SIMCO ION™
An ITW Company

Simco-Ion Electrostatic Neutralizer

Static Neutralizing Bar MEB / SS-50

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.

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.

This equipment is intended for use in electrostatic processes that are free from water, oil and other conductive contaminants. Exposure to such contaminants will cause failure of the electrical insulation system in the product.

This equipment should not be operated in an ambient with corrosive fumes of acid/alkali or corrosive gases such as chlorine.

The equipment is designed to be used with specific Simco-Ion Power unit. Its performance and durability cannot be guaranteed if any other power supply 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 Static Neutralizing Bars 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 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.

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) Static bar and high voltage cable (typically 3m) 1 pc.

2) Mounting Device

Model	**Device**	
MEB	MEB Clamp	2 pcs.
MEB−CE/RS	X1/2 (flat plate)	2 pcs.
SS-50	X1/2 (flat plate)	2 pcs.
SS-50−CE/RS	X1/2 (flat plate)	2 pcs.

A kind of bracket different from the above-mentioned by prior meeting might be attached.

3) Plastic ties and Plastic blocks 1 set.

4) Daily Inspection Label 1 pc.

5) 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.

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ELECTRIC SHOCK HAZARD

SECTION 1. General Description

Simco-Ion Static Bars are used to neutralize static charge. These are used with Simco-Ion Power unit. Each type is designed to be used with a particular type of Power unit. ME, MEB, P-SH --- each of these static bar models needs a single phase AC 7 kV ± 7 % Power unit. SS-50 needs a single phase AC 4 kV ± 7 % Power unit.

NOTE:

A mistake in choosing a correct combination of Static Bar and Power unit might damage the units. The following table provides guidelines for the type of Static Bars and the corresponding Power units.

Bar model	Shape	color	Size [mm]	Special Features	Power unit model
MEB [shockless type]	Rectangular section	Grey/Silver or Blue/Silver	16 × 19	Light Inexpensive CE:RoSH.CE marking RS:RoSH	Power Unit 47 Power Unit 150 (Only the shielded cable has corresponded) F167J F167
SS-50 [Non-shockless]	Rectangular section	White/Black or White/Silver	13 × 17 or 16× 19 (CE/RS)	High efficiency CE:RoSH.CE marking RS:RoSH	Power Unit 47 Power Unit 150 (Only the shielded cable has corresponded) F164J

Sometimes Ion balance circuits are needed to balance the concentration of ions produced by charge neutralizers. Ion balance circuits are not used with Shockless type eliminators. However, SS-50 (hot or non-shockless type) bar can have an Ion balance circuit by using Power Unit 4. For the details on the number of eliminators that can be connected with a Power unit, please contact our sales division.

Simco-Ion Static Bars use AC high voltage Power units. Shockless static eliminators use capacitive coupling to limit the amount of electrical energy that can be drawn from an electrode when it is shorted to ground. Because of the limited energy that can be drawn from the electrode, these type of static eliminators are inherently safe from shock hazard. In the non-shockless type (hot type) eliminators, needle electrodes have direct contact with high voltage conductor.

⚠ CAUTION

F167, F167J, F164J Power units do not include any failure detection circuit. Consequently, in the event of any short-circuit or sparking, the high voltage output is not disconnected. If this continues, the insulation of the Static Bar/high voltage cable will be burnt. Periodic checking and maintenance should be done to prevent this from happening.

Power Unit 47 and Power Unit 150 have failure detection circuits inside; therefore, insulation damage can be prevented.

SECTION 2. Specifications

2.1 Common characteristics

Function: Static Charge Neutralizer

Ambient conditions: About 0 to 40 ℃, 10 to 85 %RH

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

Warranty: One year after shipment

2.2 The following table presents the other characteristics of the different types of bars.

Model	MEB		SS−50	
Certification	Certified*	–	–	
Rated volts/ construction	AC 7 kV;shockless		AC 4 kV; non-shockless	
Overall [mm] Dia / W × H	16 × 19		13 × 17	16 × 19
Approximate Weight [g/m]	330	570	430	690
Ionizing emitter material	Stainless Steel/Titanium			
Grounding electrode material	Anodized Aluminum (white)	SUS304	Anodized Aluminum (black)	SUS304
Insulation material	PVC		Teflon	
High voltage cable	MEB-black/ White silicone large dia.	White silicone shielding	H-red/White silicone small dia.	White silicone shielding
High voltage cable shielding	Shielding available with silicone cable only			
HV cable end connector	Model A3030		Model A3031	
Type of cable direction	Straight/Right angle		Straight only	
Mounting stud	Optional	None	Standard back stud	None
CE marking / RoSH	None	CE:CE and RoSH RS:RoSH	None	CE:CE and RoSH RS:RoSH
Air bar	Optional			

*: Japanese Ministry of Labor or UL (USA) certified

NOTE:

- **For detailed drawings, please contact our sales division.**
- **Weight of bars shown in the table above is only approximate.**
- **High voltage cable is, normally, not shielded. Standard high voltage cable is covered by semi-transparent polyethylene tube and grey colored spiral.**
- **Silicone cable is not approved by either Japanese Ministry of Labor or UL (USA).**
- **For any further information on any of the products, please contact our sales division.**

SECTION 3. Principle of Operation

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

Simco-Ion static eliminator operates as follows:

1) When the power switch is turned on, it 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) As the unlike charges attract, the charged object that needs to be neutralized attracts ions of opposite polarity until it is neutralized.

Fig.1 shows how an object, charged statically to 20～50 kV can be neutralized, typically, down to 0.1 to 0.2 kV.

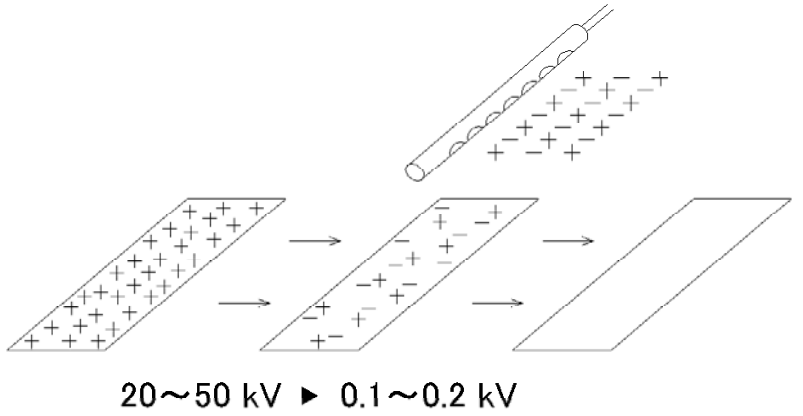

Fig.1 Neutralization of charged object using a static bar

SECTION 4. Installation

⚠⚡ CAUTION

- **The installation of the Power unit, high voltage cable and static bars must be carried out by a trained electrician.**
- **Ionizing needle electrodes are very sharp and can cause considerable physical injury. Please handle Static Bars with care.**
- **Complete all wirings before switching on the power.**

4.1 Location

- Best locations are usually just ahead of place where static charge gives trouble.
- The material to be neutralized should not be in contact with another surface as it passes the static bar, since static charges cannot be easily neutralized if the object is not free.
- Static bars should be pointing directly towards the object to be neutralized.
- Static bar should be placed more than 15 mm and less than 50 mm from the object. High efficiency bars can be located further than this. All bars can be efficient at close distance. In case, the charged object is moving at high speed, make the distance close, if possible.
- Between Static Bars and charged material to be neutralized, there should be no other object.
- The bar cannot be cut or bent.

⚠ CAUTION

- **A neutralized object is not static-proof. It can get charged again by friction.**
- **For a thick object (>0.1 mm), neutralization is necessary on both the surfaces. Two Static Bars will be required, one for each surface.**
- **In case the speed of the object is high, it is better to have more than one bar. The distance between two nearest faces of two bars, placed side by side should be about 25 mm.**

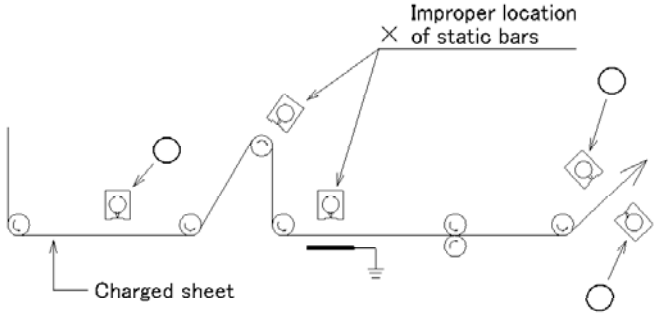

Fig.2 Static bar location

4.2 Mounting

- Static bars may be provided with mounting brackets that can be bent and twisted to support them from the frame of the machine or convenient stationary shafts that span the machine. Studs may also be provided for direct mounting. See the specification table on page 6 for details.
- The case of the Static Bars must be grounded. Grounding resistance should be checked with a tester. It should be ≦100Ω. Improper grounding affects neutralization performance and could lead to electrical shock hazard.
- Do not cover the ionizing points.
- A Static Bar should not touch the object to be neutralized.

⚠ CAUTION

- **Do not twist or bend the bar. Do not put any pressure on it.**
- **For installing air bar, please read page 20 and 21.**

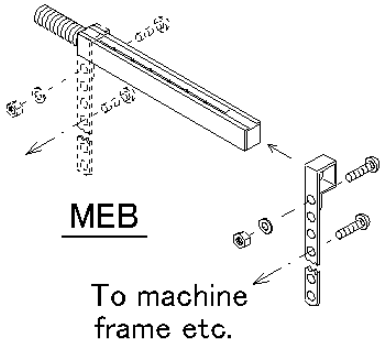

Fig.3 Static bar installation

4.3 High Voltage Cable Installation

⚠⚡ 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.**
- **Do not turn the Power unit ON until all connections and wiring are completed.**

Cable Assembly

The static bar MEB usually provides the high voltage line for a special polyethylene tube and the spiral for mechanical protection. The static bar SS-50 usually provides the high voltage line for a special spiral for mechanical protection.

There are two types of high voltage connectors available. In SS-50, model A3031 type connector is used. In all other bars, model A3030 is used. Further information on connectors can be obtained from the specification table. For the details on construction, see page 19.

NOTE: The static bar MEB doesn't have any space between terminals of a combination and a static bar in the spiral and the polyethylene tube either ; also there should be no space between the spiral-polyethylene tube combination and the high voltage connector. The static bar SS-50 doesn't have any space between the spiral and the static bar terminal either ; also there should be no space between the spiral and the high voltage connector.

Laying of the high voltage cable

1) Decide on a wiring route from the static bar to the Power unit.
2) The high voltage connectors are sensitive to damage by mechanical movement. In order to avoid any damage, fix the high voltage cable near the Static bar and the Power unit first and then at about 1 m intervals between these points. Attach the high voltage cable to the machine frame, etc., by using cable holding plastic blocks and "plastic wire tie". Shielded cables do not need any plastic block.
3) The power unit, cable and the static bar should be located in an easily accessible place such that the any replacement in future can be easily carried out.

⚠ CAUTION

- **High voltage cable is special; pulling, sharp bending could damage it. Also, metal powder and water should be avoided on the cable.**
- **Do not tie the cables together if each cable is connected to a separate Power unit.**

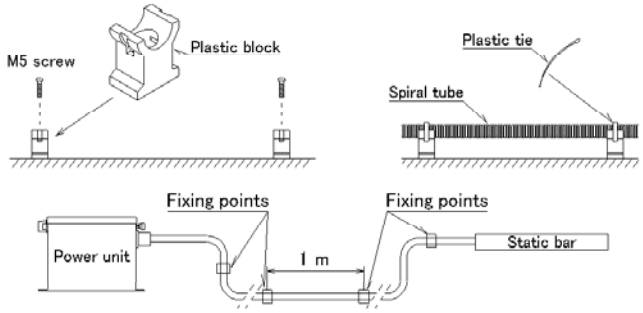

Fig.4 High voltage cable installation

- **The minimum bending radius permitted is about 60 mm. While installing the cable, avoid contact with the pointed corners of metal frame. Pointed corners could damage the insulation and eventually lead to failure.**

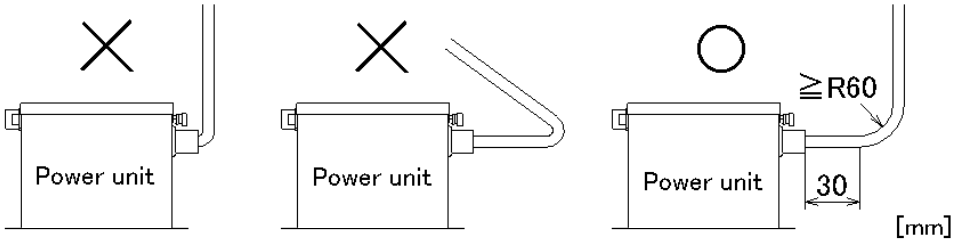

Fig.5 Bending of high voltage cable

- **The following figure shows how not to apply pressure on the high voltage cable.**

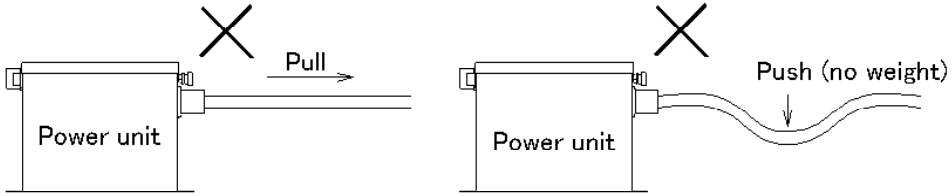

Fig.6 Pressure on high voltage cable

- **In case of a shielded cable, the shield must be connected to the ground terminal of a Power unit and then connected to ground as shown below in Fig.7. If grounding is not properly done, there is a risk of electrical shock/fire hazard.**
- **The shielded cable cannot be shortened easily. If it is necessary, please contact us or our agents.**
- **Electrical discharge generates noise that might interfere with electrical signal in neighboring circuits. Significant reduction in noise can be obtained by using shielded high voltage cable.**

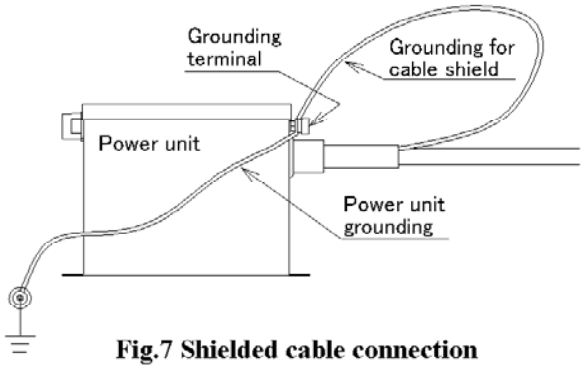

Fig.7 Shielded cable connection

⚠ ATTENTION

- **Unshielded high voltage cable cannot be replaced by shielded high voltage cable except when silicone cable is used.**
- **Do not use a metal tube or metallic tape for shielding. Use a proper shielded cable. The shield must be grounded properly or it could be an electrical shock/fire hazard.**
- **If shielded cable is needed, please contact our sales division.**

4.4 High voltage labels

The three attached labels should be used on the high voltage cable. (Simco-Ion provides labels written in Japanese.)

4.5 Type of connectors and number of parallel connections

The following table provides information on the type of connectors and their applications.

Type	Configuration	High Voltage cable units	Static-bar 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/ A3031	By hand
Preconnector	Straight	1 to 1	A3030/ A3031	By hand
HV parallel connector	More than 2 parallel outputs	1 to 2～6	A3030 US/ A3031 US	By hand
HV parallel connection box	More than 2 parallel outputs	≧2 to ≧2	2 - 4S solderless ring terminal	M4 Screw

NOTE:

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

4.6 High voltage cable connection at the power unit

- Proper connector attached to the high voltage cable terminal is used to connect the high voltage cable to the Power unit. For details, please refer to the instruction manual for your Power unit.
- If necessary, please contact us for a copy of the instruction manual for the Power unit.

SECTION 5. Operation

An ON/OFF switch on the Power unit is used to turn a static bar on and off. Please read the manual of instructions for your Power unit before turning it on.

SECTION 6. Maintenance

A static bar employs high voltage and is a special product. If regular maintenance is neglected, their may be deterioration of neutralizing performance. There is also a possibility of insulation burn-out.

6.1 Cleaning of a static neutralizing bar

⚠ CAUTION

- **Turn off the power supply at the power unit at the time of cleaning.**
- **There is the possibility of injury because of sharp needles.**
- **Never use metal brush (wire).**
- **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 bar; use a few drops on a piece of cloth and use it to clean the bar. Let it dry completely before power supply is turned on.**

Periodically remove dirt (possibly the deposition of white powder or black/dark brown powder) with a nylon brush. In order to remove dirt that cannot be removed by brushing alone (paint, ink, oil), a little pure methanol or pure IPA may be used.

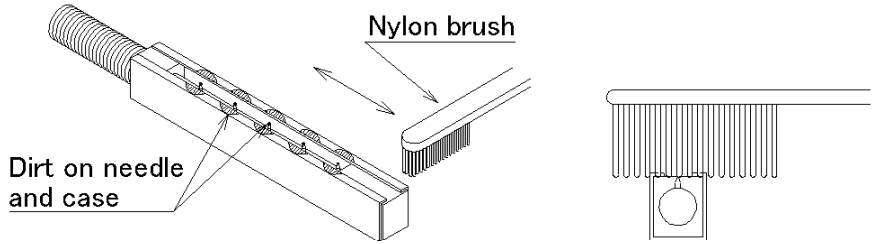

Fig.8 Cleaning of static bars by nylon brush

6.2 Maintenance of the high voltage cable

Periodically check the high voltage cable for color change or damage on the external tube that protects the cable. This type of minor problem that does not involve the high voltage cable itself, can be easily taken care of by putting some insulation tape around this region. In case a high voltage cable becomes dirty with oil, water etc., please wipe it off with a piece of cloth. In case the high voltage cable itself is damaged, contact our sales division as a replacement of the static bar may be necessary.

⚠ CAUTION

Turn off the Power unit before removing a high voltage cable from the Power unit side. The other side of the cable is permanently connected to the bar and cannot be removed.

6.3 Important Initial checks

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

Visual check:
Check if any of the needles is bent or if there is any other sign of abnormality. In this case, the bar might have to be replaced.

Spark test:

⃠ WARNING

When conducting the following test, be certain that no flammable solvents or gas is in the ambient air. Also, switch off any computer or sequencer to protect against electrical transients and noise.

Steps:

1) Use a small screw-driver.

2) Switch on the Power unit. Holding the insulated part of the screw-driver, touch the metal shaft to the grounded case and bring it close to ionizing needles.

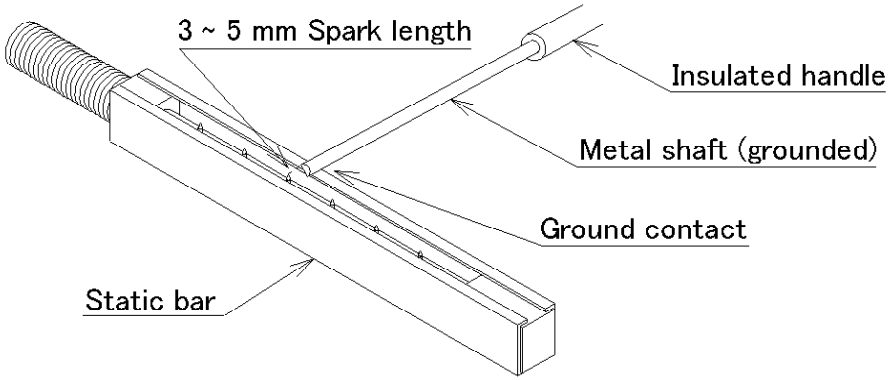

Fig.9 Spark test

Troubleshooting for spark test:

Bar type	Model	Type of spark	Comment	Cause	Countermeasure
Shockless	MEB	No spark	NG	Insulation problem in bar/cable or problem with the Power unit	Replace bar/ repair Power unit
		White spark, 2~ 3 mm long	OK		
		5~ 8 mm long strong red spark	NG	Insulation problem between electrodes	Replace bar
Non-shockless (hot)	SS-50	No spark	NG	Insulation problem in bar/cable or problem with the Power unit	Replace bar/ repair Power unit
		5~ 8 mm long strong red spark	OK		

Grounding resistance check
Measure the resistance between the casing of static neutralizer, machine frame and the Power unit. The meter should read less than 100Ω.

Neutralizing performance check
This test should be done periodically. The neutralization performance should be measured with an electrostatic fieldmeter.

- Measure the initial voltage of the charged object.
- Turn the static bar on and use it to neutralize a charged object.
- Measure the final voltage using the fieldmeter.

If there is efficient neutralization, the voltage should decrease quickly (see Fig.1). Please note that for efficient neutralization, the static bar should be located close to the charged object as mentioned earlier.

Insulation resistance
If spark test and neutralization performance are found unsatisfactory, the insulation resistance of the bar should be checked. The following table provides the course of action to be taken depending on the insulation resistance.

Bar type	Model	Measuring points	Equipment used	Comments
Shockless	MEB	Needle - HV cable end	DC 1,000 V meggar	≧1 GΩ: OK 1 GΩ~ 100 MΩ: bar needs to be cleaned <100 MΩ: bar needs to be replaced.
		HV cable end - grounding electrode connected to ground	DC 10,000 V meggar	≧10 GΩ: OK 10 GΩ~ 100 MΩ: bar needs to be cleaned. <100 MΩ: bar needs to be replaced.
Non-shockless (hot)	SS-50	HV cable end - grounding electrode connected to ground	DC 1,000 V meggar	≧1 GΩ: OK 1 GΩ~ 100 MΩ: bar needs to be cleaned. <100 MΩ: bar needs to be replaced.
		Needle - HV cable end	Tester	≦10Ω: OK >10 Ω: replace bar.

⚠ ATTENTION

- **Each needle electrode in shockless bars is insulated. During insulation resistance measurements, each needle should be tested separately. In hot bar all needle electrodes are directly connected to high voltage.**
- **Disconnect the cable at the Power unit end while carrying out the resistance measurements.**
- **In insulation resistance measurements above, high voltage cable-end refers to the spring belonging to the connectors, such as in A3030 etc..**
- **If, even after cleaning, the insulation resistance of the bar does not become normal, it might need replacement.**
- **Even if the insulation resistance values are normal, regular cleaning of the needles is necessary.**
- **If a 10,000 V meggar is not available, a 1,000 V meggar can be used. The same criteria of success or failure as for other 1,000 V meggar tests can be accepted in this case.**

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

SECTION 7. Abnormal conditions

7.1 Spark from an ionizing needle electrode

During normal operation, there should be no visible spark. If spark is observed, the bar should be cleaned properly (see section 6.1). If the sparking continues even after cleaning, please switch off the Power unit and contact us directly or an authorized agent in your area.

7.2 Other abnormalities

In case the following abnormalities are observed, please switch off the Power unit and contact us directly or an authorized agent in your area.

a) Sparking from any part of a static bar or high voltage cable

b) Change in shape of a static bar

c) Melting or burning of high voltage cable

SECTION 8. Replaceable parts

- There is no replaceable part with the bar or the high voltage cable.
- If the protective tube on high voltage cable changes color or is damaged, reinforce with insulation tape or contact us for replacement.
- High voltage connectors (A3030 or A3031) should be replaced if any crack is observed.

SECTION 9. Other products

Type	Application	Model
Fieldmeter	Measurement of voltage on a charged object	FMX-004
Surface resistance meter	Measurement of surface resistance, grounding resistance	ST-4
Static analyzer (Charge plate monitor)	Measurement of decay time, offset voltage, etc.	EA-5J
High voltage meter	Measurement of Power unit output voltage	Simco-Ion HV meter (simple design, AC only)
Static bar	Neutralization of charged sheet-material	Static Air knife, Blue Bar
Other bar	Clean room applications	MF-4N
Ionizing air nozzle	Neutralization and removal of dust	H, HS, ionFOCUS Ⅱ, R35-F, R35-R
Ionizing air gun	Hand gun for neutralization and blowing of dust	HBA, ES, TOP GUN 3, COBRA GUN
Ionizing blower	Wide area application for rugged industrial use	XC, PC, FPD AS31, AS21, CENTURION SERIES

Besides, there is a variety of other available products such as conductive mat, conductive floor, foot-checker etc. Please ask us or our agents in your area for details.

Model A3030/A3031 high voltage connector assembly

A3030 high voltage connector
For black/white 6 mm dia. HV cable

A3031 high voltage connector
For red/white 4 mm dia. HV cable

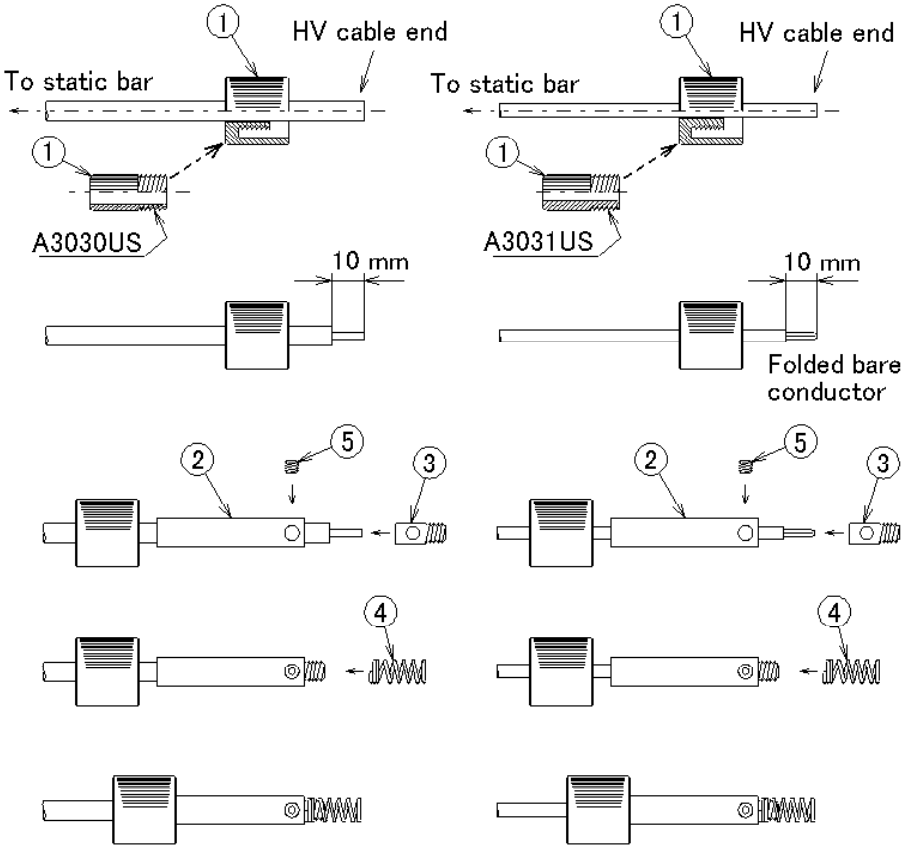

Fig.10 A3030/A3031 connector assembly

Procedure:

1) Plug ① is inserted as shown in figure above.
2) Remove 10 mm long insulation (to bare the conductor) for black or white cable and 20 mm long insulation for red high voltage cable. Fold the 20 mm long bare conductor in red cable into half its size (10 mm).
3) Part ② is now inserted on the high voltage cable.
4) Part ③ (head) can now be put on the conductor, slide part ② onto it, align the holes and use a set screw (part ⑤) to fix the head firmly on the cable.
5) The spring (part ④) can now be screwed on to the head (③).

Installation instructions for Simco-Ion air bar

Before installing, please read these instructions. Using Simco-Ion air bars with Simco-Ion static bars, static charges at long distance can be neutralized with high efficiency.

1. Installation

i) Air bar should be inserted into one side of an one-touch connecting valve; the other side of the valve is connected to the air supply.

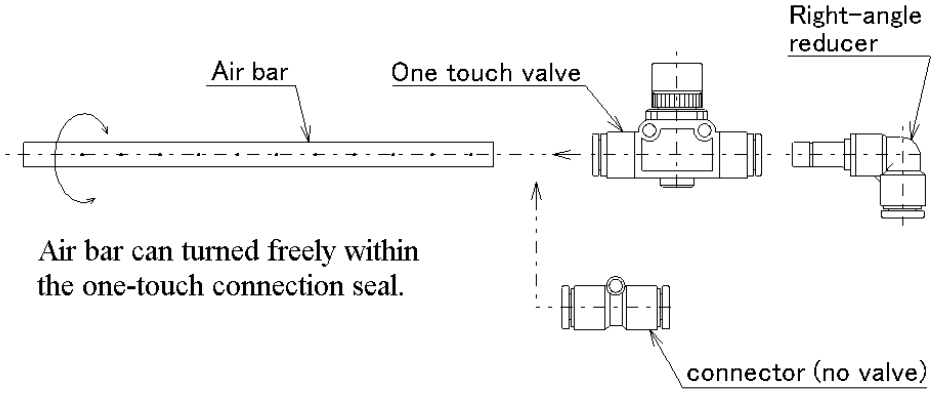

Fig.11 Air bar connection

ii) Combine air bar and static bar and adjust the direction of air flow as shown below.

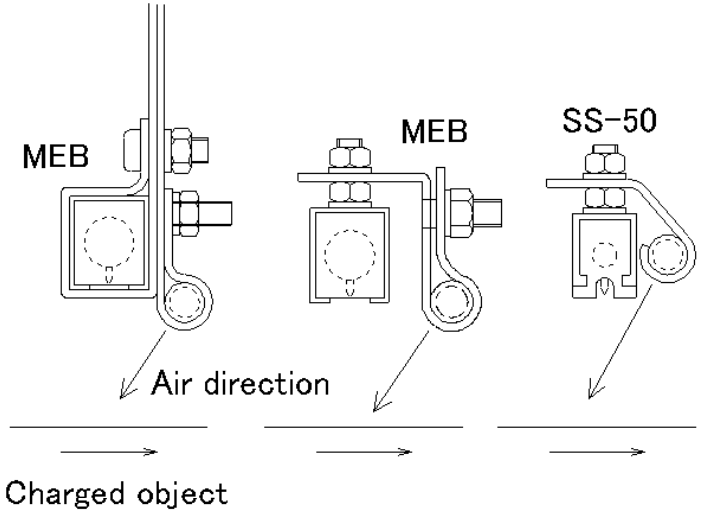

Fig.12 Air bar and Static bar combination

NOTE:

- **Air should enter from the side marked IN on the valve.**
- **Air tube outside diameter is 8 mm. If air bar is short (~ 100 mm), change the tube dia. from 8 mm to 6 mm using a reducer.**
- **Recommended air pressure is 0.01 ~ 0.7 MPa. Normally 0.3 MPa is used.**
- **If air bar is >1 m long, use two valves, one on each side of the air bar.**

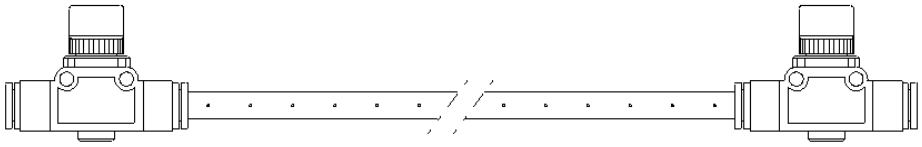

Fig.13 Long static bar with valves on both ends

2. Air flow rate

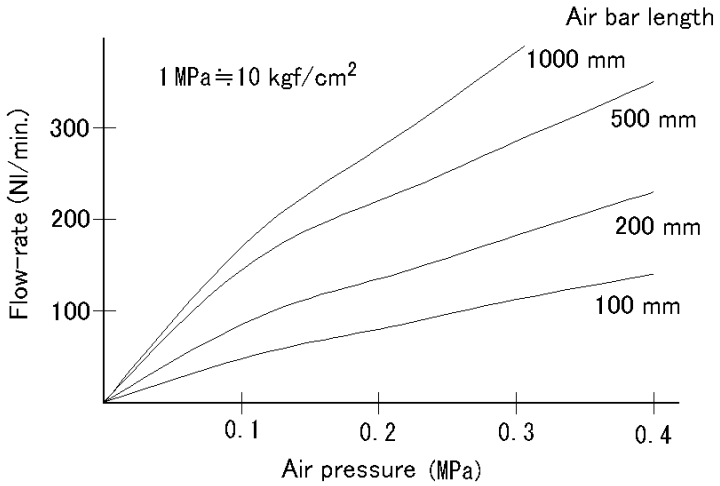

Fig.14 Variation of air-flow rate with pressure for different air-bar lengths

3. Air supply

Air supplied to the air bar should be clean, free from oil vapor, water and dust. So, air should be filtered properly before use.

4. Maintenance

Air bar should be removed and cleaned with a metal brush periodically. If water, oil etc. are present, clean the bar with alcohol. If that does not clean it properly, a replacement of the air bar may be necessary.

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	*Simco-Ion Electrostatic Neutralizer* ***Static Neutralizing Bar MEB / SS-50***		
Delivery Date	Product's serial number contains information on the shipping date.	Warranty Period	***A one year Warranty***

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