

Simco-Ion Electrostatic Neutralizer Ionizing Air Nozzle Model HS-3

INSTRUCTIONS

Installation/Operation/Maintenance



CAUTION

It is important that these instructions be read and understood before attempting to install or operate the equipment. Failure to do 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 preserved carefully.

Thank you for buying Simco-Ion products. This equipment will meet your expectations and provide safe operation when it is properly installed and maintained. This nozzle should be used with a proper Simco-Ion Power unit.

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) Simco-Ion Model HS-3 Ionizing air nozzle | 1 pc. |
| The number of nozzles and the length of the high voltage cable are different depending on the specification when ordering. | |
| 2) Mounting bracket (typically H clamp) | 1 pc. |
| (The bracket of the attachment is different depending on the specification when ordering.) | |
| 3) Plastic ties and Plastic blocks | 1 set. |
| 4) Instructions Manual / Warranty | 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 made 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.

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, corrosive gases such as chlorine or volatile organic compounds.

The equipment is designed to be used with specific Simco-Ion Power unit. Its performance and durability cannot be guaranteed if any other power supply is used. The Power unit, in turn, shall be connected to proper utility line. The utility line conditions are indicated on the nameplate of the Power unit.

The Ionizing Air Nozzles and Power units should be mounted in position and all high voltage connections completed with high voltage cables properly secured before the system is connected to the utility lines. Flexing the high voltage cables with power on can cause failure of the insulation system.

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

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 unit and contact us or our sales representatives in your area. Inspection, exchange and repair service will be provided in accordance with the warranty conditions.

The neutralizing electrodes, Emitters, 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.

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.

The equipment was assembled and inspected at 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

Simco-Ion Model HS-3 are ionizing air nozzles that produce an intense air flow that is rich in both positive and negative ions. Ions produced by an emitter located inside of a nozzle are carried by the flowing air from the nozzle towards a charged object. The nozzles are used to neutralize static charge which causes problems such as attraction of particles to statically charged object and undesirable adhesion of plastic films due to electrostatic charge. Typical applications include cleaning of objects that have developed static charge during handling or during fabrication. It can be applied in inspection, testing, assembly, and factory environments.

Clean dry air up to a pressure of 0.7 MPa (≈ 7 kgf/cm²) can be used with the nozzle. Compressed air line is connected to the nozzle. The nozzle can blow off as high speed and intense air blast for a powerful cleaning.

Model HS-3 need a 7 kV single-phase AC power supply. Simco-Ion Power Unit 47 supplies low current and high voltage necessary for the static elimination by these nozzles. In this Power unit, a high voltage fault detection circuit is available. In case of any abnormal condition in the high voltage circuit (a short circuit, leak etc.), the output of the Power unit will be interrupted. In addition, relay contacts are available for remote display of the abnormal conditions.

The maximum allowable number and type of nozzles that could be connected to one Power unit, permitted load, are listed below.

Nozzle Model	Power unit Model	Permitted load	High voltage cable
HS-3	Power Unit 47	20 pcs. (Manifold type)	3 m long, 2 pcs.

CAUTION

- More eliminators, connected to a single Power unit, would overload it and might damage the Power unit.
- A mistake in choosing a correct combination of static neutralizers and Power units might damage neutralizers and units.
- HS-3 and Power Unit 47 do not have an ion balance circuit for balance adjustment.
- For the details of Power Unit 47, please refer to its exclusive instruction manual.

Section 2. FEATURES

The important features of HS-3 are as follows;

- Shockless: Capacitively-coupled electrodes
- Replaceable electrode (emitter)
- High voltage cable for HS-3: Double protection using an insulating PE tube and a flame retardant PE tube.
- Air outlet consists of two parts:
Ground cover (Grounding electrode); SUS304
Nozzle tip; Nylon 66 UL 94-V-0
- Fault detection circuit with Simco-Ion's Power Unit 47.

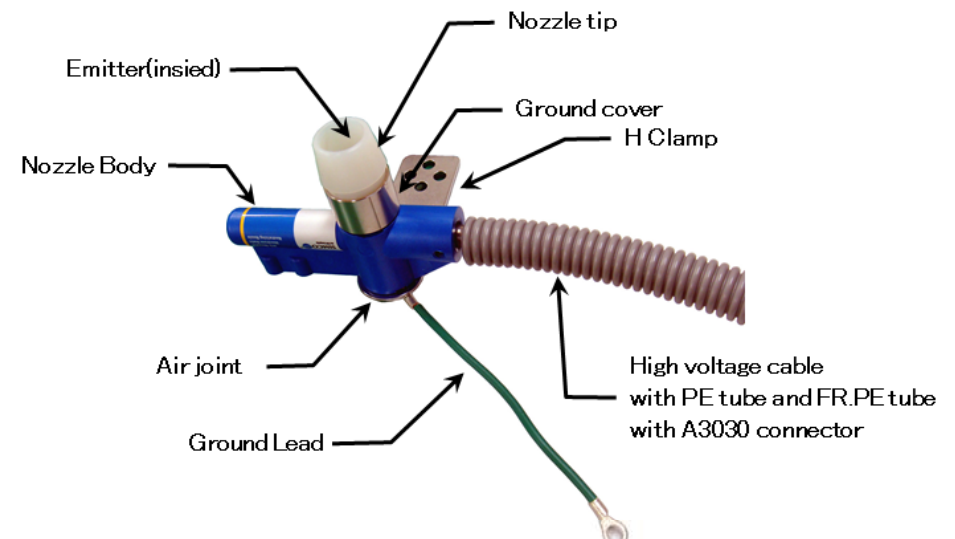


Photo 1. Ionizing Air Nozzle Model HS-3

Section 3. SPECIFICATIONS

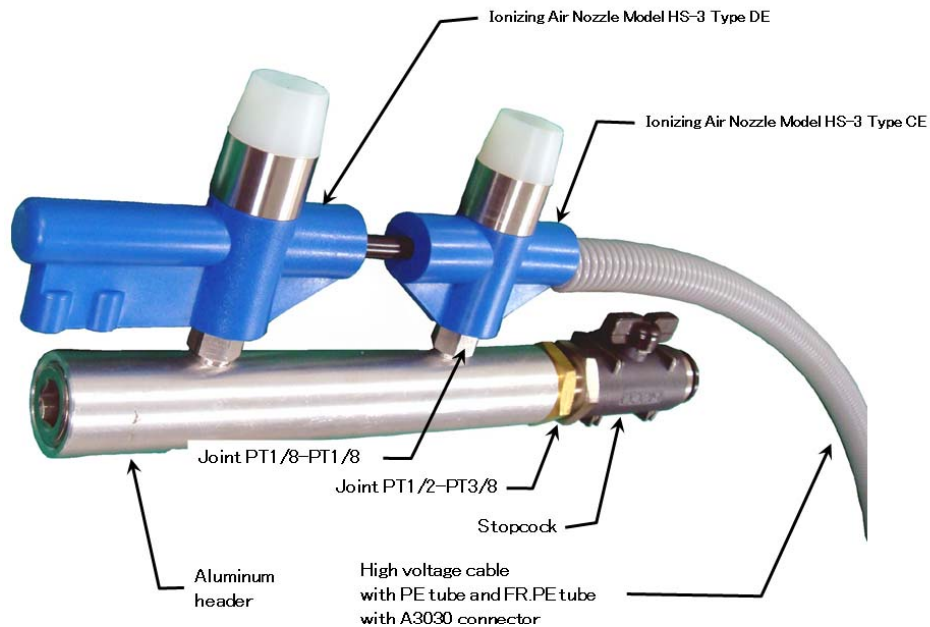


Photo 2. Ionizing Air Nozzle Model HS-3 Manifold type

Model:	HS-3
Product type:	AC high voltage ionizing air nozzle
Construction:	Capacitively-coupled electrode; shockless
Rated voltage:	7 kVac, 50/60 Hz
Operating distance:	50 mm to 300 mm between ionizing point and charged object.
Charge Decay Time:	less than 1 seconds Size 6"×6", 20 pfd charged plate, 150 mm from the nozzle. Decay from 1000 V to 100 V with air pressure ≥ 0.3 MPa.
Ion Balance: (offset voltage)	± 100 V or less is standards. (The ion balance adjustment circuit is not included.)
Ambient conditions:	0 – 45 °C, 10 – 90 %R.H. No freezing, no condensation and rapid temperature variations should be avoided.
Life expectancy:	Over 10,000 hours (based on 8 h/d, 250 d/y, 5 years)
Warranty:	One year after shipment
Size:	See the drawings on pages 24.
Weight:	HS-3; approx. 520 g (includes a 3 m long high voltage cable and a connector)
High voltage cable:	Standard high voltage cable with PE tube and Flame Deterrent PE tube, standard length is 3 m.
Cable end:	Standard high voltage connector model A3030
Input air pressure:	0.7 MPa max., clean dry air or N ₂
Input air temp.:	0 – 40 °C. There should be no freezing, no condensation and rapid temperature variations should be avoided.

Air supply:

Single use of the nozzle; Quick connection for 6 mm outside dia. tube.

Manifold type (using a aluminum header);

Header length	Nozzle quantity	Outside diameter of a suitable air tube	Stopcock quantity
≤500 mm	≤2	φ 8	1
≤800 mm	≤4	φ 10	1
<1000 mm	≤9	φ 12	1
≥1000 mm	≥10	φ 12 (connection needed to both side of the header)	2 (one at each end of the header)

The stopcock (photo-2) has a quick connector for the air tube. A reducer is used for air tubes of 10 mm diameter or less. The header may have no stopcock depending on customer's specifications.

Air consumption:

Audible noise:

Blow off force:

Refer to the following table (average values)

Input air pressure (MPa)	0.05	0.1	0.2	0.3	0.4	0.5
Air consumption (NL/min.)	33	47	68	87	110	133
Audible noise (dB-A)	67	82	89	94	95	97
Blow off force (g)	3	13	34	60	92	120

Measurement condition:

Audible noise: measured at 1 m around the nozzle

Blow off force: at 75 mm distance, target size is φ 134 mm

NOTE:

- For the details of Power Unit 47, please refer to its instruction manual.

Section 4. PRINCIPLE OF OPERATION

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

MODEL HS-3 are a shockless type eliminators. In the shockless type eliminators, emitters are capacitively coupled to high voltage, resulting in a current limited design for safety.

The high voltage cable is special. It cannot be replaced by other ordinary electrical cables. There will be electrical noise produced by high voltage discharge.

Simco-Ion Ionizing Air Nozzle Model HS-3 operates as follows:

- 1) When the power switch is turned on, high voltage is available to the ionizing electrodes or emitters.
- 2) Because of the 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 air supplied through the HS-3 or HSS-2 blows both ions to the charged object.
- 4) As the unlike charges attract, the charged object that needs to be neutralized attracts ions of opposite polarity until it is neutralized.
- 5) Dust particles are similarly neutralized and easily blown away from the surface. The nozzle should be placed so that air flow is directed opposite to the direction of work flow; this placement prevents dust from falling back onto the work.

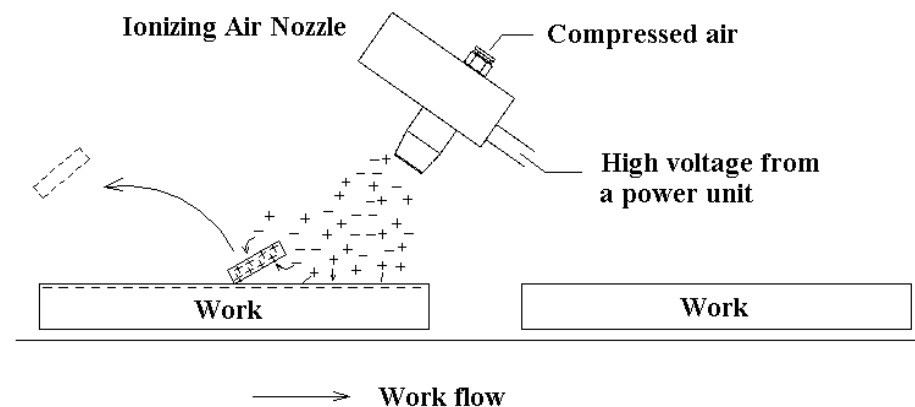


Fig. 1 Neutralization of charged object using a HS-3 nozzle

Section 5. INSTALLATION

CAUTION

- The installation of the Power unit, high voltage cable and ionizing air nozzles must be carried out by a trained electrician.
- Complete all installations, wirings and connections before switching on the power.

5.1 Installation of a Power unit

- The Power unit should be located such that the length of the cable supplied is sufficient to connect the nozzle. For more information regarding location, installation etc., see manual of instructions on the Power unit.

5.2 Location of ionizing air nozzles

- The best location is usually just ahead of the area where static charge gives troubles.
- The material to be neutralized should not be in close contact with any surface as it passes the nozzles, since static charges cannot be neutralized from between two surface in intimate contact. Partial contact of the material with a surface may not interfere with effective static elimination; however this should be avoided when possible.
- Nozzles should be pointing directly towards the object to be neutralized.
- Nozzles should be placed 50 mm ~ 300 mm from the object. Please install the ionizing air nozzles close to a charged object and input enough air pressure for efficient neutralizing performance. Make certain the ionized air stream hits as much of the material as possible to ensure complete neutralization and cleaning. Some consideration should be given to lateral spread of the air and blow-off force acting on the work. However, the ionizing air nozzles can be used without air flow at closer range (approx. 50 mm) as a static eliminator.
- Nozzles should be positioned so the air is directed opposite the direction of travel of the material being cleaned and neutralized. This ensures that any dust or lint is blown back toward the untreated material.
- The mounting must be free from strong vibrations. There should no condensation from the airflow.

5.3 Mounting of ionizing air nozzles

- The nozzle is provided with a mounting bracket that can be bent and twisted to support it from a machine frame or other secure structure.

5.3.1 Mounting for a single nozzle (Option)

- Use a bracket "X10S" provided with M5 screws for mounting the nozzle. Then, the grounding lead should be tightened with screws as shown in Fig. 3. The nozzle has two mounting holes with Spinert inserts having M5 thread to a depth of 9 mm on the opposite side of the air outlet. The mounting bracket must be grounded. If grounding is not properly done, there is a risk of electrical shock/fire hazard.

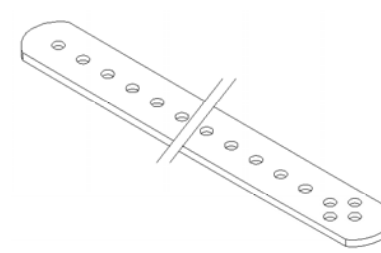


Fig. 2 Mounting bracket X10S

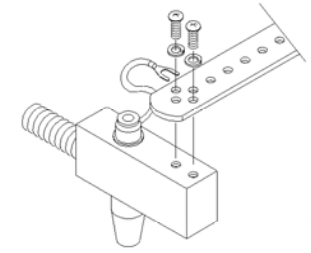


Fig. 3 Mounting for a single nozzle

5.3.2 Mounting for a manifold type

- For nozzles mounted on air header, use a bracket "C clamp" provided with M5 screws. If the brackets cannot be attached to a well grounded member of the machine frame, a ground wire must be connected between one of the brackets and a good ground. The air direction can be adjusted by rotating the header before securing the screws.

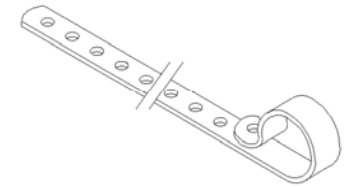


Fig. 4 Mounting bracket C clamp

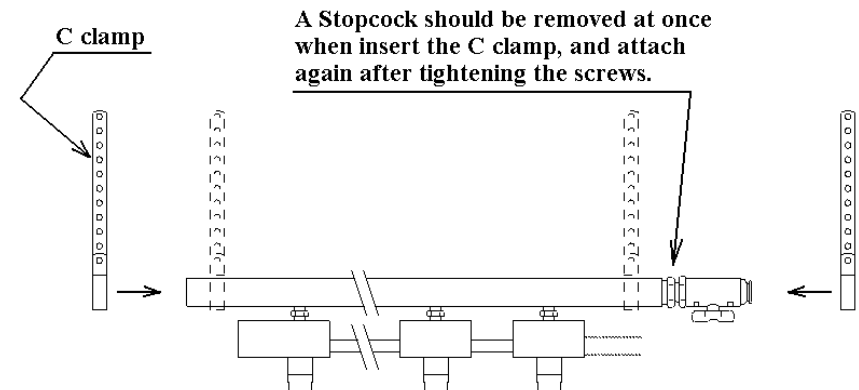


Fig. 5 Mounting for a manifold type

5.3.3 Mounting for intermediate nozzles

- The intermediate nozzles called C.E. type (cable-thru type) can be added on the high voltage cable between the dead-end nozzle called D.E. type (last nozzle at end of cable) and the Power unit. The dead-end nozzle is the last nozzle located farthest away from the Power unit. When all nozzles are mounted, thread the high voltage cable through the nozzles and connect to the Power unit.
- This mounting needs a socket wrench for the emitter tightening and reworking may be required for the air header. Please contact our sales department or our agents for detail.

⚠ CAUTION

- Ionizing needle electrodes (emitters) are very sharp and can cause considerable physical injury. Please handle nozzles with care.
- Do not cover the emitters. If there is any object within 10 mm from an emitter, there is a risk of spark over.
- The machine frame should be grounded.
- Do not place nozzles in contact with charged objects. Also, do not attach the nozzle to a moving part of a machine.

5.4 High Voltage Cable Wiring

⚠ ⚡ CAUTION

- The high voltage wiring should be done by a trained technician.
- The high voltage cable is specially constructed for this product. Do not replace it with any other wire. Life expectancy of high voltage cable is about 10,000 hours. Please consider future maintenance and replacement while installing the high voltage cable.
- Do not turn the Power unit ON until all connections and wiring are completed.

5.4.1 Cable Assembly

- For nozzles model HS-3, the high voltage cables are, normally, provided with special polyethylene tubes and spirals for mechanical protection.

5.4.2 Laying of the high voltage cable

- Decide on a wiring route for the high voltage cable from the nozzles to the Power unit.
- The high voltage connectors are sensitive to damage by mechanical movement. In order to avoid any damage, secure the high voltage cable near the nozzles and the Power unit first and then at about 1 m intervals between these points. Cable supports (plastic blocks) are used to guide the high voltage cable from the nozzles, along the frame of the machine, to the Power unit. Attach the high voltage cable to the machine frame, etc., by using cable holding plastic blocks and "plastic wire tie".
- The power unit, cable and the nozzles should be located in an easily accessible place such that the any replacement in future can be easily carried out.

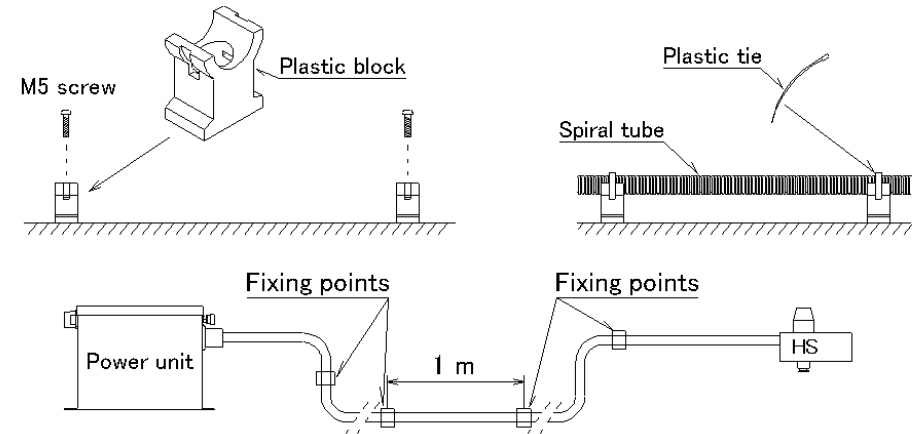


Fig. 6 High voltage cable installation

⚠ CAUTION

- Avoid contact with the pointed corners of metal frame. Pointed corners could damage the insulation and eventually lead to failure. Also, metal powder and water should be avoided on the cable.
- Do not place the high voltage cable in contact with signal lines. Coupling between the high voltage cable and the signal lines may affect the signals.
- Do not leave any space between the spiral-polyethylene tube combination and the end of nozzle; also there should be no space between the spiral-polyethylene tube combination and the high voltage connector.
- Avoid sagging of high voltage cable. High voltage cable should be fixed on a machine frame and so on using plastic ties or nylon clamps. Do not use anything else, such as metal wires and the like.
- Do not deform the cable by forcible fastening.
- High voltage cable should not be moved after installation.
- Pulling, sharp bending could damage it. The minimum bending radius permitted is about 60 mm.

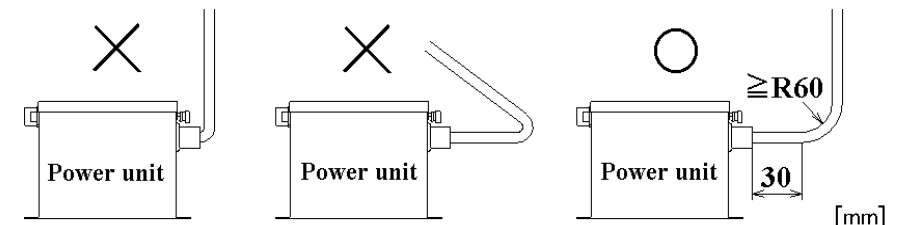


Fig. 7 Bending of high voltage cable

⚠ CAUTION

- Figure 8 shows how not to apply pressure on the high voltage cable. Also, do not attach it to a moving portion of a machine.

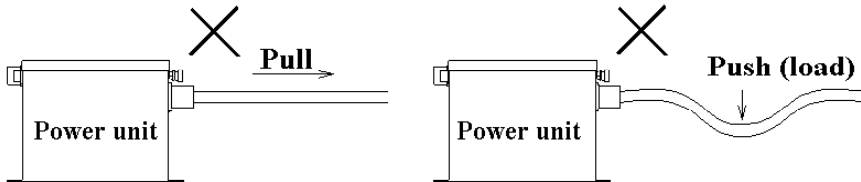


Fig. 8 Pressure on high voltage cable

- Do not tie the cables together if each cable is connected to a separate Power unit.
- Electrical discharge generates noise that might interfere with electrical signal in neighboring circuits.
- Unshielded high voltage cable cannot be replaced by shielded high voltage cable.
- Do not use a metal tube or metallic tape for shielding.

5.5 High voltage cable connection at the Power unit

- A high voltage connector model A3030 is attached for standard type. The connector has a spring on the tip, and it should be connected into output of a Power unit.
- Insert the A3030 to the high voltage output female connector of the Power unit and finger tighten.
- Do not use any tools since their use may damage the connector and the terminal.
- Please refer to the instruction manual for your Power unit; if necessary, please contact our sales department for a copy.

5.6 Grounding the nozzle

- The grounding electrode (Ground cover) of the nozzles must be connected to the ground. For the single nozzle, the grounding lead, placed at the air joint side, must be grounded. For the manifold type, the grounding leads of nozzles should be connected to the air header. The air header must be grounded.

⚠ CAUTION

- After completing all ground connections, the ground resistance should be checked with a tester. It should be ≤ 100 ohms. Improper grounding affects neutralization performance and could lead to electrical shock hazard.

5.7 High voltage labels

- The three attached stickers of "CAUTION HIGH VOLTAGE" should be used on the high voltage cable. Please put these stickers on a suitable position of the high voltage cable.

5.8 Type of connectors and number of parallel connections for HV cables

- These are number of different connectors available for connecting high voltage cables in parallel or extending the length of a cable.
- The following table provides information on the type of connectors, possible number of cables that can be connected, connecting method etc.

Type	Configuration	High Voltage cable units	Ionizer side cable end connector	Connecting method
3 wire connector	Y	1 to 1 - 3	2 - 4S solderless ring terminal	M4 Screw
T- 2 connector	T	1 to ≥ 1	A3030	By hand
Preconnector	Straight	1 to 1	A3030	By hand
HV parallel connector	More than 2 parallel outputs	1 to 2 - 6	A3030 US	By hand

⚠ CAUTION

- Do not use any connector other than that made by Simco-Ion.
- Contact our sales division for detailed information and figure.

5.9 Air tube connection

- Clean, dry air or N_2 should be supplied to nozzles. Air connections on individual nozzles are normally by a synflex tubing of 6 mm outside diameter using one touch connector attached to the nozzle. Air connections to a header are done by suitable size air tubing such as 8, 10 or 12 mm outside diameter. The air tubing should be connected to a stopcock or an one touch connector attached at the end of the header. If the header is equipped with a stopcock or an air connector at both ends, the air tubing should be connected to both stopcocks or air connectors.
- The maximum allowable pressure is 0.7 MPa (≈ 7 kgf/cm²). In practice, a pressure of 0.4 MPa is recommended for blow off of dust, and 0.05 MPa for static neutralization of objects at 50 mm from the nozzle. Please use a pressure regulator.
- It is recommended that the input air should be turned ON first by a solenoid valve and a sequencer before the high voltage supply is turned on.

CAUTION

- Make the air tubing as short as possible to minimize any loss in pressure along the tube.
- It is essential the air be filtered ahead of the nozzle or header. Contamination in the air supply may clog the nozzles and cause an electrical short circuit. Therefore, the cleanliness of air affects the frequency of cleaning of nozzles and emitters. Use an air-filter and a 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 the Power unit. The fault detection circuitry of the Power Unit 47 will also not act properly for shorter cycle times.

Section 6. OPERATION

When all installation and wiring has been completed and inspected, including grounding, the Power unit and nozzle are ready for operation. Apply utility line voltage to the Simco-Ion Power unit. An ON/OFF switch on the Power unit is used to turn an ionizing air nozzle on and off. (Air flow cannot be controlled.) Please read the manual of instructions for your Power unit before turning it on.

6.1 Start Operation

- 1) Supply clean dry air.
 - Air flow from the nozzle starts.
- 2) Turn the switch of the Power unit on.
 - An indicating lamp of the Power unit turns on.
 - Neutralization starts.

6.2 Stop Operation

- 1) Turn the switch of the Power unit off for ionization to stop.
- 2) Stop air supply.

CAUTION

- Confirm that there is no visible spark.
- Confirm that compressed air is blown directly to the charged object.
- Turn the switch off when the Power unit is not in use. If left unused for a long period of time, the Power unit should be unplugged from line socket.

6.3 Operation checks

6.3.1 Spark test

WARNING

- Do not perform this test in a hazardous area, and especially near flammable materials or solvents.
- If electrical noise can influence devices in the area. Turn off that equipment during the test.

- 1) Turn the power switch ON.
- 2) Take a screwdriver with an insulating handle and connect its metal shaft to the common ground with a connecting lead.
- 3) Approach the emitter with a sharp corner of the screwdriver within 2-3 mm, until a spark occurs. An arc, approximately 2-3 mm long, should be observed. (It will be necessary to observe this discharge in dim light.)

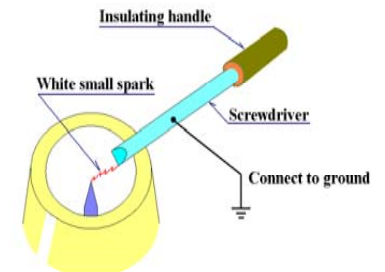


Fig. 10 Spark test

⚠ ATTENTION

- This test must be done periodically.
- When no spark occurs, check the input voltage, the plug, fuse, the high voltage cable and ground connections, etc., in accordance with the instructions for the Power unit. Also, clean the ionizing point in accordance with the cleaning instructions provided below (Maintenance) and test again.

6.3.2 Troubleshooting based on spark test

Spark	Comment	Cause		Countermeasure
No spark	NG	The lamp of the Power unit comes on, when the HV cable is disconnected at the Power unit.	Insulation problem in the nozzle or HV cable.	Test the cable. Replace cable or nozzle as necessary.
		The lamp of the Power unit does not come on, even if the nozzle and cable are disconnected.	Failure of the Power unit	Repair or replace the Power unit
White small spark, 2-3 mm long	OK	-		-
Red large spark, 5-8 mm long	NG	Failure of the coupling capacitance of the electrode.		Replace the nozzle

⚠ CAUTION

- When large spark occurs, this would turn off high voltage and the pilot lamp in the case of Power Unit 47. In this case, remove the screwdriver; turn the power switch OFF. After a few seconds, turn the power switch ON again. The pilot lamp should light up and high voltage output should be restored.
This indicates a failure of the main insulation of the nozzle. The faulty nozzle must be replaced.
- Do not attempt to disassemble and repair the Power unit, nozzle or cable assemblies. Efforts to modify the products may void applicable warranties and expose operators to hazardous conditions.

6.3.3 Neutralizing performance check

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

- Obtain two kind of plastics such as PVC, PP, Acrylic, etc. Recommended size is 150 mm x 150 mm x 1 mm.
- Rub those together for charging up enough; near 5 kV.
- Measure and record the initial voltage of the charged object using the fieldmeter.
- Turn the ionizing air nozzle on and use it to neutralize a charged object. (distance: 50 mm)
- Measure and record the final voltage again. Please maintain records of these measurements.

If the charged object is neutralized quickly, the ionizing air nozzle and the Power unit are working properly. Please note that the voltage of the object does not decrease without the ionizing air nozzle turned on.

If it is not neutralized, clean the ionizer in accordance with the cleaning instructions described below in Section 6 and then perform the spark test. Also, all other check should be done for remedy in accordance with the Section 7

⚠ ATTENTION

- Use an electrostatic field meter with traceable calibration.



Photo 3. FMX-004

Section 7. MAINTENANCE

7.1 Periodic maintenance

CAUTION

- The ionizing air nozzle employs high voltage and is a special product. If regular maintenance is neglected, there may be deterioration of neutralizing performance. There is also a possibility of insulation burn-out.

7.1.1 Cleaning of the ionizing needle; emitter

If there is dust on Emitter tip, Nozzle tip and Ground cover, ionizing efficiency suffers. Even if the nozzles are used in clean rooms, there may be the accumulation of white powder due to the interaction electric field with humidity and ambient air. Please clean those parts with a soft nylon brush or clean cloth regularly. Recommended interval time is every 100 - 200 hours.

7.1.2 Removal of hard contaminants

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, the Ground cover, insulation materials such as the Nozzle tip, the Nozzle body and a hole of air outlet on the nozzle. Recommended interval time of this work is every 500 - 2000 hours.

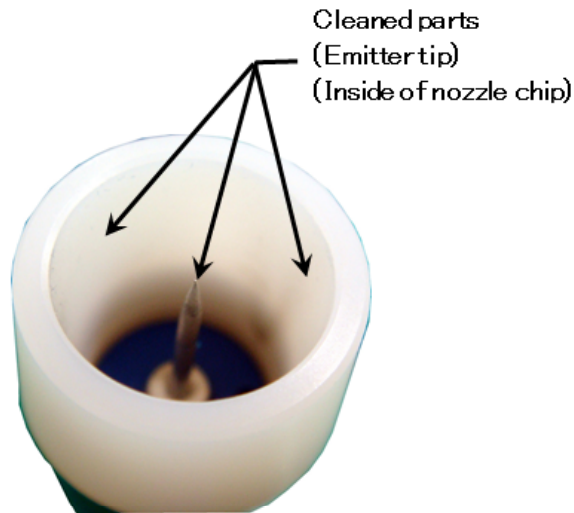


Photo 4. Cleaning points

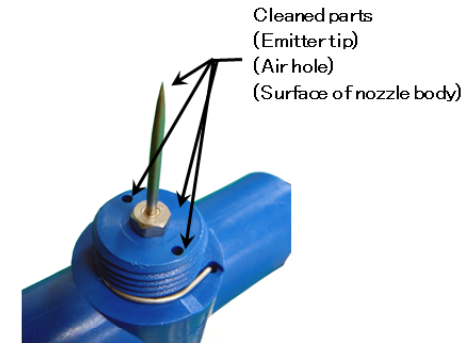


Photo 5. Inside of the Nozzle tip



Photo 6. Nozzle parts for cleaning



Photo 7. Nut driver for emitter

CAUTION

- Turn off the power supply at the Power unit at the time of cleaning.
- There is a possibility of injury because of a 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. The emitter can be replaced easily by a Nut driver.
- Be sure not to leave any cotton fiber on the emitter tip if a cotton swab is used.
- If there is a crack, a break or considerably change of color on the nozzle body, the nozzle must be replaced.
- 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 the ionizer. Also, allow the ionizer to dry completely before use.
- The suggested cleaning intervals for 7.1.1 and 7.1.2 should be somewhat varied depending on working conditions.
- Confirm the resistance between the Ground cover and ground by a tester when reassembling of the Nozzle tip, the Ground cover and the nozzle after cleaning. It should be less than 100 ohms.

7.1.3 Maintenance of the high voltage cable and other visual checks

- Periodically check the high voltage cable for color change or damage on the external tube that protects the cable. Also, please check if the inside cable is damaged. When the inside cable is damaged, ionizing cannot be achieved.
- In case a high voltage cable becomes dirty with oil, water etc., please wipe it off with a piece of cloth.
- In case of minor problem that does not involve the high voltage cable inside, it can be easily taken care of by putting some insulation tape around this region.
- In case the high voltage cable inside is damaged, contact our sales division as repair or replacement of the ionizing air nozzle may be necessary.
- Periodically inspect the high voltage connector A3030 and output terminal of the Power unit for cracks, contamination and electrical tracking.

7.1.4 Operation checks

Operation checks described in 6.3.1 "Spark test" and 6.3.3 "Neutralizing performance check" should be done periodically.

7.2 Grounding resistance check



- The following checks should be carried out by a trained electrician.

By a tester, measure the resistance listed below. The measured value must be less than 100 ohms.

- The Ground cover \longleftrightarrow Ground such as machine frame, etc.
- The ground terminal of the Power unit \longleftrightarrow Ground such as machine frame, etc.

If the measured value is over 100 ohms, check the ground connections and rectify the wiring.

Section 8. ABNORMAL CONDITIONS

8.1 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, the power unit should be turned off and Simco Japan or Simco Japan's authorized agents should be contacted.

8.2 Other abnormalities

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

- a) Sparking from any part of the ionizing air nozzle/ high voltage cable
- b) Change in the shape of the ionizing air nozzle/ Power unit
- c) Melting or burning of the high voltage cable
- d) Smoke from the ionizing air nozzle/ high voltage cable/ Power unit
- e) Abnormal sound or smell from the ionizing air nozzle/ high voltage cable/ Power unit
- f) Overheating of the Power unit

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

8.3 Replaceable parts

Model	Part	Quantity	TYPE	Expected life
HS-3	Emitter	1 pc/ 1 unit	for HS-3 (same parts)	Approx. 10,000 hours
	High voltage cable		for HS-3 (standard cable)	

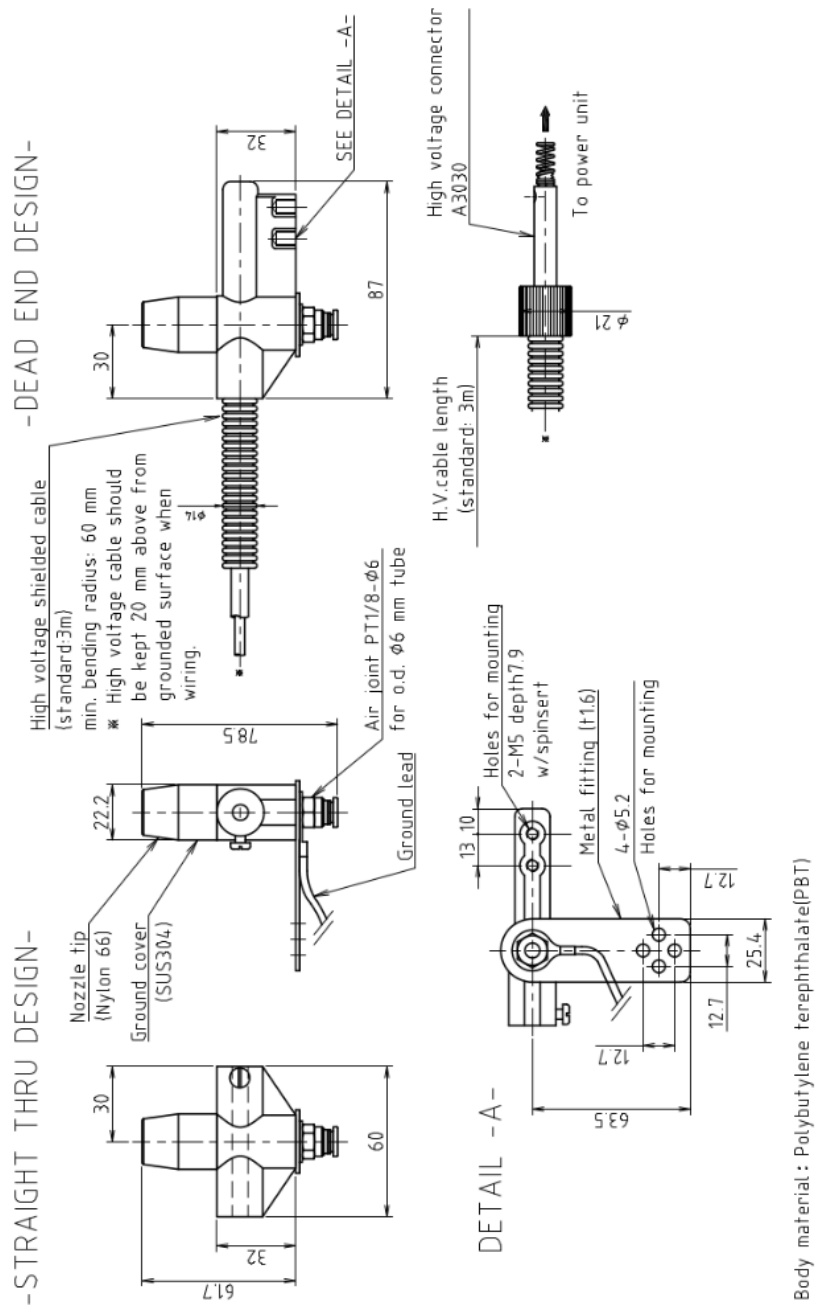
- High voltage connectors A3030 should be replaced if any crack is observed.



- Replacements of all parts, except A3030 connectors and emitters, are done by Simco-Ion. (require payment)
- After the warranty period expires, any repair or checking will be charged and require payment, even if it is within the life expectancy period.

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.

Drawings MODEL HS-3



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 Model HS-3</i>		
Shipping Date	Product's serial number contains information on the shipping date.	Warranty Period	<i>A one year Warranty</i>

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SIMCO JAPAN, INC.

**1-2-4, Minatojima-Nakamachi,
Chuo-ku, Kobe, 650-0046, Japan**

Phone: +81-78-303-4651 Fax: +81-78-303-4655

WEB: <http://www.simcoion.jp/>
INQUIRY e-mail: info@simcoion.jp