

## Simco-Ion Power Supply Model Power Unit 150

*with CE marking, RoHS compliant*

### **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.

#### Receipt of equipment

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.

#### Packing articles and accessories

- |   |        |
|---|--------|
| 1) Simco-Ion Power Supply, model Power Unit 150 | 1 unit |
| 2) AC/DC Adapter                                | 1 pc.  |
| 2) DC 24 V connection cord 1.8 m long (option)  | 1 pc.  |
| 3) 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

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### **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 contains a high voltage transformer. Please follow the operating instructions carefully in order to minimize electrical shock hazard.

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

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

It can be connected to an input voltage 24 Vdc +/- 10 %. It is recommended to use an AC/DC adapter provided by Simco-Ion. It can be connected to an input voltage range of 100 - 240 Vac, 50/60 Hz. Normally, a line cord with a 3-pin plug is provided for connecting the input to 100 - 125 Vac line. This cord must be changed when connected to 200 Vac line. The line cord for 250 Vac is not supplied by Simco-Ion.

The power supply must have proper grounding. Without proper grounding there may be electrical shock/fire hazard. Also, the fault detection circuit does not operate properly without ground connection.

Switch the equipment OFF during prolonged periods of non-use, such as plant shut-down, overnights, weekends etc.

During normal use of this product, there should be no visible spark. If any spark is observed, please turn off power immediately. In case sparking continues, contact us or our sales representatives in your area. Inspection, exchange and repair service will be provided in accordance with the warranty conditions.

This equipment is likely to be damaged if dropped. In such an event, it should be carefully examined and any necessary repairs be made by an authorized technician. The equipment will produce considerable electrical noise and insulation might burn if the unit is damaged.

The power supply 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

Power unit 150 includes a high voltage compact transformer and it is intended for use with static eliminators manufactured by Simco-Ion. It gives a variable AC output in the range 3,500V to 7,000V for many kinds of eliminators. A variable DC output in the range -150 to +550V can be superimposed on the AC output and can be used for ion balance adjustment. It cannot be used as DC power supply only.

Power Unit 150 can be connected to shockless type and hot type ionizers with high voltage shielded cable. Shockless static eliminators use capacitive coupling (except Blue bar, R36 nozzles) to limit the amount of electrical energy that can be drawn from an emitter when it is shorted to ground. By limiting the amount of energy any electrical shock can be prevented. As the electrode of hot type ionizers is directly connected to high voltage, an electrical shock will be experienced if touched when the device is active. (Maximum current is limited to 5 mA.)

**Table-1: Maximum allowable number and type of static eliminators**

| Type of Eliminator | Eliminator model        | High voltage setting | Permitted load   |
|--------------------|-------------------------|----------------------|--|
| Static bars        | MEB-CE/A<br>Blue bar HL | 6.8 kV               | 2 units, total max. bar and shielded cable length: 7 m |
|                    | Blue bar                | 5.0 kV               | 2 units, total max. bar and shielded cable length: 8 m |
|                    | MF                      | 4.0 kV               |  |
|                    | SS50CE/A                | 3.5 kV               |  |
| Shielded type      | HSS series              | 6.8 kV               | 2 units with max. 5 m long shielded cable              |
|                    | R36 series              | 5.0 kV               | 2 units with max. 8 m long shielded cable              |
|                    | TN series               | 4.0 kV               |  |
|                    | H , SFN3                | 3.6 kV               |  |
| Gun                | ES                      | 6.8 kV               | 2 units with max. 5 m long shielded cable              |

### ATTENTION

- The Table-1 shows the maximum number of eliminators that could be connected to one Power Unit 150. More eliminators, connected to a single Power Unit 150, would overload it and might damage the unit.
- When ion balance is important, please connect only one eliminator to one Power Unit 150. Individual control of ion balance of the eliminators is not possible when more than one ionizer is connected to the same power supply.
- With Power Unit 150 the ion balance for HSS and TN nozzles, static bar MEB-CE and Air gun ES cannot be adjusted.
- For more details, please consult the sales department of Simco Japan.

## Section 2. FEATURES

Input rating of Simco-Ion Power unit 150 is 24 Vdc +/- 10%, 1 A. Please use a Simco-Ion switching AC/DC adapter. The adapter can be used under a wide range of input voltages such as single-phase 100 to 240 Vac, 50 to 60 Hz.

Using the terminals available on Power Unit 150, it can be switched on and off remotely and linked with the operating sequence of customer's machines.

A pilot lamp of high brightness blue LED helps to confirm if the unit is ON from far.

### Special features of Simco-Ion Power Unit 150:

#### 2.1 Variable AC high voltage output

Generally, a power unit for static eliminators supplies its own ionizers with a fixed high voltage output. The demand for power units that could adapt to various ionizers has increased recently because of cost consideration and convenience. To meet this need, Power Unit 150 has been designed to give a variable AC voltage output in the range 3,500 to 7,000 V.

#### 2.2 1/1000 voltage output terminals for monitoring the high voltage output

Power Unit 150 has 1/1000 voltage output terminals intended to be used for output monitoring. The high voltage output of the Power Unit 150 can be checked easily with a multimeter on AC voltage measuring mode. Power Unit 150 is a simple, useful and convenient high voltage power supply for static eliminators.

#### 2.3 Adjustable DC bias voltage output

It is designed to generate DC bias voltage superimposed on AC high voltage output. Generally, under the application of AC voltage, the number of positive and negative ions produced by an ion emitter are different. Therefore, often, there will be residual charge left on an object during static elimination. This residual charge level depends on the high voltage level, temperature and the airflow. Under wide variation of temperature and airflow, this charge unbalance becomes significant. When a static eliminator is used under such variable ambient conditions, ion balance adjustment is indispensable. As Power Unit 150 can generate variable DC bias voltage (-150 to +550V) superimposed on AC high voltage, ion balance adjustment under a variety of operating conditions is possible.

#### 2.4 Fault detection circuit

Power Unit 150 includes a fault detection circuit to turn off the high voltage and inform an operator when there is a failure on high voltage output or cable. The insulation system of a static eliminator is normally exposed to hostile environment and consequently has a finite life. Failure detection circuits are, therefore, important for monitoring processes that have critical static elimination needs. Power Unit 150 is a safe and high performance high voltage power supply.

## Section 3. SPECIFICATIONS

### 3.1 Model Power Unit 150

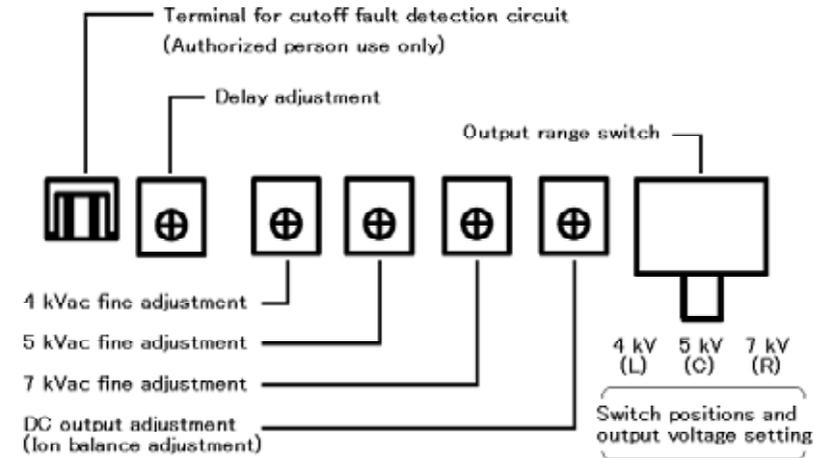
#### 3.1.1 Mechanical specifications

- Dimensions: 126 (W) × 144 (L) × 115 (H) [mm] (includes flanges)  
Refer to a drawing in page 21.
- Weight: Approx. 3.1 kg
- Sheet thickness: 1.2 mm (box metal)
- Color: White, gloss finish
- IP code: 20
- Output terminals: 2 ceramic high voltage connectors for Simco-Ion A3030/A3031 or A3030R/A3031R high voltage connectors
- Others: Main switch, pilot lamp (blue LED), remote ON/OFF and alarm output terminals, voltage output terminals for monitoring the high voltage output, ground terminal, flanges, nameplate (blue), RoHS compliant, CE marking

#### 3.1.2 Electrical specifications

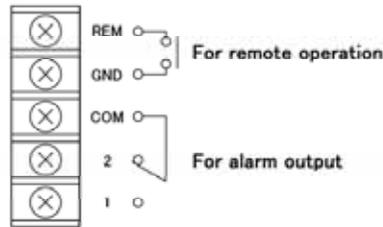
- Input: 24 Vdc +/- 10%, 1.0 A max.
- Input connector: MOLEX 5569-02A1-210  
Suitable connector: Housing 5557-02R-210, terminal 5556-PBTL
- AC output: 3,500 - 7,000 Vac (adjustable), 150 Hz +/- 10 Hz
- DC bias voltage: -150 - +550 Vdc (adjustable, for ion balance control)
- Short circuit current: 5 mA max.
- Maximum Load: See the Table-1 (page 4)
- Fuse: 3.15 A, 125 V, (E67006), on the internal PCB
- AC monitoring output: 1/1000 V +/- 5 % of AC high voltage output  
Fujicon check terminal F6101 (Pin dia.: 2 mm)
- Electrical noise: Adapted to VCCI Class A
- Output setting: By opening the lid, output voltage setting can be changed using an output range switch. The output voltage can be adjusted using an each fine adjustment potentiometer.

| Output  | AC         |            |            | DC            |
|---------|------------|------------|------------|---------------|
| Setting | 4 kV       | 5 kV       | 7 kV       | -150 - +550 V |
| Range   | 3.5-4.2 kV | 4.2-5.2 kV | 6.0-7.2 kV |               |



- Indicator: High brightness blue LED is turned on by the power switch. With the power switch off or the activation of the fault detection circuit, the blue LED is turned off.
- Fault detection circuit: It operates to disconnect the input voltage in case of a fault on the high voltage side and activate a relay contact.
- Operating conditions: - current limit, when over 5 mA of output AC current.  
- voltage limit, when the high voltage falls below approx. 75 % of each setting of rated output voltage.
- Relay contacts: - The contacts are rated for 250 Vac, 0.2 A or 30 Vdc, 2 A.
- | Relay Contact | Main Power switch OFF | Main Power switch ON |          |
|---------------|-----------------------|----------------------|----------|
|               |                       | Normal               | Abnormal |
| 1 - COM       | Open                  | Closed               | Open     |
| 2 - COM       | Closed                | Open                 | Closed   |
- Reset: - Turn the power switch OFF and ON again. More than 6 seconds waiting period for restart operation. When remote operation, the waiting time should be more than 0.1 second.
- Response time: - Variable, HIGH (turn to right end); 50 - 80 ms (Default setting)  
LOW (turn to left end); 250-- 300 ms  
The total time to respond may be affected by the nature of the spark.

Terminals: A 5 terminal block (2 for remote operation and 3 for alarm)  
Fujicon terminal block, F2362AX-5P-CT  
Screws: M3 × 0.5 × 6L, Tightening torque: 0.6 N·m



Remote operation: When power switch is turned off, if the terminals REM and GND are closed by an external relay etc., the unit will be turned ON. If the terminals are open, the unit will be turned OFF. In ON position of the power switch, the remote operation is not possible.

### 3.1.3 Others

Ambient condition: for operation; 0 - 50 °C, 10 - 90% RH (no condensation)  
for storage; -30 - 70 °C, 10 - 95% RH (no condensation)

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

Warranty: **1 year after shipment.**

### 3.2 Switching AC/DC adaptor

Input: 100 - 240 Vac, 47 - 63 Hz (allowable range), 840 mA max., IEC 320 C6 INLET

Output: 24 Vdc +/- 5%, 1.5 A max.

Standard line cord: 125 Vac max. (This cord must be changed to an appropriate cord for 200 Vac line.), 1.8 m long with a 3 prong plug.

Output cord: 1.8 m long with a MOLEX 2P connector, UL 2468 AWG 20.

Safety circuit: Overcurrent protection (output short circuit protection)

Insulation resistance: Input-output 100 MΩ at 500 Vdc

Dielectric strength: Input-output 2 kVac, one minute

Dimensions: 44 (W) × 28 (H) × 96 (L) [mm] (body only)

Weight: Body: 150 g approx., line cord: 160 g approx.

Ambient condition: for operation; 0 - 40 °C, 5 - 95% RH (no condensation)  
for storage; -20 - 65 °C, 5 - 95% RH (no condensation)

Others: RoHS compliant, CE marking, PSE marking, UL60950-1

## Section 4. FAULT DETECTION CIRCUIT

Power Unit 150 includes a fault detection circuit.

### 4.1 Purpose

Static eliminators employ high voltage for the generation of ions that are used to neutralize static charges. The types of fault that might occur in such a high voltage circuit are: i) insulation degradation and failure and ii) accidental short circuit with grounded objects in the vicinity.

Contamination of high voltage insulation causes insulation degradation with time and provides leakage path for current to flow. Excessive leakage current, accidental short circuit with grounded object, arcing -- all these could burn insulation and can, potentially, become fire hazard.

A fault detection circuit interrupts the supply to the primary of the transformer (used in a Power unit) under such abnormal conditions

### 4.2 Operating principle

As the Fig. 1 shows, Power Unit 150 uses an inverter type transformer, the rated secondary open circuit voltage being 3.5 - 7 kVac. One of the two terminals of the secondary winding is grounded and the other terminal provides high voltage output. Abnormally high secondary current would result in significant reduction of the secondary output voltage. A fault detection circuit operates by detecting this and by interrupting the input voltage to the transformer primary.

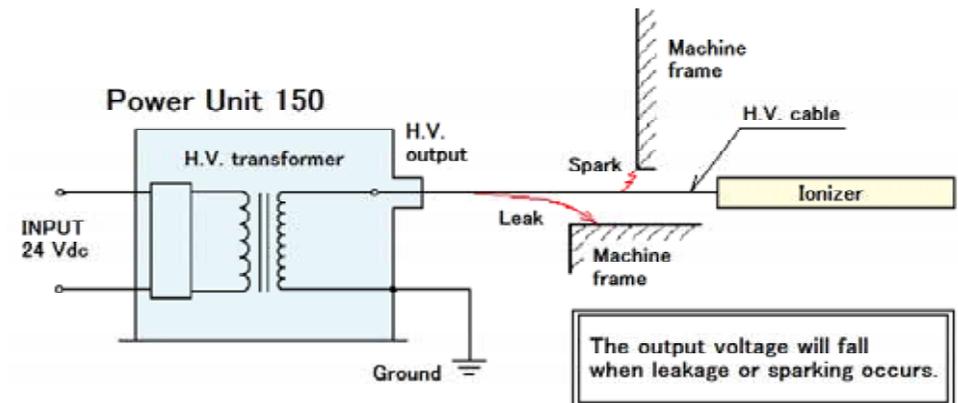


Fig. 1: Abnormal situation of the static eliminator

### 4.3 Fault conditions

The fault detection circuit is activated when the high voltage output falls to around 75 % of the rated value.

In case the fault detection circuit is activated, the high voltage and the indicating lamp are turned off. An auxiliary circuit (optional) is available for warning against abnormal conditions. For resetting, the power switch needs to be turned OFF and then ON again after 6 seconds. During remote operation, the waiting time should be more than 0.1 second. If the fault persists, it operates again.

### CAUTION

- When no high voltage output is available because of the operation of the fault detection circuit, do not operate again without investigating the cause and taking appropriate preventive measure.
- The operation of ionizers and fault detection circuit should be checked periodically by spark test or performance test.

## Section 5. ION BALANCE CIRCUIT

Power Unit 150 is equipped with a circuit to provide DC bias voltage. That can be used for the adjustment of ion balance.

### 5.1 Purpose

Generally, under the application of AC voltage, the number of positive and negative ions produced by an ion emitter are different. Therefore, often, there will be residual charge left on an object during static elimination.

Fig. 2 shows a static voltage decay curve with time during static elimination when ion balance is good. If the number of positive and negative ions are equal, the static charge of both polarity can be eliminated to zero volt. Fig. 3 shows a decay curve when ion balance is bad. The positive charged decay curve and negative charged decay curve are not same. The final ion balance voltage deviates from zero volt.

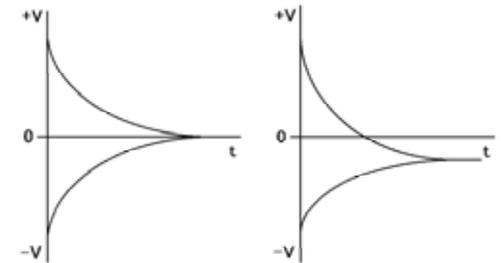


Fig. 2

Fig. 3

In Fig. 3, the ionizer produced too much negative ions.

As Power Unit 150 can generate variable DC bias voltage (-150 to +550V) superimposed on AC high voltage, ion balance adjustment is possible except on some type of ionizers. Table-2, below, indicates where ion balance adjustment is effective.

Table-2: Ionizer models for Power Unit 150

| Ion balance    | Type       | Model                 | Construction                               |
|----------------|------------|-----------------------|--|
| Adjustable     | Static bar | Blue bar              | Resistance connection                      |
|                |            | MF series             | Direct connection or Resistance connection |
|                |            | SS50/A shielded type  | Direct connection                          |
|                | Nozzle     | R36 series            | Resistance connection                      |
|                |            | H shielded type, SFN3 | Direct connection                          |
| Not adjustable | Static bar | MEB-CE                | Condenser coupling                         |
|                | Nozzle     | HSS, HSS-2            |  |
|                |            | TN series             |  |
|                | Gun        | ES                    |  |

### 5.2 Operating principle

The extent of unbalance would depend upon applied high voltage on the emitters, the emitter shape, humidity, airflow etc.

In film, paper and plastic industries, the static problems during manufacturing processes are contamination attraction, attraction or repulsion of sheets and components or electrical shock from charged products etc. In these cases, a good ion balance is not needed. The acceptable offset voltage by an unbalanced ionizer can be tens or several hundreds of volts.

In electronic industries, low offset voltage such as 100 V could breakdown a product. In this case, the static charge should be controlled to very low levels. Therefore, the ion balance adjustment is important.

Generally, higher voltage results the increase of ion producing. With Power Unit 150 the ion balance can be adjusted by adding a desired polarity of DC bias on the AC high voltage output. The wide range of adjustable DC bias voltage can result in good ion balance for many kinds of ionizer and operating conditions.

### 5.3 Operation

AC high voltage and DC bias voltage are turned ON/OFF by the power switch on Power Unit 150.

Before shipment, AC high voltage and DC bias voltage are set to suitable value corresponding to the type of ionizer to be used. No further adjustment is necessary by user. The factory settings for ionizers, operating conditions, AC high voltage levels and DC bias voltages are shown in the Table-3 on page 16.

DC bias voltage should be varied to readjust ion balance when the operating conditions are changed. (ex. different distance between charged object and ionizer, the use compressed air for ionization). For procedure of adjustment, please refer to Section 7.

### ATTENTION

- **With time the ionization condition might change. Periodic check and readjustment of ion balance are recommended.**

## Section 6. INSTALLATION

### WARNING

**Do not install Power Unit 150 in an ambient that contains organic solvents or flammable gases.**

### CAUTION

- **Do not apply input voltage to the Power unit until all ground and high voltage connections have been completed and static eliminating device has been installed.**
- **Please handle it with care; avoid mechanical shocks because of sensitive electronic circuit inside.**
- **Proper grounding of the Power unit enclosure is essential for safe operation of the equipment.**
- **Proper orientation in placing the unit is needed so as to avoid water going into high voltage connection.**

### 6.1 Mounting of the Power units

Power Unit 150 can be easily mounted using the mounting flanges at the base of the unit by four M5 screws. Do not drill the enclosure of the unit. The machine on which static charges are to be eliminated, the static eliminators and the Power units should have common ground connection.

### 6.2 High Voltage Cable and Connectors

Power Unit 150 is designed specifically for use with Simco-Ion static neutralizing equipment with shielded cable. For the details of maximum load, please refer the Table-1 on page 4.

The high voltage cable on the static eliminators may be shipped with a spring loaded male connector at its end. After installing the static eliminator, the spring loaded male connector of the high voltage cable can be inserted in the high voltage female connector of the Power unit and finger tightened (Do not use any tool). Either type A3030, A3031 or A3030R, A3031R (RoHS compliant) high voltage connectors can be used with Power Unit 150. The grounding lead of high voltage shielded cable must be connected to the ground terminal of the unit.

### NOTE:

- **Please consult the instructions for the static eliminating device for information on its proper installation.**
- **If the load exceeds the specified maximum Power Unit 150, neutralizing equipment and high voltage cable may be damaged. Also, if the load is high, the fault detection circuit may activate when turning the power switch ON.**

### 6.3 Alarm Circuitry

Power Unit 150 will signal abnormal conditions by lighting a red lamp. A separate power supply (customer supplied) is needed to use these features. When using an alarm device, connect it to the alarm output terminals located on the side of Power Unit 150. During an abnormal condition, signal closes or opens a relay contact (COM, 1, 2). The maximum rating of the relay contacts are: 250 Vac, 0.2 A or 30 Vdc, 2 A.

See Section 3, SPECIFICATIONS for details.

After switching the Power Unit 150 ON, high voltage output needs several hundred milli-seconds to reach the final value. The relay contact of alarm shows abnormality during this time. Therefore, when checking alarm function using a sequencer, one second time-lag between switch-on and the alarm signal is needed.

### 6.4 Remote operation

Power Unit 150 has the terminals for remote operation. When power switch is turned off, if the terminals REM and GND are closed by an external relay etc., the unit will be turned ON. If the terminals open, the unit will be turned OFF. If power switch is turned ON, the remote operation will be invalid. See Section 3, SPECIFICATIONS for details.

### 6.5 Utility line connection

Power Unit 150 can be connected to an input voltage 24 Vdc +/- 10 %. It is recommended to use an AC/DC adapter provided by Simco-Ion. This adapter has a MOLEX connector 5557-02R-210 at the end of DC cord. This connector cannot be inserted in the opposite direction to prevent mis-connection. Please refer to the drawing on page 21 for the polarities of the input terminals.

The adapter can be connected to an input voltage range of 100 - 240 Vac, 50/60 Hz. Normally, a line cord with a 3-pin plug is provided. It should be plugged into a grounded 3-terminal receptacle for input voltage range 90 -125 Vac. This cord must be changed when connected to 200 Vac line. The line cord for 250 Vac is not supplied by Simco-Ion.

If the AC/DC adapter provided by Simco-Ion is not used, a 24 V +/- 10 %, more than one ampere DC power supply will be required. The DC input connection for Power Unit 150 requires a MOLEX 5557-02R-210 housing and two 5556-PBTL terminals. The connecting leads consist of 2P, AWG 20 (0.5 mm<sup>2</sup>) wires.

An optional DC cord 1.8 m long with a MOLEX connector is available. The red lead should be connected to +24 Vdc. The black lead should be connected to 0 V and ground. If the black lead cannot be connected to ground, a separate lead should be used to ground Power Unit 150 with machine frame.



### CAUTION

- **Proper grounding of the Power unit enclosure is essential for safe operation of the equipment. The resistance to ground must be less than 100 ohms.**

### 6.6 Connection of a multimeter

The high voltage output of Power Unit 150 can be checked easily by connecting an AC voltmeter (multimeter).

Connect the measuring leads to a multimeter set to AC voltage measurement mode. Polarity is not important during AC voltage measurement. Connect other end (check pins) to the monitor terminals of Power Unit 150. The terminals are Fujicon check terminals F6101. The check pin size should be 2 mm diameter.

When the multimeter is in AC voltage measurement mode and the Power Unit 150 is turned ON, the multimeter will display 1/1000 voltage of the high voltage output of the Power Unit 150. The value should be 3.5 to 7 Vac which represents Power Unit 150 output voltage in kVac directly.



### CAUTION

- **The multimeter has to be set to AC voltage measurement mode. Do not apply any voltage to the monitoring terminals of Power Unit 150.**
- **Do not short circuit the monitor terminals to each other or to ground. Wrong connections might damage the Power Unit 150 and the multimeter.**

## Section 7. ADJUSTMENTS

### ATTENTION

- All of adjustment potentiometers and an output range switch are placed inside of the unit to prevent misuse. Adjustments are done by opening the lid. Refer the drawing on page 7 for details.
- Adjustment should be made by an authorized technician.

#### 7.1 Adjustment of DC bias voltage and high voltage AC output

AC and DC output voltage of each Power Unit 150 are adjusted to stated voltages for each type of ionizer at the factory when shipped. Following table shows the ionizer model and the default output voltage for a typical operating condition.

**Table-3: Ionizer model vs. default outputs**

| Type       | Model          | AC Output | DC Output | Distance / Condition           |
|------------|----------------|-----------|-----------|--------------------------------|
| Static Bar | MEB-CE         | 6.8 kVac  | 0 Vdc     | Ion balance cannot be adjusted |
|            | Blue bar R50   | 5.0 kVac  | 90 Vdc    | 100 mm                         |
|            | SS50A shielded | 3.5 kVac  | 190 Vdc   | 100 mm / 0.2 MPa               |
|            | MF-4 (20)      | 4.0 kVac  | 220 Vdc   | 100 mm / 0.2 MPa               |
|            | MF-4 (30)      | 4.0 kVac  | 150 Vdc   | 100 mm / 0.2 MPa               |
|            | MF-4R          | 4.0 kVac  | 270 Vdc   | 100 mm / 50 NL/min.            |
| Air Nozzle | HSS-2          | 6.8 kVac  | 0 Vdc     | Ion balance cannot be adjusted |
|            | R36 series     | 5.0 kVac  | 220 Vdc   | 150 mm / 0.1 MPa               |
|            | H shielded     | 3.6 kVac  | 110 Vdc   | 150 mm / 0.1 MPa               |
|            | TN-2/2R        | 4.0 kVac  | 0 Vdc     | Ion balance cannot be adjusted |
|            | SFN3           | 3.6 kVac  | 0 Vdc     | 100 mm / 0.2 MPa               |
| Air Gun    | ES             | 6.8 kVac  | 0 Vdc     | Ion balance cannot be adjusted |

1 MPa = 10 kgf/cm<sup>2</sup>

MF-4 (20): Emitter spacing is 20 mm. MF-4 (30): Emitter spacing is 30 mm.

In case no air bar is used or when condition of use of ionizer (distance or air pressure) is different from the table, ion balance should be readjusted. A CPM (Charge plate monitor) is required for the adjustment. Follow the procedures below:

- Turn off the power switch of Power Unit 150. Open the lid by undoing two upper side screws.

- Confirm the output range switch is set to proper position for the ionizer. If the AC output for the ionizer is 6.8 kVac in the Table-3, the output range switch should be set to the position of 7 kV (R: right side). If the AC output is 5.0 kVac, it should be set to the position of 5 kV (C: center). Other case, it should be set to the position of 4 kV (L: left side).
- Connect a multimeter to the monitor terminals (1/1000 output terminals) of Power Unit 150 for the confirmation of the high voltage output. Turn the Power Unit 150 on and confirm the AC output voltage. Adjust the fine adjustment potentiometer, if needed. The output voltage has to be properly adjusted for each ionizer. During normal use of any ionizer, there should be no visible spark. If an excessive voltage is applied a spark may occur. Sparking generates electrical noise. Moreover, the life of Power Unit 150 or the ionizer will be shortened considerably.
- Install the CPM plate in the working area in front of ionizer with ion balance mode.
- Check the voltage displayed on the CPM, adjust ion balance (DC bias voltage) of Power Unit 150 with a small screwdriver until the ion balance becomes 0 V.

If CPM is not available, please consult Simco's sales department.

### CAUTION

- Do not raise the output voltage beyond each setting voltage by the output range switch position. The position of 7 kV, the limit output voltage is 7.0 kV. The position of 5 kV, the limit output voltage is 5.0 kV. The position of 4 kV, the limit output voltage is 4.0 kV. Overvoltage may shorten the life of the ionizer and the high voltage cable.

#### 7.2 Delay adjustment for fault detection circuit

The adjustment of delay of the fault detection circuit to act is done by adjusting a potentiometer. It is preset to [HIGH (Fast)] at the factory.

If the fault detection circuit acts frequently with no apparent reason, then adjust the time delay to [LOW (Slow)]. The [LOW] setting might be required, for instance where the utility lines have frequent disturbances.

Turn off the power switch of Power Unit 150. Open the lid by undoing two upper side screws. Rotate the potentiometer of delay adjustment to counterclockwise using a small screwdriver.

In case, the duration of abnormal condition is shorter than the adjusted delay, the fault detection circuit will not be activated.

## Section 8. OPERATION

### 8.1 Start-up

Turn the power switch ON. When in remote operation, close the terminals REM and GND. In this case, the power switch should be off. The pilot lamp, blue LED, which should light up indicates that the static eliminating device is energized and static charge neutralization is occurring. The alarm circuit acts and indicates the normal operation. If a multimeter is used, the meter indicates the output voltage of the Power Unit 150.

### 8.2 Abnormal conditions

When there is a spark over or short circuit on the high voltage side of the Power Unit 150, a fault detection circuit operates to cut off the high voltage and DC bias voltage by disconnecting the input to primary of the transformer. An alarm circuit and/or an emergency light circuit, if used (optional), should be activated. The pilot lamp is turned off indicating that the static eliminator is not energized. The display of the multimeter shows 0 V. Turn the power switch OFF. When remote operation, open the terminals REM and GND.

### 8.3 Alarm switch reset

After finding and correcting the problem, turn on the power switch of Power Unit 150 or close the terminals REM and GND. If an abnormal condition persists, the alarm circuit will be activated again after a delay.

### 8.4 Special situation

#### CAUTION

- **The fault detection circuit will operate improperly and possibly shutdown the static eliminator when there is a large momentary fluctuation in the line voltage either because of an intermittent discharge to ground, or a large capacity motor switching on the same supply circuit.**
- **Wait 6 seconds before turning the power ON again. When remote operation, the waiting time should be more than 0.1 second.**
- **If Power Unit 150 is cycled on and off, the cycle time must be more than five minutes to prevent damage to the unit. In this case, the supply line to the unit should be interlocked with the operation of the fault detection system.**

### 8.5 Power OFF

When the power switch of Power Unit 150 is turned off (when remote operation, the terminals REM and GND is opened), the pilot lamp would also be turned off and the static elimination stops. Switch the Power Unit 150 OFF during prolonged periods of non-use, such as plant shut-down, overnights, weekends etc. This will insure long life for ionizers with optimum ion output.

## Section 9. MAINTENANCE/INSPECTIONS

### 9.1 Maintenance

Power Unit 150 and the AC/DC adapter do not require any special maintenance. It has no replaceable parts, other than common electrical items such as switch, pilot lamp etc.

Periodically check ground connection and proper functions of the pilot lamp (blue LED). The measured resistance between the enclosure of static neutralizing equipment, machine frame and the Power Unit 150 should be less than 100 ohms.

Follow the manual of instructions of the static eliminators for its maintenance.

### 9.2 Fault detection circuit

#### CAUTION

- **When conducting the following test, be certain that no flammable solvents and gases are in the ambient air. Also, switch off any computer or sequencer in the vicinity to protect these against electrical transients and noise.**
- **The test of the fault detection circuit should not be repeated frequently as it causes undue stress on the transformer.**

- a) Turn the power switch ON.
- b) Take a screwdriver with an insulating handle and connect its metal shaft to the common ground with a connecting lead. If the ground connection is no good, the operator might suffer from electrical shock. Insert the metal shaft of the screwdriver to the high voltage connector of the unit until a spark occurs. This would turn off high voltage, DC bias voltage and the pilot lamp.
- c) Remove the screwdriver; turn the power switch off.
- d) After 6 seconds, turn the power switch ON again. The pilot lamp should light up and high voltage output and DC bias voltage should be restored.

### 9.3 Output voltage measurement (AC High Voltage)

It is recommended to connect a multimeter with the monitoring terminals of the Power Unit 150. The procedure is described Section 6 in page 15. Also, an AC high voltage meter or a high impedance (10 giga-ohms) divider can be used for direct measurement by connecting to the high voltage output terminal.

**NOTE: If a low impedance divider is used to measure the output voltage, it would load the transformer; therefore, correct open circuit voltage will not be measured.**

# Section 10. TROUBLESHOOTING

## 10.1 Troubleshooting

| Step | Trouble   | Probable cause   | Countermeasure  |
|------|---|--|---|
| 1    | The pilot lamp does not light or there is no output voltage when the power switch is turned on. | i) The supply voltage has not been switched on.<br>ii) High voltage cable and static neutralizing equipment (ionizer) need cleaning. | Switch on the supply voltage. If the problem continues, the cable and ionizer should be cleaned with a soft cloth or a soft nylon brush. Do not use any solvent or metallic brush. Regular cleaning will maintain a high performance level for a static eliminator.   |
| 2    | Power unit shows abnormal condition even after cleaning.  | High voltage cable or static ionizer may be damaged.   | Turn the power unit off. Disconnect the high voltage connector from the power unit. Test the power unit separately. If it works properly, the high voltage cable or ionizers may need repair or replacement. A power unit with multiple neutralizers may need to be checked with each ionizer separately to locate the source of the problem. |
| 3    | Even after following through steps 1 and 2, the power unit does not work.                       | The power unit may be damaged.   | Repair or replacement may be necessary. Contact Simco Japan, Inc. or our agent with the serial number of the power unit and a description of the problem.   |

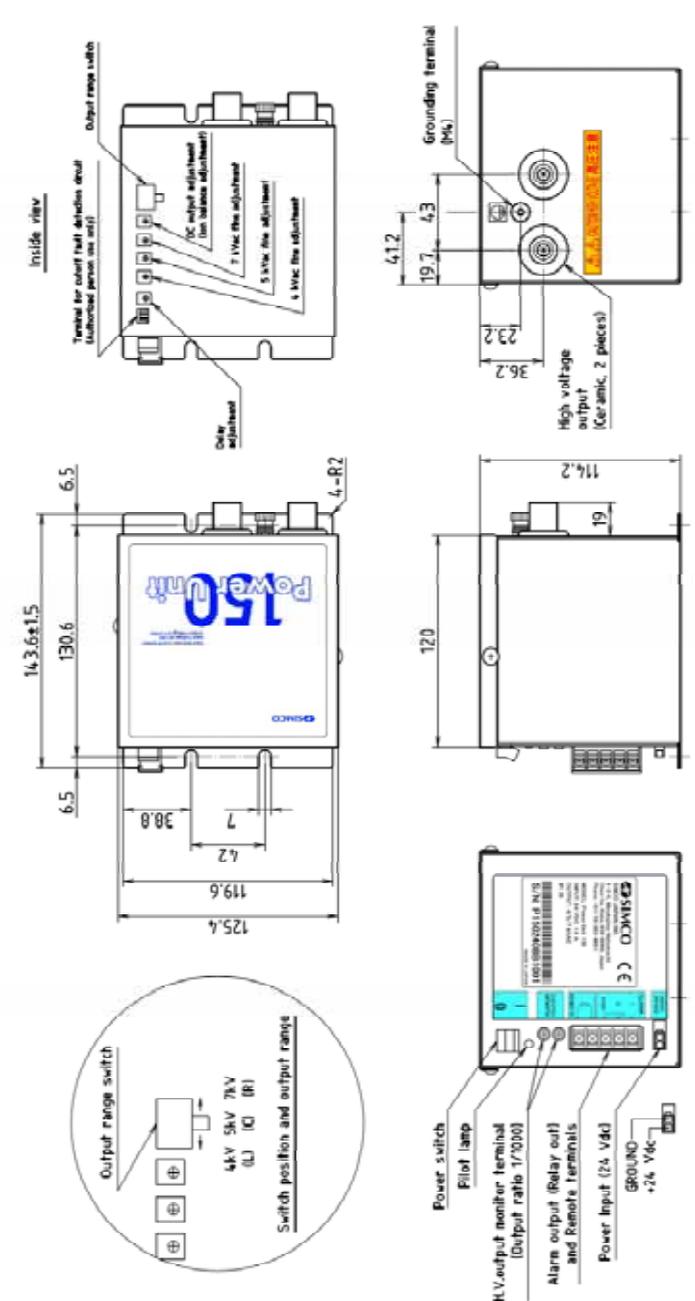
## 10.2 Abnormal conditions

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

- a) It is impossible to adjust the output voltage correctly
- b) Any persistent visible spark
- c) Change in shape of the power unit or the AC/DC adapter
- d) Any abnormal sound, smell or high temperature

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

# POWER UNIT 150



Notes:  
 - During adjustment of AC output voltage, the Load (Static bars or Nozzles etc.) should be connected to the output terminals and then adjust the high voltage output by confirming voltage using monitor terminals by AC voltmeter.  
 - During adjustment of DC output voltage for ion balance adjustment, use a CPM to confirm offset voltage at the test position.

Paint: White, gloss finish  
**UNIT; mm**

## 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  | <b><i>Simco-Ion Power Supply<br/>Model Power Unit 150</i></b>      |                 |                                       |
| Delivery Date | Product's serial number contains information on the shipping date. | Warranty Period | <b><i>A one year<br/>Warranty</i></b> |



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