



An ITW Company

IONIZATION SOLUTIONS



# **Air Ionizer**

## **fusION™**

User's Manual

# About Simco-Ion

Simco-Ion develops, manufactures, and markets system solutions to manage electrostatic charge. As the world's largest provider of electrostatics management products and services, Simco-Ion improves its customers' business results by providing a total solution to their electrostatic discharge and electromagnetic interference challenges. Simco-Ion Technology Group is a division of Illinois Tool Works (ITW), located in Alameda, California. For more information about Simco-Ion visit [www.simco-ion.com](http://www.simco-ion.com) or call +1 800-367-2452. Simco-Ion is ISO 9001-2008 certified.

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# Important Safety Information



Carefully read the following safety information before installing or operating the equipment. Failure to follow these safety warnings could result in damage to your ionization system and/or voiding the product warranty.



**DISCONNECT POWER SUPPLY BEFORE SERVICING.**

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**SHARP POINTS - Risk of injury. Keep hands/fingers away.**

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- ☒ Do not operate the fusION ionizer or power supply in the presence of flammable liquids or within an explosive atmosphere.
- ☒ The fusION ionizer, when operated with the optional power supply, is to be connected to the main electric source with the included 3-wire line cord and grounded plug set. Do not remove the electrical ground pin of the plug set.
- ☒ A factory qualified service technician must perform component service and repairs. Please contact Simco-Ion Customer Service for information.

# Informations de Sécurité Importantes



Lisez attentivement les consignes de sécurité suivantes avant d'installer ou d'utiliser l'équipement. Le non-respect de ces avertissements peut entraîner des dommages à votre système d'ionisation et/ou d'annuler la garantie du produit.



**DÉBRANCHER L'ALIMENTATION AVANT DE PROCÉDER À L'ENTRETIEN.**

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**Pointus Points - Risque de blessure. Garder les mains/ doigts à l'écart.**

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- ☒ Ne pas faire fonctionner la fusion ioniseur ou alimentation en présence de liquides inflammables ou dans une atmosphère explosive
- ☒ La fusION d'ioniseur, lorsqu'il est utilisé avec le bloc d'alimentation en option, est d'être connecté à la principale source électrique avec le inclus 3-wire cordon d'alimentation et fiche de terre. Ne retirez pas la broche de masse du connecteur série.
- ☒ N'insérez pas d'objets dans l'unité de grilles d'entrée ou de sortie en cours de fonctionnement. Dommage pour l'ioniseur et/ ou peut entraîner des blessures graves.

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# 1

## Description

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1.1 fuslON Air Ionizer

1.2 Features

# 1.1 fusION Air Ionizer

The Simco-Ion fusION is a miniature bi-polar corona air ionizer capable of controlling electrostatic charge in the local area. Applications for fusION are those found inside process equipment and mini-environments in the semiconductor back-end, flat-panel display, pharmaceutical and medical device industries. It is especially well suited for applications with space constraints, low ambient airflow and low clearance.

The Simco-Ion fusION is a compact, steady state, bi-polar DC air ionizer designed for easy installation, and minimal maintenance. The ionizer can be powered by an optional universal input, low voltage power supply, or through a 24 VDC power bus in the host main circuit. Multiple fusIONs can be linked together from the power supply, allowing up to 5 units to be daisy-chained.



Figure 1. fusION Miniature Bi-polar Corona Air Ionizer

Careful selection of construction materials ensures the ionizer's conformity to industry standards for ISO 14644-1 Class 4 cleanliness requirements.

Optional fan, air purge, and in-line assemblies provide improved airflow for applications benefiting from reduced discharge times. Air purge improves maintenance cycle when used with clean dry air (CDA).

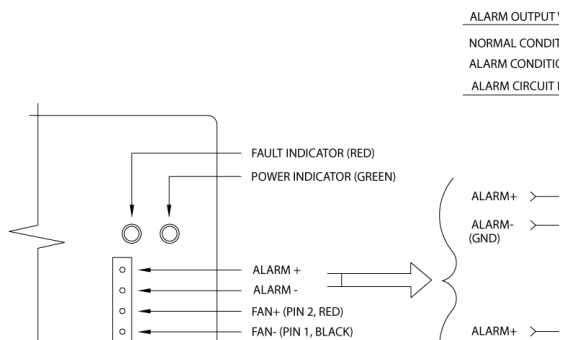


Figure 2. Inline fusION Air Ionizer



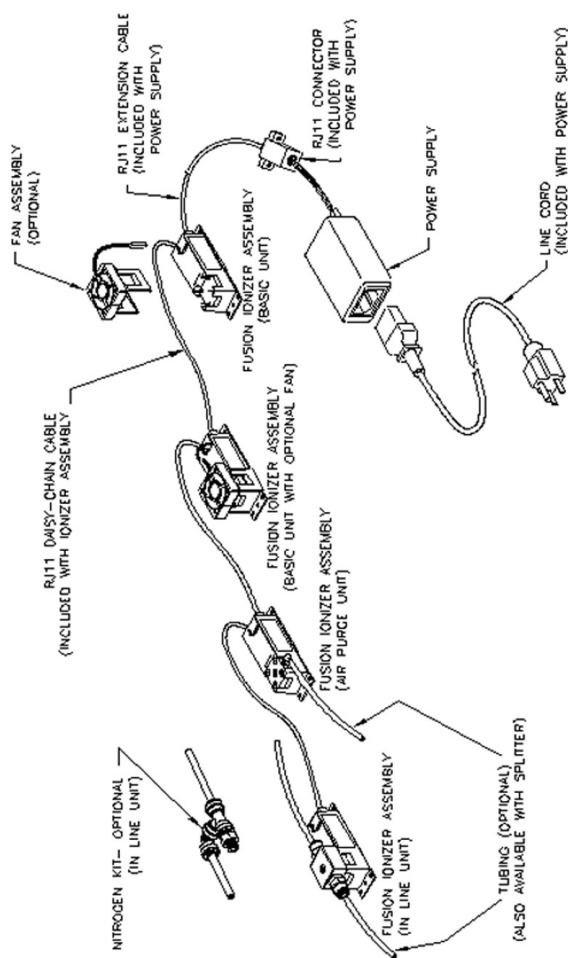


Figure 3.

## 1.2 Features

- Operation and balance control of the fusION is automatically regulated by built-in circuitry. A green light on the face of the ionizer indicates active condition. A red light will indicate if a fault condition has occurred. Mounting holes for the ionizer are provided within the integral base of the unit.
- Controlled airflow from an optional fan, gas purge or in-line assembly improves the performance of the fusION. The fan assembly is easily snapped onto the fusION enclosure, and is powered through an onboard connector jack. The fan assembly circulates ambient air.
- The gas purge and in-line assemblies allow for use with pressurized CDA (clean dry air) or Nitrogen. Both options improve the discharge times and offset voltage performance of the ionizer. Extended intervals between emitter point cleanings is an added benefit of gas purge.
- A multi-positioning connector provides for simplified gas supply tube routing within the host equipment.
- FusIONs are supplied with Tungsten emitter points.



# 2

## Installation

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2.1 Mounting

2.2 Fan Assembly Mounting & Connections

2.3 Gas Purge Assembly Mounting & Connections

2.4 In-line Assembly Mounting & Connections

## 2.1 Mounting

Inspect the shipping container and contents for visible damage. Report any damage directly to the carrier before attempting installation of the unit.



**SHARP POINTS - Risk of injury. Keep hands/fingers away.**

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**Pointus Points - Risque de blessure. Garder les mains/ doigts à l'écart.**

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The fusION ionizer is designed for fixed position mounting onto a secure equipment frame or partition surface. The flanged base of the ionizer may be used as a template, or see Figure 3 for complete dimensional information.

Prepare the mounting surface with the necessary mounting holes. Secure with #4 or #6 screw hardware as required. Mounting hardware is not supplied with the unit.

### Mounting Location Requirement

The center of the ionizer's emitter pin grid must have a minimum 3" spherical radius clearance to any adjacent equipment frame or wall surface. A clear line of sight is recommended to the area requiring static neutralization for the best ionizer performance.



This product is intended to be supplied by a Listed AC Adapter or Power Unit marked "Class 2" or "LPS" and rated output 24 VDC, 1.66A.

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Ce produit est destiné à être alimenté par un adaptateur secteur ou unité d'alimentation marqué "Classe 2" ou "LPS" et sortie nominale 24 VCC, 1,66 A.

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After the ionizer mounting has been completed, connect the power cord between the ionizer and power supply. Secure the power supply as necessary. Connect the line cord from the power supply to the main electric source. The green light on the ionizer will indicate normal operation.

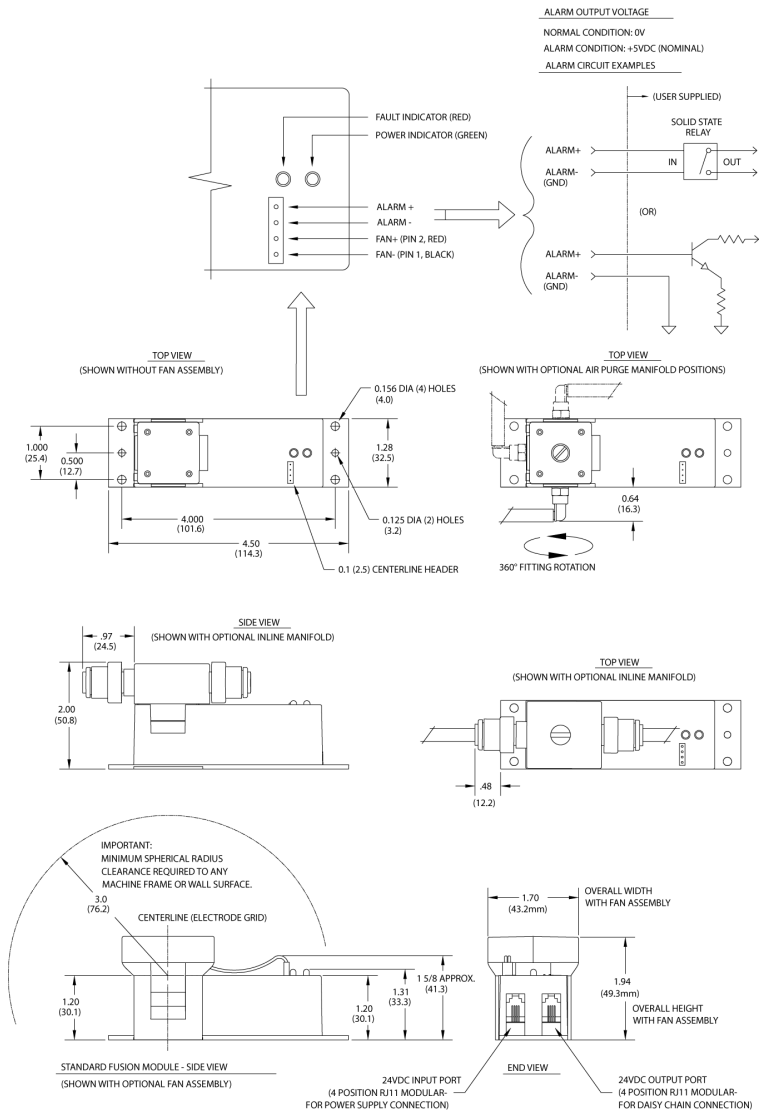


Figure 4.

## 2.2 Fan Assembly Mounting & Connections

Engage the open end of the fan assembly directly around the emitter pin grid area of the ionizer, until it snaps into place. Insert the power lead connector of the fan assembly into the socket located in the top of the ionizer enclosure. The black wire, pin 1 in the connector must be positioned towards the outside of the ionizer enclosure. See Figure 3 for complete connection diagram.

On applications requiring a permanent fan assembly mounting to the ionizer:

1. Apply a small amount of cement (suitable for bonding polycarbonate) along the tab junction after assembling the components.
2. Allow the cement to completely dry before putting the ionizer into service.

## 2.3 Gas Purge Assembly Mounting & Connections

**It is recommended that any purge manifold adjustments be made prior to final installation of the ionizer.**

An adjustable purge manifold is mounted within the emitter pin grid area of the ionizer. The manifold adjustment allows for repositioning of the gas tube fitting for efficient gas supply routing within the host equipment.

The purge manifold can be adjusted by first removing the center retaining screw.

Carefully pull the manifold straight out of the emitter pin grid area. Verify that the gasket at the bottom of the grid area is fully against the surface.

Rotate the purge manifold to the desired position, replace and tighten the screw.

Install the optional 1/8" ID gas tubing onto the barbed fitting and secure the ionizer onto the mounting surface. The barbed fitting may be rotated 360 degrees to simplify the tube connection.

Connect the power supply to the ionizer, and route all wiring and tubing clear of sharp edges and moving parts in the host equipment. Maximum recommended gas supply: 45 psig (CDA or Nitrogen).

A +5 VDC (TTL level) alarm output is provided for remote monitoring of the ionizer operating condition. See Figure 3 for complete connection diagram.



## 2.4 In-line Assembly Mounting & Connections

An in-line manifold is mounted within the emitter pin grid area of the ionizer. The in-line manifold allows for multi-tube configurations for tight locations which have been previously inaccessible for other ionizers. The input and output connectors both take 1/4" OD / 1/8" ID tubing. Insert the tubing into the connector and run the tube to the desired location, or, use a 2-way splitter to direct ionization to two different locations. For optimal performance, use the shortest tube lengths possible. Excessive tube lengths will increase discharge times. Inline models without a nitrogen kit are not suitable for use with pure nitrogen as the gas supply, a 1-2% CDA mixture is recommended. The optional nitrogen kit will allow for pure nitrogen to be used as the gas supply.

# 3

## Maintenance

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3.1 Calibration & Cleaning

3.2 Cleaning

## 3.1 Calibration & Cleaning

The fusION ionizer is designed for calibration free operation with a minimum of maintenance and cleaning. There are no user serviceable parts within the ionizer. No attempt should be made to disassemble or repair defective products. Please contact Simco-Ion customer service for information concerning repair or replacement.

**All corona type ionizers form deposits on the emitter electrodes during normal service. Typical deposits appear as a white coating upon the pointed tip region of the electrode. Periodic cleaning of the pointed tips will maintain the performance and extend the life of the ionizer. Maintenance frequency will depend on the relative humidity and cleanliness of the location where the ionizer is operated.**



Figure 5. Eroded and Dirty Silicon Emitter Point Tip

## 3.2 Cleaning

Occasional cleaning of the ionizer housing may be accomplished with a clean cloth moistened with common glass cleaning solution.

The recommended emitter cleaning procedure is as follows:

1. Turn the ionizer off by disconnecting it from the electrical power source.
2. Simco-Ion recommends using the ITW-TEXWIPE model TX726, Crush Tube product for cleaning the emitter electrodes. (Follow ITW-TEXWIPE product instructions) A substitute method consists of a cleanroom swab saturated in a cleaning solution of isopropyl alcohol and de-ionized water. These items may be obtained from local cleanroom products suppliers.
3. Prepare the Crush Tube or swab for use. Insert it directly onto the point of the electrode (CAUTION: SHARP PINS, AVOID CONTACT), rotate slowly, and withdraw. Repeat this process until all visible deposited material has been removed.
4. Allow cleaning solution to dry completely before returning the ionizer to service.



# 4

## Specifications

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4.1 Specifications

4.2 Parts & Accessories

# 4.1 Specifications

<b>Input Voltage</b>	24 VDC, 0.2A
<b>Output Voltage</b>	±3500 VDC, 50 mW, 5 µA, Steady State
<b>Discharge</b>	±1000V to ±100V, <15 sec @ 6" (152.4 mm) without fan; ±1000V to ±100V, <10 sec @ 12" (304.8 mm) with fan; ±1000V to ±100V, <5 sec with gas purge @ 12" (304.8 mm), @ 1.4 bar (20 psi) input gas pressure; ±1000V to ±100V, <5 sec @ 6" (152.4 mm) @ 0.7 bar (10 psi) input gas pressure with in-line (tests performed per ESD STM-3.1-2006)
<b>Balance</b>	±50V
<b>Power Supply Input Voltage</b>	Universal, 100-240 VAC, 50/60 Hz (24 VDC, 1.66A output)
<b>Air Volume</b>	0.5 scfm @ 5 psi to 4 scfm @ 50 psi (14.2 l/m @ 0.34 bar to 113.3 l/m @ 3.4 bar) with gas purge; 0.8 scfm @ 5 psi to 3.6 scfm @ 50 psi (22.6 l/m @ 0.34 bar to 101.9 l/m @ 3.4 bar) with in-line
<b>Emitter Points</b>	Four (4), Tungsten
<b>Cleanliness</b>	ISO 14644 Class 4
<b>Operating Env.</b>	Temperature 32-122°F (0-50°C), humidity 20-65% relative non-condensing
<b>Coverage Area</b>	12" x 12" @ 6" spacing (304.8 x 304.8 mm @ 152.4 mm)
<b>Audible Noise</b>	31 dB with fan
<b>Operating Mode</b>	Steady-state DC
<b>Status Output</b>	TTL level alarm output
<b>Mounting</b>	Integral mounting flanges accept four (4), #4 or #6 screws (not supplied)
<b>Enclosure</b>	White polycarbonate (UL 94V-0 flammability rating)
<b>Weight</b>	0.25 lb (113g) without fan; 0.30 lb (136 g) with fan
<b>Dimensions</b>	1.31H X 1.28W X 4.5L in. (33.3 X 32.5 X 114.3 mm)
<b>Warranty</b>	Two year limited warranty
<b>Certifications</b>	RoHS 2 Compliant

## 4.2 Parts & Accessories

Part No.	Description
4010447	Fan assembly
4010448	Power Supply (North America/Japan)
4010449	Power Supply (Continental Europe)
4010450	Power Supply (United Kingdom)
4010577	fusION Compact Air Ionizer, Tungsten (W) emitter points
4010831	fusION Ionizer with gas purge, Tungsten (W) emitter points
4012229	In-line fusION Ionizer, Tungsten (W) emitter points
4370760	Tungsten (W) emitter points (1)
5051288	Kit, Tungsten emitter points (4) with extractor tool
5051310	Kit, Daisy-chain jumper cable
5051513	Kit, Nitrogen





## Warranty & Service

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Simco-Ion provides a limited warranty for the fusION Ionizer. 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 shall 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 Technical Support at [techsupport@simco-ion.com](mailto:techsupport@simco-ion.com) or +1 (510) 217-0470.

# Notes

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