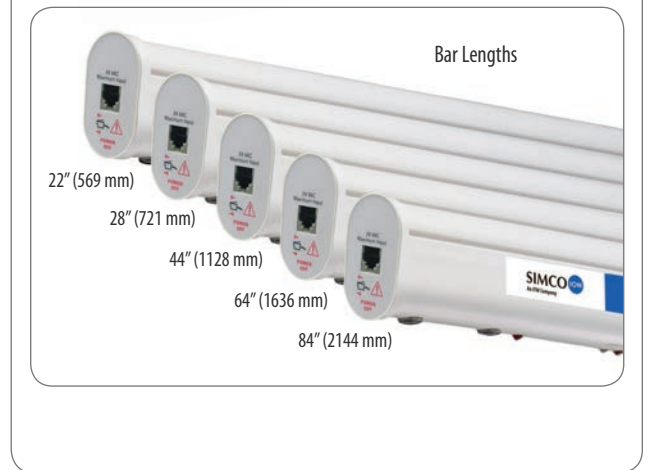


### Features

- Complete integration with tool control system; no controller required
- Fully adjustable parameters for each AeroBar utilizing Pulsed DC or Steady-state DC modes
- Ion current monitoring
- Several lengths available including three lengths specifically designed for Equipment Front End Modules (EFEM)
- Single-crystal silicon emitter points






### Benefits

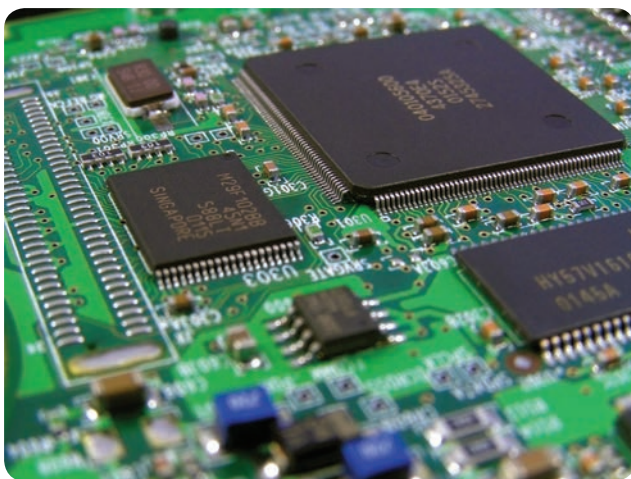
- Continued optimal performance each time the system is powered up
- Alarm capability of ensured performance
- Fine-tune ionization for individual process requirements in each area of the tool
- More consistent ion output and stable performance
- Flexible lengths allow versatility for a variety of application designs
- Ultra-clean emitter material, with no risk of wafer contamination from dopants or metals



Designed for Front-End and Back-End Semiconductor Manufacturing to Control Electrostatic Discharge, Particulate Contamination in Mini-Environment and Workstations

## 5225S Specifications

|                       |  |
|-----------------------|--|
| <b>Alarm</b>          | Alarm activates when the bar is no longer able to maintain the preset ion output level, alarm is displayed visually by a red LED in the middle of the ionizer chassis, settable threshold alarm limits for predictive maintenance  |
| <b>Cleanliness</b>    | ISO 14644 Class 1  |
| <b>Connectors</b>     | RJ-11 modular jack receptacles   |
| <b>Current</b>        | Output: <15 $\mu$ A, current and voltage limited   |
| <b>EMI</b>            | Below background level   |
| <b>Emitter Points</b> | Single crystal silicon, replaceable  |
| <b>Indicators</b>     | Individual red LEDs flash for each polarity, middle red LED flashes rapidly in alarm, all 3 LEDs blink when communication occurs   |
| <b>Ozone</b>          | <0.005 ppm   |
| <b>Regulation</b>     | Output and balance stability is achieved by independently regulating the ion emission current of each polarity at each ionizer   |
| <b>Technology</b>     | Pulsed DC, Steady-state DC or standby  |
| <b>Timing</b>         | Both on/off timing for each polarity are settable from 0-10 sec @ 0.1 sec increments, LEDs on the bar indicate the polarity of the ion emission  |
| <b>Voltage</b>        | <b>Input:</b> 24 VAC, 50/60 Hz, 1W (typ)<br><b>Output:</b> 0-20 kVDC, $\pm 10\%$ for each polarity on an individual AeroBar, positive or negative output levels can be adjusted separately with IR Handheld Remote   |
| <b>Enclosure</b>      | ABS plastics, fire retardant   |
| <b>Dimensions</b>     | 2.1"H x 1.2"W x 22.4, 28.4, 35.7, 44.4, 55.6, 64.4, 75.5, 84.4"L<br>(53 x 30.5 x 569, 721, 907, 1128, 1412, 1636, 1918, 2144 mm)   |
| <b>Weight</b>         | 1.5 lb (1.02 kg) for a 22" (56.9 cm) bar (approx. 6 oz per additional ft/0.17 kg per additional 30 cm)   |
| <b>Certifications</b> | SEMI F47      |



Specially Designed for Front-End and Back-End Semiconductor Manufacturing Process to Provide High Performance with Simple Integration and Operation

## Simple Integration

The AeroBar Model 5225S is powered by a 24 VAC source, eliminating the need for an external controller. Wall transformer kits (24 VAC output) are available for easy installation using flat modular cables. A Facility Monitoring System (FMS) output signal from the bar provides an immediate warning in the event of an alarm. Several lengths of the AeroBar are available, including three specially designed for two, three and four EFEM load port applications. Multiple AeroBars can be installed in either a daisy-chain or drop-tee configuration, creating a system that is versatile and easy to install in any customized equipment or application

## Infrared Handheld Remote

As part of our line of digital ionizers, the Model 5225S provides excellent reliability and performance. Exacting parameters and easy setup using the infrared Handheld Remote means that the Model 5225S is ideal for retrofits, low volume tools, systems with programmable logic controllers (PLC) or cleanroom work areas where the performance, stability, and reliability of digital ionization is desired.



## Optional Bar Lengths for use in 300 EFEMs

Option lengths available with optimized placement of emitter points over the Front Opening Unified/Universal Pod (FOUP) for use in 300 EFEMs.



## Ultra-Clean Metal-free Modulated Pulse Bar

# AEROBAR<sup>®</sup> MP 5635 / 5635M

The AeroBar 5635 and 5635M AeroBar Modulated Pulse (MP) ionizing bar are specifically designed to eliminate static charge in semiconductor and other ultra-clean manufacturing processes where fast discharge time, low swing voltages and precision balance are required. This breakthrough technology enables AeroBar mounting within 150 mm of the wafer. MP technology, combined with ultra clean silicon emitter points and precision adjustment, provides ISO 14644 Class 12 ionization (0.01 µm particles or nanoparticles) and ISO 14644 Class 1 (0.1 µm particles) cleanliness, critical for smaller technology nodes. MP technology is easy to adjust and features the ability to fine-tune voltage, frequency and balance to meet differing environmental and product sensitivity requirements.

Model 5635M (metal-free) specially designed for applications where exposed metallic surfaces are not permitted.



## Features

- ISO 14644 Class 1 (0.1 µm particles) and ISO 14644 Class 12 (2018) (0.01 µm particles)
- Modulated pulse technology
- Low field voltages
- Air-assist capability
- Optional software with an easy-to-use interface with wide adjustability

## Benefits

- Compatible with all wafer technology nodes including 14 nm and below
- Precision balance, high ion output with long-term stability
- Uniform balance across the AeroBar
- Safe placement as close as 150 mm of the wafer or reticle
- Enhanced static charge neutralization at fast automation speeds
- Model 5635M is perfect for "no metal" applications



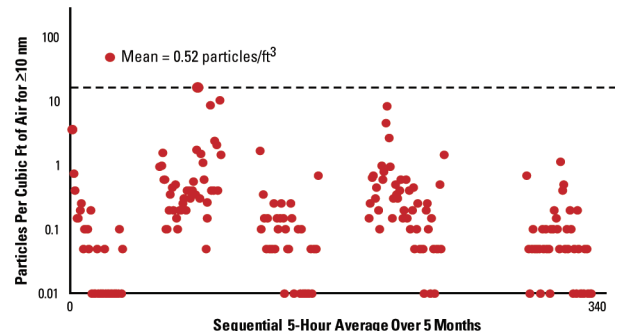
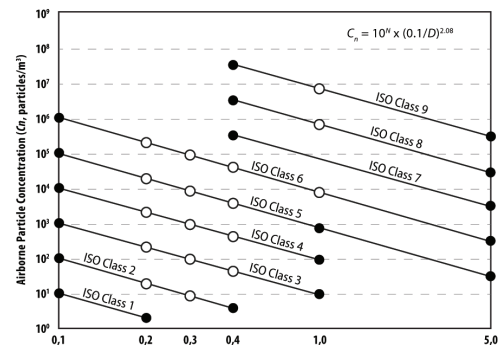
Model 5635

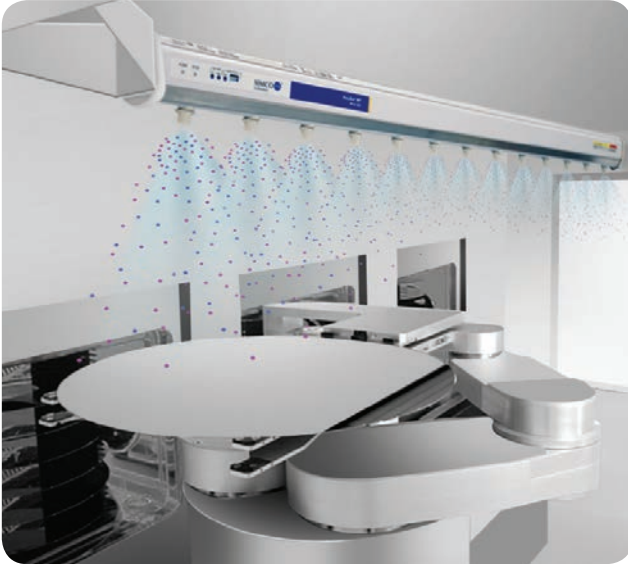


Model 5635M (metal-free)

## Cleanliness

Model 5635 is designed to operate in and maintain ISO 14644-1 cleanliness (10 particles or less per m<sup>3</sup> for particles of 0.1 micron and larger). Model 5635 will also perform to ISO 14644-12 cleanliness (1200 particles or less per m<sup>3</sup> (34 particles per ft<sup>3</sup>) for particles of 0.01 micron and larger) when operated at 45-50% output voltage setting and OpenJet nozzles with single crystal silicon emitters.



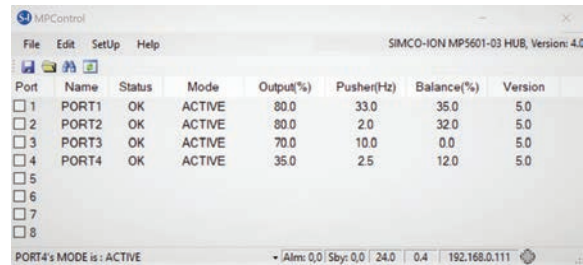


## 5635 / 5635M Specifications

|                       |   |
|-----------------------|---|
| <b>Airflow</b>        | 45 psi max gas pressure, 1-3.5 lpm/nozzle thru 8 mm OD one-touch fitting (optional)   |
| <b>Air Supply</b>     | Clean dry air (CDA) or nitrogen (N <sub>2</sub> <10 psi)  |
| <b>Balance</b>        | <±20V over time and across the bar length (measured in a controlled environment at 24" distance)  |
| <b>Bar Settings</b>   | Balance, frequency and power output   |
| <b>Cleanliness</b>    | Meets ISO 14644-12 cleanliness (0.01 µm particles or nanoparticles) and ISO 14644 Class 1 (0.1 µm particles) using 45-50% output voltage setting and OpenJet nozzles with single-crystal silicon emitters |
| <b>Distance</b>       | 150-1000 mm distance to surface (application and customer specification dependent)  |
| <b>EMI</b>            | Below background level  |
| <b>Emitter Pitch</b>  | 50 mm or 75 mm spacing between nozzles, 50 mm spacing only on the 450 mm and 600 mm lengths   |
| <b>Emitters</b>       | Single crystal silicon emitter points   |
| <b>Frequency</b>      | Default setting at 5 Hz, adjustable from 1-33 Hz  |
| <b>Ozone</b>          | <0.05 ppm   |
| <b>Performance</b>    | 15 sec (typ) with no air-assist, Vp-p Swing of 80 Vp-p (measured @ 24" below an emitter center group of points)   |
| <b>Temperature</b>    | Operating Env: 59-95°F (15-35°C), 30-60% RH (non-condensing)  |
| <b>Technology</b>     | Modulated pulse (MP) technology   |
| <b>Voltage</b>        | Input: 24 VDC ±10%<br>Output: 13.5 kV p-p (max), adjustable   |
| <b>Enclosure</b>      | ABS chassis, stainless steel rails on the outside of the bar  |
| <b>Dimensions</b>     | 3.1"H x 1.3"W x 18", 24", 34", 39", 45", 51", 57", 63", 69", 75", 81", 87", 93"L<br>(78 x 34 x 450, 600, 850, 1000, 1150, 1300, 1450, 1600, 1750, 1900, 2050, 2200, 2350 mm)                              |
| <b>Certifications</b> | CE, UL, and other safety symbols  |

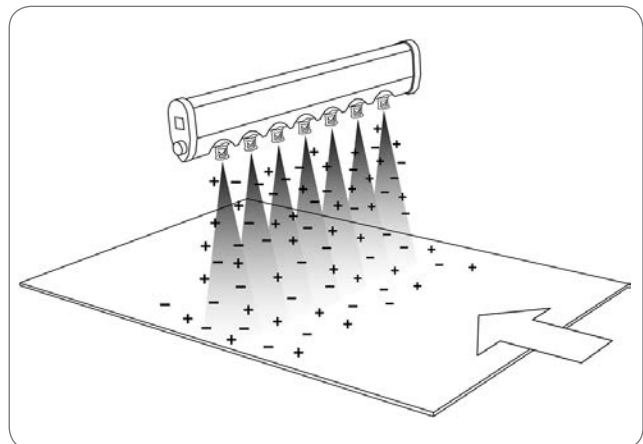
## Power Distribution Box with MP Control Software

The Model 5601 Power Distribution Box with the MP Control Software can be used to centralize power and software control for up to 8 MP AeroBars.



## 5601 Specifications

|                      |   |
|----------------------|---|
| <b>Alarm Output</b>  | Relay closure to ground   |
| <b>Communication</b> | Ethernet (RJ-45) to/from PC, individual bar standby inputs        |
| <b>Indicators</b>    | Green power, yellow communication, red alarm, blue USB            |
| <b>Output</b>        | 8 RJ-45 ports (1 for each 5635 bar)                               |
| <b>Voltage</b>       | Input: 24 VDC for each bank of 4 bars, 5.6A total (0.7A max/port) |
| <b>Dimensions</b>    | 1.2H x 6.3L x 3.6W in (3.1 x 16.0 x 9.2 cm)                       |
| <b>Weight</b>        | 15 oz (420g)  |



Model 5635 AeroBar MP with OpenJet Nozzles



## Steady-state DC Ionization Bar & Controller

# AEROBAR® 5685

Simco-Ion's AeroBar Ionizer Model 5685 is designed to control static charge in mini-environments, laminar flow hoods and workstations. The Model 5685 features a unique aerodynamic design that ionizes a local area without disrupting laminar flow. Ideal in 12-24 inch distance applications with laminar air flow, the Model 5685 utilizes Steady-state DC ion emission and Simco-Ion's IsoStat technology. IsoStat technology guarantees intrinsically balanced ionization. No complicated feedback circuits are required to maintain balance and adjustment is never needed. The Model 5685 is available in four different lengths and installation is fast, using easy-mount clips. Plug and play, the ionizer provides balanced ionization upon power up. Available with ultra-clean single crystal silicon emitter points, the Model 5685 meets ISO 14644 Class 3 standards (Fed. Std. 209e) Class 1 equivalent.



### Features

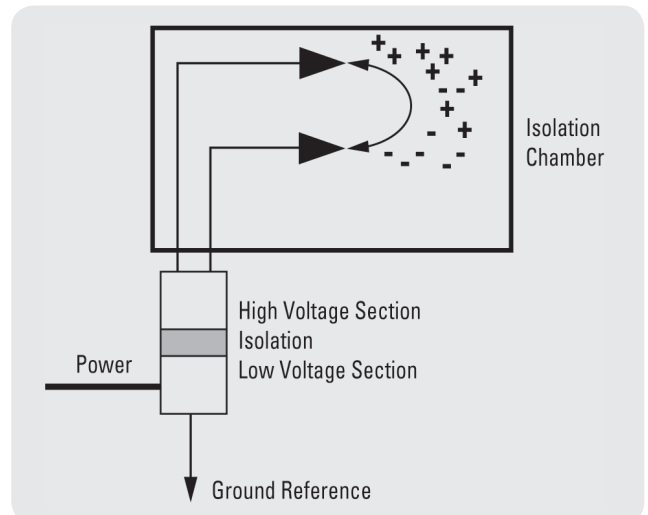
- IsoStat technology
- Steady-state DC ion emission for high ion density
- Single-crystal silicon or titanium emitter points
- Multiple lengths, including short 11-inch AeroBars

### Benefits

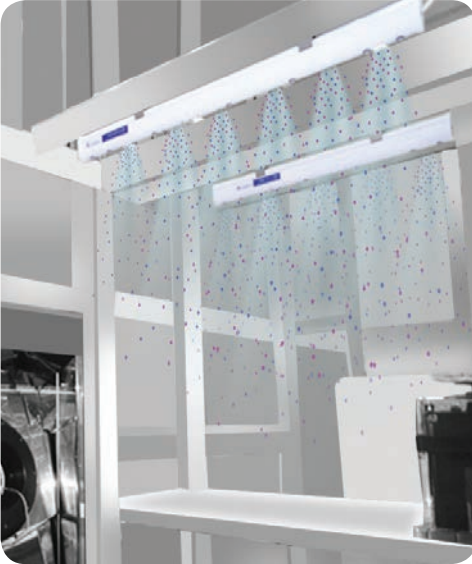
- Intrinsically balanced output of both positive and negative ions, making it ideal for any surface charge applications, low offset voltages, no calibration needed
- Fast discharge when combined with typical laminar air flows for ion delivery
- Compatible material choices for any process, silicon and titanium, ISO 14644 Class 3 (Fed. Std. 209e Class 1) equivalent
- Ability to install in a multitude of hood, workstation, and mini-environment sizes



### IsoStat Technology







## 5685 Specifications

|                       |   |
|-----------------------|---|
| <b>Airflow</b>        | 60 fpm (min) required at bar for proper operation   |
| <b>Balance</b>        | $\pm 50V$ @ 24" measured directly below two opposite polarity emitter points (Model 5685 must be mounted at least 6" away from grounded surfaces for optimum balance performance) |
| <b>Discharge*</b>     | 25 sec or less for $\pm 1000V$ to $\pm 100V$ discharge @ 24" with min 60 fpm airflow  |
| <b>Emitters</b>       | Machined titanium or single-crystal silicon, replaceable every 2-3 years depending on environment conditions  |
| <b>Indicators</b>     | Green power   |
| <b>Mounting</b>       | Two mounting clips provided, various clips and hangers available  |
| <b>Technology</b>     | Steady-state DC   |
| <b>Temperature</b>    | Operating Env: 59-95°F (15-35°C), 20-60% RH (non-condensing)  |
| <b>Voltage</b>        | Input: 24 VAC ( $\pm 10\%$ ), 50-60 Hz, 3.5W (max)<br>Output: 7.5 kV (typ)  |
| <b>Dimensions</b>     | 2.1"H x 1.13"W x 11", 22", 44", 64"L<br>(5.3 x 2.9 x 27.9, 55.9, 111.8, 162.6 cm)   |
| <b>Weight</b>         | 9 oz per foot of bar length (255g per 0.3m)   |
| <b>Certifications</b> | CE cULus  |

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

## Convenient Power Choices

The Model 5685 may be powered by either of these available transformers for 24 VAC:

- 120 VAC input, use the 33-1420-01 transformer
- 230 VAC input, use the 33-1430-01 & 33-1433-01 transformer

## 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).

**Machined Titanium:** Simco-Ion's titanium needles are recommended for many clean-rooms. Titanium emitters meet Class 1 requirements for particle emissions, erode less quickly than tungsten, produce no particle bursts, and are easily maintained.



## *μWire "Microwire" Ionization Bar*

# AEROBAR<sup>®</sup> 5710

Simco-Ion's μWire ("Microwire") AeroBar Model 5710 is a cost-effective, high-performance ionizer specifically designed to eliminate static charge on large surface areas. It is particularly suited for sensitive flat panels where fast discharge times and low swing voltages are desired. The use of Micropulse technology applied to a corona wire system reduces ion recombination thus increasing production efficiency and performance.

The μWire Bar with its unique corona wire design not only produces more ions than emitter points, but the corona wire design also permits the bar to be placed closer to substrates without causing the "striping effect" that emitter point bars can generate.

The μWire AeroBar 5710 includes a 2nd air input connector which improves performance on bars 2500 mm and longer. Shields have also been added to protect wire contacts, making it truly a "one swipe to clean" bar.

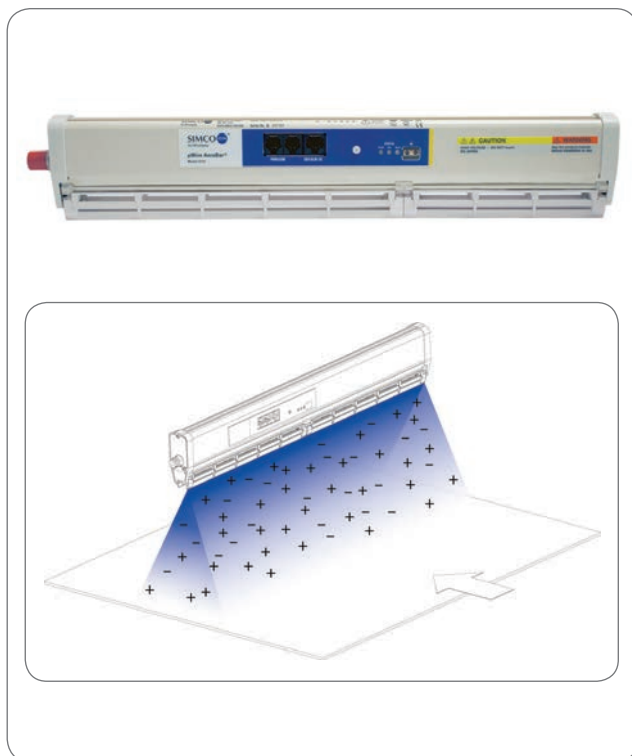


### Features

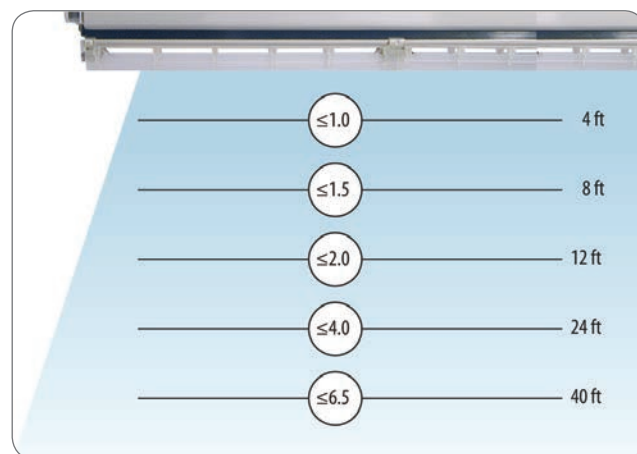
- Unique corona wire design, no emitter points
- Micropulse high voltage technology
- Flexible and powerful setup

### Benefits

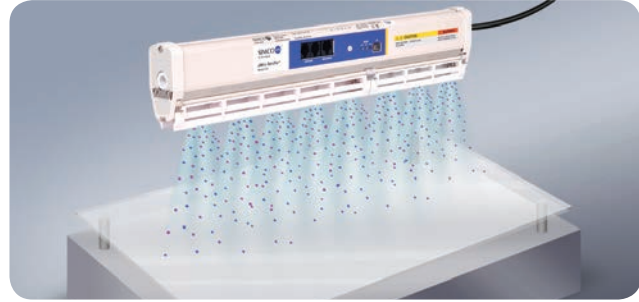
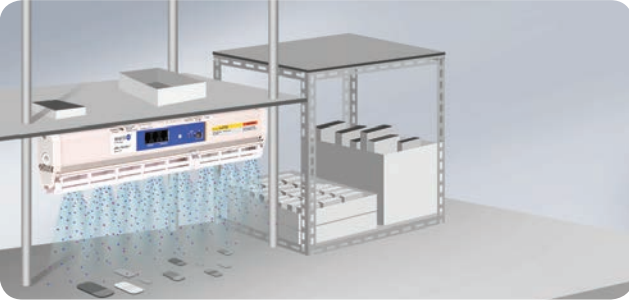
- Fast cleaning with a single swipe of the wire
- Allows mounting close to the product without danger of striping
- Long-term balance stability and discharge time performance
- Uniform balance over the length of the bar
- Lower cost-of-ownership than emitter-point technology ionizers
- Standard "plug-and-play" use or user-optimized performance for specialized applications performance



### Typical Discharge Times (sec)



μWire AeroBar Model 5710 (500 mm length) with 50 mm Air Jet Spacing.  
Measured using Simco-Ion CPM Model 280A with HEPA flow (60 fpm or 0.3m/sec) and CDA flow at 50 lpm.



## 5710 Specifications

|                       |   |
|-----------------------|---|
| <b>Airflow</b>        | 345 kPa (50 psi) optimal, 620 kPa (90 psi) max  |
| <b>Air Input</b>      | <b>Bars 400-1500 mm</b> with 50 mm air jet spacing: (1) 6 mm OD quick fitting connector; <b>bars 1650-2400 mm</b> with 50 mm air jet spacing or <b>bars 400-1500 mm</b> with 25 mm air jet spacing: (1) 8 mm OD quick fitting connector; <b>bars 2500 mm and longer</b> with 50 mm air jet spacing with 50 mm air jet spacing: (2) 8 mm OD quick fitting connectors |
| <b>Balance</b>        | Inherently self-balancing system $\leq \pm 25V$ over the length of the bar, maintain balance setting $> 6$ months without cleaning in clean environments  |
| <b>Bar Settings</b>   | All operating parameters set via a wired handheld terminal (HHT)  |
| <b>Cleanliness</b>    | ISO 14644 Class 2 (better than Fed. Std. 209E Class 1)  |
| <b>Corona Wire</b>    | Tungsten, 80 micron dia.  |
| <b>Discharge*</b>     | $< 1.5$ sec for $\pm 1000V$ to $\pm 100V$ discharge @ 12" (30 cm), 50 mm air jet spacing with min CDA 2 lpm/airjet  |
| <b>EMI</b>            | Below background level  |
| <b>Frequency</b>      | Default setting at 1 Hz, adjustable from 0.1-35 Hz  |
| <b>Gas</b>            | Clean dry air (CDA)   |
| <b>Indicators</b>     | Green power, yellow communication, red alarm  |
| <b>Ozone</b>          | $< 0.05$ ppm  |
| <b>Range</b>          | 150-2000 mm, application and specification dependent  |
| <b>Technology</b>     | Micropulsed high voltage  |
| <b>Temperature</b>    | Operating Env: 59-95°F (15-35°C), 30-60% RH (non-condensing)  |
| <b>Voltage</b>        | Input: 24 VDC $\pm 10\%$ , 12W (max)<br>Output: Adjustable, 13 kV pk-pk (typ)   |
| <b>Enclosure</b>      | ABS chassis, stainless steel reference plates   |
| <b>Dimensions</b>     | 3.0"H x 1.3"W x 15.75", 19.7", 25.6", 29.5", 35.4", 39.4", 45.3", 49.2", 55.1", 59.1", 65", 68.9", 74.8", 78.75", 84.65", 88.6", 94.5", 98.4", 104.3", 108.25", 114.15", 118.1"L (76 x 33 x 400, 500, 650, 750, 900, 1000, 1150, 1250, 1400, 1500, 1650, 1750, 1900, 2000, 2150, 2250, 2400, 2500, 2650, 2750, 2900, 3000 mm)                                       |
| <b>Certifications</b> | CE, UL, IEC, RoHS   |

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

## Application Flexibility

The  $\mu$ Wire AeroBar can be operated with the factory default settings in "plug-and-play" mode or optimized for a specific Handheld Terminal. The bar's ability to perform well in either a vertical or horizontal position along with the  $\mu$ Wire AeroBar low profile height design makes it easy to install in a variety of flat-panel tool locations, including mail-slot, conveyor and load/unload cassette areas. The Power-Signal Distribution Box accessory can be used to monitor the  $\mu$ Wire AeroBar status in a convenient location.

A maximum of three  $\mu$ Wire AeroBars may be electrically connected together in a serial fashion ("daisy-chained"). Chaining bars together can create a simpler electrical wiring scheme that provides power and communication to all of the connected bars.

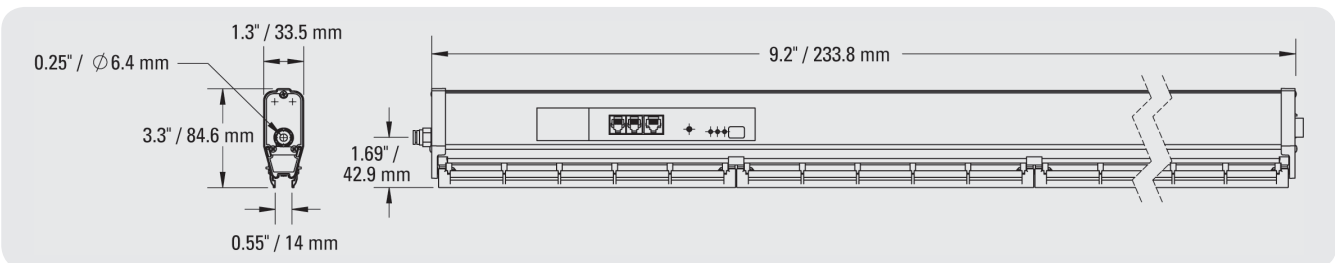
## Handheld Terminal (HHT)

The HHT can be used to change the settings and use to monitor the bar's status and parameter, indicator LEDs is desired. The HHT can be used to monitor the 5710 AeroBar during operation such as bar address, frequency, power output, standby mode, alarm test and firmware version..



## Power/Signal Distribution Box

Available for use to monitor the  $\mu$ Wire AeroBar status in a convenient location. (33-5700-01).



## *μWire "Microwire" Ionization Bar* **AEROBAR® 5711**

Simco-Ion's μWire ("Microwire") AeroBar Model 5711 is a cost-effective, high-performance ionizer specifically designed to eliminate static charge on large surface areas, particularly suited for sensitive flat panels where fast discharge times and low swing voltages are desired. The μWire AeroBar utilizes MicroPulse technology applied to a corona wire system for optimal performance. MicroPulse technology reduces ion recombination at the corona wire. Corona wire design produces more ions than emitter points and also permits the bar to be placed closer to substrates, diminishing the recombination of ions and the resulting "striping effect."

The 5711 includes all the latest design features of the μWire AeroBar to make the bar easier to clean and provide higher performance. Shields have been added to protect the corona wire contacts during the cleaning process, making it truly a "one swipe to clean" bar.



### Features

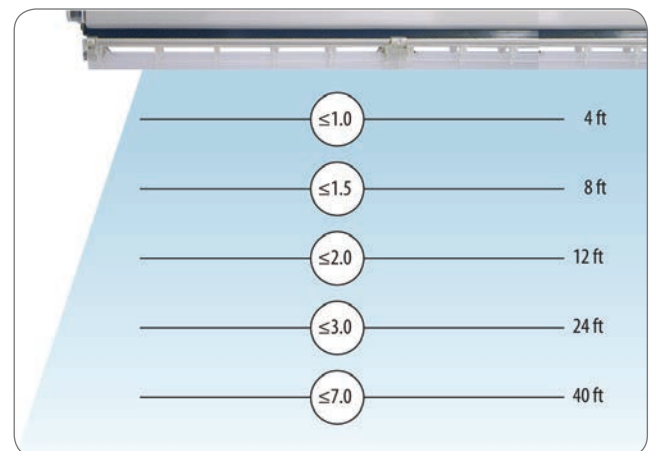
- Compact size 6 to 10 inches (150 to 250 mm length)
- Unique corona wire design, no emitter points
- Micropulse high voltage technology

### Benefits

- Charge protection for even the most space-limited automation tools
- Bar mounted closed to target without ionization "striping"; one swipe cleaning with the bar in place
- Long-term balance stability and discharge time performance
- Uniform balance over the length of the bar
- Innovative ionization generation that translates to lower total-cost-of-ownership
- Convenient access to the power input, status lights and remote alarm connection

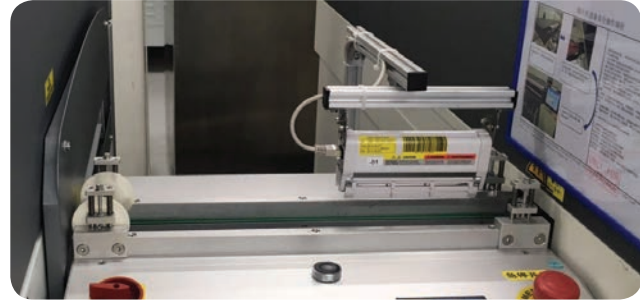
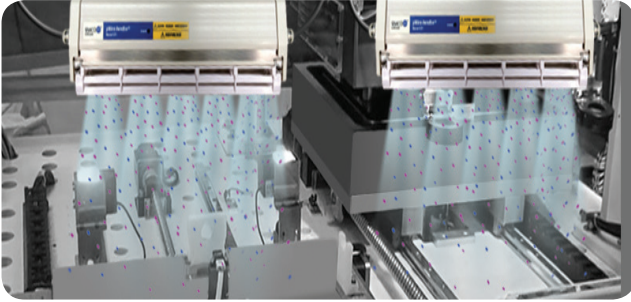


### Typical Discharge Times (sec)



μWire AeroBar Model 5711 (250 mm length) with 25 mm Air Jet Spacing.  
Measured using Simco-Ion CPM Model 280A with CDA flow at 0.5 gpm or 2 lpm per air jet (4.8 gpm or 18 lpm total) and no HEPA flow.





## 5711 Specifications

|                       |  |
|-----------------------|--|
| <b>Airflow</b>        | 150 mm AeroBar = 2.6 gpm/10 lpm, overall per bar<br>250 mm AeroBar = 4.8 gpm/18 lpm, overall per bar   |
| <b>Air Supply</b>     | Clean dry air (CDA)  |
| <b>Alarm Output</b>   | Relay contact, rated $\pm 24$ VDC @ 0.2A max   |
| <b>Balance</b>        | $< \pm 25$ V over length of bar, maintains balance performance $> 6$ months without cleaning (ISO 14644-1 Class 4 or better environment)   |
| <b>Bar Settings</b>   | All operating parameters are set via a Handheld Terminal (HHT) by either wired connection or battery powered IR control to the controller  |
| <b>Cleanliness</b>    | ISO 14644 Class 2 (better than Fed. Std. 209E Class 1)   |
| <b>Corona Wire</b>    | Tungsten, 80 micron diameter   |
| <b>EMI</b>            | Below background level   |
| <b>Frequency</b>      | Factory default setting is 1 Hz, adjustable from 0.1-35 Hz   |
| <b>Indicators</b>     | Green power, yellow communication, red alarm (combinations of LEDs indicate specific status conditions of the bar)   |
| <b>Ozone</b>          | $< 0.05$ ppm   |
| <b>Performance</b>    | 3.5 sec decay average @ 600 mm (typ) measured at AeroBar center and 25 mm straight air jet spacing, 18 l/m purging air, (250 mm long AeroBar), no laminar flow; setting 1 Hz, 100% output, CPM: balance $< \pm 10$ V, swing 100V pk-pk |
| <b>Range</b>          | Target ionization 6-79" (150-2000 mm)  |
| <b>Technology</b>     | Micropulsed high voltage   |
| <b>Temperature</b>    | Operating Env: 59-95°F (15-35°C), 30-60% RH (non-condensing)   |
| <b>Voltage</b>        | Input: 24 VDC $\pm 10\%$ , 12W (max)<br>Output: Adjustable, 13 kV pk-pk (typ)  |
| <b>Enclosure</b>      | AeroBar: ABS chassis, stainless steel reference plates<br>Controller: Stainless steel chassis  |
| <b>Dimensions</b>     | AeroBar: 3.0"H x 1.3"W x 6.3 or 10.2"L (76 x 34 x 160 or 260 mm)<br>Controller: 4.7"H x 1.9"W x 3.2"D (119 x 48 x 83 mm)   |
| <b>Certifications</b> | CE, UL, IEC, RoHS  |

## Application Flexibility

The  $\mu$ Wire AeroBar can be operated with the factory default settings in "plug-and-play" mode, or optimized for a specific application using the Handheld Terminal. The bar's ability to perform well in either a vertical or horizontal position along with the  $\mu$ Wire AeroBar low profile height and length design makes it easy to install in a variety of flat-panel tool locations (mail-slot, conveyor and load/unload cassette areas as well as within many backend semiconductor assemblies and test areas.

## 5711-CTRL Controller

The 5711-CTRL controller can be placed in a convenient location for easy access to power input (local 24 VDC or power adapter from AC wall power), ionization status lights, handheld terminal setup connection and remote status connection.



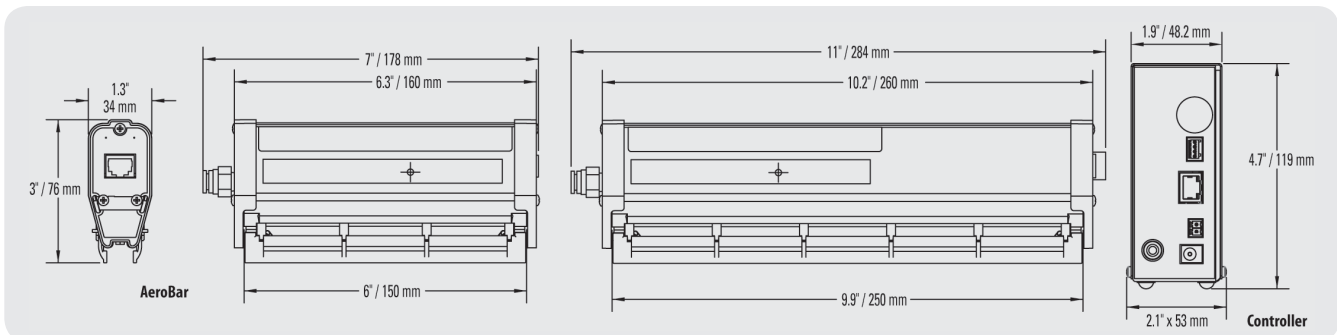
## Handheld Terminal (HHT)

Use the Handheld Terminal (HHT) to change the settings of the 5711 AeroBar. The HHT can also be used to monitor operation status and parameter, such as bar address, frequency, power output, standby mode, alarm test and firmware version.



## Emitter Wire Cleaner

The 5711  $\mu$ Wire AeroBar has a specific design emitter wire cleaner, that places foam swap inside the swap along the emitter wire, so that accumulated dirt can be removed in a fast and simple way. The emitter cartridge can also be detached for replacement.



## 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™ 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.



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.

### 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

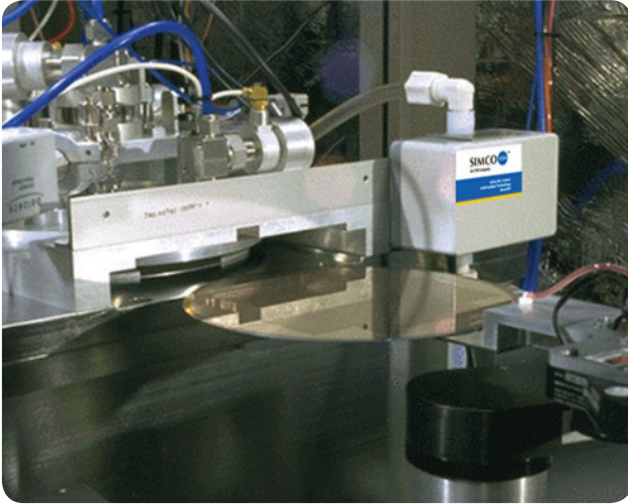
- Precise delivery of balanced ionization to confined areas; ideal for use in caustic environments where emitter points cannot be exposed
- Can be used in a variety of applications
- No calibration needed
- Fast discharge times
- Provide ISO 14644 Class 3 cleanliness
- Maintenance-free for two years







Model 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

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

\* 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.

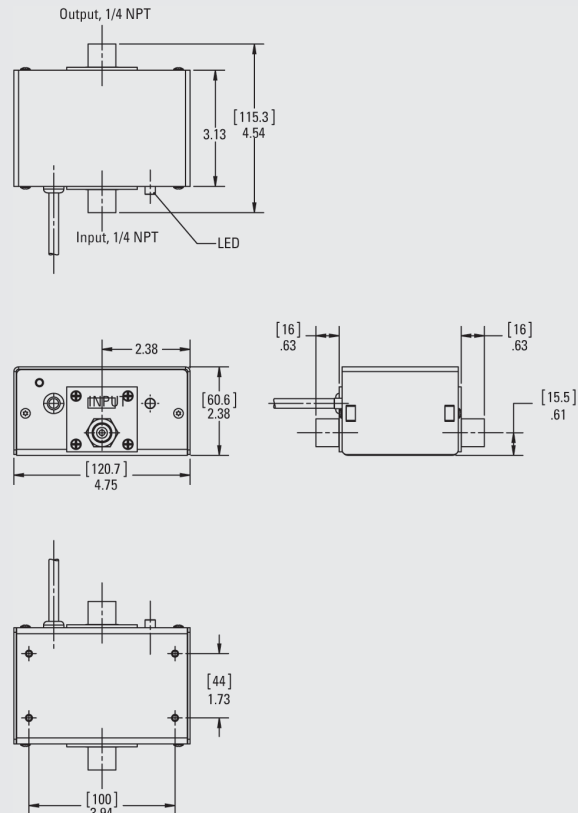
## Applications

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.

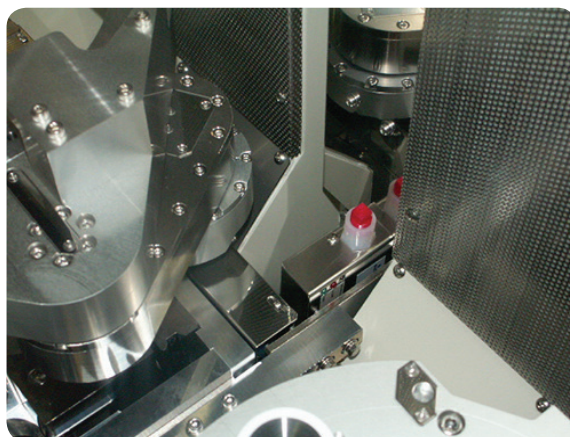


### Features

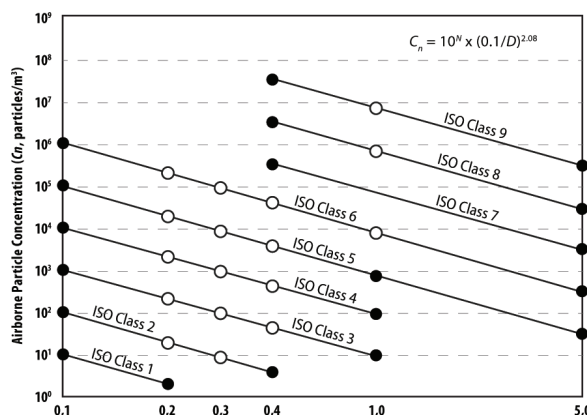
- ISO 14644 Class 1 (0.1 µm particles) and ISO 14644 Class 12 (2018) (0.01 µm particles)
- Alarms indicating low ion output, high voltage power supply failure, low gas flow
- Standby mode
- Auto shut-off with low gas flow
- Compact size
- +24 VDC input power

### 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

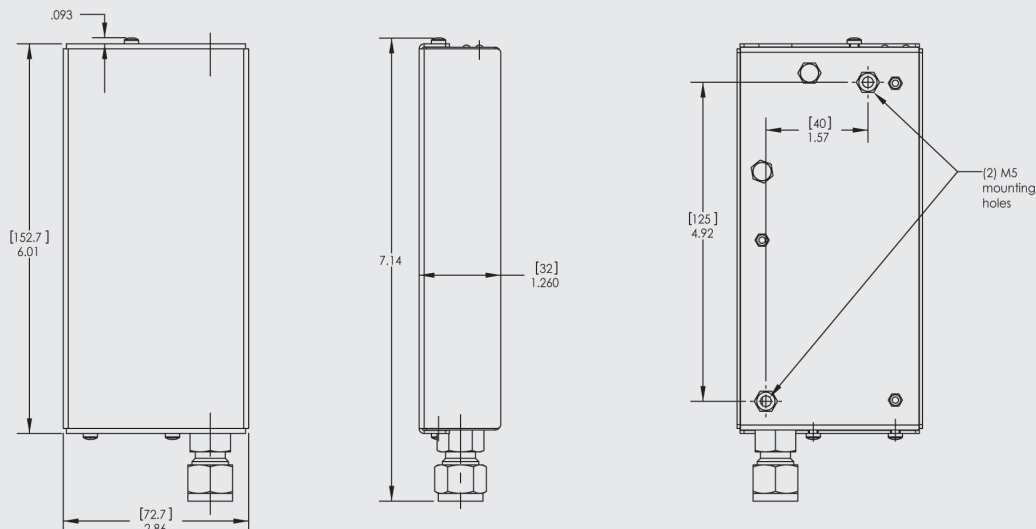
|                          |   |
|--------------------------|---|
| <b>Alarms</b>            | HV alarm, low ions alarm, low gas flow alarm  |
| <b>Balance</b>           | ±25V or less range with no output manifold, measured @ 150 mm (6") from CPM   |
| <b>Cleanliness</b>       | ISO 14644 Class 1 (0.1 µm particles) &<br>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)<br><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)<br><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<br><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<br><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>    |     |



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



Ionizing Bar System



Controller Model 4052e

### 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.

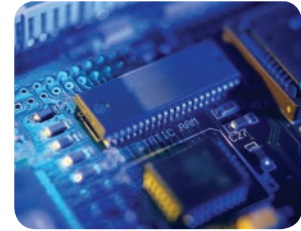
## Emitter Point Technology

**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.

## Target Applications

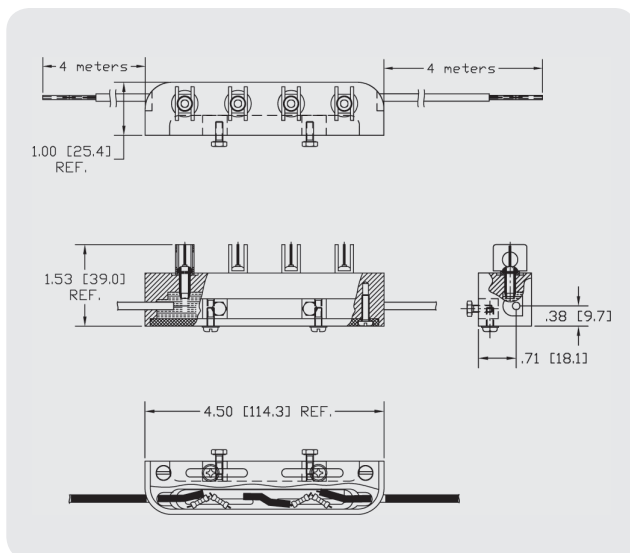
The back-end semiconductor industry uses a series of extensive reliability testing that will ensure the conformance of integrated chips and modules. Testing of the product at extreme high and low temperatures will ensure the conformance of integrated chips and modules; designed to accelerate real life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







## 4610TF Specifications

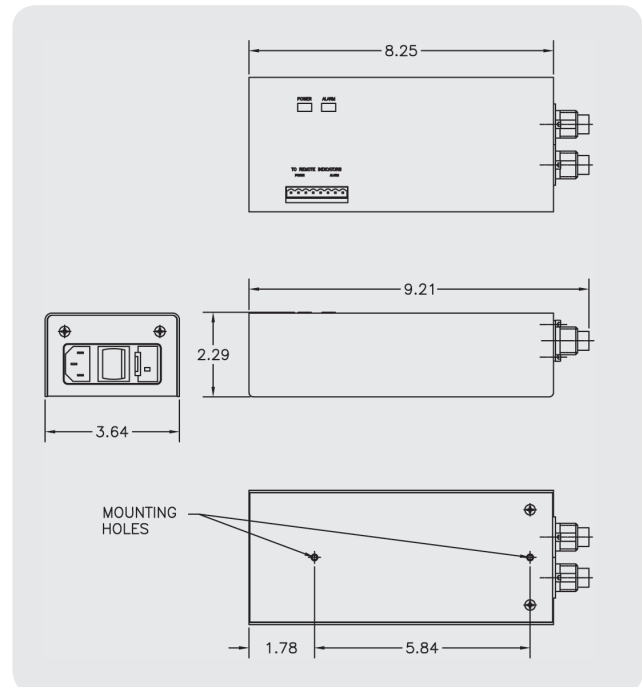
|                       |   |
|-----------------------|---|
| <b>Airflow</b>        | 60-100 fpm (18.3-30.5 mpm) recommended  |
| <b>Cabling</b>        | 30 kV, 13.3' (4m) / 21.7' (6m)  |
| <b>Discharge*</b>     | <3 sec @ 6" (15 cm) distance between ionizer and CPM<br><5 sec @ 10" (25 cm)<br><10 sec @ 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> |     |

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



## 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<br><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> |     |



## Extreme Temperature Ionizer System

# Model 4612

Simco-Ion's new Extreme Temperature Ionization System provides  $<\pm 10V$  balance in extreme environments from  $-50^{\circ}\text{C}$  to  $+150^{\circ}\text{C}$ . The 4612 Ionizer, along with its 4062e Controller and 550 Extreme Temperature Passive Sensor 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  $150^{\circ}\text{C}$  ( $310^{\circ}\text{F}$ ) and as low as  $-50^{\circ}\text{C}$  ( $-58^{\circ}\text{F}$ )
- 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

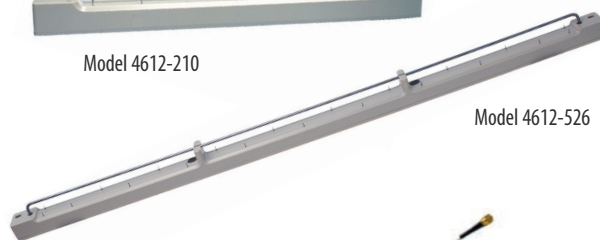
### Benefits

- 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

#### Ionizing Bar System



Model 4612-210



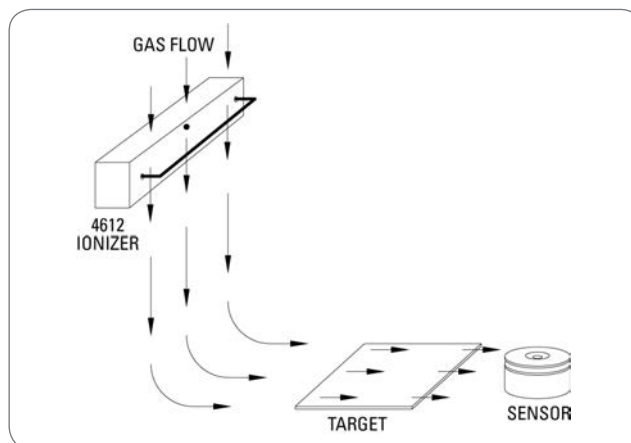
Model 4612-526

Model 550 Extreme Temperature Passive Sensor Antenna



#### 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.





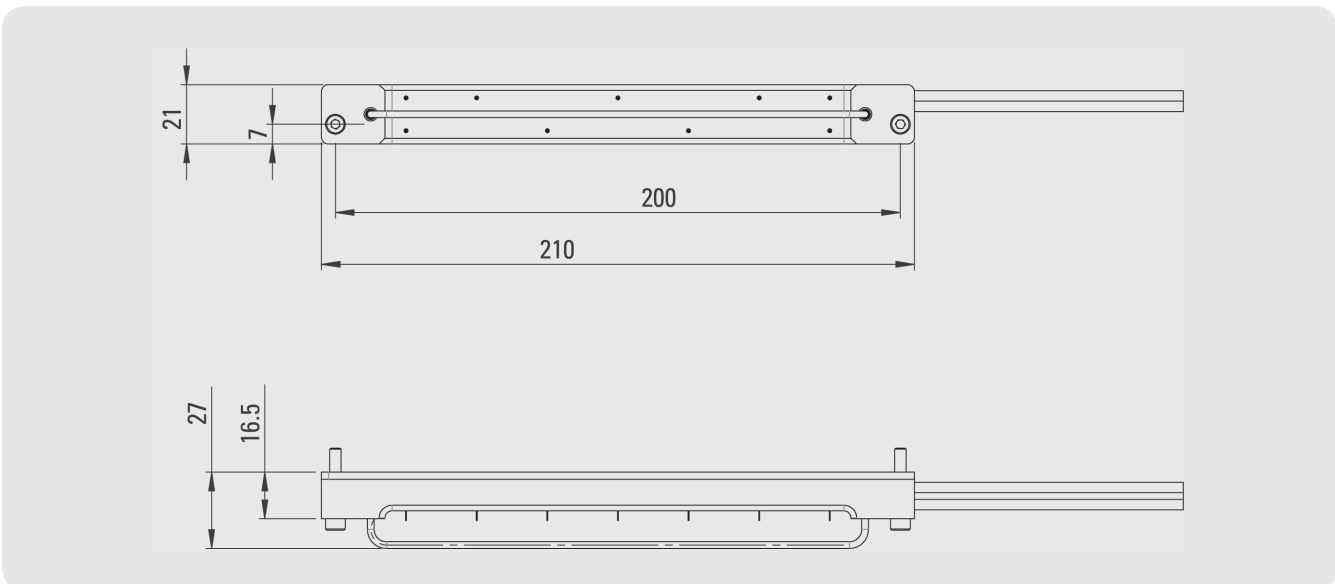
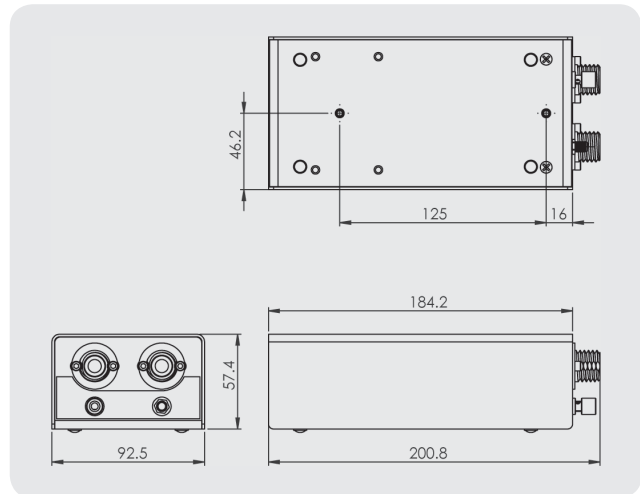
## 4612 Specifications

|                       |   |
|-----------------------|---|
| <b>Alarms</b>         | Low input voltage, HV output fault, antenna signal too variable/noisy and/or out of range   |
| <b>Balance</b>        | ±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 ±1000-100V)   |
| <b>Emitter Points</b> | Tungsten  |
| <b>FMS</b>            | Relay contact, rated ±24 VDC @ 0.2A, max 4-20 mA current output   |
| <b>Gas</b>            | <b>Flow:</b> 100 fpm (min) velocity past 4612 Ionizer<br><b>Supply:</b> Clean dry air (CDA) or nitrogen (N <sub>2</sub> ) with min purity 99.99%                                  |
| <b>Technology</b>     | DC corona discharge   |
| <b>Temperature</b>    | <b>Operating Env:</b> -50°C to +150°C (max)<br><b>Gas:</b> 150°C (max)  |
| <b>Voltage</b>        | Input: +24 VDC, ±5% @ 0.25A, 6W (max)   |
| <b>Mounting</b>       | 4612-210: Two M4 holes<br>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)<br>4612-526 mm Ionizer: 20.7"L x 0.8"W x 1.2"H (526 x 21 x 30 mm)<br>550 Antenna: 1.7" dia x 0.9"H (44 dia x 22 mm) |
| <b>Weight</b>         | 4612-210 mm Ionizer: 12 oz (365g)<br>4612-526 mm Ionizer: 18 oz (515g)<br>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°F (10-35°C), 30-60% RH (non-condensing)  |
| <b>Voltage</b>        | <b>Input:</b> 24 VDC ±5% @ 1.0A to 4062 Controller (optional external power supply to convert from 100-240 VAC to 24 VDC)<br><b>Output:</b> ±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   |



## In-tool Ionizer

# 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).

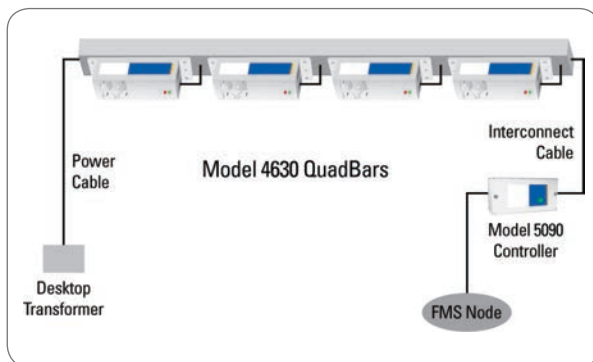


### Features

- 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<br>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,<br>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> |       |

## 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.

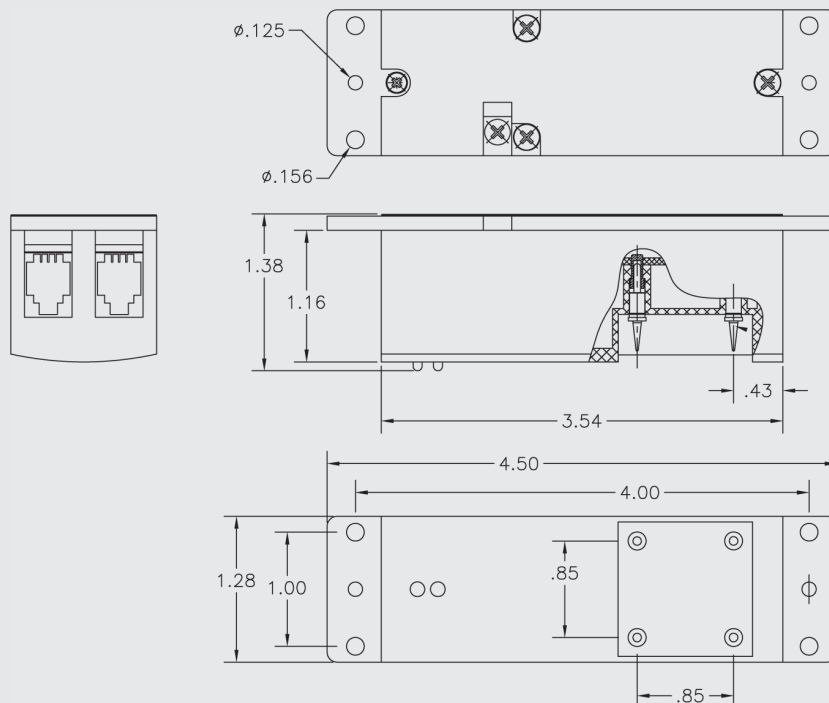
## Model 4030 Controller

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<br>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 Quadropole 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

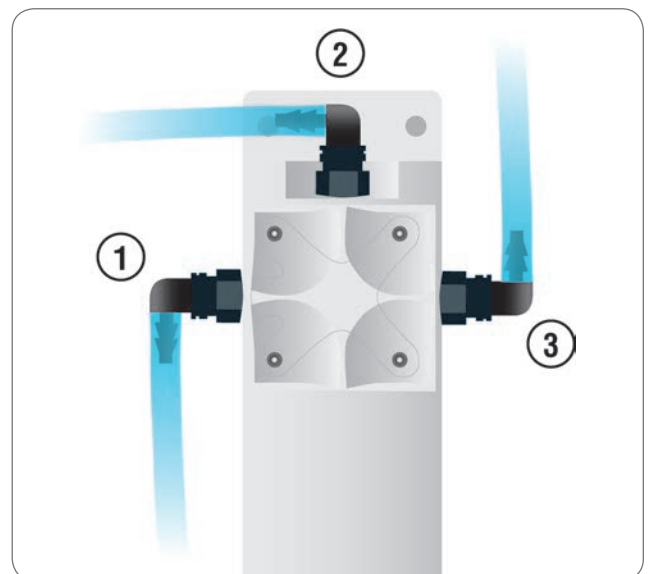
- Air assist cartridge design with cross-channel air delivery; two cartridge design options
- Rotatable cartridge design
- Quadropole configuration with IsoStat technology
- Compact size
- Single Crystal Silicon emitter points
- Alarm output to FMS or process tool controller

### 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)<br>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<br><b>Flow:</b> 0-25 lpm @ 0-7 psi<br><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;<br>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<br>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,<br>width 1.92" (4.88 cm), air connection elbow on the end, ionizer body<br>length 3.9" (10 cm)   |
| <b>Weight</b>         | 3.8 oz (108g)   |
| <b>Certifications</b> |      |

\* 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.



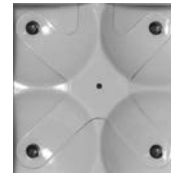
## 4030 Specifications

|                   |  |
|-------------------|--|
| <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<br>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)   |

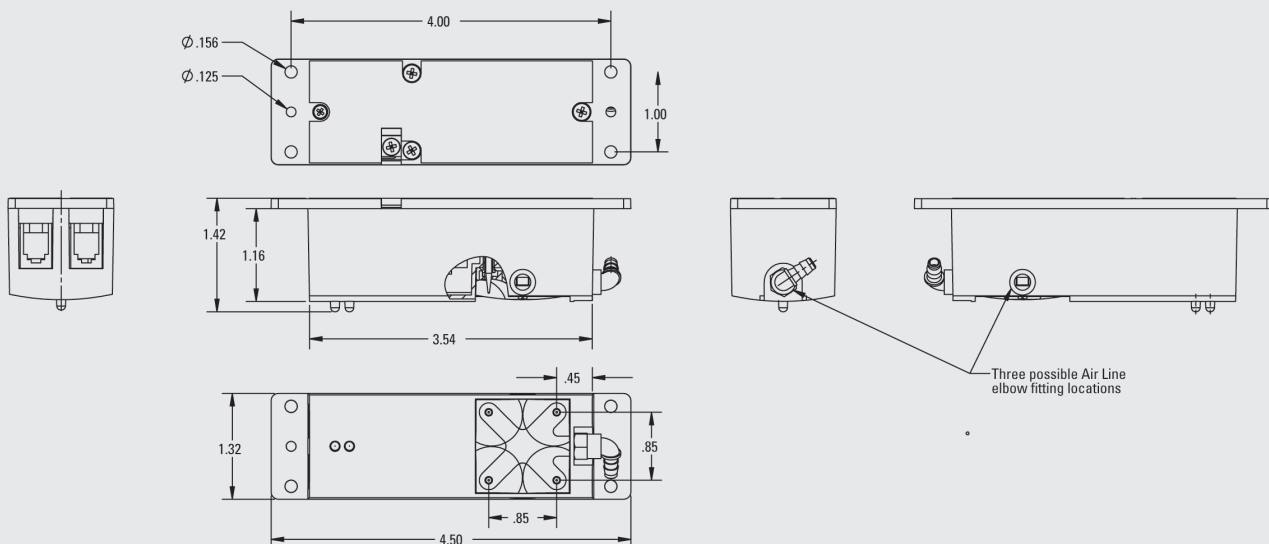
## Insert Cartridge Options



Standard cross-channel cartridge with airflow sheath around the emitter point 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

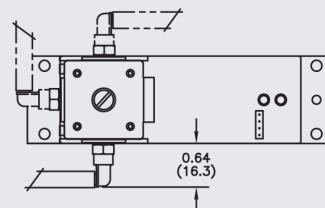
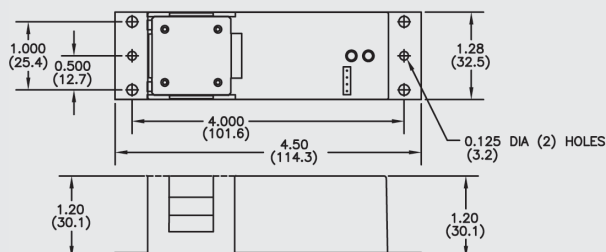
- Fits into the tight confines of any process tool
- No adjustments needed to maintain the required balance
- Standard features for convenient user operation
- Daisy-chain, up to 5 fusIONs, perfect for layered in-tool ionization protection
- Improved performance with extended coverage area



### fusION Specifications

|                       |  |
|-----------------------|--|
| <b>Balance</b>        | <±50V  |
| <b>Discharge*</b>     | Without fan: <15 sec @ 6" (15.2 cm) with airflow (50 fpm/m)<br>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 eUL US 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

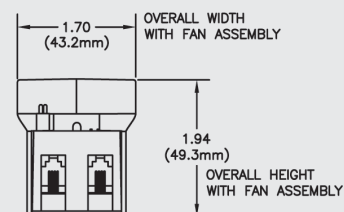
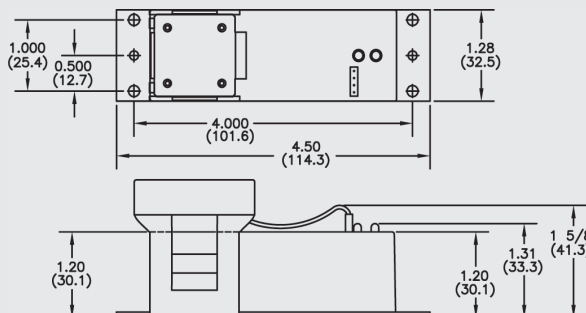
### Benefits

- 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<br>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    IEC 60335-1   |

\*. 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  |

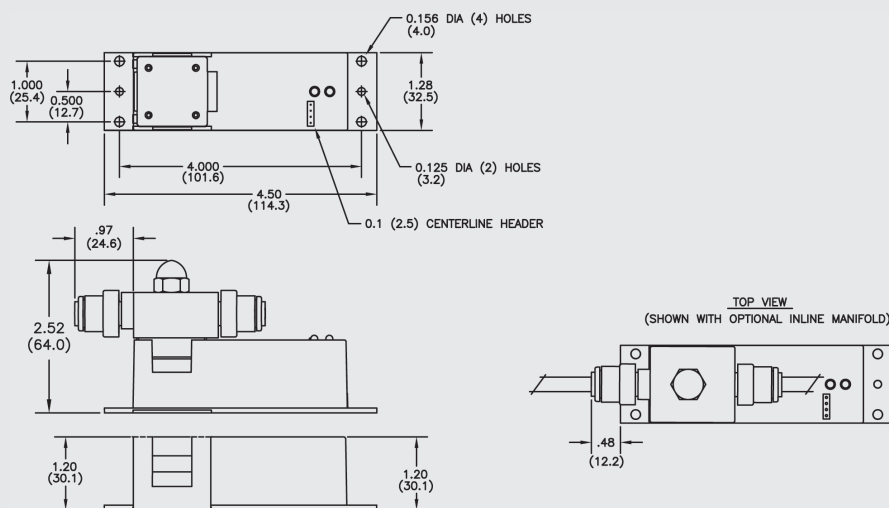
Offset voltage and discharge time determined as per ANSI/ESD STM3.1 ionization using a 6" x 6", 20 pF plate (charge plate monitor).  
Discharge times are in seconds from 1000-100V.



## 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 $\mu$ A 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<br><b>Flow:</b> 0.8 scfm @ 5 psi to 3.6 scfm @ 50 psi<br><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<br>Output: ±3500 VDC, 50 mW, 5 $\mu$ A, 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> |  230V, 50 Hz  120V, 60 Hz  |

## Other Applications



## ionONE Spot Ionizers

# 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

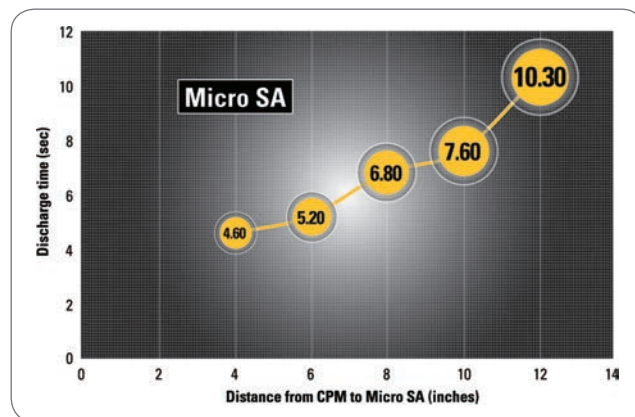
ionOne Spot Ionizers



Micro S

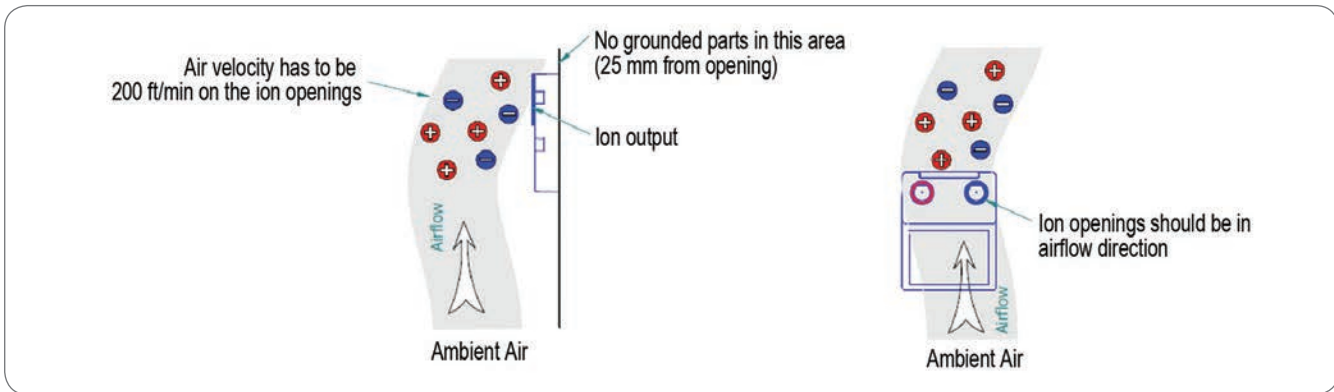
Micro SA

## 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

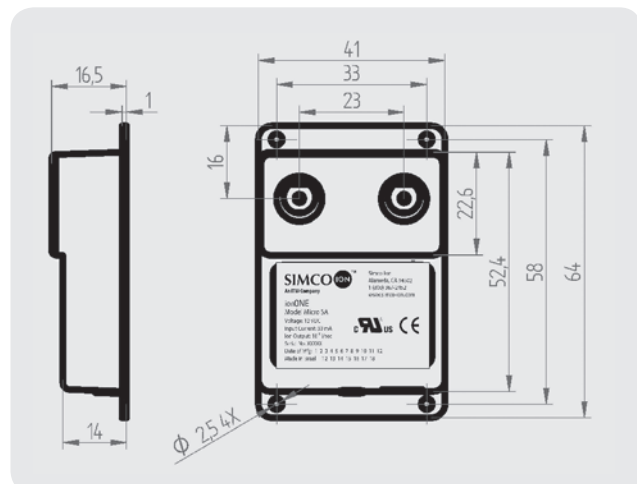
|                       |   |
|-----------------------|---|
| <b>Air</b>            | <b>Flow:</b> Ambient 200 ft/min (1.0m/sec) minimum recommended<br><b>Consumption:</b> Micro SA: 10-30 liters/min<br><b>Fitting:</b> 4 mm OD, barbed<br><b>Supply:</b> Clean dry air (CDA) |
| <b>Audible Noise</b>  | Micro S: 47 dB @ 1' distance<br>Micro SA: 67 dB @ 1' distance using 20 lpm air  |
| <b>Balance</b>        | Micro S: <±30V, Micro SA: <±20V   |
| <b>Cleanliness</b>    | Meets ISO 14644 Class 5 (Fed. Std. 209E Class 100)  |
| <b>Connectors</b>     | 3 pin modular   |
| <b>Coverage</b>       | Micro S: 6" x 6" (150 x 150 mm) @ 3"<br>Micro SA: 6" x 6" (150 x 150 mm) @ 6"   |
| <b>Discharge*</b>     | Micro S: <10 sec @ 3" (76 mm)<br>Micro SA: <8 sec @ 6" (150 mm), 20 lpm airflow (min)   |
| <b>EMI</b>            | Below background levels (recommended 2" minimum distance)   |
| <b>Emitter Points</b> | Stainless Steel   |
| <b>Indicators</b>     | Blue on power, blue off no power  |
| <b>Ozone</b>          | <0.05 ppm   |
| <b>Status Output</b>  | Facility Monitoring System (FMS) capable  |
| <b>Temperature</b>    | Operating Env: 40-122°F (5-50°C), 30-70% RH (non-condensing)  |
| <b>Voltage</b>        | Input: Isolated 12 VDC, 30 mA   |
| <b>Mounting</b>       | 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)   |
| <b>Enclosure</b>      | Polycarbonate-ABS plastic blend   |
| <b>Dimensions</b>     | 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                       |
| <b>Weight</b>         | Micro S: 0.56 oz (16g)<br>Micro SA: 0.67 oz (19g)   |
| <b>Certifications</b> |   |

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

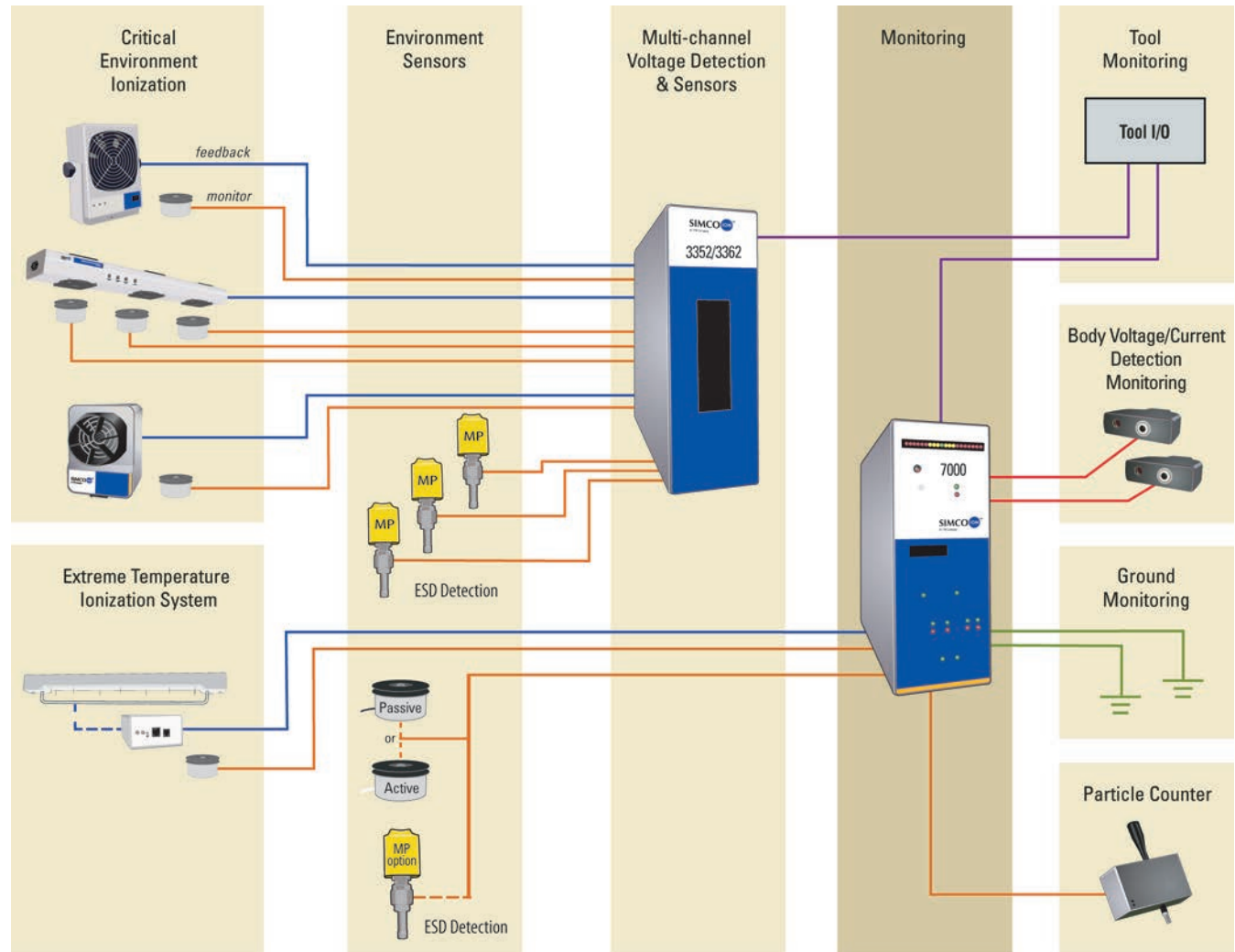
## AC Adaptor Kit



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



# Smart Manufacturing



|                 | Novx MiniPulse   | Novx 7000   | Novx 3352   | Novx 3362   | Novx 3352 MP  | Novx 3362 MP   |
|-----------------|--|---|---|---|---|--|
| Function        | ESD Event Monitor, combines detection with specialized antennas to count & record event quantity | Multifunction microprocessor for monitoring             | Ionizer monitoring multichannel voltage detection (monitoring to 5000V) | Ionizer monitoring multichannel voltage detection, balance & discharge time | Ionizer monitoring multichannel voltage detection & ESD event detection | Ionizer monitoring/ multichannel voltage detection & ESD event detection |
| Software        |  | Calibrator Reader                                       | Calibrator Reader   | Calibrator Reader   | Calibrator Reader   | Calibrator Reader  |
| No. of Channels | 1 channel  | 1 active or passive, 1 MP, 1 particle counter, 2 ground | Up to 3 passive antennas  | Up to 3 active antennas   | Up to 3 passive antennas +3 MiniPulse                                   | Up to 3 active antennas +3 MiniPulse                                     |



## The Electrostatic Control Management System

# Enhanced with the Novx Advantage

Simco-Ion offers a complete Electrostatic Control Management System to meet the challenges and requirements of Industry 4.0. These latest ionization products are specially designed to integrate with our Novx products for the **Novx advantage—the capability to simultaneously detect, measure, record and monitor electrostatic voltage**. Our Electrostatic Control Management System is an essential tool for today's semiconductor manufacturing industry.



### CRITICAL ENVIRONMENT IONIZING BLOWERS

Balance:  $\pm 3V$  or better  
 $\pm 1V$  Novx closed-loop feedback  
 Cleanliness: ISO 14644 Class 4

#### Model 5810i Overhead Ionizing Blower

- 2- or 3-fan configuration
- Daisy-chainable

#### Model 5822i In-tool Ionizing Blower

- Compact
- FMS connection and audio alarm

#### Model 5832 Benchtop Ionizing Blower

- Sensor input, FMS connection, alarms and management control
- Auto-clean system

### Extreme Temperature Ionization System Model 4612 Bar, Model 4062e Controller and 550 Antenna

- Withstands up to 302°F (150°C), down to -94°F (-70°C)
- Sensor input, FMS connection, alarms, management control
- Meets  $\pm 10V$  or better balance (per S20.20)
- Novx 3362 active antenna feedback control

### Novx MiniPulse for Process and Tool Monitoring ESD Event Detection

- Compact, embeddable monitor
- 9-24 VDC power input or 9V battery
- Variable antenna orientations



## Critical Electrostatic Process Monitoring

# Novx 7000

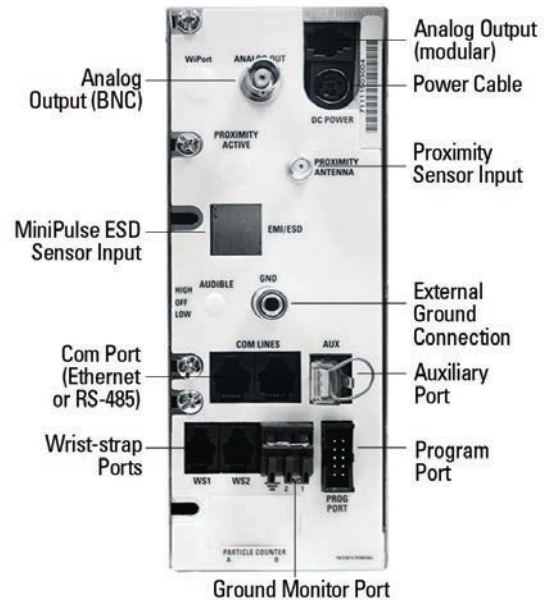
The Novx Series 7000 Process Monitor is a multi-purpose microprocessor-based instrument for monitoring critical electrostatic-related parameters in workstations and process environments. The six dedicated use channels provide the flexibility to customize the instrument for the monitoring capability and communication required at each location. Module options include field voltage detection/ionizer balance, ESD event, body voltage detection or ground monitoring and particle counting.

### Features

- Smart Signal Processing
- Multiple sensor and antenna styles
- Daisy-chainable, RS-485 or Ethernet output
- ESD event detection tracking
- Three options for field voltage monitoring
- User-programmable alarm set-points with automated messaging
- Closed-loop control to tool computer
- Plug-in modules allow factory upgrades

### Benefits

- Discriminates ESD events from other events and background noise
- Adapts to a variety of process applications, environmental conditions, and configurations
- Ability to connect multiple units with a single output or IP address
- Logs events with software
- Select appropriate detection method for the application
- Customize each sensor location; ensures prompt alarm notifications
- Provides ability to shut down tool when thresholds are exceeded
- Provides flexibility to reconfigure monitors for processes with differing requirements



## 7000 Specifications

| Field Sensing                      | Passive   |
|------------------------------------|---|
| Accuracy                           | ±1V for ≤20V, ±5% for >20V                                      |
| Antennas                           | ±1V to ±5000V max   |
| Bandwidth with Filter              | 5 Hz  |
| Input Impedance                    | >100 GΩ   |
| Peak Hold*                         | OFF, ON   |
| Voltage*                           | Output (full-scale): 0 - ±5.0<br>Input Range: ±15 to ±5000V     |
| ESD Event Detection                | CDM / HBM   |
| Particle Counter Sensing Interface | Data acquisition/power available for most popular sensor models |
| Body Voltage Detection             |   |
| Accuracy*                          | ±0.5V   |
| Alarm 1 & 2 (adjustable)*          | 1 - 10V   |
| Voltage* <sup>1</sup>              | Applied (dual-wire): <0.5V                                      |
| Wrist-strap*                       | Voltage Threshold: 0.1-10V<br>Alarm Delay: 1-25 sec             |
| Ground Monitoring                  |   |
| Accuracy                           | 0.5V  |
| Current                            | Applied (short circuit): <1 mA                                  |
| GND 1 & 2 Threshold                | 1-20W   |
| Range                              | 1-20W   |
| Voltage                            | Applied (open circuit) <0.5V                                    |
| General                            |   |
| Audible Alarms                     | Off, High, Low  |
| Digital Display                    | 4-Digit   |
| LED Display Scale                  | 1 - 5000V   |
| Novx Com                           | RS-485 or Ethernet  |
| Power Supply                       | 100-240 VAC, 50/60 Hz   |
| Enclosure                          | Stainless Steel   |
| Dimensions                         | 2.7"W x 7"H x 5.5"D (6.9 x 17.8 x 14 cm)                        |
| Weight                             | 2.5 lb (1.4 kg)   |

\* = Programmable. 1 = Open circuit voltage measured with Fluke 45 meter.



Novx 7000 Inside an Automated HSA Tool

### Module Options

**LED Proximity Display:** A visual field voltage level indicator with Red/Yellow/Green display.

**Field Voltage Detection, Ionizer Balance:** Provides local field voltage and ionizer balance monitoring along with closed-loop feedback control for the passive antenna system.

**MiniPulse ESD Event Detection:** Combines detection with specialized antennas to count and record event quantity.

**Body Voltage Detection and Ground Monitoring:**

1. Provides 2 each dual wire operator body voltage detection (typical alarm level set-point is ±3V to 10V).
2. Provides Ground Monitoring of 1 each hard ground and 1 each soft ground at a workstation

**Particle Counter Interface:** Powers and collects output data from most particle counters and provides system status with data logging.

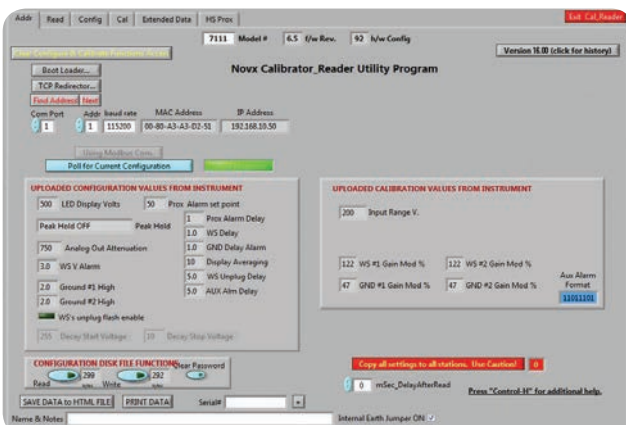
**Communication:** Choose from RS-485 or Ethernet.

### Programming

The instrument is programmable through Calibrator\_Reader Software, allowing the user to set thresholds and alarms, define data logging parameters and automate alarm notifications. The time-stamped graphical interface provides the ability to cross-correlate events to sensor measurements. Time-stamped data logging files provide the ability to cross-correlated events to Series 7000 measurements.

### Calibrator Reader Software

For Novx instruments almost all the configuration and calibration parameters are set through the Novx Com Line communication port. This procedure is accomplished using the Novx Calibrator\_Reader Program running on a desktop or notebook computer.



## Novx Advanced Voltage Detection Systems

# Novx 3352/3362/3352MP/3362MP

The Simco-Ion Novx Passive and Active Multi-fan Closed-loop Ionizer Controllers deliver Novx advantage—the capability to simultaneously detect, measure, record and monitor electrostatic voltage; a cost-effective solution for multiple locations.

The versatile antennas used with these systems allow their use in a variety of applications including monitoring sensitive workstations, in-tool voltages or ionizer performance with the option of closed-loop control to select ionizer products.

Data input is actively monitored and logged in with time stamps. User settable thresholds and alarm levels that provide a proactive safeguard for critical areas. Proven a solution to Industry 4.0 to monitor, analyze and control ionization while providing traceability and control.

### Features

- Microprocessor-based controllers, multichannel, digital I/O, auxiliary I/O, local addressability, RS-485/Modbus or Ethernet data output
- Passive and active antenna configurations
- Precision resolution
- Programmable closed-loop control for up to 3 solid state DC ionizer fans or a 3-fan blower
- Programmable alarm set-points with tool shutdown
- Voltage/polarity displays, local red/green LEDs

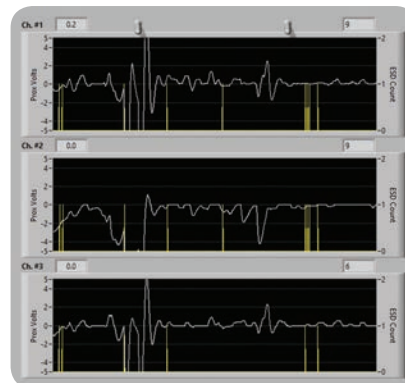
### Benefits

- Provides easy integration, cost/performance advantages, direct communication to other Novx instruments or a tool controller
- Monitor voltage at distances and ionizer balance; perform in situ decay testing without the added expense of a CPM
- Measure and record voltage down to 0.1V
- Enable closed-loop feedback control to select ionizers based on balance or decay test results
- Reduce process variations, decrease scrap/rework and improve process yields
- Visual indicators at the instrument



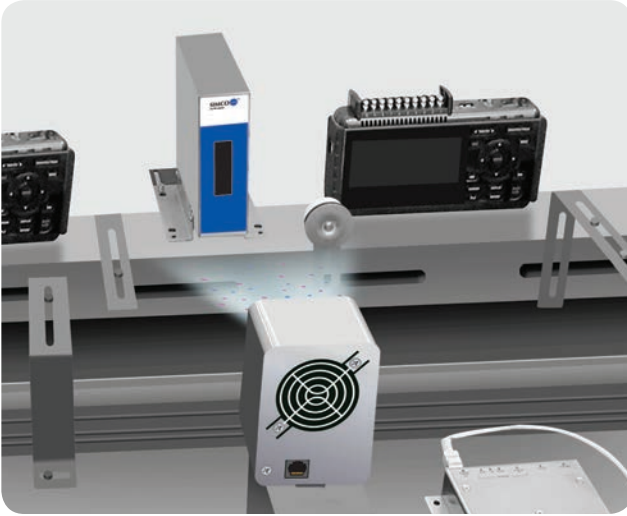
### Special Features

Both the Novx 3352 and 3362 feature a front panel which have an LCD screen that displays the voltage and alarm status of each of the three channels in real-time. Files can be exported for Excel graphing and analysis. These instruments can operate as stand-alone systems and interface to the process controller to initiate response testing and data reporting.



Proprietary Calibrator Reader Program reading in real-time mode  
3 channels: yellow = ESD white = proximity measurement



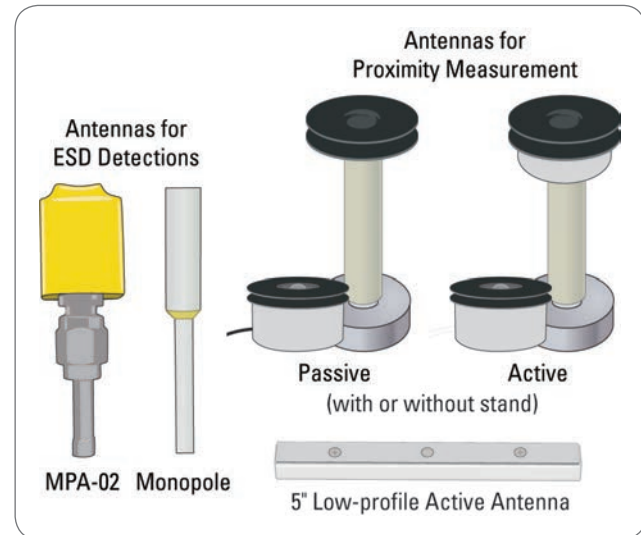


## 3352/3362 Specifications

|                        | Novx 3352  | Novx 3362  |
|------------------------|--|--|
| <b>Accuracy</b>        | 0.5V for <20V, $\pm 5\%$ for >20V  | 1V for <20V, $\pm 5\%$ for >20V  |
| <b>Antenna</b>         | Passive (up to 3 channels)   | Active (up to 3 channels)  |
| <b>Aux Out</b>         | Open collector   | Open collector   |
| <b>Capacity</b>        | 1, 2 or 3 fans   | 1, 2 or 3 fans   |
| <b>Communication</b>   | RS-485/Modbus, Ethernet  | RS-485/Modbus, Ethernet  |
| <b>Decay Testing</b>   | up to 3 channels (3362 only)   | up to 3 channels (3362 only)   |
| <b>Display</b>         | 4-digit  | 4-digit  |
| <b>Indicators</b>      | Red, green or alarm  | Red, green or alarm  |
| <b>Reporting Range</b> | 0 to $\pm 5000V$   | 0 to $\pm 150V$  |
| <b>Set-points</b>      | Alarm: Programmable<br>Audible Alarm: $\pm 0.5V$ (min)<br>Zero: Programmable | Alarm: Programmable<br>Audible Alarm: $\pm 1V$ (min)<br>Zero: Programmable |
| <b>Voltage</b>         | Input: 24 VDC  | Input: 24 VDC  |
| <b>Enclosure</b>       | Stainless steel  | Stainless steel  |
| <b>Dimensions</b>      | 2.0"W x 6.8"D x 6.5"H<br>(5.1 x 17.3 x 16.5 cm)                              | 2.0"W x 6.8"D x 6.5"H<br>(5.1 x 17.3 x 16.5 cm)                            |
| <b>Weight</b>          | 2.1 lb (0.95 kg)   | 2.2 lb (1 kg)  |
| <b>Certifications</b>  | CE, cULus, RoHS, REACH   | CE, cULus, RoHS, REACH   |

## Antennas

The antennas have been designed for specific reception characteristics for radiated pulse transients that result from ESD events.



## Applications

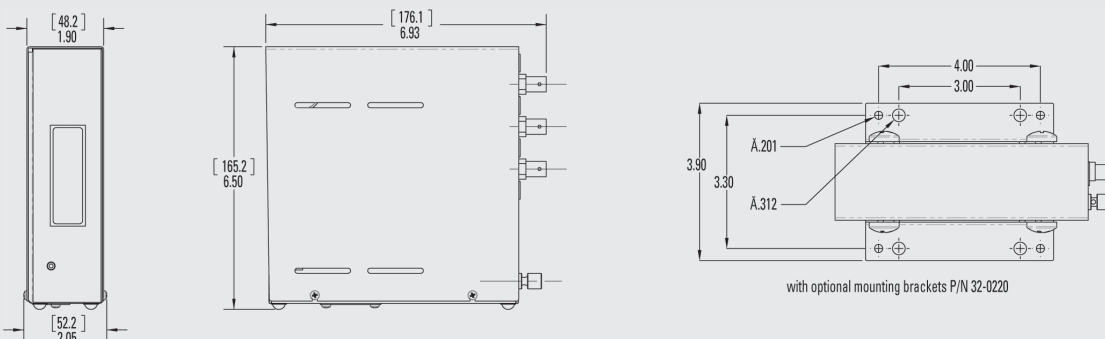
The **Novx 3352 Passive Multi-fan Closed-loop Controller** connects with passive antennas to detect low-level voltage change and ion balance with sensitivity down to 1V. Antenna configurations:

- Monitor voltages on moving targets
- Monitor ionizer balance
- Provide closed-loop control to ionizer fans
- Distinguish the proximity of voltages from SSDC ionizer signals

The **Novx 3362 Active Multi-fan Closed-loop Controller** connects to active antennas, providing similar voltage and ion balance detection capability as the 3352 with the addition of decay tests. The powered antenna acts as a charged plate monitor (CPM) to periodically measure ionizer discharge times at programmable frequencies. A "Decay Test" button is provided on the front panel of the 3362 for manually initiating an ionizer decay test.

Antenna connection configurations:

- Monitor voltages on moving targets
- Monitor ionizer balance
- Distinguish the proximity of field from SSDC ionizer signals
- Perform decay testing automatically or on command



## Novx ESD Event Monitoring

# Novx MiniPulse

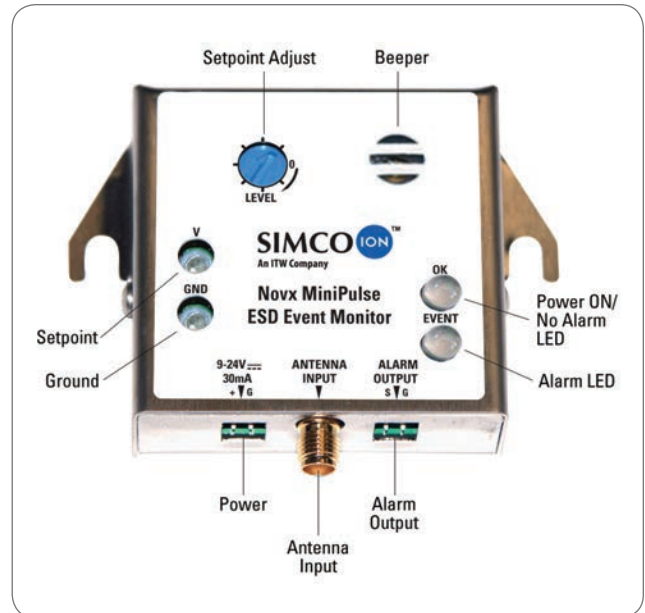
The Novx MiniPulse ESD Event Detector is designed for tool and process monitoring. This affordable, small footprint embeddable monitor has been developed to warn of product damage risks at the point of electrostatic discharge. The MiniPulse uses time domain and threshold discrimination to detect pulse electromagnetic energy. Through the use of specific antenna configurations and placement, the MiniPulse can provide ESD event detection for well-defined small areas.

### Features

- Small footprint
- Red/green LED alarm; audible alarm
- Open Collector Output on Alarm
- 9-24 VDC power input, including 9V battery operation
- Variable antenna orientations & adjustable threshold settings

### Benefits

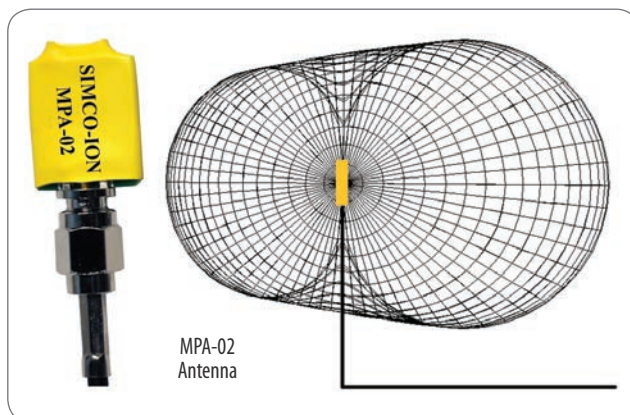
- Easily fit inside a tool or in a manufacturing line
- Visual and audible alarms of ESD events
- Able to integrate into a Factory Monitoring System (FMS)
- Multiple power options provide flexibility in use
- Tunable to specific applications while eliminating false alarms



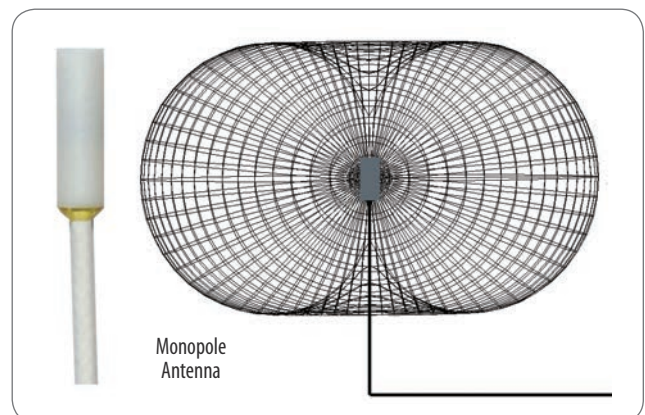
### Antennas

There are two standard antennas for use with the MiniPulse which serve different ESD detection purposes:

- The **MPA-02 Microstrip ESD Antenna**. Focused lobe directional design with packplane signal rejection ratio of 3 dB or greater. Developed for use with the Novx 7000 monitor unit, and also with the MiniPulse.
- The **Monopole Antenna**. General use with a 360° monitoring capability. This antenna has an isotropic nature and acquires ESD signals equally from different directions. This antenna is more appropriate for monitoring an area such as a workbench or other open area.




Microstrip ESD Antenna—Focused Lobe Directional Design



Omni-directional Antenna—360° ESD Monitoring

## MiniPulse Specifications


|                       |  |
|-----------------------|--|
| <b>Accuracy</b>       | ±20 V/m radiated amplitude   |
| <b>Alarm</b>          | <b>Output:</b> Open collector pulls to GND on alarm +24 VDC max, 0.2A load max<br><b>Audible:</b> Piezo buzzer sounds momentarily on ESD event   |
| <b>Cleaning</b>       | The exterior stainless steel chassis may be cleaned with a dry cleanroom cloth or a cleanroom cloth dampened with distilled or deionized water   |
| <b>Connectors</b>     | <b>Alarm:</b> 0.100" header, locking, 2-pin 0.025" square right angle posts (mating connector is a Molex 22-01-3027, TE Connectivity 3-640440-2 or other equivalent connector)<br><b>Antenna:</b> SMA<br><b>Power Input:</b> 0.100" header, locking, 2-pin 0.025" square right angle posts |
| <b>Indicators</b>     | Green normal operation, red ESD event  |
| <b>Power</b>          | 9-24 VDC, 30 mA (9V alkaline battery option can be used to provide up to 20 hours of operation, no ground required)  |
| <b>Range</b>          | 1-1000 V/m radiated ESD event  |
| <b>Response</b>       | 50 ms (reset time)   |
| <b>Setpoint</b>       | Detection level user adjustment via "Level" trimpot, pulse detection length  |
| <b>Temperature</b>    | Operating Env: +40°F to +120°F (5-49°C) electronics, +40°F to +150°F (5-65°C) antenna, humidity 10-60% RH (non-condensing)   |
| <b>Dimensions</b>     | 2.1W x 2.08L x 0.75H in. (5.3 x 5.0 x 1.9 cm) (not including mounting flanges)   |
| <b>Weight</b>         | 4 oz (113 g)   |
| <b>Certifications</b> | CE    |

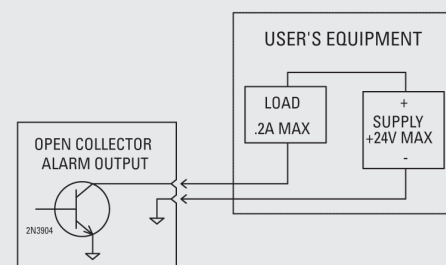
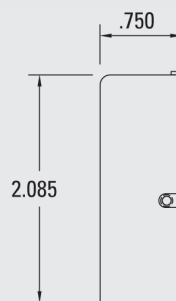
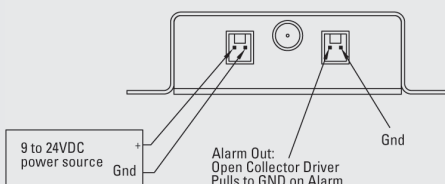
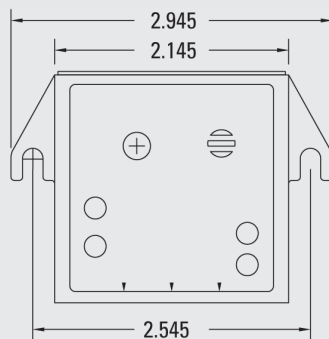
## Charge Device Model Event Simulator (CDMES)

The optional CDMES was designed to allow ESD detectors to be calibrated inside the tools and processes where CDM events occur. This simulation tool allows calibrated CDM events of different magnitudes to be produced at the location where production devices are most vulnerable and where ESD monitoring sensors are located



## CDMES Specifications

|                       |   |
|-----------------------|---|
| <b>Accuracy</b>       | ±10 V/m radiated amplitude  |
| <b>Cleaning</b>       | Periodic point replacement only   |
| <b>Connectors</b>     | <b>Power Input:</b> 0.100" header, locking, 2-pin .025" square right angle posts (mating connector is a Molex 22-01-3027, TE Connectivity 3-640440-2 or other equivalent connector)<br><b>Oscilloscope:</b> SMA-male (RG-316 cable) |
| <b>Power</b>          | Variable benchtop DC power 2 kV supply  |
| <b>Response</b>       | 50 ms   |
| <b>Range</b>          | 25-2000 VDC (using 14-1245 power supply)  |
| <b>Temperature</b>    | Operating Env: 40-120°F (5-49°C), 10-60% RH (non-condensing)  |
| <b>Dimensions</b>     | 7.67"L x 1.65"W   |
| <b>Weight</b>         | 3.6 oz (102g)   |
| <b>Certifications</b> | CE    |



## Cleanroom Ionization System

# Model 5515

The Model 5515 Ceiling Emitter and Controller Models 5522/5582 comprise our state-of-the-art digital room ionization system. The two controller models enable the user to start with the Model 5522 controller capable of small system with 20 or fewer ceiling emitters, and grow into a large system with full software monitoring capabilities by simply moving to the Model 5582 Controller. Digital technology allows each ceiling emitter's parameters, including ion output, ion pulse timing or digital address, to be individually set at its location using the Model 5571 or Model 5572 handheld controllers. Precision fine tuning of each ceiling emitter enables the ionization system to achieve maximum performance in any airflow condition and for each application.



### Features

- Fully digital technology
- Single crystal silicon or titanium emitter points
- Advanced feedback technology
- Small and large capacity controllers

### Benefits

- Provides precision control of all parameters with expansive data output capabilities
- Ensures ultra-clean performance with low maintenance; single crystal silicon emitter points meet the needs of leading-edge wafer processing applications
- Maintains balanced, high ion output over long periods for stable performance between emitter point cleanings
- Capable of growing from a small system with FMS output only to a large system using IonManager Pro software as requirements change



Model 5515  
Ceiling Emitter



Model 5582  
(up to 80 ceiling emitters)

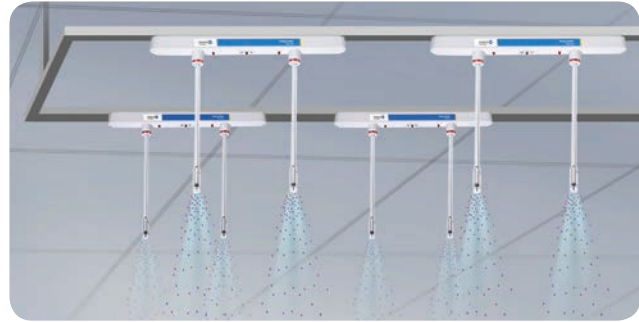
Model 5522  
(up to 20 ceiling emitters)

Model 5572 Handheld Remote

IonManager Pro software provides a visual management tool to monitor and manage the system, including alarm conditions, room layouts, and individual emitter and controller status. Automated notifications for alarm conditions and maintenance alerts are user controlled. Data logging provides a history of system changes and security levels assure access by only authorized users.





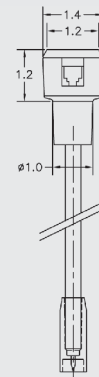
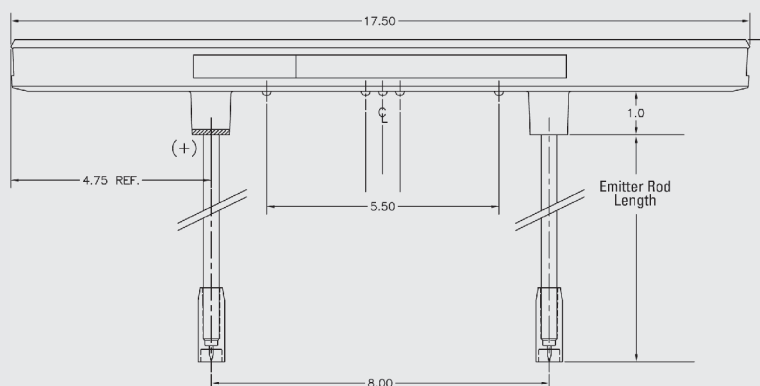


## 5515 Specifications

|                       |   |
|-----------------------|---|
| <b>Alarm</b>          | Alarm operates when emitter is no longer able to maintain preset ion output level, visual LED in the middle of the emitter (optional audible alarm at controller) |
| <b>Cleanliness</b>    | <b>Single-crystal silicon</b> ISO 14644-1, <b>titanium</b> ISO 14644-3 standards (better or equal to Fed. Std. 209(e) Class 1 equivalent)                         |
| <b>Connectors</b>     | Telephone-type RJ-11 modular jack receptacle on each end of emitter   |
| <b>Control Signal</b> | Ionization parameters are adjusted with the 5571 Handheld Terminal, 5572 IR Remote or via IonManager Pro software   |
| <b>Emitter Rods</b>   | 2.5, 5, 10, 15, 24, 36, 60 or 66" length<br>(6.4, 12.7, 25.3, 38.1, 61.0, 91.4, 152.4 or 167.6 cm)  |
| <b>Emitter Points</b> | Single-crystal silicon or titanium  |
| <b>Ozone</b>          | <0.005 ppm  |
| <b>Regulation</b>     | Output/balance stability is achieved by independently regulating the ion emission current of each polarity at each emitter  |
| <b>Technology</b>     | Pulsed DC, Steady-state DC or standby   |
| <b>Temperature</b>    | Operating Env: 59-95°F (15-35°C), 20-60% RH (non-condensing)  |
| <b>Timing</b>         | Precise timing (0-10 sec @ 0.1 sec resolution) is generated by a local microcontroller  |
| <b>Voltage</b>        | <b>Input:</b> 24 VAC, 50/60 Hz, 1W (typ)<br><b>Output:</b> 0-20 kVDC for each polarity, positive/negative output levels adjusted separately                       |
| <b>Dimensions</b>     | 1.2"H x 1.4"W x 17.5"L (3.1 x 3.6 x 44.5 cm)  |
| <b>Weight</b>         | 16.4 oz (465 grams)   |
| <b>Certifications</b> | CE cUL US ENEC  |

## System Performance Security

The Model 5515 Ceiling Emitter, Model 5582 Controller and IonManager Pro software provide consistent ionization protection throughout your facility. The advance notification system communicates system alarms and warnings immediately so corrective action can be taken. The alarm notifications are user configurable and can be sent to multiple personnel via email, SMS or pager.



## Cleanroom Ionization System Controllers

# Model 5522 & 5582

Simco-Ion's small and large capacity controllers, enable the user to start with the Model 5522 controller capable of controlling a small system with 20 or fewer ceiling emitters and grow into a large system up to 80 ceiling emitter with full software monitoring capabilities by simply moving to the Model 5582 Controller.



Model 5522 Controller

Model 5582 Controller

## Application Evaluation Capabilities

Exclusive in the industry, Simco-Ion offers a full applications evaluation service to see whether your facility is operating at its peak efficiency.

We approach each customer's situation—whether it's a large facility, or in a limited/confine space or in a critical manufacturing environment—with earnest diagnostic evaluation supported by technical expertise to develop innovative solutions to improve operations, increase product quality and control cost. This approach has continued to earn high recognition globally throughout the OEM and end-user customers.

### Contact us at:

<https://technology-ionization.simco-ion.com/distributors>

Sales Service +1 (510) 217-0460

Email: [saleservices@simco-ion.com](mailto:saleservices@simco-ion.com)

## 5522 / 5582 Specifications

|                       |   |
|-----------------------|---|
| <b>Capacity</b>       | Model 5582: 80 ceiling emitters<br>Model 5522: 20 ceiling emitters  |
| <b>Indicators</b>     | Green power, red alarm, audible alarm   |
| <b>FMS</b>            | Relay or 4-20 mA output (available on Model 5522 / 5582 controllers, no software capability on the Model 5522 controller) |
| <b>Output Signal</b>  | RS-485 to emitters (5522 & 5582), Ethernet or RS-485 to IonManager Pro (5582 only)  |
| <b>Voltage</b>        | Input: 100/115/220-240 VAC $\pm 10\%$ , 50/60 Hz voltage selectable & fuse protected<br>Output: 24 VAC                    |
| <b>Dimensions</b>     | Model 5582: 6.2"H x 4.4"W x 13.2"L (15.8 x 11.1 x 33.5 cm)<br>Model 5522: 3.0"H x 2.8"W x 12.4"L (7.5 x 7.0 x 31.6 cm)    |
| <b>Weight</b>         | Model 5522: 3.2 lb (1.4 kg)<br>Model 5582: 7 lb (3.18 kg)   |
| <b>Certifications</b> | CE, UL, and other safety certifications   |

## Accessories

The **Handheld Terminal 5571** supplements and expands use of the controller. It is used to set Controller and emitter parameters. It connects to the controller with a modular cable at the port labeled "Input Module". The 5571 features 30 keys and a four-line LCD screen.



The **Infrared Remote Control Model 5572** is used to read and modify the emitter parameters directly at the emitter. It features a narrow infrared beam that prevents communication errors with nearby emitters. The Remote Control Model 5572 allows you to view current emitter settings and change the positive and negative output levels.

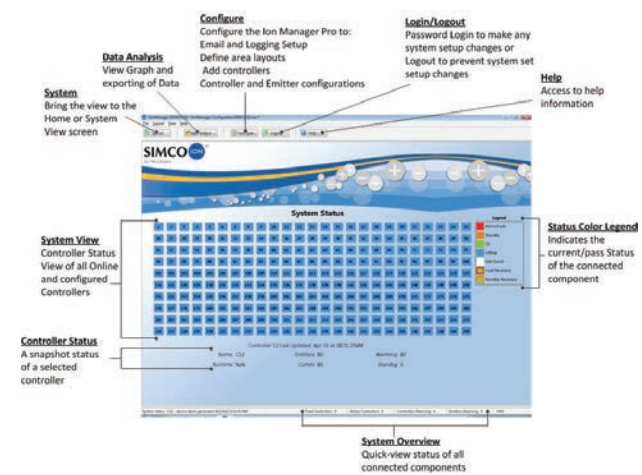


## Cleanroom Ionization System Management Software

# IonManager Pro

IonManager Pro software monitors, manages and analyzes Simco-Ion's Digital Room Ionization Systems (Ceiling Emitter Model 5515 and 5582 Controller).

The software provides customers with a cost-effective way to monitor system status and manage system maintenance requirements through visual indicators and automated notifications. IonManager Pro features simple graphical images of the ionization system with a drill-down hierarchy to individual components for instant identification of status and operational parameters. Fault conditions are easily viewed and identified with real-time graphical displays. Text messages or email notifications can automatically be sent to the maintenance team. Integrated summary reports based on user preferences, are available for management review. System performance can be easily analyzed by accessing history logs, using the built-in statistical and graphing tools, or exporting the data into common analysis packages.



The controller layout view offers status verification for each ionizer.

### Features

- The standard system manages and monitors up to 10 controllers and up to 800 emitters; larger systems are available
- Configurable alarm event notifications based on user preferences
- Real-time event capture
- User-friendly visual interface

### Benefits

- Provides a single monitoring system for large installations
- Enables automated text or email notifications to multiple users
- Assures fast notification of alarm or maintenance conditions; provides time stamped data log of system events and conditions
- Allows user to quickly identify and locate alarm conditions

|                         |  |
|-------------------------|--|
| <b>Compatibility</b>    | Ionizer Model 5515 Digital Emitter and Model 5582 Controller   |
| <b>Data Collection</b>  | RS-485 or Ethernet ports, compares actual measured values to control limit values in real time, produces fault log data stream   |
| <b>Data Archive</b>     | Data stream from data collector, creates hour/day/month/year reports, user-selectable polling periods  |
| <b>Net Interface</b>    | Incoming TCP/IP connections, password verification   |
| <b>Data Viewer</b>      | Area selector, multiple graphs, user-selectable facility layout display, alarm status colored symbols, live data to historical data  |
| <b>Options</b>          | Larger system sizes available  |
| <b>Output File</b>      | CSV (imports into spreadsheets)  |
| <b>Operating System</b> | Windows XP (SP3)® or Windows 7®  |
| <b>Hardware</b>         | PC-compatible computer (not provided) with 2 GHz processor, 1 GB RAM minimum (2 GB RAM for larger system >100 controllers), 80 MB of free disk space, CD-ROM, color monitor with 1280 x 1024 screen resolution minimum, one (1) Ethernet adapter, one (1) Serial port (optional)<br>Layout drawings of each area are required in jpg, png or bmp file formats for system configuration |
| <b>Interface</b>        | Graphic overview of the controller and ionizer system, facility layout   |
| <b>Notifications</b>    | Text messaging or email, dependent upon system configuration   |

## Charge Plate Monitor

# Model 280A

Simco-Ion's Model 280A incorporates enhanced circuitry that enables it to more accurately measure the performance of high-frequency AC ionizers, as well as pulsed DC ionizers and Steady-state DC ionizers. The architecture of the Model 280A simplifies testing in open or enclosed environments. The detachable plate and programmable automated test sequencing offer remote testing capability, allowing multiple tests without opening an enclosure to reset the instrument.

The Model 280A can be used as a portable CPM and is capable for of up to 6 hours of operation on the internal battery before recharge. It has enough memory for storage of over 1000 tests and more than 100 individual test locations.

### Features

- Enhanced circuitry bandwidth to measure high frequency AC ionizers
- Improved plate capacitance accuracy
- User programmable test protocol
- Delayed start
- AC line input or battery operation
- CPM comes with 6" detachable plate
- Built-in temperature and humidity sensors
- Onboard data archiving memory
- Digital LCD display

### Benefits

- Increased dynamic range to capture AC ionization performance
- Provides more accurate decay times
- Manual mode or automated test sequencing
- Portability for easy movement in a variety of test locations
- Ideal for mini-environments & inside process tools
- Accurately documents environmental test conditions
- Onboard memory holds test data with ability to download data for records or analysis
- Easy to read and interpret data screen



### 280A Specifications

|                       |  |
|-----------------------|--|
| <b>Accuracy</b>       | Electrometer $\pm 0.1\%$ reading, $\pm 1.0V$ referred to input   |
| <b>Bandwidth</b>      | 1 kHz @ 20 Vp-p, 10 Hz @ 2000 Vp-p, response <10 mSec  |
| <b>Battery</b>        | Life: Up to 6 hours with 12V internal rechargeable battery<br>Charging Time: <8 hours to >90% capacity   |
| <b>Charge Plate</b>   | Discharge: <200 mV/sec<br>Capacitance: 20 pF, $\pm 5\%$ (not including strays)   |
| <b>Communication</b>  | RS-232   |
| <b>Displays</b>       | <b>Peak:</b> Positive and negative peak voltage during float mode<br><b>Graphical:</b> 240 X 64, backlight LCD, character/graphic<br><b>Voltage:</b> 3.5 digits, $\pm 1.0V$ resolution<br><b>Timer:</b> 4 digits   |
| <b>Power Input</b>    | IEC type AC power input jack   |
| <b>Timer</b>          | 0.1-999.9 sec in 0.1 sec increments, 1000-9999 sec in 1 sec increments   |
| <b>Temperature</b>    | Operating Env: 41-95°F (5-35°C)<br>Sensor: 3.6°F ( $\pm 2^\circ C$ ) typ, $\pm 5\%$ typ from 10-80% RH @ 77°F (25°C)<br><b>Input:</b> 90-250 VAC 50/60 Hz @ 12W<br><b>Charging:</b> $\pm 10$ to $\pm 1000V$ differential, adjust 10-100V, 1V increments<br><b>Start:</b> 1000V $\pm 0.3\%$ standard, adj. between 10-1000V, 1V increments<br><b>Stop:</b> 100V $\pm 3\%$ standard, adj. between 0-995, 1V increments |
| <b>Voltage</b>        |  |
| <b>Zero</b>           | Stability & drift <100 mV/sec  |
| <b>Dimensions</b>     | 11"W x 9"L x 5"H (27.9 x 22.9 x 12.7 cm)   |
| <b>Weight</b>         | 12.5 lb (5.7 kg)   |
| <b>Certifications</b> | CE cUL US  |

## Handheld Electrostatic Fieldmeter Model FMX-004

Simco-Ion's Model FMX-004 Fieldmeter is a compact handheld electrostatic fieldmeter used for locating and measuring static charges. Its pocket size makes it handy to use, and four-button operation makes it easy to operate.

The FMX-004 measures static voltages within  $\pm 30$  kV (30,000V) at a distance of 1 inch. Results are simultaneously displayed numerically and in bar graph format. POWER on/off, ZERO adjustments, MODE, and HOLD are all pushbutton operation. The HOLD button allows the display to retain the static charge reading. This is especially useful where the display is difficult to see during measurement.

Two LED guide lights help position the fieldmeter at the right distance from a charged test object. The conductive case and ground snap facilitate grounding for accurate measurement. The circuitry of the FMX-004 has been designed to make measurements in areas using air ionization.

### Analog Output

The FMX-004 has an optional cable and bracket kit available. The bracket enables the fieldmeter to be mounted for continuous reading collection. The analog output cable allows you to feed an output signal to a PLC, data acquisition card, data logger, chart reader or other devices.



### Features

- Digital display with color coded bar graphs
- Lightweight, compact design
- Distance ranging lights
- Audible alarm feature
- Battery powered with auto shut-off feature
- Analog output

### Benefits

- Easy to read especially in low light environments
- Convenient to use in hard to reach areas
- Ensures accurate distancing and measurements
- User convenience feature to insure proper operation
- Extends battery life; energy efficient
- Signals to a chart recorder or other device for hard copy documentation of static charge levels

### FMX-004 Specifications

|                       |  |
|-----------------------|--|
| <b>Accuracy</b>       | $\pm 10\%$   |
| <b>Balance</b>        | 0 to $\pm 300V$  |
| <b>Battery</b>        | 9V, 6F22Y manganese battery, approximately 30 hours<br>Power turns off automatically after 5 min   |
| <b>Distance</b>       | 1" $\pm 0.2$ " (25 mm $\pm 0.5$ mm), LED guide for correct distance (between charged object and Fieldmeter)  |
| <b>Display</b>        | Red positive polarity, blue negative polarity<br><b>Auto-ranging:</b> 3 digits x.xx = 0 to $\pm 1.49$ kV xx.x = $\pm 1.0$ kV to $\pm 30.0$ kV (Hi); xxx = 0 to 300 (Ion Balance); [HOLD]: Retains display after a measurement; [A.OFF]: auto power-off function deactivated; [Err]: error sign if sensor is damaged; battery condition display (4 stages)<br><b>Renewal Rate:</b> 5 times per second |
| <b>Range</b>          | 0 to $\pm 1.49$ kV (low), $\pm 1.0$ kV to $\pm 30$ kV (high)<br>Bar Graph: (Auto) $\pm 0.1$ kV (low), $\pm 2$ kV (high), $\pm 20V$ ion balance   |
| <b>Response</b>       | <1 sec   |
| <b>Temperature</b>    | Operating Env: 50-100°F (10- 40°C), 0-60% RH (non-condensing)  |
| <b>Enclosure</b>      | Conductive resin (ABS)   |
| <b>Dimensions</b>     | 4.8"L x 2.9"W x 1.0"D (123 x 73 x 25 mm)   |
| <b>Weight</b>         | 6 oz (170g)  |
| <b>Certifications</b> | CE, UL, IEC  |



## Handheld Electrostatic Fieldmeter

# Model 775

The pocket-sized Simco-Ion Model 775 Fieldmeter is designed to locate and measure static charge potentials on products, people, equipment and packaging. The 775 uses a non-contacting, chopper stabilized field sensor and a ranging light mechanism to ensure correct measurements of electrostatic fields in all areas—even those using air ionization. The fieldmeter is easily zeroed with the turn of a small knob and does not require re-zeroing between measurements. Powered by a 9V battery, the 775 features a conductive, impact-resistant case and a convenient snap-on ground lead to facilitate grounding and increase accuracy.



### Features

- Digital display
- Distance ranging lights
- Chopper-stabilized circuit
- SAMPLE and HOLD functions
- Battery powered, pocket-sized meter
- Analog output

### Benefits

- Easy to read
- Ensures accurate distancing and measurements
- Operates in ionized environments
- Useful in hard-to-reach places
- Portable, for use in facility static audits
- Signals to a chart recorder or other device for hard copy documentation of static charge levels

### 775 Specifications

|                       |   |
|-----------------------|---|
| <b>Accuracy</b>       | ±5%, chopper stabilized (accuracy unaffected by air ionization), least significant digit of display indicates tens of volts |
| <b>Battery</b>        | 9V alkaline battery included, battery life is excess of 40 hours  |
| <b>Controls</b>       | On/off sideswitch, sample/hold pushbutton, zero control   |
| <b>Display</b>        | 3-1/2 digits, 0.4" (1 cm) digit height  |
| <b>Features</b>       | Hold and low battery indicators, automatic polarity   |
| <b>Ground</b>         | Grounded through conductive case, snap-fastened ground strap provided   |
| <b>Output</b>         | Analog output through miniature jack, 1V corresponds to 10 kV   |
| <b>Range</b>          | ±0.00 to 19.99 kV @ 1" (2.5 cm), higher voltages may be measured at distances >1"   |
| <b>Response</b>       | 5 Hz at analog output, digital display updates 3 times per second   |
| <b>Temperature</b>    | Operating Env: 0-104°F (0-40°C)   |
| <b>Enclosure</b>      | Conductive case   |
| <b>Dimensions</b>     | 4.2"L x 2.4"W x 0.9"D (10.7 x 6.1 x 2.3 cm)   |
| <b>Weight</b>         | 5 oz (141.8g) with battery  |
| <b>Certifications</b> | CE  |

## Handheld Periodic Verification System Model 775PVS

The Simco-Ion Periodic Verification System Model 775PVS is a handheld alternative to a charged plate monitor. It consists of **three components**—a **fieldmeter**, a **detachable plate** and a **charger** for measuring the static charge and verifying ionizer performance. Used alone, the fieldmeter measures electrostatic fields on any surface.

Ranging lights ensure accurate and repeatable measurements by enabling users to determine the exact distance at which the voltage reading is correct. A SAMPLE and HOLD function allows measurements in places difficult to reach with other instruments. Attach the plate and use the charger, and the Model 775PVS can be used to verify ionizer operation and check ion balance and discharge times. The unit is designed to take measurements that correspond to those made by a charged plate monitor following Ionization Standard ANSI EOS/ESD S3.1-2006 of the ESD Association (see graph below). For increased accuracy, the included flexible ground cord should be used to connect to a solid ground during operation.



### Features

- Digital display
- Distance ranging lights
- Chopper circuit
- NIST-traceable calibration

### Benefits

- Easy to read
- Ensures accurate distancing and measurements
- Operates in an ionized environment
- Correlatable to a charged plate monitor



### 775PVS Specifications

#### 775 Specification

Please see previous page under 775 Fieldmeter

#### Plate Assembly

|             |   |
|-------------|---|
| Calibration | Adjusting screw provided  |
| Ground      | Ground plate attaches to conductive case of 775 Fieldmeter            |
| Range       | 0-2 kV for either polarity, higher voltages may be measured           |
| Dimensions  | 1.0"H x 3.0"W x 1.3"D (2.5 x 7.6 x 3.3 cm) Teflon™ standoffs supports |
| Weight      | 2.5 oz (71g)  |

Certifications

#### Charger

|                |  |
|----------------|--|
| Battery        | 9V alkaline battery  |
| Output         | <b>Each polarity:</b> 1300 VDC $\pm$ 20%. limited to $<1 \mu A$<br><b>Two SST contact plates:</b> Output polarity depends on which plate is grounded |
| Indicators     | Red LED  |
| Dimensions     | 4.2"L x 2.4"W x 0.9"D (10.7 x 6.1 x 2.3 cm)  |
| Weight         | 4 oz (113g) with battery   |
| Certifications |  |

## Ionizing Air Cartridge

# 6110/6110A

Simco-Ion's self-contained compressed Air Ionizing Cartridge controls static charge in production, packaging, laboratory and other environments where static build-up can cause contamination, ESD, material handling problems or microprocessor lock-up. Compact and rugged, the cartridge can be used either for in-line ionization or as an ionizing blow-off gun.

For in-line use, both models connect to a compressed air source, and it is ready to ionize any production equipment.

Model 6110A (with airflow) may be attached to an ordinary air gun and the airstream is ionized for effective particle removal. An internal sensor initiates ionization only when the gun is triggered, ensuring on-demand control of static charge.

### Features

- IsoStat technology
- Internal air flow sensor (Model 6110A)
- Shielded emitter points
- Compact size
- Optional blow-off gun kit

### Benefits

- Intrinsically balanced; no calibration needed
- On-demand ionization during gun operation
- No shock hazard
- Adapts to compressed air lines
- Fits any air gun

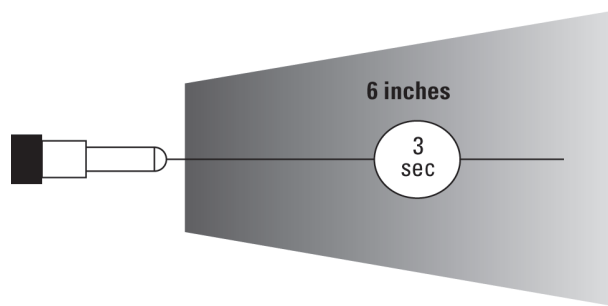


Adapter



Air Gun/Hose Kit

### Typical Discharge Times (sec)







<4 sec, 1000-100V for either polarity. Measured with 6110(A) air output connector 6" from the plate of a CPM and an inlet air flow rate of at least 2 scfm. 2 scfm is the minimum flow rate for operation of the 6110(A).

## IsoStat Technology

Simco-Ion's IsoStat technology guarantees intrinsically balanced ionization and eliminates complicated feedback circuits. Ionizers incorporating this technology never need calibration and require very little maintenance. IsoStat is based on a law of physics, Conservation of Charge, which states that charge cannot be created or destroyed in an isolated system. By isolating the ionizer's emitter points from ground, IsoStat ensures equal numbers of positive and negative ions.

## 6110/6110A Specifications

|                       |   |
|-----------------------|---|
| <b>Airflow</b>        | At least 2 scfm   |
| <b>Air Line</b>       | 1/4" NPT female (input and output), 1/8" NPT adapter available  |
| <b>Balance</b>        | >±25V @ 6" (15.2 cm)  |
| <b>Discharge*</b>     | ±1,000-100V, <4 sec   |
| <b>Emitter Points</b> | Tungsten alloy, estimated life 5 years of continuous use  |
| <b>Indicators</b>     | Green power   |
| <b>Power</b>          | Wall transformer 120 VAC (powers up to 10 units),<br>100 VAC & 230 VAC models available   |
| <b>Sensor</b>         | Turns ionizer off when air is not flowing (Model 6110A only), model<br>without sensor also available for continuous flow applications   |
| <b>Technology</b>     | Steady-state DC   |
| <b>Voltage</b>        | Input: 24 VAC, <1W from transformer   |
| <b>Dimensions</b>     | 2.2"D x 3.1"L (5.6 x 7.9 cm) not including fittings   |
| <b>Weight</b>         | 6 oz (170.1g)   |
| <b>Certifications</b> |     |

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

## Accessories

The Model 6110A is supplied with a nozzle and adapter which may be used as an air gun using Simco-Ion air gun/hose kit, part number 91-6150. (The Model 6110 does not operate with this kit.)



## Applications

In-line ionization reduces ESD damage and microprocessor lock-up in:

- IC packaging and marking
- Surface-mount equipment
- Device testing equipment

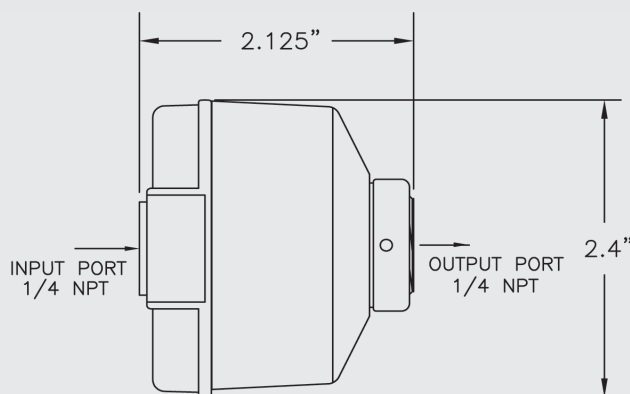
Ionizing blow-off gun removes particles in:

- Printed circuit board assembly
- Medical device manufacturing
- Film processing

BACK PLATE

INDICATOR LED

POWER CONNECTOR



## Ionizing Blow-off Gun

# AIRFORCE 6115

Simco-Ion AirForce 6115 Ionizing Blow-off Gun was designed with the operator in mind. Its lightweight and flexible air hose moves with the operator and makes work easier. No high voltage cable means improved operator safety. The gun's ergonomic design, with a light touch trigger and easy-view LED, minimizes fatigue and eliminates wrist hyperextension. The compact console can be mounted anywhere, so it doesn't take up valuable workspace but is still easily accessible. To make the work environment more pleasant, the AirForce 6115 also features low audible noise.

Strong blow-off power makes the AirForce 6115 effective in removing particle contamination and ideal for use in clean process applications. It is the only gun product rated at ISO 14644 Class 4 cleanliness. Steady-state DC ion emission provides efficient ionization with an average discharge time of less than 1.0 second.

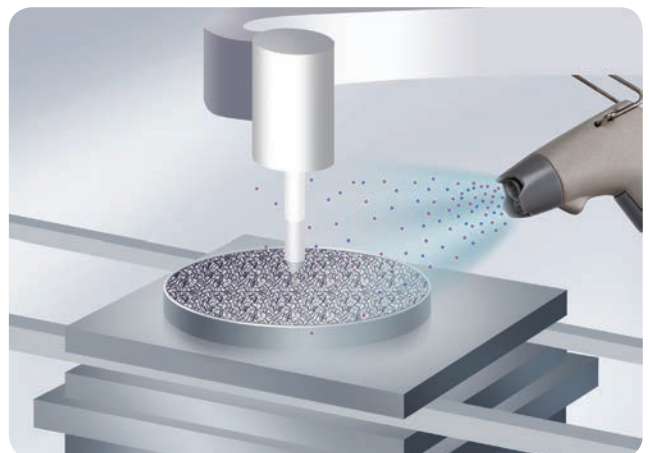


## Features

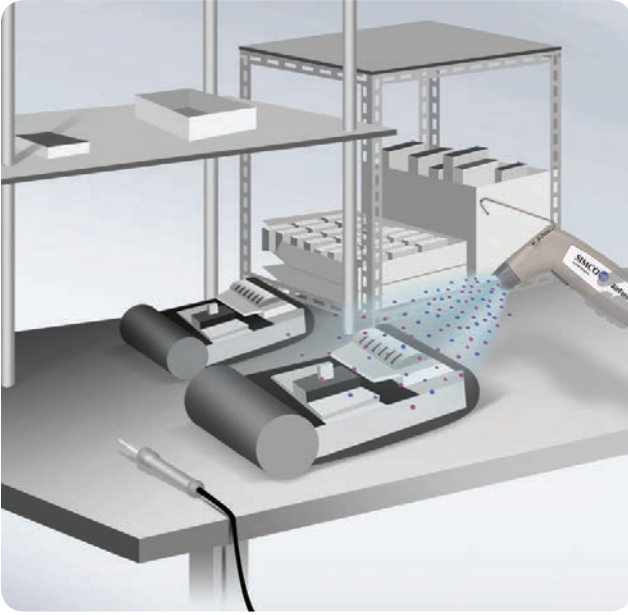
- Ergonomic gun design
- Flexible, lightweight air hose with low voltage power cable
- Replaceable emitter point assembly & quick-eject filter
- Strong blow-off force
- Steady-state DC ion emission
- IsoStat technology
- Durable static-dissipative materials
- ISO 14644 Class 4 cleanliness operation

## Benefits

- Reduces fatigue and wrist hyperextension
- Moves with operator and does not interfere with work
- Minimizes maintenance downtime
- Effective removal of particle contamination
- Fast discharge times; efficient ion delivery
- Intrinsically balanced; no calibration needed
- Holds up to high impact; ESD-safe
- Suitable for use in cleanroom applications for semiconductor, medical and hard disk drive







Optional Foot Pedal



Gooseneck Mounting Stand

## 6115 Specifications

|                       |  |
|-----------------------|--|
| <b>Air Hose</b>       | Static-dissipative polyurethane, 3/8" outside diameter, 8 ft (2.4m)/65 psi   |
| <b>Audible Noise</b>  | 70 dBA @ 1m (30 psi)   |
| <b>Balance</b>        | ±30V   |
| <b>Blow-off Force</b> | 41g @ 30 psi (measured @ 3" (7.6 cm) from a 2" (5.1 cm) dia. target)   |
| <b>Cleanliness</b>    | Meets ISO 14644 Class 4 (Fed Std. 209E Class 10)   |
| <b>Discharge*</b>     | ±1000-100V 1.0 sec @ 6" (15.2 cm), 30 psi  |
| <b>EMI</b>            | 29 dbμV, average level 100 KHz to 1.1 MHz  |
| <b>Emitter Points</b> | Tungsten emitter points  |
| <b>Filter</b>         | 99.9% efficient, 0.01 micron or larger air particles (99.9% coalescing efficiency)   |
| <b>Gas</b>            | Connection: 1/4" male industrial interchange quick disconnect<br>Supply: Clean dry air (CDA) or nitrogen (N <sub>2</sub> ) (20-65 psi) |
| <b>Indicators</b>     | Green on both console and gun  |
| <b>Ozone</b>          | <0.005 ppm (typ)   |
| <b>Power</b>          | 24 VAC, 10W powered from wall transformer  |
| <b>Technology</b>     | Steady-state DC  |
| <b>Mounting</b>       | Metal mounting plate attaches to back of console   |
| <b>Enclosure</b>      | Gun/console: static-dissipative polycarbonate (gun hanger 302 stainless steel)   |
| <b>Dimensions</b>     | Gun: 8"L x 3"W x 1"D (20.3L x 7.6W x 2.5D cm)<br>Console: 8.5"L x 3.0"W x 1.6"D (21.6L x 7.6W x 4.1D cm)                               |
| <b>Weight</b>         | Gun: 12 oz (341g) with 8 ft (2.4m) air hose<br>Console: 11.5 oz (326g)   |
| <b>Certifications</b> | CE, UL, ENEC, RoHS   |

## IsoStat Technology

Simco-Ion's IsoStat technology is the first balancing technology for ionizers to guarantee intrinsically balanced ionization and elimination of complicated feedback circuits.

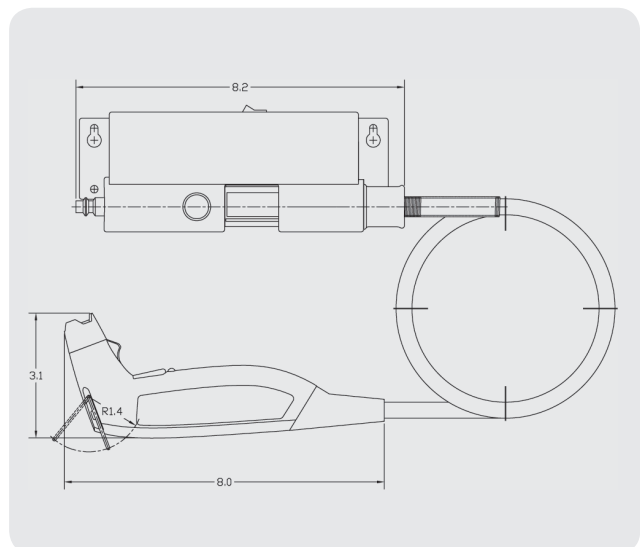
IsoStat is based on a law of physics—Conservation of Charge—which states that charge cannot be created or destroyed in an isolated system. By isolating the ionizer's emitter points from ground, IsoStat ensures equal numbers of positive and negative ions. Characteristics of IsoStat ionizers include:

- Ionizers never need calibration and require very little maintenance
- Small size and operation without grounding wires

## High Reliability

IsoStat technology also guarantees that the AirForce is calibration free and requires little maintenance when used with CDA or N<sub>2</sub>. When the air filter or emitter points need replacement, they snap in and out in less than a minute—reducing gun down-time and improving long-term performance.

To avoid replacement costs, the AirForce is made from durable polycarbonate that holds up to high impact. The gun body, air hose and control console are static dissipative and ESD-safe. And an extremely low EMI level ensures the AirForce won't interfere with other electronic equipment or operations.



## Ionizing Air Gun

# TOP GUN™ 3

Simco-Ion's Top Gun Ionizing Air Gun is a high-performance ionizing air gun designed for a wide variety of electronic manufacturing, medical and assembly applications. Balanced to  $0 \pm 15V$ , the Top Gun features high blow-off force and low air consumption providing high-efficiency cleaning and maximum static charge decay. A filter at the exit of the gun ensures that the air is clean.

The gun body is lightweight but durable. It features a light-touch trigger, making it comfortable even for extended use. All functionality is built into the gun, including a flow control valve, a balance adjustment for calibration, and a two-level LED which indicates both power and ionization. Both the gun and cable are static dissipative. A hanger is provided for easy mounting.

The orION, converted from Top Gun to work as ionizing air nozzle, also features high blow-off force capability and reliable balance stability maintained at better than  $\pm 15V$ . An easily replaceable 0.01-micron particle filter is positioned at the nozzle air exit to provide the highest confidence that clean air is delivered to sensitive product.



### Features

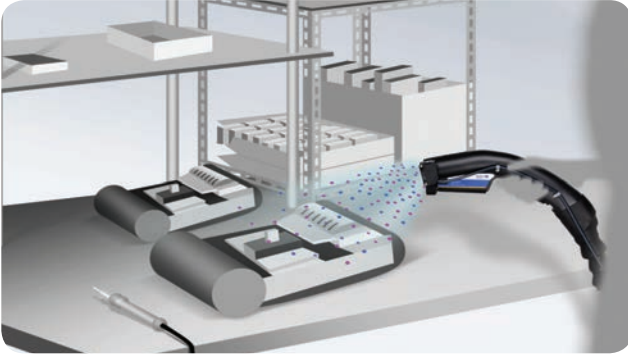
- Lightweight, ergonomic design
- Flow control valve for adjustable airflow
- Electrically balanced ion output
- Integrated, replaceable filter-nozzle
- Ionization indicator light

### Benefits

- Maximum user comfort prevents operator fatigue and increases productivity
- Airflow use that meets the specific application requirements
- Protects ESD-sensitive components and assemblies
- Insures air contacting the target area is clean
- Eliminates the guesswork of ionization at target area



| Top Gun 3 Balance Long-term Stability (V) |      |         |         |         |
|---|------|---------|---------|---------|
| Distance                                  | 0 hr | 195 hrs | 465 hrs | 465 hrs |
|   |      | @ 2 Bar |         |         |
| 5 cm                                      | -8   | 5       | 0       | 0       |
| 10.2 cm                                   | -8   | 8       | 1       | 1       |
| 15.2 cm                                   | 0    | 6       | 5       | 5       |
|   |      | @ 4 Bar |         |         |
| 5 cm                                      | -2   | 2       | -1      | -1      |
| 10.2 cm                                   | -5   | 2       | -1      | -1      |
| 15.2 cm                                   | -1   | 1       | 1       | 1       |



## Top Gun 3 Specifications

|                       |  |
|-----------------------|--|
| <b>Airflow</b>        | 2.4 scfm @ 30 psi (68/min, 2 bar)<br>4.6 scfm @ 60 psi (130/min, 4 bar)<br>7.4 scfm @ 100 psi (210/min, 7 bar)                   |
| <b>Air Hose</b>       | Static dissipative polyurethane 7' or 14' standard, 5' or 14' with optical sensor (integral to gun and control module)           |
| <b>Air Pressure</b>   | Pressure relief in nozzle complies with OSHA requirements  |
| <b>Audible Noise</b>  | 76 dbA @ 30 psi input (2 bar), 89 dbA @ 60 psi input (4 bar), 97 dbA @ 100 psi input (7 bar) (measured 24" (600 mm) from nozzle) |
| <b>Balance</b>        | ±15V   |
| <b>Blow-off Force</b> | 180g @ 100 psi, 2" diameter target 3" from the gun   |
| <b>Discharge*</b>     | 1.3 sec @ 6" (15.2 cm), 30 psi (±1000-100V), 0.5 sec @ 2" (5 cm), 60 psi (±1000-100V)  |
| <b>Filter</b>         | 0.01 micron rating; replacement filters available  |
| <b>Gas</b>            | Connection: 1/4" NPT (female)<br>Supply: Clean dry air (CDA) or nitrogen (N <sub>2</sub> ) (100 psi max)                         |
| <b>Temperature</b>    | Operating Env: 32-104°F (0-40°C), 30-60% RH (non-condensing)   |
| <b>Ozone</b>          | 0.001 ppm measured 18" (450 mm) from gun, operation @ 15 psi (1 bar)   |
| <b>Voltage</b>        | Input: 120 VAC, 60 Hz, 0.2A, 230 VAC, 50 Hz, 0.1A  |
| <b>Enclosure</b>      | Gun: Static dissipative polycarbonate/ABS blend<br>Cable: static dissipative polyurethane  |
| <b>Dimensions</b>     | 6.45"H x 5.20"W x 3.35"D (does not incl. flanges) (164 x 132 x 85 mm)  |
| <b>Weight</b>         | Gun: 6.5 oz (185g)<br>Air hose: 1.25 ounces/ft (115g/m)  |
| <b>Certification</b>  | CE, RoHS, UL, ENEC   |

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

## Power Unit Specifications

|                    |  |
|--------------------|--|
| <b>Power</b>       | 120 VAC, 50/60 Hz, .10A, 230 VAC, 50/60 Hz, .05A   |
| <b>Power Inlet</b> | IEC 320 with 400 mA SLO fuse   |
| <b>Pressure</b>    | Clean dry air (CDA) or nitrogen (N <sub>2</sub> ) (7 bar) 1/4" NPT connector, female (100 psi max) |
| <b>Dimensions</b>  | 5.20W " 6.45"H x 3.35"D (132 x 164 x 85 mm)  |
| <b>Enclosure</b>   | Powder-coated steel  |
| <b>Weight</b>      | 6.5 lbs (2.7 kg)   |

## Sidekick and Foot Pedal

The Top Gun with Sidekick offers hands-free operation and flexible positioning during assembly and manufacturing processes. A foot-pedal controls both ionization and airflow, which reduces compressed air costs and extends the life of the ionizer.

- Fully adjustable 18" (46 cm) neck focuses the ionized airflow
- Tabletop bracket provides easy mounting
- Foot-pedal permits hands-free operation



Hands-free Sidekick Option



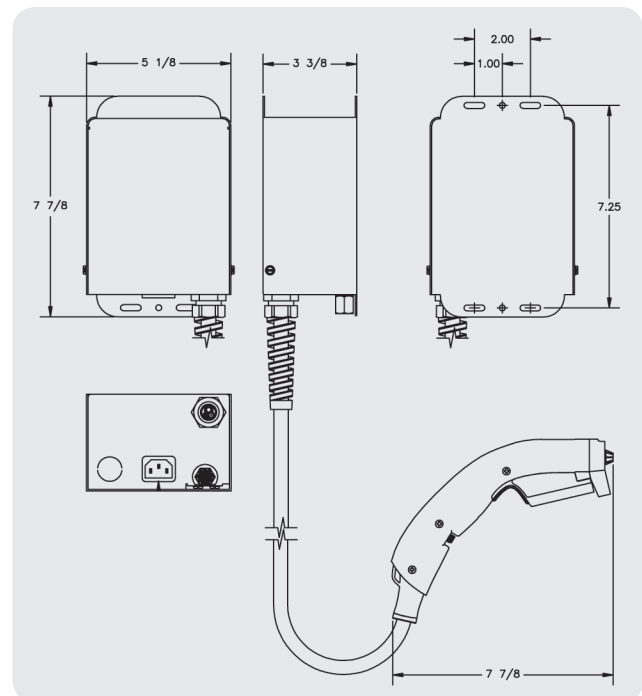
Foot Pedal Option

## Optical Sensor

For automated assembly, Top Gun is available with an optional optical sensor, which automatically activates Top Gun when an object is in range. The Optical Sensor has an "adjustable range" from 1-30". Two LED indicators show when the optical sensor is turned on and when the object passing through the sensor area is automatically being ionized.



Optical Sensor



## Ionizing Air Nozzle & Controller

# orION™

Simco-Ion's orION Ionizing Air Nozzle and Controller provides high performance and reliability in a compact, compressed air nozzle. It has been designed for use in fixed applications on manufacturing lines, equipment, and tool applications in the telecommunications, consumer electronics, semiconductor and medical device manufacturing industries.

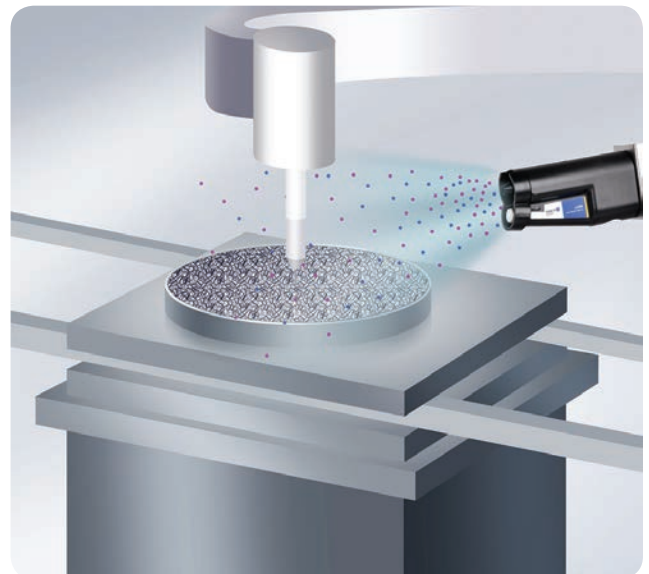
The orION features high blow-off force capability combined with fast removal of electrostatic surface charge. Reliable balance stability is maintained at better than  $\pm 15V$ . An easily replaceable 0.01-micron particle filter is positioned at the nozzle air exit to provide the highest confidence that clean air is delivered to sensitive product.

### Features

- Compact nozzle and cable assembly
- Forceful gas-jet nozzle
- Integrated filter within nozzle
- Remote operation of ionization and nozzle gas flow
- Ionization balance adjustments at nozzle and at controller

### Benefits

- Reduces fatigue and wrist hyperextension
- Moves with operator and does not interfere with work
- Minimizes maintenance downtime
- Perfect for tight-constrained applications
- Fast, effective charge neutralization and blow-off cleaning
- Contaminate free gas discharge
- Offers control of orION from most convenient operator location
- Convenient balance optimization







## Applications

- Medical device manufacturing and packaging
- Precision parts assembly
- Particulate removal in optics
- Cleaning glass or molded parts prior to finishing
- Cleaning thermo-formed trays

## orION Specifications

|                      |  |
|----------------------|--|
| <b>Air Pressure</b>  | Pressure relief in nozzle complies with OSHA requirements  |
| <b>Audible Noise</b> | 76 dB @ 30 psi (206 kPa), 89 dB @ 60 psi (412 kPa), 97 dB @ 100 psi (690 kPa) (measured 24" (600 mm) from nozzle)  |
| <b>Balance</b>       | 0V ±15V  |
| <b>Discharge*</b>    | <1 sec @ 2" distance, <2 sec @ 6" distance (input pressure between 10-100 psi)   |
| <b>Connectors</b>    | 4 position, keyed circular   |
| <b>Filter</b>        | 0.01 micron rating   |
| <b>Gas</b>           | <b>Consumption:</b> 2.4 scfm @ 30 psi (206 kPa), 4.6 scfm @ 60 psi (412 kPa), 7.4 scfm @ 100 psi (690 kPa)<br><b>Inlet:</b> 1/4" NPT (female)<br><b>Supply:</b> 100 psi (690 kPa) max clean dry air (CDA), nitrogen (N <sub>2</sub> ), CO <sub>2</sub> |
| <b>Ozone</b>         | <0.5 ppm measured @ 1'   |
| <b>Power</b>         | IEC320 inlet   |
| <b>Temperature</b>   | Operating Env. 32-104°F (0-40°C), 30-70% RH (non-condensing)   |
| <b>Voltage</b>       | Input: 120 VAC, 60 Hz, 0.2A, 230 VAC, 50 Hz, 0.1A  |
| <b>Weight</b>        | <b>Nozzle:</b> 6.5 oz (185 g)<br><b>Cable:</b> 1.25 oz/ft (115 g/m)<br><b>Controller:</b> 6.0 lb (2.7 kg)  |
| <b>Dimensions</b>    | Controller: 6.45"H x 5.20"W x 3.35"D (does not incl. flanges)<br>(164 x 132 x 85 mm)   |
| <b>Certification</b> | CE, RoHS, REACH  |

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

## Flexible Neck Stand & Foot Switch

orION with Sidekick offers hands-free operation and flexible positioning during assembly and manufacturing processes. A foot switch controls both ionization and airflow, which reduces compressed air costs and extends the life of the ionizer.

The flexible gun mount allows the operator to focus the ionized airflow where it is needed. The stand includes a steel bracket for easy bench top mounting.

- Fully adjustable 18" (46 cm) neck focuses the ionized airflow
- Tabletop bracket provides easy mounting
- Foot switch permits hands-free operation



Foot Pedal Option

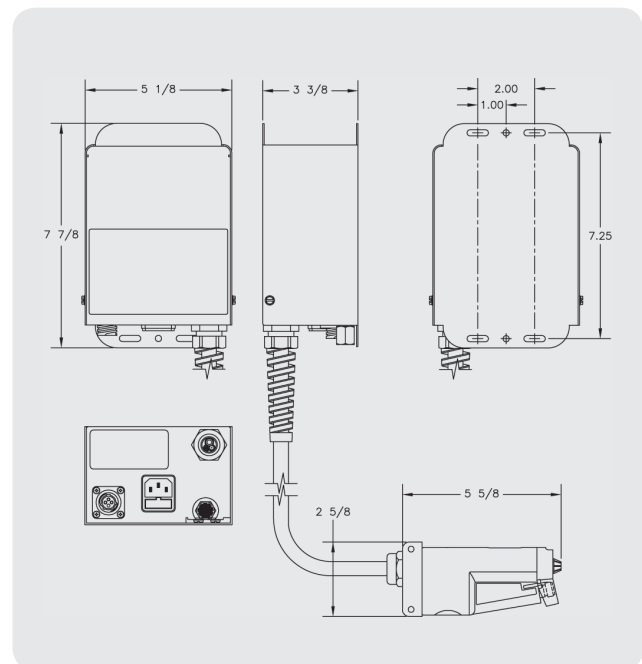
## Optical Sensor

For automated assembly, orION offers an optional optical sensor, which automatically activates the orION when an object is in range. The optical sensor has an adjustable sensing range from 1-30" (2.5-76 cm).



## Power Unit Assembly

Compressed gas is connected to a power unit with a solenoid to turn gas flow on and off. Gas tubing connects to nozzle that has been carefully designed to yield a forceful blast while keeping the noise level low.





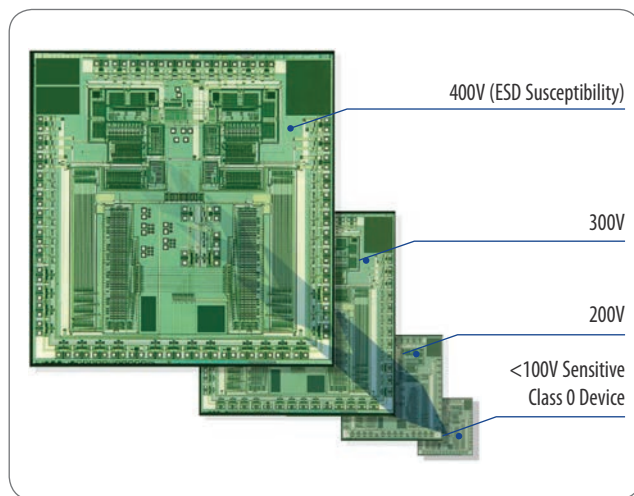
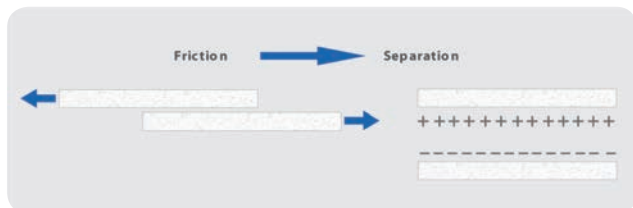
## BASIC KNOWLEDGE

### How is static electricity generated?

Charge generation will occur when two surfaces in contact are separated, one surface loses electrons and becomes positively charged while the other surface gains the same electrons and becomes negatively charged. Removing the charge on conductive materials can be accomplished by grounding; however, insulators (such as plastic, glass, ceramics, etc.) will need ionized air to remove the charge.

### Why is static a problem?

It is well-documented that damages and yield losses attribute to the effect of static charges. Particle contamination is a major issue as charged materials attract more particles to their surfaces than their non-charged counterparts, i.e., Electrostatic Attraction (ESA). Direct electrical damage caused by Electrostatic Discharge (ESD) devices can occur with a variety of ESD failure modes. Also, ESD events produce Electromagnetic Interference (EMI) that can cause equipment malfunctions, lockups and direct damage to the product via radiated and conducted forms.

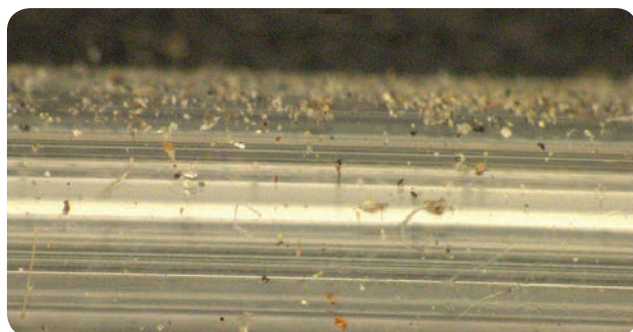


### Ultra-sensitive Devices

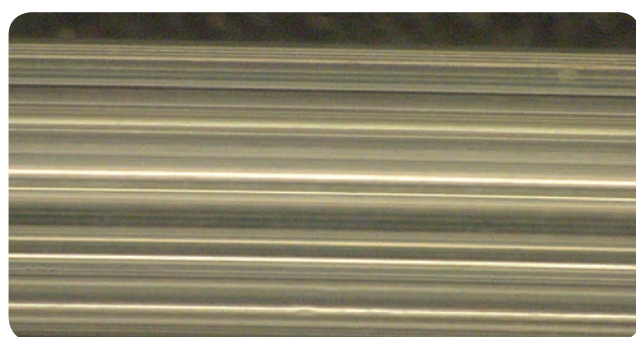
Ultra ESD sensitive (ESDS) devices (especially those sensitive below 100V) are appearing in the various industries at a rapid pace. In the last few years, many facilities have struggled with ESD damage directly resulting from limitations of those standard ESD controls that have been used so effectively in the past. Ionization and continuous monitoring with the latest technology are crucial in combating the effects of static on these ultra-sensitive devices.

## ELECTROSTATIC ATTRACTION

Materials typically used in the manufacturing cleanroom—plastic, quartz, ceramics, glass and silicon—are good insulators and become charged easily. Air entering the cleanroom is stripped of its normal ion content as it moves through the air filtration system. Thus, modern cleanrooms foster higher levels of static charge that remain on objects for long periods of time. The very nature of the cleanroom makes it difficult to apply antistatic measures because most surface treatments and many static-dissipative materials are not cleanroom compatible.



**Without Static Control**



**With Static Control**

If a critical product surface becomes charged and the charge is not removed, the surface will attract airborne particulates in the cleanroom. Regardless of the filtration system, personnel, machinery, and processes can introduce particulates into the air. The electrostatic attraction affecting these particles is surprisingly strong and is very difficult to remove. Contamination of this nature is a major contributor to product degradation and device failure.

# DISTINCTIVE FEATURE

## Emitter Technology

**Emitter Cleaning:** The regular maintenance of ionizers keeps sensitive environments as protected as possible from harmful static charge effects. Periodically inspect emitter points for breakage, buildup on the tips or any discoloration is required: usually, the cycle is quarterly; some may extend to yearly; tightening request may ask for monthly. It is one of the most important components of ionizer maintenance and ensures continued optimum performance from ionizers.

- **Manual Cleaning:** Simco-Ion ionizers are designed with an integrated brush, by a simple action—one turn, one press or one pull, the dirt on the emitter tips is removed.
- **Automated Cleaning:** To minimize the contamination and time involved, Simco-Ion developed the patented Auto-Clean Systems as an option. Since it works automatically each time the ionizer is turned on or off, it reduces maintenance time and ionizer downtime.

**Emitter Materials:** Simco-Ion's ionizer emitter assembly are made of various materials and shapes: metallic (stainless steel, tungsten, titanium) and non-metallic (single crystal silicon); pin-type or wire-type, providing a longer working life and better cleanliness for applications in various industries.

### 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 <5 particles per cubic foot (<0.05 microns in size verified with condensation nucleus (CNC) and optical particle counters).

|                     |   |
|---------------------|---|
| Electrode Type      | Emitter point   |
| Class Compatibility | ISO Class 3 (FED Std 209e Class 1) or better                      |
| Particles           | 5 (average/cu. ft.)   |
| Estimated Life      | 10-15 years (depending on maintenance & environmental conditions) |
| Maintenance         | Recommended 3 months intervals                                    |

### 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.

|                     |   |
|---------------------|---|
| Electrode Type      | Emitter point   |
| Class Compatibility | ISO Class 4 (FED Std 209e Class 10) or higher recommended         |
| Particles           | 21 (average/cu. ft.)  |
| Estimated Life      | 10-15 years (depending on maintenance & environmental conditions) |
| Maintenance         | Recommended 3 months intervals                                    |

### Machined Titanium

Simco-Ion's titanium emitter points are recommended for many clean-rooms. Titanium emitters meet ISO Class 3 (FED Std 209e Class 1) requirements for particle emissions, erode less quickly than tungsten, produce no particle bursts and are easily maintained.

|                     |   |
|---------------------|---|
| Electrode Type      | Emitter point   |
| Class Compatibility | ISO Class 3 (FED Std 209e Class 1) or better                      |
| Particles           | 21 (average/cu. ft.)  |
| Estimated Life      | 10-15 years (depending on maintenance & environmental conditions) |
| Maintenance         | Recommended 3 months interval                                     |

## Facility Monitoring System (FMS)

Many of the process and manufacturing facilities where ionizers are used contain a remote system that monitors equipment status. Facility Monitoring System (FMS) capability offers an ionizer status connection from the ionizer to either the process monitoring or facility monitoring system.

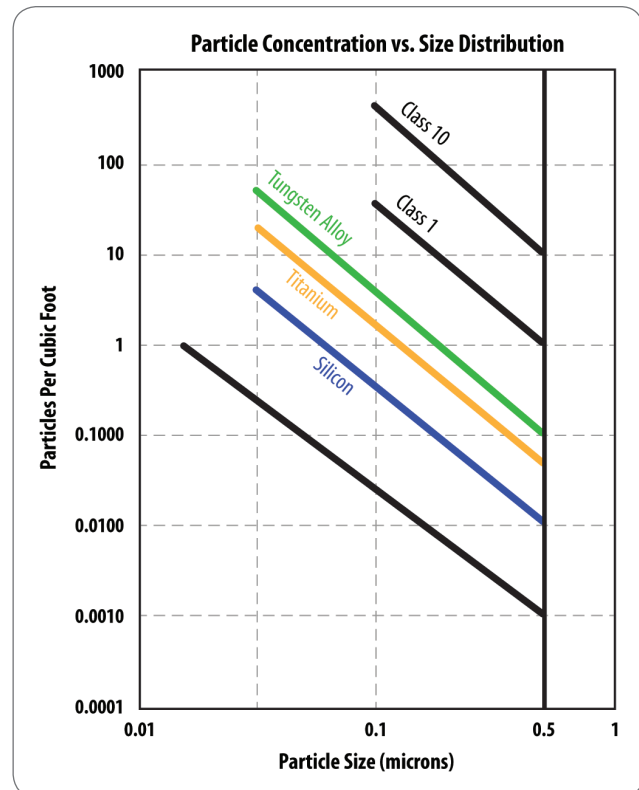
## Compatible to ISO 14644-1 Cleanroom Standards

The widespread use of ionizers in rooms, laminar flow hoods, and point-of-use applications has greatly improved the control of static charge in cleanroom environments.

Simco-Ion's ionizers are compatible with the different level of cleanroom; some can be up to ISO 14644-12 (nanoscale particles), providing the best solution in static control industry.

## Integrated Comfort Heater

Several products contain an integrated heater. While the heater is not intended to provide a significant source of room heat, it does provide user comfort and added productivity.



## WARRANTY & SERVICE

Simco-Ion provides a limited warranty. New products manufactured or sold by Simco-Ion are guaranteed to be free from defects in material or workmanship for a period of two (2) years\* from date of initial shipment. Simco-Ion liability under its new product warranty is limited to servicing (evaluating, repairing or replacing) any unit returned to Simco-Ion that has not been subjected to misuse, neglect, lack of routine maintenance, repair, alteration or accident.

In no event is Simco-Ion be liable for collateral or consequential damages. Consumable items such as, but not exclusive to, emitter points, emitter wires, batteries, filters, fuses or light bulbs are only covered under this warranty if found defective as received with the new product.

To obtain service under this warranty, please contact Simco-Ion, Technology at [saleservices@simco-ion.com](mailto:saleservices@simco-ion.com), +1 (510) 217-0460, +1 (800) 367-2452 or [techsupport@simco-ion.com](mailto:techsupport@simco-ion.com).

\* Exception is the ionONE brand of product (Models Micro S/SA) which are warranted for one (1) year.

### Application Evaluation Capabilities

Exclusive in the industry, Simco-Ion offers a full applications evaluation service to see whether your facility is operating at its peak efficiency.

We approach each customer's situation—whether it's a large facility, or in a limited/confine space or in a critical manufacturing environment—with earnest diagnostic evaluation supported by technical expertise to develop innovative solutions to improve operations, increase product quality and control cost. This approach has continued to earn high recognition globally throughout the OEM and end-user customers.

#### Contact us at:

<https://technology-ionization.simco-ion.com/distributors>

**Sales Service +1 (510) 217-0460**

**Email: [saleservices@simco-ion.com](mailto:saleservices@simco-ion.com)**

## CERTIFICATE DEFINITION



Registered trademarks of Underwriters Laboratories, Inc.



Registered trademarks of Nemko, a Nationally Registered Testing Lab (NRTL).



Products are determined compliant with applicable directives for Europe, through self-declaration or third-party examination.



KC Certification, a mandatory certification scheme which ensures that only products certified by accepted certification bodies can enter the Korean market.

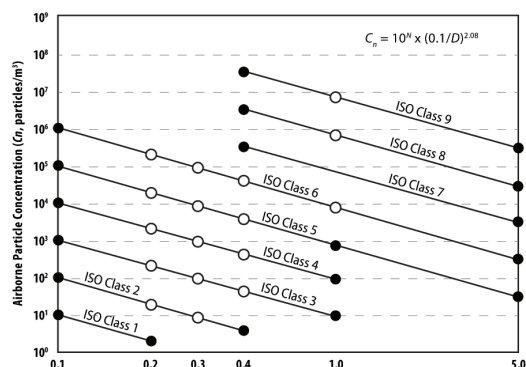


Compliant with European Union restriction of hazardous substances directive 2002/95/EC regarding "the Restriction Of The Use Of Certain Hazardous Substances In Electrical And Electronic Equipment".

## ISO CLASS 1 for 0.1 & 0.01 MICRON PARTICLES

ISO 14644 Class 1 (1999) establishes 9 particulate class limits. A class is met when airborne particles-per-cubic-meter (or particles-per-cubic-foot) do not exceed the class limit. The following graph summarizes the class limit lines for particles between 0.1 micron and 5 micron.

Model 5635 is designed to operate in and maintain ISO 14644 cleanliness (10 particles or less per m<sup>3</sup> for particles of 0.1 micron and larger). Model 5635 will also perform to ISO 14644-12 cleanliness (1200 particles or less per m<sup>3</sup> for particles of 0.01 micron and larger) when operated at 45-50% output voltage setting and OpenJet nozzles with single crystal silicon emitters.



# ISO 14644 CLEANROOM STANDARDS (2018)

| Cleanliness Level | ISO 14644 Class Number | FED STD 209E Equivalent* | Particles/Ft <sup>3</sup> of Air<br>≥0.5 μm | Maximum Concentration Limits (particles/m <sup>3</sup> of air)<br>for Particles Equal To and Larger than the Considered Sizes Shown |         |         |            |           |         |
|-------------------|------------------------|--------------------------|---|---|---------|---------|------------|-----------|---------|
|                   |                        |                          |   | ≥0.1 μm   | ≥0.2 μm | ≥0.3 μm | ≥0.5 μm    | ≥1 μm     | ≥5 μm   |
| Extremely Clean   | ISO 1                  |                          |   | 10  | 2       |         |            |           |         |
|                   | ISO 2                  |                          |   | 100   | 24      | 10      | 4          |           |         |
|                   | ISO 3                  | Class 1                  | 1   | 1,000   | 237     | 102     | 35         | 8         |         |
|                   | ISO 4                  | Class 10                 | 10  | 10,000  | 2,370   | 1,020   | 352        | 83        |         |
|                   | ISO 5                  | Class 100                | 100   | 100,000   | 23,700  | 10,200  | 3,520      | 832       | 29      |
|                   | ISO 6                  | Class 1,000              | 1,000                                       | 1,000,000   | 237,000 | 102,000 | 35,200     | 8,300     | 293     |
|                   | ISO 7                  | Class 10,000             | 10,000                                      |   |         |         | 352,000    | 83,200    | 2,930   |
|                   | ISO 8                  | Class 100,000            | 100,000                                     |   |         |         | 3,520,000  | 832,000   | 29,300  |
| Clean             | ISO 9                  | Room Air                 |   |   |         |         | 35,200,000 | 8,320,000 | 293,000 |

\* Canceled on 9/11/92—superseded by ISO Standards.

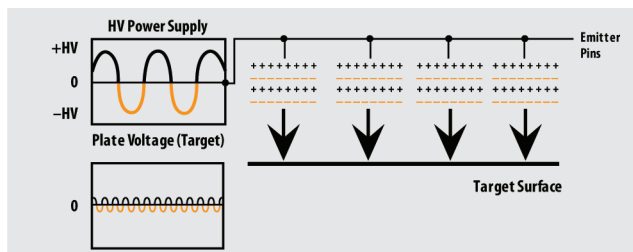
| Class #                  | Title  | Status                  | Description   |
|--------------------------|--|-------------------------|---|
| ISO 1                    | Classification of air cleanliness by particle concentration  | ANSI Standard 2015      | Covers the classification of air cleanliness in cleanrooms and associated controlled environments.  |
| ISO 2                    | Monitoring to provide evidence of cleanroom performance related to air cleanliness by particle concentration | ANSI Standard 2015      | Specifies requirements for monitoring and periodic testing of a cleanroom or clean zone to prove its continued compliance with ISO 14644-1.   |
| ISO 3                    | Test methods   | ANSI Standard 2005      | Specifies test methods for designated classification of airborne particulate cleanliness for characterizing the performance of cleanrooms and clean zones.  |
| ISO 3 (DIS) <sup>1</sup> | Test methods   | DIS December 2016       | This new Draft International Standard updates “textbook” guidance that has been in use since 2005 and sets out appropriate test methods for measuring the performance of an installation, a cleanroom, or an associated controlled environment. |
| ISO 4                    | Design, construction and start-up  | ANSI Standard 2001      | Specifies requirements for the design and construction of cleanroom installations.  |
| ISO 5                    | Operations   | ANSI Standard Aug. 2004 | Specifies basic requirements for cleanroom operations.  |
| ISO 6                    | Vocabulary, Terms, Definitions and Units   | ANSI Standard 2008      | This document harmonizes the definitions of terms used in describing materials and processes relating to cleanrooms and associated controlled environments.   |
| ISO 7                    | Separative devices (clean air hoods, gloveboxes, isolators, mini-environments)                               | ANSI Standard Nov. 2004 | Specifies the minimum requirements for the design, construction, installation, testing and approval of separative devices.  |
| ISO 8                    | Classification of air cleanliness by chemical concentration (ACC)  | ANSI Standard 2013      | Covers the classification of airborne molecular contamination (AMC) in cleanrooms and associated controlled environments.   |
| ISO 9                    | Classification of surface particle cleanliness   | ANSI Standard 2012      | Establishes the classification of cleanliness levels on solid surfaces by particle concentration in cleanrooms and associated controlled environments.  |
| ISO 10                   | Classification of surface cleanliness by chemical concentrations   | Standard 2013           | Defines the classification system for cleanliness of surfaces in cleanrooms with regard to the presence of chemical compounds or elements.  |
| ISO 12                   | Specifications for monitoring air cleanliness by nanoscale particle concentration                            | ANSI Standard 2018      | Covers the monitoring of air cleanliness by particles in terms of concentration of airborne nanoscale particles.  |
| ISO 13                   | Cleaning of surfaces to achieve defined levels of cleanliness in terms of particle/chemical classifications  | Standard 2017           | Addresses the cleaning to a specified degree on cleanroom surfaces, surfaces of equipment in a cleanroom and surfaces of materials in a cleanroom.  |
| ISO 14                   | Assessment of suitability for use of equipment by airborne particle concentration                            | Standard 2016           | Specifies a methodology to assess the suitability of equipment for use in cleanrooms and associated controlled environments.  |
| ISO 15                   | Assessment of suitability for use of equipment and materials by airborne chemical concentration              | Standard 2017           | Provides requirements and guidance for assessing the chemical airborne cleanliness of equipment and materials which are foreseen to be used in cleanrooms and associated controlled environments.   |
| ISO 16                   | Code of practice for improving energy efficiency in cleanrooms and clean air devices                         | DIS March 2018          | Provides guidance and recommendations for optimizing energy usage and maintaining energy efficiency in new and existing cleanrooms, clean zones and separative devices.   |

1. DIS = Draft International Standard updates.

Ref: <http://www.iest.org/Standards-RPs/ISO-Standards/ISO-14644-Standards>.

# TECHNOLOGY

**AC Technology:** AC ionizers are comprised of an alternating high voltage supply that is connected to emitters. All emitters receive both positive and negative voltage. Air assist is critical with this arrangement because ion-to-ion recombination frequently occurs. Pulse AC is similar to AC, but variations of the frequency and signal shape enable faster discharge times. However, high voltage offsets are possible.

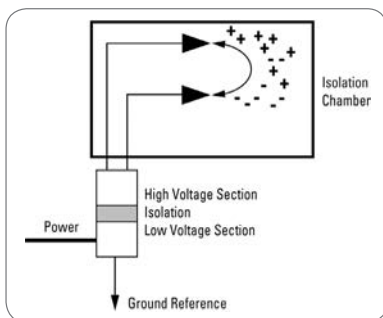


**Advanced Feedback Technology:** Maintains balanced, high ion output over long periods for stable performance between emitter point cleanings. (Ref: Model 5515)

**Corona Technology:** Air ions are produced by radioactive emission or by a phenomenon called 'corona discharge' where a high voltage is applied to a sharp point.

**Corona Wire:** The corona wire design permits the ionizer to be placed closer to substrates, diminishing the recombination of ions and the resulting 'stripping effect', no emitter points. (Ref: Models 5710, 5711)

**IsoStat Technology:** It's the first balancing technology for ionizers to guarantee intrinsically balanced ionization and elimination of complicated feedback circuits. IsoStat is based on a law of physics, Conservation of Charge, which states that charge cannot be created or destroyed in an isolated system. By isolating the ionizer's emitter points from the ground, IsoStat ensures equal numbers of positive and negative ions.



**MicroPulse Technology:** MicroPulse technology reduces ion recombination at the corona wire (ionizer placed closer to the substrate), thus increasing product efficiency and performance. Provide a uniform ion distribution with low field voltage. (Ref: Models 5635, 5635M, 5711)

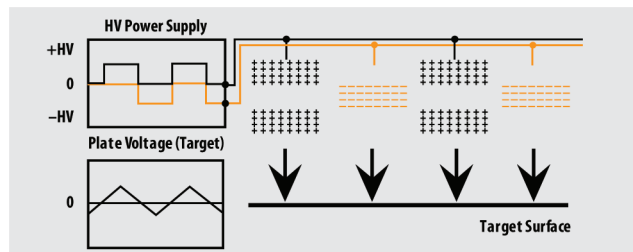
**Modulated Pulse (MP) Technology:** Combines high-frequency sine wave with modulated pulses (MP) for high ion output and delivery with long-term stability. Using MP technology together with ultra-clean silicon emitter points to achieve stringent ISO cleanliness requirements.

**Piezoelectric Technology:** Using piezoceramic material between two electrodes to form a high voltage transformer. Generates positive and negative ions in pulse mode from the emitter points. (Ref: ionOne Models Micro S, Micro SA)

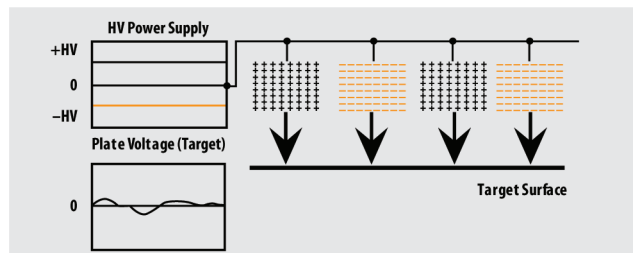
**μPulse Technology:** Patented μPulse technology with high-efficiency output to meet the performance, cleanliness, and low cleaning/maintenance requirements of large surface areas, especially in the FPD industry. μPulse Technology and wire emitters combine to provide long maintenance cycles. (Ref: Models 5710, 5711)

**Photon Technology:** The principle behind soft x-ray static elimination is the use of air ionization of soft x-ray. Soft x-rays are easily absorbed within the atmosphere to generate positive and negative ions. These positive and negative ions move being pulled according to the electrical charge of the electrified object according to coulomb's force and ultimately meeting with the electrified charge to become neutralized. Different from corona discharge type, soft x-ray, a form of light, is used.

**Pulse DC:** Pulsed DC ionizers allow positive and negative emitter points to be turned on and off alternately, creating clouds of positive and negative ions. The positive and negative output voltages so that the maximum swing values are within 20V of each other, averaging a value as close to zero as possible. The swings should not exceed 150V in either direction. Pulsed DC is similar to Steady-state DC (separate positive and negative supplies), but on/off pulses are applied to the emitters on an alternate basis. The discharge times can be substantially better than Steady-state DC ionizers; however, voltage offsets can be greater than.



**Steady-state DC:** Steady-state DC continuously applies a positive high voltage to emitter points and negative high voltage to the other half. The combined value of the positive and negative settings is as close to zero as possible, and less than  $\pm 20V$ . Steady-state DC ionization is commonly used in room systems, laminar flow hoods, blowers, and blow-off guns. Steady-state DC ionizers are comprised of separate sets of emitters connected to separate positive and negative supplies. The high voltages (positive and negative) both stay on simultaneously and constantly in this "Steady-state DC" configuration. Better discharge times can be realized versus AC ionizers without air assist.





# APPLICATIONS

| PRODUCT GROUP             | PRODUCT   | BACK-END SEMICONDUCTOR | FRONT-END SEMICONDUCTOR | GENERAL ELECTRONICS | FLAT PANEL DISPLAY | LIFE SCIENCES | PAGE |
|---------------------------|---|------------------------|-------------------------|---------------------|--------------------|---------------|------|
| BLOWERS                   | Model 5802i Benchtop                                | ●                      |                         | ●                   |                    |               | 1    |
|                           | Model 5810i Overhead                                | ●                      |                         | ●                   |                    |               | 3    |
|                           | Model 5822i In-tool                                 | ●                      |                         | ●                   |                    |               | 5    |
|                           | Model 5832 Benchtop                                 | ●                      | ●                       | ●                   |                    |               | 7    |
|                           | Model 6422e / 6422eAC In-tool, Point-of-Use         | ●                      |                         | ●                   |                    | ●             | 9    |
|                           | Model 6432e In-tool, Focused Coverage               | ●                      |                         | ●                   |                    | ●             | 11   |
|                           | Model 6832 Benchtop                                 |                        |                         | ●                   |                    |               | 13   |
|                           | Aerostat® FPD Overhead                              |                        |                         | ●                   | ●                  | ●             | 15   |
|                           | Aerostat® Guardian Overhead                         |                        |                         | ●                   |                    | ●             | 17   |
|                           | Aerostat® PC2 In-tool, Targeted Coverage            |                        | ●                       | ●                   | ●                  | ●             | 19   |
|                           | Aerostat® XC2 Benchtop, Extended Coverage           | ●                      |                         | ●                   | ●                  | ●             | 21   |
|                           | Guardian CR2000 Overhead, Cleanroom                 | ●                      |                         | ●                   | ●                  | ●             | 23   |
|                           | miniION2 In-tool or Focused Coverage                | ●                      |                         | ●                   |                    | ●             | 25   |
|                           | AeroBar® 5225 In-tool, Critical Environment Bar     | ●                      | ●                       |                     | ●                  | ●             | 27   |
| BARS                      | AeroBar® 5225S Standalone, Critical Environment Bar | ●                      | ●                       |                     | ●                  | ●             | 29   |
|                           | AeroBar® MP 5635 In-tool, Ultra-clean               |                        | ●                       |                     | ●                  | ●             | 31   |
|                           | AeroBar® MP 5635M (metal-free)                      |                        | ●                       |                     | ●                  | ●             | 31   |
|                           | AeroBar® 5685 In-tool, Standalone                   | ●                      | ●                       |                     | ●                  | ●             | 33   |
|                           | μWire AeroBar® 5710                                 |                        |                         | ●                   | ●                  |               | 35   |
|                           | μWire AeroBar® 5711                                 | ●                      |                         |                     | ●                  |               | 37   |
|                           |   |                        |                         |                     |                    |               |      |
| SPECIAL APPLICATION       | Model 4210 CDA or Nitrogen Gas                      | ●                      | ●                       |                     |                    |               | 39   |
|                           | Model 4214 In-line Nitrogen Gas                     |                        | ●                       |                     |                    |               | 41   |
|                           | Model 4610TF High / Cold Temperature                | ●                      |                         |                     |                    |               | 43   |
|                           | Model 4612 In-tool Extreme Temperature              | ●                      |                         |                     |                    |               | 45   |
|                           | QuadBar™ 4630 In-tool                               | ●                      | ●                       |                     |                    |               | 47   |
|                           | QuadBar™ 4635 In-tool with Air-Assist               | ●                      | ●                       |                     |                    |               | 49   |
|                           | fusION with Fan Attachment                          | ●                      |                         | ●                   |                    | ●             | 51   |
|                           | fusION AA with Air-Assist                           | ●                      |                         | ●                   |                    | ●             | 52   |
|                           | In-line fusION, Local Area                          | ●                      |                         | ●                   |                    | ●             | 53   |
|                           | ionONE Micro S & SA                                 | ●                      |                         | ●                   |                    | ●             | 55   |
| ELECTROSTATIC MONITORING  | Novx 7000 Process Monitor                           | ●                      | ●                       | ●                   | ●                  | ●             | 59   |
|                           | Novx 3352/3362 Voltage Detection System             | ●                      | ●                       | ●                   | ●                  | ●             | 61   |
|                           | Novx MiniPulse ESD Event Detector                   | ●                      | ●                       | ●                   | ●                  | ●             | 63   |
| ROOM SYSTEM               | Model 5515 Ceiling Emitter                          | ●                      | ●                       |                     |                    | ●             | 65   |
| INSTRUMENTATION           | Model 280A CPM (Charge Plate Monitor)               | ●                      | ●                       | ●                   | ●                  | ●             | 69   |
|                           | FMX-004 Handheld Fieldmeter                         | ●                      | ●                       | ●                   | ●                  | ●             | 70   |
|                           | Model 775 Fieldmeter                                | ●                      | ●                       | ●                   | ●                  | ●             | 71   |
|                           | Model 775PVS Periodic Verification System           | ●                      | ●                       | ●                   | ●                  | ●             | 72   |
| CARTRIDGES, GUNS, NOZZLES | 6110/6110A, In-line or Blow-off Gun                 | ●                      |                         | ●                   |                    |               | 73   |
|                           | AirForce® 6115 Blower-off                           | ●                      | ●                       | ●                   | ●                  | ●             | 75   |
|                           | TopGun™ Blower-off                                  | ●                      |                         | ●                   | ●                  | ●             | 77   |
|                           | orION & Controller, Compressed Air                  | ●                      |                         | ●                   | ●                  | ●             | 79   |

# PRODUCT INDEX

| MODEL       | DESCRIPTION  | BAR | BLOWER | BENCHTOP | OVERHEAD | IN-TOOL | GENERAL | SPECIAL APPLICATION | CRITICAL ENVIRONMENT | CLEANROOM | ULTRA-CLEAN | CONFINED SPACE | CEILING EMITTERS | ROOM SYSTEM | ESD EVENT DETECTION | INSTRUMENTATION | GUNS/NOZZLE/CARTRIDGE | SOFTWARE | CONTROLLER | ACCESSORIES |
|-------------|--|-----|--------|----------|----------|---------|---------|---------------------|----------------------|-----------|-------------|----------------|------------------|-------------|---------------------|-----------------|-----------------------|----------|------------|-------------|
| 280A        | Charge plate monitor   |     |        |          |          |         |         |                     |                      |           |             |                |                  |             |                     | •               |                       |          |            |             |
| 550         | Remote antenna used with extreme temp 4612 ionizer                     |     |        |          |          |         |         | •                   |                      |           |             |                |                  |             |                     |                 |                       |          |            | •           |
| 775         | Handheld Electrostatic Fieldmeter                                      |     |        |          |          |         |         |                     |                      |           |             |                |                  |             |                     | •               |                       |          |            |             |
| 775 PVS     | Fieldmeter with Periodic Verification System                           |     |        |          |          |         |         |                     |                      |           |             |                |                  |             |                     | •               |                       |          |            |             |
| 3352/3362   | Novx voltage detection system with CLFB                                |     |        |          |          |         |         |                     |                      |           |             |                |                  |             | •                   | •               |                       |          |            |             |
| 3352/3362MP | Novx voltage detection system with MiniPulse with CLFB                 |     |        |          |          |         |         |                     |                      |           |             |                |                  |             | •                   | •               |                       |          | •          |             |
| 4030        | Controller for QuadBar™ 4630, 4635                                     |     |        |          |          |         |         | •                   |                      |           |             |                |                  |             |                     |                 |                       |          | •          |             |
| 4052e       | Controller for 4610TF high temperature ionizer                         |     |        |          |          |         |         | •                   |                      |           |             |                |                  |             |                     |                 |                       |          | •          |             |
| 4062e       | Controller for 4612 extreme temperature ionizer & 550 antenna          |     |        |          |          |         |         | •                   |                      |           |             |                |                  |             |                     |                 |                       |          | •          |             |
| 4210        | In-line gas ionizer, Clean Dry Air (CDA) or Nitrogen (N <sub>2</sub> ) |     |        |          |          |         |         | •                   |                      |           | •           | •              |                  |             |                     |                 |                       |          |            |             |
| 4214        | In-line gas ionizer, Nitrogen (N <sub>2</sub> )                        |     |        |          |          |         |         | •                   |                      |           | •           | •              |                  |             |                     |                 |                       |          |            |             |
| 4610TF      | High temperature ionizer used with 4052e controller                    | •   |        |          |          |         |         | •                   |                      |           |             |                |                  |             |                     |                 |                       |          |            |             |
| 4612        | Extreme temp ionization system (4062 controller, 550 antenna)          | •   |        |          |          |         |         | •                   | •                    |           |             |                |                  |             |                     |                 |                       |          |            |             |
| 4630        | QuadBar 24 VAC ionizer, 4030 controller, FMS Module 5090               | •   |        |          |          |         |         | •                   | •                    |           |             | •              |                  |             |                     |                 |                       |          |            |             |
| 4635        | QuadBar 24 VAC air assist, 4030 controller, FMS Module 5090            | •   |        |          |          |         |         | •                   | •                    |           |             | •              |                  |             |                     |                 |                       |          |            |             |
| 5200-IM6T   | Interface module, used with AeroBar 5225/5225S                         |     |        |          |          |         |         |                     |                      |           |             |                |                  |             |                     |                 |                       | •        |            |             |
| 5090        | FMS interface module for QuadBar 4630, 4635 & 5515 room system         |     |        |          |          |         |         |                     |                      |           |             |                |                  |             |                     |                 |                       |          |            | •           |
| 5225        | AeroBar®, Software-controlled, used with 5200-IM6T/IonMonitor          | •   |        |          |          | •       |         |                     | •                    |           |             |                |                  |             |                     |                 |                       |          |            |             |
| 5225S       | AeroBar®, Standalone, used with 5200-IM6T & IonMonitor                 | •   |        |          |          |         |         |                     | •                    |           |             |                |                  |             |                     |                 |                       |          |            |             |
| 5515        | Software-controlled room system with Model 5522 controller             |     |        |          |          |         |         |                     |                      | •         |             |                | •                | •           |                     |                 |                       |          |            |             |
| 5522        | Controller for 5515 ceiling emitter (up to 20 emitters)                |     |        |          |          |         |         |                     |                      |           |             |                |                  | •           |                     |                 |                       |          | •          |             |
| 5571        | Handheld terminal for 5515 ceiling emitter room system                 |     |        |          |          |         |         |                     |                      |           |             |                |                  | •           |                     |                 |                       |          |            | •           |
| 5572        | Handheld remote used with 5515 ceiling emitter room system             |     |        |          |          |         |         |                     |                      |           |             |                |                  | •           |                     |                 |                       |          |            | •           |
| 5582        | Controller for 5515 ceiling emitter (up to 80 emitters)                |     |        |          |          |         |         |                     |                      |           |             |                |                  | •           |                     |                 |                       |          | •          |             |
| 5601        | Power distribution box used with AeroBar® 5635/5635M                   |     |        |          |          |         |         |                     |                      |           |             |                |                  |             |                     |                 |                       |          |            | •           |
| 5635        | Modulated pulse (MP) AeroBar® used with MP control software            | •   |        |          |          |         |         |                     |                      |           | •           |                |                  |             |                     |                 |                       |          |            |             |
| 5635M       | Metal-free (MP) AeroBar® used with MP control software                 | •   |        |          |          |         |         |                     |                      |           | •           |                |                  |             |                     |                 |                       |          |            |             |
| 5685        | AeroBar® local area ionizer  | •   |        |          |          |         | •       |                     |                      |           |             |                |                  |             |                     |                 |                       |          |            |             |
| 5700        | Power distributor box used with AeroBar MP 5635/5635M                  |     |        |          |          |         |         |                     |                      |           |             |                |                  |             |                     |                 |                       |          |            | •           |
| 5710        | µWire AeroBar®   | •   |        |          |          |         | •       |                     |                      |           |             |                |                  |             |                     |                 |                       |          |            |             |
| 5711        | µWire AeroBar® used with 5711-CTRL controller                          | •   |        |          |          |         | •       |                     |                      |           |             | •              |                  |             |                     |                 |                       |          |            |             |
| 5711-CTRL   | Controller for µWire AeroBar® 5711                                     |     |        |          |          |         |         |                     |                      |           |             |                |                  |             |                     |                 |                       |          | •          |             |
| 5802i       | Blower, optional external sensor feedback to Novx Products             |     | •      | •        |          | •       |         |                     | •                    |           |             |                |                  |             |                     |                 |                       |          |            |             |

# PRODUCT INDEX

| MODEL              | DESCRIPTION   | BAR | BLOWER | BENCHTOP | OVERHEAD | IN-TOOL | GENERAL | SPECIAL APPLICATION | CRITICAL ENVIRONMENT | CLEANROOM | ULTRA-CLEAN | CONFINED SPACE | CEILING EMITTERS | ROOM SYSTEM | ESD EVENT DETECTION | INSTRUMENTATION | GUNS/NOZZLE/CARTRIDGE | SOFTWARE | CONTROLLER | ACCESSORIES |
|--------------------|---|-----|--------|----------|----------|---------|---------|---------------------|----------------------|-----------|-------------|----------------|------------------|-------------|---------------------|-----------------|-----------------------|----------|------------|-------------|
| 5810i              | Blower, optional external sensor feedback to Novx Products    |     | •      | •        | •        |         |         |                     | •                    |           |             |                |                  |             |                     |                 |                       |          |            |             |
| 5822i              | Blower, optional external sensor feedback to Novx Products    |     | •      | •        |          | •       |         |                     | •                    |           |             |                |                  |             |                     |                 |                       |          |            |             |
| 5832               | Blower, optional external sensor feedback to Novx Products    |     | •      | •        |          |         |         |                     | •                    |           |             |                |                  |             |                     |                 |                       |          |            |             |
| 6110/6110A         | Cartridge, air ionizing maintenance                           |     |        |          |          |         | •       |                     |                      |           |             | •              |                  |             |                     |                 | •                     |          |            |             |
| 6115               | AirForce™ blow-off gun  |     |        |          |          |         |         |                     |                      | •         |             |                |                  |             |                     |                 | •                     |          |            |             |
| 6422e/6422e-AC     | Blower, point-of-use, in-tool/auto-clean system with FMS      |     | •      |          |          | •       |         |                     |                      |           |             | •              |                  |             |                     |                 |                       |          |            |             |
| 6432e              | Blower, local area, self-balancing with FMS                   |     | •      |          |          |         | •       |                     |                      |           |             | •              |                  |             |                     |                 |                       |          |            |             |
| 6832               | Blower, FMS connection and alarms for management control      |     | •      | •        |          |         | •       |                     |                      | •         |             | •              |                  |             |                     |                 |                       |          |            |             |
| 7000               | Novx process monitor  |     |        |          |          |         |         |                     | •                    |           |             |                |                  |             | •                   |                 |                       |          |            |             |
| Aerostat® FPD      | Blower, wide coverage   |     | •      |          | •        |         | •       |                     |                      |           |             |                |                  |             |                     |                 |                       |          |            |             |
| Aerostat® Guardian | Blower, multi-fan, heater & task lights                       |     | •      |          | •        |         | •       |                     |                      |           |             |                |                  |             |                     |                 |                       |          |            |             |
| Aerostat® PC2      | Blower, lightweight   |     | •      | •        |          |         |         |                     |                      |           |             | •              |                  |             |                     |                 |                       |          |            |             |
| Aerostat® XC2      | Blower, extended coverage                                     |     | •      | •        |          |         |         |                     |                      |           |             |                |                  |             |                     |                 |                       |          |            |             |
| Antennas           | Active/passive/monopole proximity meas., used w/Novx product  |     |        |          |          |         |         |                     |                      |           |             |                |                  |             |                     |                 |                       |          |            | •           |
| Calibrator Reader  | Use with Novx instruments                                     |     |        |          |          |         |         |                     |                      |           |             |                |                  |             |                     |                 |                       | •        |            |             |
| CDMES              | Charge Device Model Event Simulator, used with Novx MiniPulse |     |        |          |          |         |         |                     |                      |           |             |                |                  |             |                     |                 |                       |          |            | •           |
| FMX-004            | Handheld electrostatic fieldmeter                             |     |        |          |          |         |         |                     |                      |           |             |                |                  |             |                     | •               |                       |          |            |             |
| fusion             | Bar, local area with optional fan                             | •   |        |          |          |         |         | •                   |                      |           |             | •              |                  |             |                     |                 |                       |          |            |             |
| fusion AA          | Bar, local area with air-assist                               | •   |        |          |          |         |         | •                   | •                    |           |             | •              |                  |             |                     |                 |                       |          |            |             |
| Guardian CR2000    | Blower, low balance, fast discharge                           |     | •      |          | •        |         | •       |                     |                      | •         |             |                |                  |             |                     |                 |                       |          |            |             |
| HHT                | Handheld terminal used with µWire AeroBar 5710 & 5711         |     |        |          |          |         |         |                     |                      |           |             |                |                  |             |                     |                 |                       |          |            | •           |
| In-line fusion     | In-line local area  | •   |        |          |          |         |         | •                   | •                    |           | •           | •              |                  |             |                     |                 |                       |          |            |             |
| IONManager Pro     | Room system management software for 5515/5522/5582            |     |        |          |          |         |         |                     |                      |           |             |                |                  |             |                     |                 |                       | •        |            |             |
| IonMonitor         | Software used with AeroBar 5225 & 5200-IM6T                   |     |        |          |          |         |         |                     |                      |           |             |                |                  |             |                     |                 |                       | •        |            |             |
| ionONE             | Micro S & Micro SA with air-assist spot ionizers              |     |        |          |          | •       |         |                     |                      |           |             | •              |                  |             |                     |                 |                       |          |            |             |
| minION™2           | Local area, focused coverage                                  |     | •      |          |          | •       |         |                     |                      |           |             | •              |                  |             |                     |                 |                       |          |            |             |
| MiniPulse          | Embeddable ESD monitoring                                     |     |        |          |          |         |         |                     |                      |           |             | •              |                  |             | •                   |                 |                       |          |            |             |
| MP Control         | Software used with Model 5635/5635MP                          |     |        |          |          |         |         |                     |                      |           |             |                |                  |             |                     |                 |                       | •        |            |             |
| MPA-02             | Micro ESD antenna for restricted areas used with Novx 7000    |     |        |          |          |         |         |                     |                      |           |             | •              |                  |             | •                   |                 |                       |          |            | •           |
| orION              | Nozzle, compress air with controller                          |     |        |          |          |         |         |                     |                      |           |             | •              |                  |             |                     |                 | •                     |          | •          |             |
| Top Gun™ 3         | Blow-off Gun  |     |        |          |          |         |         |                     |                      |           |             |                |                  |             |                     |                 | •                     |          |            | •           |
| µWire              | Microwave AeroBar® 5710 & 5711                                | •   |        |          |          |         |         |                     |                      |           |             |                |                  |             |                     |                 |                       |          |            |             |

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