

Simco-Ion Electrostatic Neutralizer Ionizing Air Nozzle ionFOCUS III

INSTRUCTIONS **Installation/Operation/Maintenance**



⚠ CAUTION

It is important that these instructions be read and understood before installation or operation. Failure to follow these instruction so could result in serious personal injury and/or damage to the equipment. At the end of this manual, a written warranty is provided. This should be stored in a safe place.

Thank you for buying Simco-Ion products. This equipment will meet your expectations and provide safe operation when it is properly installed and maintained.

Checking the contents of package

Please carefully remove the equipment from the carton and inspect. Note any damage that might have occurred during shipment. Empty the carton to ensure that small parts are not discarded. If any damage has occurred during shipment, the local carrier should be notified at once. A report should be forwarded to SIMCO JAPAN, INC. The address and other relevant informations are written on the back cover page.

Package Contents

- 1) Ionizing air nozzle ionFOCUSIII 1 pc.
(Standard nozzle chip type + Exclusive use AC/DC adaptor)
or
Ionizing air nozzle ionFOCUSIII -B
(Standard nozzle chip type)
- 2) Instructions Manual / Warranty 1 pc.
- 3) Option
 - Exclusive use AC/DC adaptor (INPUT 100-240 Vac)
 - Code (power supply code for AC/DC adaptor) for 200V
(PU150-AD200C)

Please check if any part is missing or does not have satisfactory finish. Contact us or our agents immediately in the event of such occurrence.

NOTES TO USERS

WARNING

This equipment is not constructed for classified (hazardous) environment. It cannot be used where it will be exposed to ignitable or corrosive materials and gases.

CAUTION

- This equipment employs high voltage. Please follow the operating instructions carefully in order to minimize electrical shock hazard. The installation and maintenance must be carried out by a trained electrician.
- This equipment is intended for use in electrostatic processes that are free from water, oil and other conductive contaminants. Exposure to such contaminants will cause failure of the electrical insulation system in the product.
- This equipment should not be operated in an ambient with corrosive fumes of acid/alkali or corrosive gases such as chlorine.
- The equipment is designed to be used with a switching AC/DC adapter, which has 24 Vdc output. Its performance and durability cannot be guaranteed if any other power supply used.
- The neutralizing electrode, an Emitter, in this product consist of sharp needle. Please take precautions against injury.
- The equipment must have proper grounding. Periodic maintenance, such as cleaning of needle electrode (Emitter), is necessary for satisfactory performance of the equipment.
- Unplug the equipment during prolonged periods of non-use, such as plant shut-down, overnights, weekends etc.
- During normal use of this product, there should be no visible spark. If any spark is observed, please turn off power and clean the unit following proper maintenance procedure. In case sparking continues, switch off the power and contact us or our sales representatives in your area. Inspection, exchange and repair service will be provided in accordance with the warranty conditions.
- This equipment is likely to be damaged if dropped. In such an event, it should be carefully examined and any necessary repairs be made by an authorized technician. The equipment may produce considerable electrical noise and/or burn off insulation if the unit is damaged.
- This equipment has been carefully assembled and inspected in Simco Japan, Inc. Do not attempt to disassemble or modify its construction. If you are not clear about its operation and maintenance, call Simco Japan's authorized agent in your area.

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Explanation of Symbols:



WARNING



ATTENTION / CAUTION



ELECTRIC SHOCK HAZARD

Section 1. GENERAL DESCRIPTION

Ionizing air nozzle ionFOCUSIII built the electrode for the static electricity removal used to remove the dust which neutralizes, removes the static electricity of the electrification thing, and adheres and the high voltage unit into, and is an air nozzle of a new type.

A state of normal operation (green LED light) and an abnormal stop (red LED light) can be confirmed from distant to ionFOCUSIII.

Switching AC/DC adaptor is necessary for ionFOCUSIII. Because the shape of the connector is different, AC/DC adaptor on the market cannot be used. Or, it is possible to connect from +24V power supply by a general purpose code.

The abnormal detection circuit of a high voltage is built in ionFOCUSIII. If a high abnormal voltage (short-circuit and Leake, etc.) is generated, the high voltage output from the high voltage unit of building into stops automatically, and self-maintains the state. At this time, the power lamp (green LED) is turned off, and an abnormal lamp (red LED) lights. The alarm is output in the opening collector at the same time. The state of ionFOCUSIII can be controlled by using this warning output in the remote place.

The compressor air or Nitrogen gases from the rear side of the nozzle to ionFOCUSIII.

ionFOCUSIII has the general purpose nozzle chip type in which various nozzle pipes are installed besides the standard nozzle chip type.

CAUTION

- **The power supply input of ionFOCUSIII is DC24V. The over voltage input damages an internal circuit. Do not use excluding switching AC/DC adaptor special of attached goods or a general purpose code.**
- **Ion balance is generally less than $\pm 10V$, if you are using, we recommend that it is adjusted to less than 0.3 MPa pressure of air supplied to the compressor ionFOCUSIII sensitive electronic device or the like.**

Features of ionFOCUSIII are as follows;

- Two LEDs, green and red: easily monitored from remote locations.
- Polished stainless steel enclosure and stainless nozzle tip: suitable for clean room applications.
- Neutralizing electrode is adopted titanium long life.
- Two M4 threads are provided on both side of the enclosure for easy mounting purpose.
- Low voltage 24 Vdc Input: built-in high voltage module, high voltage external wiring is unnecessary.
- Safety: includes fault detection circuit with alarm terminals for monitoring at a remote location.
- Because the remote input terminal has been installed, it could easily set remote control and the synchronization operation with the mechanical equipment.

Section 2. SPECIFICATIONS

2.1 Ionizing Air Nozzle ionFOCUSIII

Product type : AC high voltage ionizing air nozzle

Size : D 31 × L77 × H54 mm approx.

The length of the one-touch fitting does not contain the total length size.

External view is because we are separately available, please ask us or agency. Moreover, it is possible to obtain from on our home page.

Weight : 175 g approx. (excludes an AC/DC adapter)

Materials : Emitter ; Titanium

Enclosure ; Stainless steel (SUS304)

Insulator ; Mainly nylon

Power input : 24 Vdc less than 120 mA

(connect with the switching AC/DC adapter provided)

Power output : 7000 V_{P-P} ± 250V_{P-P} 33kHz

Direct contact with high voltage; there is a risk of electrical shock if an emitter is touched.

Operating distance : 50 mm to 300 mm between the nozzle and charged object.

Charge Decay Time : less than 1.0 seconds measured by 6" x 6", 20 pF charged metal plate, 300 mm from the nozzle. Decay from 1000 V to 100 V with air pressure \geq 0.2 MPa

Ion Balance : This unit doesn't have an ion balance adjustment circuit.

less than ± 10 V (measured by 6" x 6", 20 pF charged metal plate, 50 - 300 mm from the nozzle with air pressure 0.05 - 0.3 MPa, clean dry air)

Fault detection circuit : When a short circuit or any abnormal electrical discharge occurs on high voltage side, it turns off high voltage output. The red LED turns on, and alarm output is activated.

Reset: Turn the power (24Vdc) OFF and ON again after investigating the cause and taking appropriate preventive measure.

Alarm output : NPN open-collector, 20 mA max.

Connect and use the cable for the plug of attached goods for the connection of the warning output.

Remote operation: It turns off the power supply when the short-circuited between the remote input terminal and COM.

Indicator : High-luminance green LED light for normal operation

High-luminance red LED light for abnormality

Input air pressure : 0.6 MPa max., clean dry air or N₂ gas

Input air temperature : 0 - 40 °C. (no freezing, non-condensing and rapid temperature variations should be avoided.)

Air supply : Clean quick connection for 8 mm outside dia. tube. The air connector can be attached to the rear or the top of the body.

Air consumption / Noise : Refer to the following table (average)

Input air pressure (MPa)	0.05	0.1	0.2	0.3	0.4	0.5	0.6
Air consumption (NL/min.)	80	120	205	280	360	440	520
Noise (dB))	90	90	95	100	105	105	105

Ambient condition : for operation ; 0 - 40°C, 10 - 85% RH

for storage ; -10 - 50°C, 0 - 90% RH

(no freezing, no condensation)

Life expectancy : Over 10,000 hours (based on 8 h/d, 250 d/y, 5 years)

Warranty : One year after shipment

Compatible specification : RoHS

2.2 Switching AC/DC adapter (option)

Input : 100 Vac – 240 Vac, 50/60 Hz, 0.9A max.

Output : 24 Vdc \pm 5%, 1.5 A max.

Safety circuit : Over current protection (Auto recovery)

Short circuit protection : The adapter will not be damaged by short circuit of the DC output to ground

Hi-pot test : Between Input & Output, 3 kVac, 3 seconds; no damage

Insulation resistance : Input to Output >100 M Ω at 500 Vdc

Size : W 47 \times D 32 \times L 68 mm approx. (excluding plug and cord)

Cord length : DC cord: 1.8 m approx., AC line cord: 1.8 m approx.

Weight : Adapter: 130 g approx. AC line cord: 180 g approx.

Environment : for operation; 0 – 40°C, 5 – 95% RH

for storage; -20 – 85°C, 5 – 95% RH

(no freezing, non-condensing)

Section 3. PRINCIPLE OF OPERATION

A static eliminator consists of ionizing electrodes (emitters), a high voltage cable and a power unit. Power unit supplies high voltage to energize ionizing electrodes. The ionizing electrodes are sharpened needle tips at high voltage, positioned near ground electrode.

ionFOCUSIII is an ionizing air nozzle with a high voltage power unit mounted inside, and it does not need any external high voltage cable.

The high voltage unit, to generate a high voltage alternating current required for neutralizing electrode.

Ionizing Air Nozzle ionFOCUSIII operates as follows :

- 1) A switching AC/DC adapter supplies 24 Vdc to ionFOCUSIII .
- 2) Power unit inside produces high voltage and energizes an emitter.
- 3) Because of the intense electric field at the emitter tip, corona discharge is initiated.
- 4) Air molecules in the vicinity of the electrode tip (actually, oxygen, nitrogen, and water vapor) is ionized to positive and negative ions. (Also referred to as the ionization of air molecules in a simplified manner.)
- 5) The clean compressed air supplied through ionFOCUSIII blows both ions to the charged object.
- 6) As the unlike charges attract, the charged object that needs to be neutralized attracts ions of opposite polarity until it is neutralized.
- 7) Attract ions of opposite polarity in the same way that has been peeled off the dust from the work with physical force of the air compressor. Its charge is neutralized and removed from the work easily. Since the charge will be also removed the dust that had been deposited also work, but there is no reattachment due to static electricity. If the dust is charged with reattachment work causes such as friction and peeling again.

ionFOCUSIII is not an anti-static device processing. In addition, since there is no such thing repel dust can discharge static electricity, usually skip the direction opposite to the traveling direction of the work piece when performing the processing of dust removal dust removed He is laminated on the workpiece I avoid.

How it works this is the "static electricity removal due to ionization" in ionFOCUSIII.

Section 4. INSTALLATION

CAUTION

- **Complete all installations before connecting the AC/DC adapter.**
- **Refer to the name of parts indicated in the drawing on page 15.**
- **Avoid vibrations and shock which could cause damage to ionFOCUSIII.**

4.1 Installation of the Ionizing Air Nozzle ionFOCUSIII

4.1.1 Location of the nozzle

- Use in a clean environment is recommended. (ex. clean room, clean booth, etc.)
- Best locations are usually just ahead of place where static charge gives trouble.
- The nozzle should be pointing directly towards the object to be neutralized. Between the nozzle and charged material to be neutralized, there should be no other object.
- The nozzle should be placed 50 mm – 300 mm from the object. Please install the nozzles close to the charged object and input enough air pressure for efficient neutralizing performance. Some consideration should be given to lateral spread of the air and blow-off force acting on the work surface.
- The mounting must be free from water, oil, solvent, other chemicals, vibration, condensation and temperature greater than 40 °C.

4.1.2 Mounting of the nozzle

- Secure the nozzle for proper use.
- Use female threads on both side of the enclosure to support it on a machine frame or other secured structure. The threads are M4 and 5 mm depth.

4.2 Grounding the nozzle

- By connecting the 3P outlet with a ground pole, if you are using a casing of the nozzle is connected to a grounded AC / DC adapter only. Further, by fixing the machine frame or the like, which is grounded casing of the nozzle, the nozzle body is grounded.

If you are from the power supply +24 V, make sure that you are grounded side (COM) GND side or Negative.

- There is a screw for the ground on the side of the rear panel. Use the grounding screw in this case can not be above ground, be sure to ground (earth) the body.
- Should be measured with a tester between the earth and the nozzle tip of the nozzle to the nozzle after installation. If the measured value of the tester is not less than 100 Ω , perform rework / verification of frame ground fixing methods and machinery.

CAUTION

- **Improper grounding affects neutralization performance.**

4.3 Air tube connection

Clean, dry air or N₂ gas should be supplied to ionFOCUSIII by a synflex tubing of 8 mm outside diameter using quick connector attached to the rear.

CAUTION

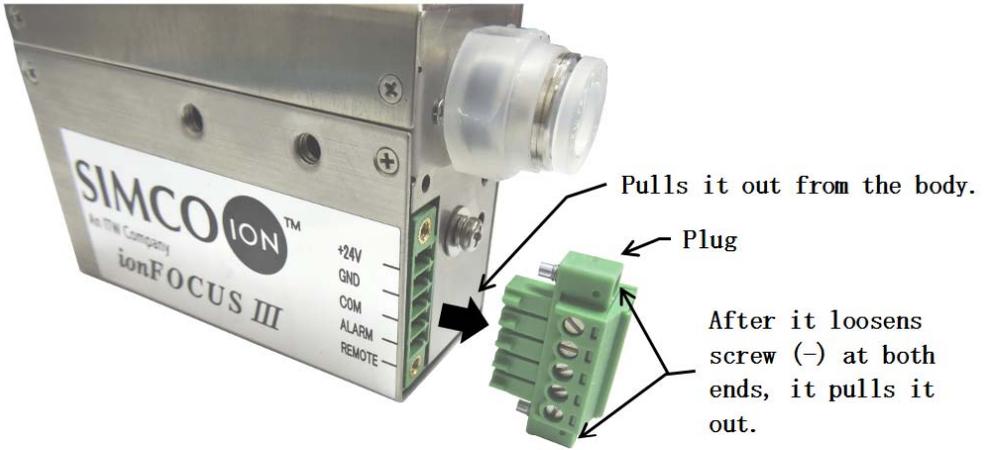
- **Use ionFOCUSIII always with compressed air or N₂ gas.**
- **Make the air tubing as short as possible. High pressure air is used and pressure loss will occur along the tube.**
- **The maximum allowable pressure is 0.6 MPa (\approx 6 kgf/cm²).**
- **Use pressure regulator, air-filter, mist separator as needed.**
- **If the air and ionization are cycled on and off, the cycle time must be more than 10 seconds to prevent damage to ionFOCUSIII. The fault detection circuitry will also not act properly for faster cycle times.**

4.4 Connection of a switching AC/DC adapter

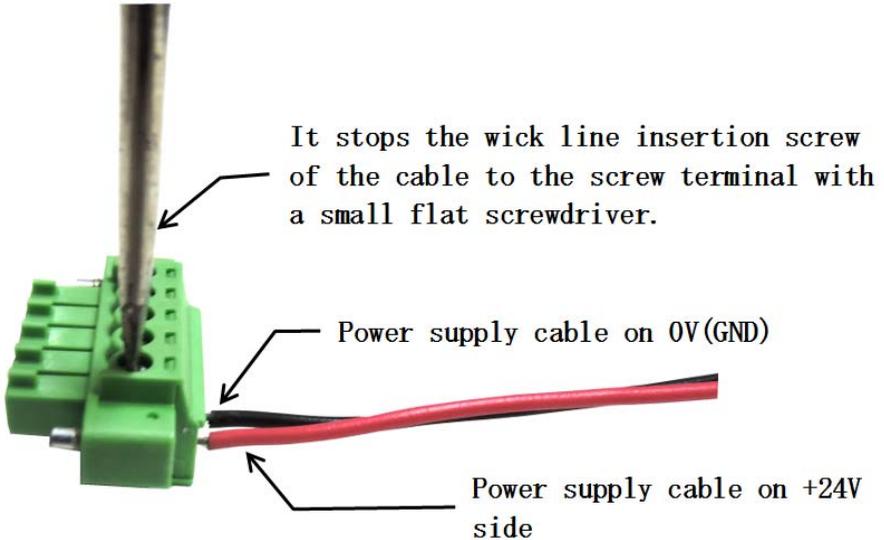
- The plug to connect with the main body is connected with this special switching AC/DC adaptor. (In the case of option had not been attached) Input rating of the adaptor is 47 - 63 Hz, AC 100 - 240 V. Rating of the supplied power cord is AC 125V. When connecting the power cord should be replaced more appropriate to the power supply line. For up to AC 125V, connect to 3P outlet with a power cord to the grounding electrode.
- Insert the plug of the terminal of the adaptor in the connector of ionFOCUSIII about the type attached by the standard. ionFOCUSIII operates at once if the power supply is supplied at the outlet. Supply air before supplying the power supply.

4.5 Wiring for plug

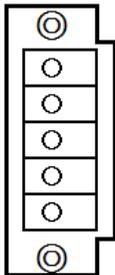
4.5.1 The plug of the screw tightening type is attached to the main body. Pull out a special plug from the main body referring to the photograph.



4.5.2 When the set sales are done, the plug is connected with the terminal of exclusive use AC/DC adaptor. However, stop cabling in the screw referring to the photograph when exclusive use AC/DC adaptor is bought by the option or supplies from customer's DC +24V power supply.



4.6.3 Connect referring to the photograph when you connect the lead line with ALARM OUT.



- 1P INPUT DC+24V
- 2P GND (COMMON)
- 3P GND (COMMON)
- 4P Alarm (In abnormal circumstances: LOW).
- 5P Remote (HIGH (opening): Output ON and LOW (close): Output OFF)

Section 5. OPERATION

5.1 Start Operation

- 1) Supply clean dry air or N₂ gas.
 - Air flow from the nozzle starts.
- 2) Connect the DC output of the switching AC/DC adapter to ionFOCUSIII. Connect the AC line cord to the adapter and the line power receptacle.
 - A green indicating lamp turns on.
 - Neutralization starts.

5.2 Abnormal conditions

- 1) If any abnormality occurs, such as high voltage sparks or short circuit, the high voltage output is interrupted.
 - The green indicating lamp turns off.
 - A red indicating lamp turns on.
 - An alarm output (open collector) is activated.
 - Neutralization stops.

※ When the circuit board of ionFOCUSIII is broken, both LEDs (indicating lamps) may turn off.

5.3 Reset

- 1) Pull out the DC plug, or disconnect the line cord plug from the power receptacle.
 - The red indicating lamp turns off.
 - Alarm output stops.
- 2) Reconnect the plug.
 - The green LED turns on.
 - Neutralization restarts.

※ If the abnormality is not resolved, ionFOCUSIII returns to the abnormal status. In this case, clean ionFOCUSIII in accordance with the cleaning instructions described below in Section 6. Also, all other checking should be done for remedy in accordance with the Section 6.

5.4 Stop Operation

- 1) Pull out the DC plug of the adapter from ionFOCUSIII, or disconnect the line cord plug from the power receptacle for ionization to stop.

2) Stop the air supply.



CAUTION

- Confirm that there is no visible spark.
- Confirm that compressed air or N₂ gas is blown directly to the charged object.
- Unplug the DC plug from ionFOCUSIII when the nozzle is not in use. If left unused for a long period of time, the AC line cord of the adapter should be unplugged from the power receptacle.

Section 6. MAINTENANCE

6.1 Cleaning of ionFOCUSIII



CAUTION

ionFOCUSIII employs high voltage and is a special product. If regular maintenance is neglected, there may be deterioration of neutralizing performance.

- 1) Clean the emitter with a soft nylon brush or clean cloth regularly.
 - 2) In order to remove dirt that cannot be removed by brushing alone, a cotton or foam swab slightly moistened with pure methanol or pure IPA may be used. Clean up the emitter, insulation material such as the white resin and holes of air outlet on the nozzle.
- Recommended interval time is every 100 - 200 hours.



CAUTION

- **Unplug the adapter at the time of cleaning.**
- **The suggested cleaning interval should be somewhat varied depending on working conditions.**
- **There is a possibility of injury because of the sharp needle.**
- **Never use metal brush (wire). Also, do not attempt to scrape the emitter with any hard or sharp object which could cause damage to the emitter.**
- **The emitter should not be bent or damaged. It should be sharp and straight for proper operation. If it becomes dull or damaged, the emitter must be replaced by using a proper tool.**
- **Be sure not to leave any cotton fiber on the emitter tip if a cotton swab is used to clean.**
- **Do not use any organic solvent (other than methanol and IPA), water, paint thinner etc.**
- **In case alcohol is used, do not pour it on ionFOCUSIII. Also, allow ionFOCUSIII to dry completely before use.**

6.2 Grounding resistance check

Use a tester, measure the resistance between the nozzle tip of ionFOCUSIII and the ground such as the machine frame. The measured value must be less than 100 ohms.

6.3 Neutralizing performance check

This test should be done periodically. The neutralization performance should be measured with an electrostatic fieldmeter Simco-Ion FMX-004.

- 1) Obtain two kinds of plastics such as PVC, PP, Acrylic, etc. Recommended size is 150 mm × 150 mm × 1 mm thickness.
- 2) Rub those together for sufficient charging to nearly 5 kV.
- 3) Measure and record the initial voltage of the charged object using a fieldmeter.
- 4) Turn ionFOCUSIII T on and use it to neutralize a charged object.
(distance: 50 mm)
- 5) Measure and record the final voltage again. Please maintain records of these measurements.

If the charged object is neutralized quickly, ionFOCUSIII is working properly.

Please note that the voltage of the object does not decrease without turning on ionFOCUSIII.

If it is not neutralized, either the adapter or ionFOCUSIII may need to be repaired or replaced.



ATTENTION

For proper measurement, use an electrostatic fieldmeter with traceable calibration.

In case a repair is needed, please contact Simco Japan's sales division or an authorized agent in your area with the details of the defects, test results, observations etc. and ask for an estimate. Any inspection and repair will be treated in accordance with the warranty provided at the end of this manual.

Section 7. ABNORMAL CONDITIONS

7.1 Spark from an ionizing needle electrode

During normal operation, there should be no visible spark. In the event of any visible spark, the electrode system should be cleaned following the procedure mentioned earlier. If sparking persists, ionFOCUSIII should be turned off and Simco Japan or Simco Japan's authorized agents should be contacted.

7.2 Other abnormalities

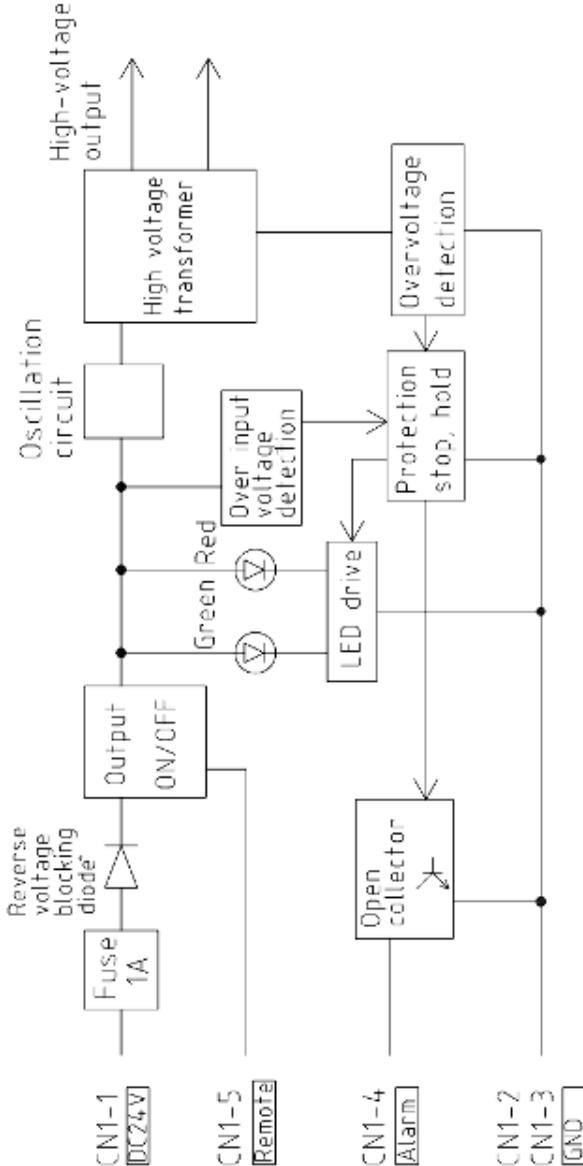
In the event of the following abnormalities, turn off the Power and contact us or our authorized agents promptly.

- a) Sparking from any part of ionFOCUSIII or the adapter
- a) Change in the shape of ionFOCUSIII or the adapter

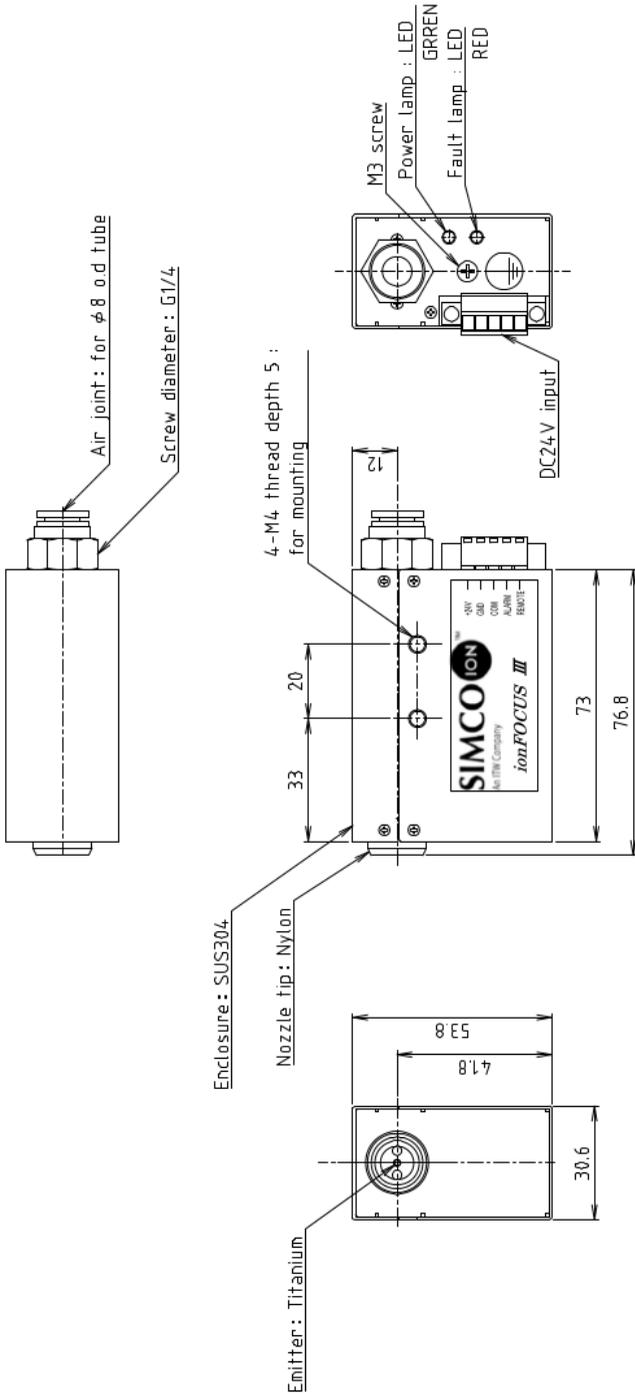
- c) Smoke from ionFOCUSIII or the adapter
- d) Abnormal sound or smell from ionFOCUSIII or the adapter
- e) Overheating of ionFOCUSIII or the adapter

All these problems need inspection/repair. Inspection/repair request should be accompanied by a detailed description of the observed abnormality.

BLOCK DIAGRAM



Overview dimensional drawing



Simco-Ion EQUIPMENT REPAIR WARRANTY

Simco-Ion equipment has been carefully tested and inspected at the factory and is warranted to be free from any defects in materials or workmanship.

Simco Japan, Inc. will, under this warranty, repair or replace any equipment, which proves upon their examination, to have become defective within the Warranty period from the date of purchase. A one year Warranty applies to all Simco-Ion equipment. The equipment is to be returned by the purchaser to Simco Japan, Inc. or authorized agent of Simco-Ion, transportation prepaid and insured for its full purchase price. Prior to returning any goods for any reason, contact Simco Japan, Inc. or authorized agent for an Authorized Return Number. This number must accompany all returns.

The Warranty does not apply when the equipment has been tampered with, misused, improperly installed, altered, has received damage through abuse, carelessness, accident, connected to improper line voltage, or has been serviced by anyone other than an authorized factory representative. The warranty does not apply when Simco-Ion parts and equipment have been energized by other than appropriate Simco-Ion Power unit or generator, or when Simco-Ion Power unit or generator has been used to energize other than Simco-Ion parts and equipment.

Simco Japan, Inc. makes no Warranty, expressed or implied, nor accepts any obligation, liabilities or responsibility in connection with the use of this product other than the repair or replacement of parts as stated herein.

Product Name	<i>Simco-Ion Electrostatic Neutralizer Ionizing Air Nozzle ionFOCUS III</i>		
Delivery Date	Product's serial number contains information on the shipping date.	Warranty Period	<i>A one year Warranty</i>

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