Simco-Ion Electrostatic Neutralizer
Ionizing Air Blower AEROSTAT XC

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 stared in a safe place.

INST-98032610

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) AEROSTAT XC with bench stand 1 pc.
2) Line cord 1.8 m long (3P) 1 pc.
3) Daily Inspection Label 1 pc.
4) Instructions Manual / Warranty (this book) 1 pc.

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.

It 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.

It shall be connected to proper utility line. The utility line conditions are indicated on the nameplate.

This equipment must have proper grounding. Without proper grounding there may be electrical shock/fire hazard.

Do not insert objects through the unit's intake or outlet grilles. Damage to the ionizer and/or personal injury may result.

The neutralizing electrodes in this product consist of sharp needles. Please take precautions against injury. Periodic maintenance, such as cleaning of needle electrodes, is necessary for satisfactory performance of the equipment.

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, contact us or our sales representatives in your area.

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. It might produce considerable electrical noise and insulation might burn, if damaged.

This equipment was assembled and inspected at Simco. 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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ELECTRIC SHOCK HAZARD

Section 1. GENERAL DESCRIPTION

Simco-Ion's Aerostat XC has been designed for use with sensitive electronic components where electrostatic discharge (ESD) is a problem. It can be applied in inspection, testing, and assembly environments. The Aerostat XC can also be used where static electricity causes problems such as adherence of dirt to objects, misalignment of small parts due to electrostatic "jumping", and undesirable adhesion of plastic films due to electrostatic charge.

The Aerostat XC ionized air blower produces an airflow that is rich in positive and negative ions. Directing the airflow onto an object or surface will neutralize the electrostatic charge present. Simco-Ion's Aerostat XC provides superior electrostatic discharge times rates over a targeted work surface area.

The Aerostat XC uses a three-speed tangential blower to produce a uniform airflow. This airflow is directed through a unique duct, which shapes the airflow. The duct also houses an ionizer emitter array. A high voltage AC transformer energizes the ionizer emitter array to generate an ion output.

The transformer output is current limited by design to conform to international safety requirements. Output from the transformer includes a special resistor that enhances ionization stability, and provides redundant current limiting for added safety.

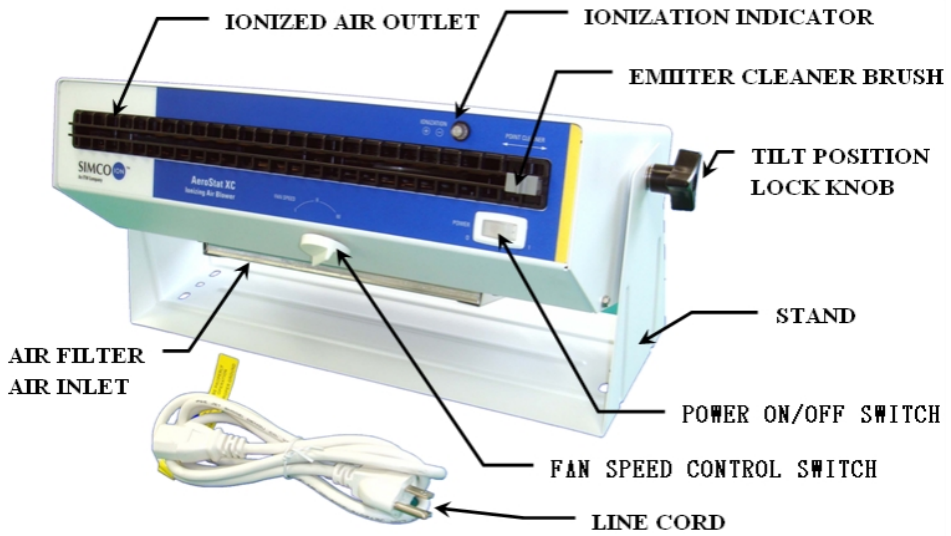
The ionizer emitter array, consists of a row of mounted stainless steel pins. The circuit result is an intense alternating electric field about each emitter. It is this intense electric field that introduces alternating polarity ions into the airflow. The shaped airflow from the Aerostat XC carries these ions to the object or surface requiring static control. An ionization indicator lamp monitors the ion output, and indicates the unit is functioning properly.

The ionizer of the Aerostat XC features an exclusive balancing circuit. This results in an equal production of positive and negative ions. The Aerostat XC also features a built-in emitter cleaner brush. Cleaning the emitters for a few seconds will prevent the build-up of airborne debris. This simple maintenance will keep the Aerostat XC working in top form for the life of the unit.

Section 2. FEATURES

Simco-Ion's Aerostat XC Ionizing Air Blower provides effective static charge neutralization. Its features are:

- Rapidly neutralizes static charges
- Covers an extended area with ionized air
- Three speed blower with wide range of airflow
- Tilt Bench stand or optional pedestal mount with 360°adjustability
- Patented (US patent # 5,153,8119) inherently balanced ion output
- Patented (US patent # 4,734,580) built-in emitter cleaner for easy maintenance
- Ionization indicator lamp
- Durable, electrically grounded steel enclosure



Section 3. SPECIFICATIONS

Model: Aerostat XC

Input: 100 V AC (±10V), 50/60 Hz (same units), less than 1.0 A

Ambient conditions: 0 to 50 ℃, 10 to 85 %RH (non-condensing)

Dimensions: 468 (W) × 189 (H) × 221 (D) [mm], Refer to attached drawing

Weight: Approx. 8.2 kg (included a filter and a line cord)

Enclosure: Formed Steel

Finish: Polyester paint, Color-White

Bench stand feet: Nonconductive, Nonstaining Polyurethane

Air filter: 30 PPI Open Cell Polyurethane Foam, Aluminum Housing.

Operating distance: 50 mm to 1200 mm (Recommended distance: 300 mm)

Ozone production: less than 0.005 ppm; measured at 150 mm in front of unit, using Dasibi Ozone Monitor model 1003AH
(By ultraviolet rays absorption method)

Air volume and Audible noise: Refer to the following table

Fan speed setting	Ⅰ	Ⅱ	Ⅲ
Air volume (m³/min)	2.0	2.7	2.9
Noise level (dB-A)	52	58	64

(Audible noise: Measured at 600 mm from unit)

Air velocity: Refer to the following table (Unit: m/s)

Distance (m)		0.3	0.6	0.9	1.2
Fan speed setting	Ⅰ	3.0	1.5	0.9	0.8
	Ⅱ	4.1	2.0	1.1	0.9
	Ⅲ	5.1	2.5	1.3	1.0

(Measured at centerline of air stream)

Ion balance range: 0 V ± 5 V (offset voltage, automatic inherent ion balance)

Discharge time: (Decay time) Refer to the following table

Fan speed setting	Measuring position (m)	Distance (m)			
		0.3	0.6	0.9	1.2
Ⅰ	0.3	8	9	10	12
	Center Line	2	5	7	9
	0.3	8	9	10	12
Ⅱ	0.3	6	7	9	11
	Center Line	1.7	3.5	5	7
	0.3	6	7	9	11
Ⅲ	0.3	5	5.5	6.5	8.5
	Center Line	1.5	2.5	4	5.5
	0.3	5	5.5	6.5	8.5

NOTE:

Offset voltage and discharge time tested per ANSI/ESD STM3.1 ESD Association Standard Test Method using 6" × 6", 20 pF metal plate (Charged Plate Monitor). Decay times are in seconds from 1000 volts to 100 volts at location shown.

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

Warranty: One year after shipment

Section 4. PRINCIPLE OF OPERATION

In general static eliminators consist of ionizing electrodes, high voltage power unit and a high voltage cable to connect power unit to ionizing electrodes. In Aerostat XC, power unit is located inside; thus it does not need an external high voltage cable.

Normally, ionizing electrodes consist of ionizing needles and ground electrode. Aerostat XC has no ground electrode. Instead, the reference electrode is isolated from the ground and is placed around the ionizing needles. This arrangement makes the working of Auto Ion Balance system possible.

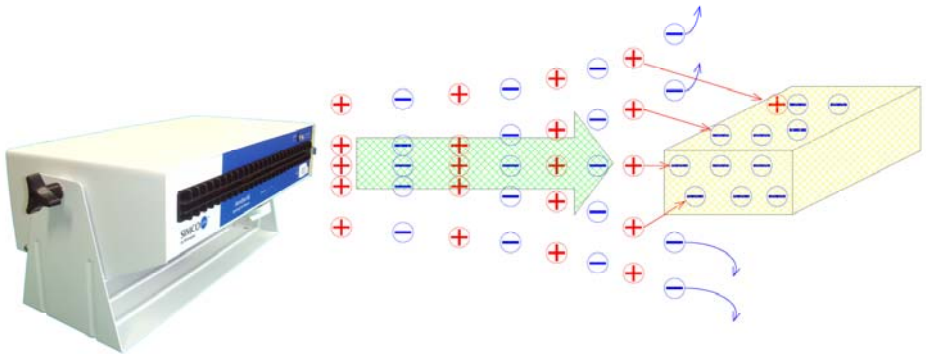
Simco-Ion Aerostat XC operates as follows:

1) When the power switch is turned on, the fan starts and the power unit produces high voltage.

2) Because of intense electric field at the emitter needle tips, corona discharge is initiated. Air around the needles is ionized and positive and negative ions are produced.

3) The airflow can be controlled by the fan speed adjustment. The ionized air stream carries ions of both polarities to the charged object that needs to be neutralized.

4) If the object has a negative charge, it will draw positive ions from the airflow. Conversely, if the object has a positive charge, it will draw negative ions from the airflow. Opposite polarity ions are attracted towards the charged object thus neutralizing its charge.



Section 5. INSTALLATION

WARNING

Do not switch on XC blower in an ambient that contains organic solvents or flammable gases.

CAUTION

- **Do not turn on power switch until all installation work is completed.**
- **XC blower must be grounded properly. It is dangerous to operate it without proper grounding; also, its neutralization performance suffers considerably.**
- **There is no restriction on the location of XC except that its air inlet should not be blocked by the wall on which it is mounted, paper or anything else**.

5.1 Location

- Although neutralization distance can reach more than 1 m, the Aerostat should be placed within 50 cm of the object to be neutralized. Recommended distance is approx. 30 cm. Shorter distance results in faster neutralization.
- The ionized air stream should be directed toward the charged object with no other object in between. Any interference will make neutralization difficult and incomplete.
- An isolated charged object can be neutralized efficiently. An object in contact with ground cannot be neutralized properly.
- Simco-Ion Aerostat XC unit includes an air filter attached to it. In a clean environment the filter may not be needed. The filter may be removed easily by loosening the four screws in the bottom of the unit. This would result in even better neutralization performance.

5.2 Installation procedure

- Simco-Ion Aerostat XC is designed for portable or permanent location operation. It is supplied with a tilt able bench stand; also, an optional pedestal mount is available. The bench stand can be used for portable operation (desk model) or bolted to a sturdy flat surface such as a wall or under a shelf.
- The direction of the air stream can be adjusted upward or downward by loosening the lock knobs, tilting the unit to correct angle and retightening the knobs.
- In case a pedestal mount is used, ionized air can be blown from a height of 30 cm.

5.3 Utility power supply connection

The rated input to this unit is 100 V, 50 or 60 Hz. Same unit can be used for both the frequencies. A line cord with a 3-pin plug is provided. If the utility supply outlet is also a 3-terminal grounded receptacle, then grounding connection is assured. On the other hand, if the utility outlet has two pins, a 3P - 2P adapter is needed. In this case, either the ground wire from the adapter should be connected to a proper ground or the unit itself should be grounded.

Section 6. OPERATION

⚠ ATTENTION

- **Confirm the supply voltage and frequency from the nameplate.**
- **Check the resistance between the enclosure and the ground. It should be less than 100 Ω.**
- **Check that the emitter cleaning brush is left at the right end of the front panel. Do not operate with the brush halfway between the edges.**

6.1 Activate Aerostat XC by setting the POWER switch to the ON position (|). Power indicating lamp comes on. The fan starts and the IONIZATION INDICATOR will illuminate to indicate the presence of ionized air. Charge neutralization occurs when ionized airflow reaches the charged object.

6.2 The direction of air stream can be adjusted upward or downward by loosening the LOCK KNOBs placed both side of XC, tilting the unit and retightening the knobs. Set the airflow as desired by adjusting the FAN SPEED to low (I), medium (II) or high (III).

Aerostat XC produces an ionized air stream that covers a large area uniformly. The time required to neutralize a static charge on an item in this area depends on many factors. Two important factors are: distance to ionizer and air velocity. Air ions constantly “neutralize” each other. Positive and negative ions are electrostatically attracted to each other. When they contact, the charge transfers and the ions recombine. With high air velocity, the ions travel further before they recombine. Setting the fan speed to high results in coverage for the greatest possible area. Decreasing the distance to the ionizer results in more rapid neutralization.

When using the Aerostat XC in an electronics assembly area, the ionized air stream should cover as much of the work area as possible. The constant flow of ionized air will prevent items such as work surfaces, tools, materials and components from developing a static charge. Charged items introduced into the work area will be neutralized and will remain neutral while they are in the air stream.

6.3 To stop Aerostat XC, turn the power switch off (position O).

⚠ ATTENTION

- **During normal operation, there should be no visible spark. In case, intermittent spark is observed, electrodes should be cleaned in accordance with the procedure mentioned in next section under the heading Maintenance. If even after cleaning sparking continues, please contact us or our agents in your area. Sparking reduces ionization efficiency. Uncontrolled sparking might damage electronic equipment in the vicinity; it might, also, damage the high voltage transformer in XC.**
- **Turn the switch off when Aerostat XC is not in use. If left unused for a long period of time, the blower should be unplugged from the power receptacle.**

Section 7. MAINTENANCE

Aerostat XC has been designed with low maintenance in mind. The only regular maintenance suggested is emitter point cleaning, ion balance checking and ion output checking. Emitter point cleaning takes only seconds with our patented built-in point cleaner. This assures continued performance on ion output.

Aerostat XC contains a patented balancing circuit that is inherently self-balancing. This circuit compensates for dirt build-up on emitters, emitter point wear, line voltage fluctuations and variations in air velocity. Scheduled checking of the ion output and balance should be considered to assure quality audit requirements.

⚠ CAUTION

During cleaning power switch must be turned off.

7.1 Emitter cleaning

Like other electrical ionizers, the ion emitters of Aerostat XC tend to accumulate dust and dirt. This decreases ion output. Therefore the emitter electrodes should be cleaned regularly.

To clean the emitters: hold the EMITTER CLEANER BRUSH and sweep back and forth across the ionized air outlet. This should be done more than once a week.

7.2 Air inlet and outlet cleaning

The air inlet screen at the bottom of the unit and the ionized air outlet should remain clean to prevent any restriction of airflow. They can be cleaned with a soft brush or vacuum cleaner.

7.3 Air filter cleaning

By loosening the four screws towards the bottom of the unit, the aluminum frame of the filter can be taken out. Slide the frame towards the rear for it to come out.

Rinse the filter in plain water while gently squeezing. If the dirt is stubborn, wash the filter in mild soap and water and then rinse. Place the filter, metal grille down, on a paper towel and gently blot element with another paper towel. Allow the filter to dry. Reinstall the filter on the unit by sliding it back and tightening the screws.

⚠ IMPORTANT:

Clean the air filter regularly for better efficiency. If the filter is damaged, it should be replaced. In this case, either contact us directly or contact our agents in your area.

Filter（outside）

Filter（inside）

7.4 Inside cleaning

Disconnect the power cord; remove the knobs and the stand; also, remove the screws on both sides to take the cover out. Use compressed air or vacuum cleaner to remove dust. Be careful so as not to damage the inside. After cleaning, place the cover back on the unit and connect the power cord to the receptacle.

⚠ CAUTION

Never use metal brush or solvents (paint thinner etc.) to clean XC.

7.5 Ion output check

7.5.1 Measure by charge plate monitor

To test the unit for ion output, the use of charged plate monitor is recommended. Decay times can be measured and checked against the tables in Section 2, Specifications. These tables comply with ANSI/ESD STM3.1 ESD Association Standard Test Method.

The recommended measure condition is shown in the following.
- The measure part of the charge plate monitor and the distance between main bodies are set to 30 cm.
- Fan speed is maximized.
- Do the measure of the environmental temperature humidity in an environment 20℃±5℃ and 60%R.H following.

7.5.2 Measure excluding charge plate monitor

If a charged plate monitor is not available, but a static meter such as Simco- Ion Electrostatic Fieldmeter FMX- 004 is available, ion output may be checked with the following procedure.

1) Prepare two plastic plates of different materials, for example PVC and Acrylic; each 150 mm sq., 1 mm thick.
2) Rub the plates together to get more than 1 kV on the surface.
3) Measure the voltage and polarity of charge using the fieldmeter.
4) Hold the plates 30 cm away from the ionized air outlet of Aerostat PC; turn the blower on for 1 second (separately for each plate).
5) Measure voltage and polarity on the plates. If both the plates are neutralized, the performance of Aerostat PC blower is acceptable.

Model FMX-004

NOTE:

If the plates are not neutralized, clean the electrodes and check its performance again, following the procedure mentioned above. If neutralization does not occur, please keep a record of the tests and contact us or our agents in your area.

7.6 Ion Balance Check

7.6.1 Measure by charge plate monitor

To test the unit for ion balance, the use of a charge plate monitor is recommended. Ion Balance (offset voltage) should be measured and checked against the specified value given in section 2, Specifications. The specification in section 2 has been prepared in accordance with ANSI/ESD STM3.1 ESD Association Standard Test Method.

Do as a recommended measure condition as well as the measure of 7.5.1 ion output check.

7.6.2 Measure excluding charge plate monitor

① Measure by Electrostatic Fieldmeter FMX-004 for the ion balance check of the attachment.

Can the measure by using the plate for the ion balance check of the attachment in case of the measure with Simco-Ion Electrostatic Fieldmeter FMX-004.

(Refer to the manual of the Fieldmeter about use etc.)

◇NOTE

The ion balance of Aerostat XC is ±5V. Make within ±10V a standard in the plate for the ion balance measure of static electricity Electrostatic Fieldmeter FMX-004 by relate, that an area and electrostatic capacity of the detection part are different from ANSI/ESD STM3.1 ESD Association Standard Test Method.

Ion Balance measure

② Measure by Electrostatic Fieldmeter

In case charged plate monitor is not available and a Electrostatic Fieldmeter in used to check ion balance, following steps should be followed.

1) A metal plate, of size equal to or larger than 150 mm square, supported on materials of high insulation resistance (glass, Teflon) is placed 30 cm away in front of Aerostat XC air blower such that the direction of airflow is normal to its surface.
2) A Electrostatic Fieldmeter is placed behind the plate. Make certain that ionized air cannot reach the measuring device.

3) With the blower off, carry out zero adjustment of the measuring device.
4) Turn on the blower and read the static potential of the metal plate.
5) If a metallic board is electrification of -5V to +5V, the ion balance is normal. If the electrification potential more than the range can be read, the ion balance is not normal.

NOTE:

Do not try to determine ion balance by holding a static meter in the ionized air stream. This will result in a meaningless reading.

⚠ CAUTION

- **Measuring instruments used in sections 7.5 and 7.6 should be calibrated.**
- **Do not try to verify the operation of the unit by drawing a spark from an ion emitter point. The design of the balancing circuit makes the "spark test" inconclusive. Sustained grounding of the ion emitters may damage the balancing circuit.**

7.7 Ion Balance calibration

Aerostat XC's ion output is inherently balanced by design. As a result, there are no calibration adjustments. Remove the surface of the insulating material where emitters of Aerostat XC are supported when it is confirmed that the ion balance is not excellent as a result of the ion balance check of 7.6 and remove the garbage such as the dust which adhere to the insulation part with the compression air etc.
If, after checking the ion balance as outlined above (section 7.6), an unbalance or ion balance (offset voltage) in excess of that specified in the Specification (section 2) is found to exist, please contact Simco Japan's or refer to the following section on "Troubleshooting".

⚠ CAUTION

- **Do not try to determine ion balance by holding a static meter in the ionized air stream. This will result in a meaningless reading.**
- **Measuring instruments used in sections 7.5 and 7.6 should be calibrated.**
- **Do not try to verify the operation of the unit by drawing a spark from an ion emitter point. The design of the balancing circuit makes the "spark test" inconclusive. Sustained grounding of the ion emitters may damage the unit.**
- **Failure of the electrical insulation of electrodes in Aerostat XC by dirt, moisture or other conductive contaminants might result bad ion balance. In this case, XC should be taken apart and cleaned, please contact Simco or our representatives in your area. Disassembly and cleaning are not covered by warranty.**

Section 8. TROUBLE SHOOTING

⚠ CAUTION

Troubleshooting, usually, requires opening the case of the unit. This exposes hazardous voltages. It should be performed by a qualified service personnel. Our company or our sales agents in your area can also be contacted. Inspection and repair service is available in accordance with warranty provided.

8.1 Spark from the emitter electrodes

During normal operation, there should be no visible spark from the needles. In case occasional sparks are observed, needles might need to be cleaned. Follow the emitter cleaning procedure mentioned above. If cleaning the emitting needles does not stop the sparking, the unit might need replacement. In that case, please switch off the unit and contact us or our representatives in your area.

8.2 Ion output and balance problems

For troubleshooting ion output and ion balance, one should check the high voltage output of the transformer and the isolation of transformer secondary, reference electrode and ion emitter bar from ground.

Voltage output: For testing the open-circuit output voltage, with the secondary terminals disconnected from the circuit and isolated from the ground, a high impedance hv meter should be connected across it. Plug the unit in and turn it on. The meter should display a minimum of 5 kVAC.

Isolation: With the unit unplugged, check the following insulation resistance values separately using a megohmmeter.

a) Two terminals of the transformer secondary connected together and chassis ground.
b) Reference electrode and chassis ground.
c) Ion emitter bar and chassis ground.

In all these cases, the measured resistance value should be greater than 10 GΩ at 7.5 kV DC.

If the unit fails any of the above tests, it should be replaced.

8.3 Other abnormal conditions

In case any of the following problems is observed, turn the unit off and contact us or our representatives in your area.

a) Any persistent visible spark inside
b) Change in shape of the blower
c) Any abnormal sound or smell
d) No airflow; fan does not work

All these problems need inspection/repair/replacement. A request for any of these requirements should be accompanied by a detailed description of the observed abnormality.

Section 9. Replacement Parts

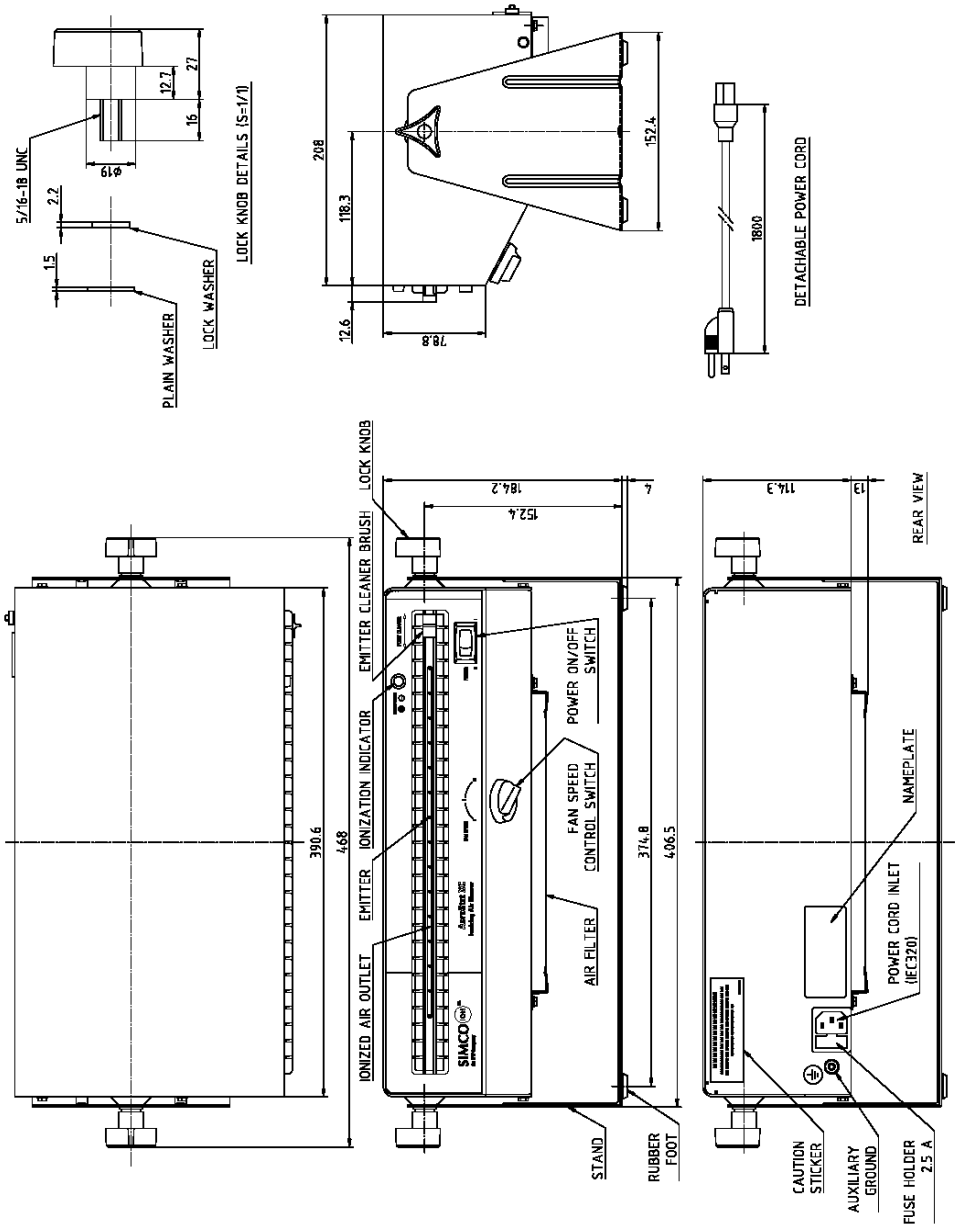
Part	No. of units in the blower	Expected life
Filter	1	Depends on working condition

Common electrical parts such as fan, lamp switch etc. are not included in this table.

⚠ ATTENTION

The air filter can be replaced by the customer on site. However, the replacement of the Ionizing electrode and the transformer must be done at the factory.

DRAWINGS



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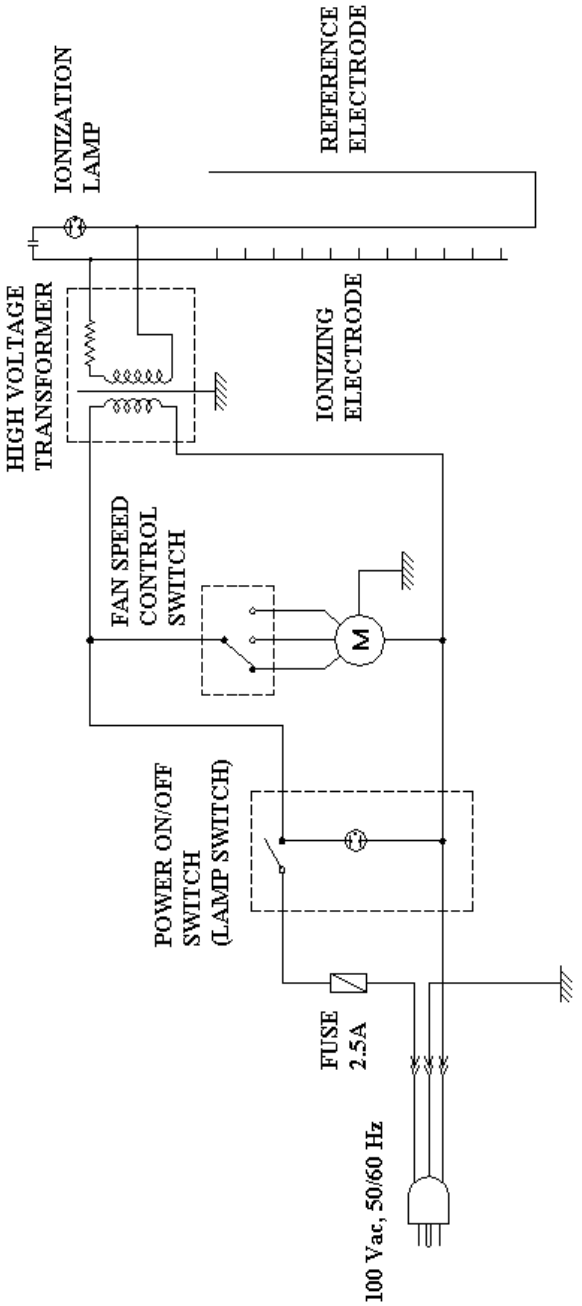

SIMCO EQUIPMENT REPAIR WARRANTY

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 equipment. The equipment is to be returned by the purchaser to Simco Japan, Inc. or authorized agent of Simco, 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 parts and equipment have been energized by other than appropriate Simco Power unit or generator, or when Simco Power unit or generator has been used to energize other than Simco 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	*Simco-Ion Electrostatic Neutralizer* **AEROSTAT XC Ionizing Air Blower**		
Delivery Date	Product's serial number contains information on the shipping date.	Warranty Period	***A one year Warranty***

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