

Simco-Ion Electrostatic Neutralizer Ionizing Air Blower AEROSTAT PC

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.

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 PC with bench stand | 1 pc. |
| 2) Line cord 1.8 m long (3P) | 1 pc. |
| 3) Grounding cord 1.8 m long | 1 pc. |
| 4) Air filter element (spare) | 1 pc. |
| 5) Daily Inspection Label | 1 pc. |
| 6) 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 designed for classified (hazardous) environment. It cannot be installed where it will be exposed to flameable or corrosive solvents and gases.



CAUTION

- This equipment employs high voltage. Please follow the operating instructions carefully in order to minimize electrical shock hazard.
- This equipment is intended for use in electrostatic processes that are free from water, oil, solvents and other conductive contaminants. Exposure to such contaminants will cause failure of the electrical insulation system of the product.
- This equipment should not be operated in an ambient with corrosive fumes of acid/alkali or corrosive gases such as chlorine.
- The primary side of this equipment must be connected to the correct line voltage and frequency as indicated on the nameplate. Do not connect a power unit with 100 V rated input voltage to 200 V supply. The applied input voltage should be within permitted range mentioned in the section 2 (Specifications).
- The equipment must have proper grounding. Without proper grounding there may be electrical shock/fire hazard.
- Do not insert any objects through intake or outlet grille.
- 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.
- 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.
- If any abnormality is observed during inspection, the unit must be repaired or replaced as required. 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 will produce considerable electrical noise and insulation might burn if the unit is damaged.
- This equipment was assembled and inspected at Simco's. 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

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

Aerostat PC was designed for use with sensitive electronic components, where ANSI/ESD is a problem. It can be applied in inspection, testing, assembly, and laboratory environments. Aerostat PC can also be used where static electricity causes problems such as: attraction of dirt to product, misalignment of small parts due to electrostatic "jumping", and undesirable adhesion of plastic films due to electrostatic charge.

Aerostat PC is a portable ionized air blower. It has high performance ionizing electrodes and power unit inside. It uses a small fan to produce airflow. The volume of airflow is controlled by a variable speed control which provides a wide range of airflow settings. Aerostat PC can neutralize static charge completely and quickly.

An inherent Ion Balance (Offset voltage) arrangement helps the production of equal quantities of positive and negative ions. A built-in emitter cleaner provides easy cleaning of the emitters. Cleaning emitters on a weekly basis keeps Aerostat PC working efficiently for the life of the unit. To assure that the unit is working properly, the high voltage AC is monitored by an ionization indicator lamp, provided on the front panel.

Features of Simco-Ion Aerostat PC Ionizing Air Blower are as follows;

- Small, and portable
- Rapidly neutralizes static charges
- Covers an extended distance with ionized air
- Variable speed fan with wide range of air flow
- Patented (US patent # 5, 153, 8119) inherently balanced ion output
- Patented (US patent # 4, 734, 580) built-in ion emitter cleaner
- Ionization indicator lamp
- Air filter
- Bench stand
- Durable, electrically grounded aluminum enclosure

Section 2. SPECIFICATIONS

Model:	Aerostat PC
Input:	100 V AC ($\pm 10V$), 50/60 Hz (same units), 0.3 A
Ambient conditions:	0 to 50 °C, 10 to 85 %RH (non-condensing)
Size:	180 (W) \times 247 (H) \times 112 (D) [mm] Refer to attached drawing.
Weight:	Approx. 2.9 kg (included a stand and a line cord)
Enclosure:	Formed Aluminum
Finish:	White paint, Polyester/Epoxy
Bench stand feet:	Non-conductive, Non-staining Polyurethane
Air filter:	30 PPI Open cell Polyurethane foam
Operating distance:	50 mm to 600 mm (Recommended distance: 300 mm)
Ozone production:	0.01 ppm (Measured at 150 mm in front of unit, fan low)

Air volume and Audible noise: Refer to the following table.

Fan speed setting	Air volume (m ³ /min.)	Audible noise (dB-A)
Minimum	1.0	50
maximum	2.0	57

(Audible noise: Measured at 600 mm from unit)

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

Distance		30 cm	60 cm	90 cm	120 cm
Fan speed setting	Low	1.2	1.0	0.7	0.6
	High	2.5	2.0	1.5	1.2

(Measured at center line of air stream)

Ion Balance range: 0 V \pm 10 V (offset voltage, automatic inherent Ion Balance)

**Discharge time:
(Decay time)**

Refer to the following table.

Fan speed setting	Measuring position	Distance (m)			
		0.3	0.6	0.9	1.2
Maximum	150 mm	5	7	11	16
	Center Line	2	5	10	15
	150 mm	5	7	11	16
Minimum	150 mm	10	14	24	34
	Center Line	4	9	16	24
	150 mm	10	14	24	34

NOTE:

Ion Balance (offset voltage) and Decay time are determined as 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 3. PRINCIPLE OF OPERATION

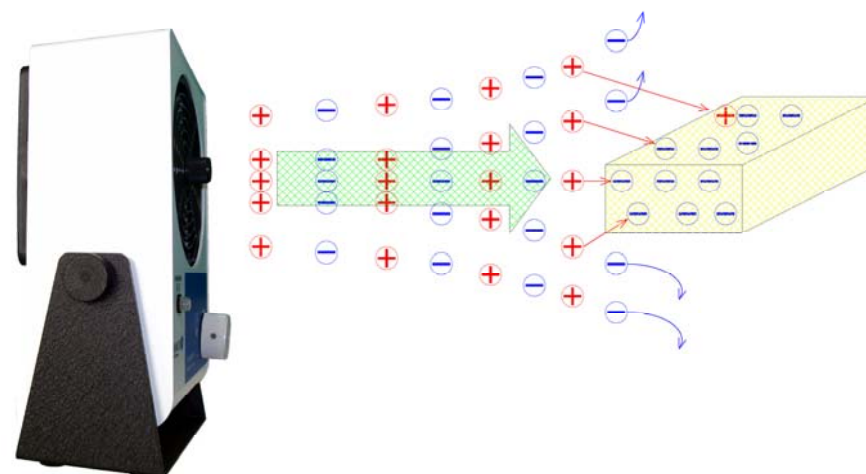
In general static eliminators consist of ionizing electrodes, high voltage power unit and a high voltage cable to connect power unit to ionizing electrodes. In Aerostat PC, power unit is located inside; thus it does not need an external high voltage cable.

Normally, ionizing electrodes consist of ionizing emitters and ground electrode. Aerostat PC 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.

The ionizing elements are energized with a low current, high voltage transformer. The transformer contains a current limiting resistor which enhances ionization stability and provides for safety. The high voltage AC is applied to a circular arrangement of ion emitter points, which results in an intense alternating electric field at the tip of the emitter points.

Simco-Ion Aerostat PC 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 tips, corona discharge is initiated. Air around the emitters 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. The air ions are attracted to the oppositely charged object and neutralize the charge on the object.



Section 4. INSTALLATION



CAUTION

Do not turn on power switch until all installation work is completed.

4.1 Location

- Although neutralization distance can reach more than 1 m, the Aerostat PC 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.
- Aerostat PC unit includes an air filter attached to it. In a clean environment the filter may not be needed. It may be removed easily from the rear of the unit. This would result in even better neutralization performance.



WARNING

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

4.2 Installation procedure

- Aerostat PC is designed for portable or permanent location operation. It is supplied with a bench stand. 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.

4.3 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 for Aerostat PC. 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.



CAUTION

- Aerostat PC air 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 Aerostat PC except that its air inlet should not be blocked by the wall on which it is mounted, paper or anything else.

Section 5. OPERATION

- 5.1 Activate Aerostat PC by turning the FAN SPEED knob clockwise, out of the OFF position. 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.
- 5.2 The direction of air stream can be adjusted upward or downward by loosening the LOCK KNOBS placed both side of Aerostat PC, tilting the unit and retightening the knobs. The airflow can be increased by turning the FAN SPEED knob further clockwise. The time required to neutralize a static charge on an item in the air stream 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 air ions travel further before they “recombine”. Setting the fan speed as high as acceptable results in rapid neutralization and coverage for very large area. Decreasing the distance results in more rapid neutralization.
- 5.3 To stop Aerostat PC, turn the FAN SPEED knob counterclockwise to the OFF position.



CAUTION

- **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.**
- **Confirm that there is no deformation of the enclosure.**
- **Check the lightning of the ionization indicator lamp periodically. The lamp is a neon bulb. It may flicker a little, especially at 50 Hz. This is normal and should not be considered as a failure. The lamp is connected to the transformer secondary in order to indicate energization of the high voltage transformer. The performance, safety and life of Aerostat PC air blowers will not be affected by the flickering of neon lamps.**
- **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.**
- **Turn the switch off when Aerostat PC is not in use. If left unused for a long period of time, the blower should be unplugged from the power receptacle.**

Section 6. MAINTENANCE

Aerostat PC 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 point cleaner. This assures continued performance on ion output.

Aerostat PC 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.

6.1 Emitters cleaning

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

To clean the emitters points hold the POINT CLEANER knob between thumb and forefinger and rotate it clockwise to the stop (approximately one turn) and release. The spring-loaded point cleaning brush will return to its parking spot. This will move a brush over the emitters to clean them. Recommended frequency of emitter point cleaning is every 160 hours of operation. (Weekly for 24 hr/day operation, monthly for 8 hr/day operation)

6.2 Air inlet and outlet cleaning

The air inlet grille on the rear of the unit and the ionized air outlet should remain clean to prevent restriction of airflow. They can be cleaned with a soft brush or vacuum.

6.3 Air filter cleaning

Remove the air filter from the rear of the unit by unsnapping the filter retainer. Rinse the filter in plain water while gently squeezing. If the dirt is stubborn, wash the filter in mild soap and water then rinse. Blot the filter dry with paper towels and allow to dry. Install filter on air inlet and secure by snapping the filter retainer in place.

⚠ IMPORTANT:

Clean 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.

6.4 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 Aerostat PC.

6.5 Ion output check

6.5.1 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 $20^{\circ}\text{C} \pm 5^{\circ}\text{C}$ and 60%R.H following.

6.5.2 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 emitters electrode 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.

6.6 Ion Balance Check

6.6.1 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 6.5.1 ion output check.

6.6.2 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 PC is $\pm 10V$. Make within $\pm 20V$ 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 PC 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 -10V to +10V, 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 6.5 and 6.6 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.

6.7 Ion Balance calibration

Aerostat PC'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 PC are supported when it is confirmed that the ion balance is not excellent as a result of the ion balance check of 6.6 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 6.6), 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

Failure of the electrical insulation of electrodes in Aerostat PC by dirt, moisture or other conductive contaminants might result bad ion balance. In this case, Aerostat PC should be taken apart and cleaned, please contact Simco Japan's or our representatives in your area. Disassembly and cleaning are not covered by warranty.

Section 7. TROUBLESHOOTING

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.

7.1 Spark from the emitter electrodes

During normal operation, there should be no visible spark from the emitters. In case occasional sparks are observed, emitters might need to be cleaned. Follow the emitter cleaning procedure mentioned above. If cleaning the emitters 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.

7.2 Ion output and Ion 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 unit unplugged the secondary terminals of the transformer should be isolated and a high impedance ($> 500 \text{ M}\Omega$) High voltage meter should be connected across it. Plug the unit in and turn it on. The meter should read a minimum of 5 kVAC.

Isolation:

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

- Two terminals of the transformer secondary connected together and chassis ground.
- Reference electrode and chassis ground.
- Ion emitter bar and chassis ground.

In all these cases, the measured resistance value should be greater than $10 \text{ G}\Omega$ at 7.5 kV DC.

7.3 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.

- Any persistent visible spark inside
- Change in shape of the blower
- Any abnormal sound or smell
- No airflow, fan does not work

Section 8. Replacement Parts

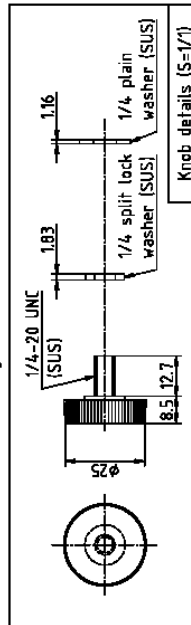
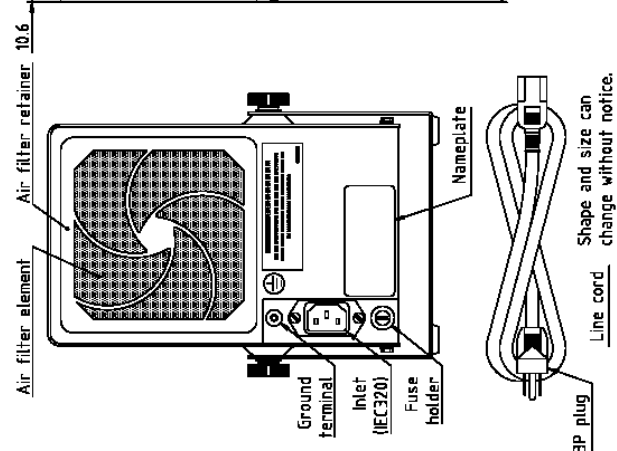
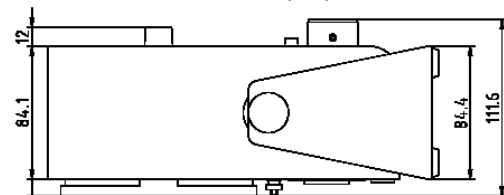
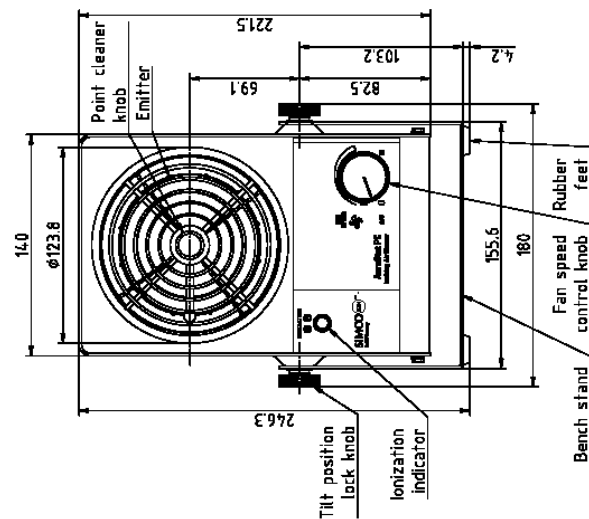
Part	No. of units in the blower	Expected life
Filter	1	Depends on working condition

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

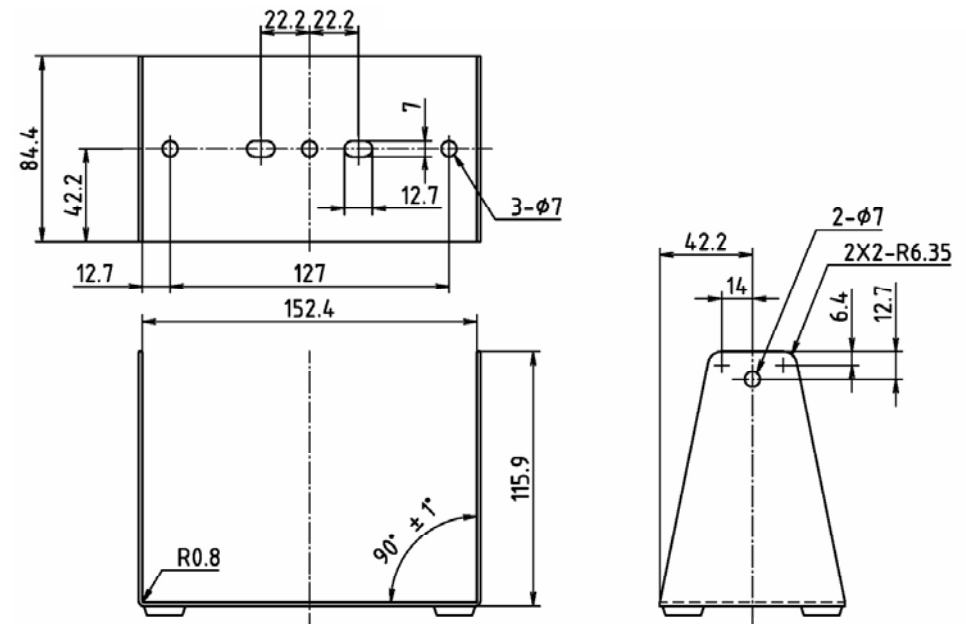
ATTENTION

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

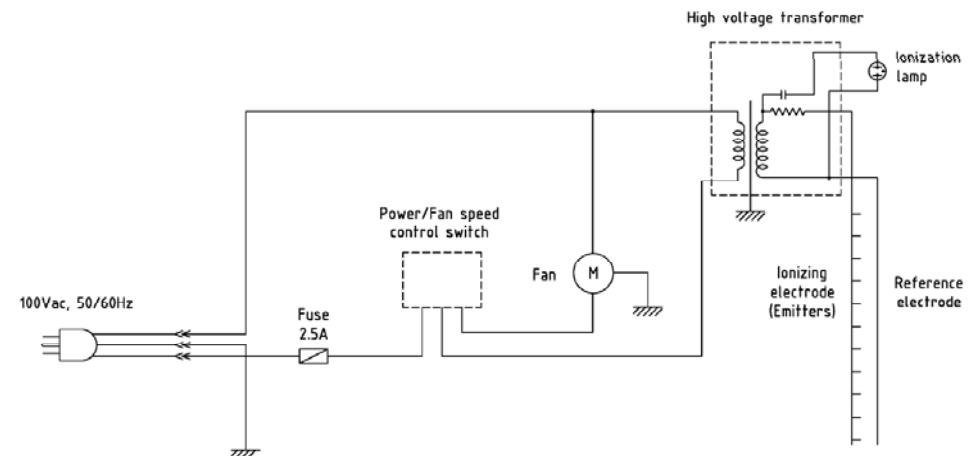
Drawings AEROSTAT PC



STAND DETAILS



AEROSTAT PC SCHEMATIC



SIMCO EQUIPMENT REPAIR WARRANTY

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

SIMCO IONTM
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