



# Guardian CR2000 Overhead Ionizing Air Blower

*User's Manual*



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## **SECTION 1: Description**

Simco-Ion's Guardian CR2000 is an overhead ionizing air blower designed specifically for use with sensitive electronic components in cleanroom applications where electrostatic discharge (ESD) is a concern. The Guardian CR2000 Ionizing Air Blower produces an airflow that is rich in positive and negative air ions. Directing the airflow onto an object that has a static electricity charge will quickly neutralize the charge. If the object has a negative static charge, it will attract positive ions from the airflow. Conversely, if the object has a positive static charge, it will attract negative ions from the airflow. The volume of airflow is controlled by variable speed control of the fans, which provides a wide range of airflow settings. The airflow can also be locked into high speed using the key switch to provide assurance of the maximum possible performance. Airflow is directed through ionizing elements which produce air ions. These ionizing elements are shrouded by ducts to eliminate airflow within the unit's chassis. The ionizing elements are energized with a low current, high voltage signal. The system contains current limiting resistors which enhances ionization stability and provides for safety. The signal is applied to a circular arrangement of ion emitters which results in an alternating polarity ion field. The airflow exiting the Guardian CR2000 carries these ions to the work area to provide static neutralization.

New design features enhance both short-term and long-term ion balance stability. A transparent duct extends from each fan output. These "ion shields" prevent ion loss to the unit's chassis and preserve ion output and balance. The Guardian CR2000 features a balancing circuit. The output from the monitoring circuit is indicated with two bicolor LEDs on the face of the unit. The Guardian CR2000 also offers built-in emitter point cleaners as a standard feature to make it easy to maintain optimum performance. To ensure cleanroom compatibility, the Guardian CR2000 uses specially chosen components which minimize the risk of particulation. All fans feature a specially designed bearing system and use silicone-free lubricants. Fans are particle tested to Class 10 cleanroom particle limits. Airflow surfaces are free of silicone materials to further minimize the risk of contamination.

## **SECTION 2: Safety**

- Read instruction manual before installing or operating device.
- This unit is equipped with a 3-prong grounding plug and must be plugged into a 3-terminal grounded receptacle. Do not defeat electrical ground by modifying plug or using an ungrounded 3-prong adapter. If an extension cord is necessary, use only a 3-wire extension cord that provides grounding.
- Do not insert objects through intake or outlet grille.
- Do not operate unit in flammable or explosive atmospheres.
- Internal repairs or servicing must be done by qualified personnel.

## **SECTION 3: Features**

- Rapidly neutralizes static charges
- Covers an extended area with ionized air
- Inherently balanced ion output
- Built-in ion emitter point cleaner
- Ion output and balance are monitored
- Variable speed fans with wide range of airflow
- Keyswitch for performance in critical applications

## SECTION 4: Specifications

3-Fan Unit Part No.:	4008630	4008705	4008704
2-Fan Unit Part No.:	4008729	4008730	4008731
Line Voltage:	120 VAC, 50/60 Hz	230 VAC, 50/60 Hz	100 VAC, 50/60 Hz
Max. Current Draw:	0.2 Amp (2-fan) 0.3 Amp (3-fan)	0.1 Amp (2-fan) 0.15 Amp (3-fan)	0.2 Amp (2-fan) 0.3 Amp (3-fan)
Air Volume Output:			
Fan Speed	Flow (3-fan)	Flow (2-fan)	
Low	135 CFM (60 l/s)	90 CFM (40 l/s)	
High	270 CFM (120 l/s)	180 CFM (80 l/s)	
Air Velocity:			
Fan Speed	Velocity at 18" (46 cm)	Velocity at 24" (61cm)	
Low	200 FPM (1.0 m/s)	150 FPM (.75 m/s)	
High	400 FPM (2.0 m/s)	300 FPM (1.5 m/s)	
Air Flow Characteristics:	3-fan: 2' x 4' Area Coverage; 2-fan: 2' x 3' Area Coverage		
Operating Temperature:	32°F (0°C) to 122°F (50°C)		
Ozone:	Unit run in closed, 1000-cubic-ft chamber. Ozone equilibrium concentration due to unit: 0.02 ppm		
Audible Noise:			
Fan Speed			
Low	48 dB(A) Measured 2 ft. (61cm) from unit		
High	58 dB(A) Measured 2 ft. (61cm) from unit		
Enclosure:	Aluminum		
Finish:	Gloss Polyester Enamel		
Mounting Hardware:	Stainless Steel		
Weight:	3-fan: 15 lbs. (6.8 kg.); 2-fan: 12 lbs. (5.5 kg)		
Size:	3-fan: 42-3/4" W x 4" H x 6-3/4" D (109 cm W x 10 cm H x 17 cm D)		
	2-fan: 31-3/4" W x 4" H x 6-3/4" D (81 cm W x 10 cm H x 17 cm D)		

# SECTION 5: Installation

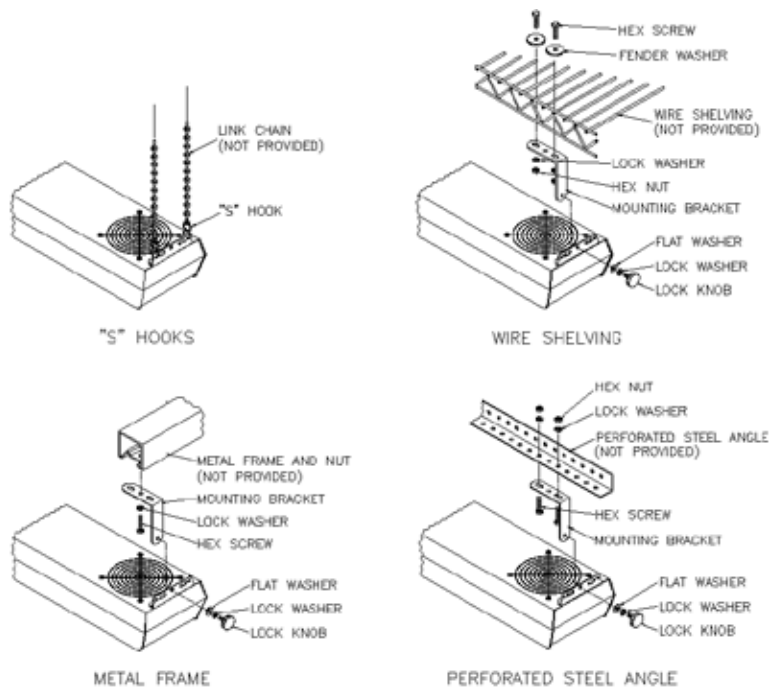
## Location

The Guardian CR2000 should be located 20 to 30 inches above the work surface, centered directly above the critical area. Other than the vertical unidirectional airflow, there should be no cross-flow of air between unit and work surface.

## Mounting

The Guardian CR2000 may be mounted using adjustable mounting brackets or "S" hooks provided. The mounting brackets are designed to secure to a variety of surfaces such as: perforated steel angle, Unistrut® metal framing and provide permanent mounting on Metro® wire shelving. First, install hanger brackets to top of Guardian CR2000 chassis using a Philips head screwdriver. Then, mount brackets as shown in illustration. When using lock knobs, place a lock washer and flat washer on the lock knobs and secure unit using center holes on mounting tabs.

Guardian CR2000 Mounting Options



## Standard Installation

The "S" hooks provide for chain mounting or mounting on wire shelving. Install the Guardian CR2000 as shown in illustration using outer holes on hanger brackets. Chain and mounting hardware (not supplied) must have a minimum safe working load rating of 20 lbs. (10 kg.). Close "S" hooks to secure unit.

## **Electrical**

The Guardian CR2000 is equipped with an IEC320 power inlet and outlet. An appropriate line cord is included in the packaging. The unit must be grounded for safe operation. Plug unit into a standard 3-terminal grounded receptacle with line voltage and frequency as listed on serial label of unit. If an extension cord is necessary, use only a properly rated 3-wire extension cord that provides grounding.

**NOTE:** The 100 and 120VAC Guardian CR2000 models are equipped with an internal self-resetting fuse to protect the high-voltage transformer in case the wrong line voltage (230 VAC) is applied. If a 100 or 120 VAC Guardian CR2000 is connected to 230 VAC, the fans will continue to run, but both Output and Balance indicator lights will turn red. If this occurs, turn off the unit and wait for one minute to allow the fuse to reset, and then connect the CR2000 to the proper line voltage.

## **Optional Daisy Chaining**

If desired, power to units may be daisy chained using the IEC320 power outlet and optional daisy chain power cord. Up to 10 units may be daisy chained.



## **SECTION 6: Operation**

Activate the Guardian CR2000 by turning the keyswitch out of the OFF position. In the ADJUSTABLE FAN SPEED position, the airflow can be adjusted by using a flat-blade screwdriver to turn the recessed FAN SPEED control. In the HIGH FAN SPEED position, the airflow is fixed at maximum. The key can be removed with the keyswitch in any position. During operation, the ION OUTPUT and ION BALANCE indicators will illuminate green to verify the presence of balanced, ionized air. The time required to neutralize a static charge on an item in the air stream depends upon fan speed. Setting a higher fan speed reduces time required for neutralization.

When locating the Guardian CR2000, the ionized air stream should cover as much of the work area as possible. The constant flow of ionized air will maintain items such as work surfaces, tools, materials and components at very low charge potentials. Charged items introduced into work area will be neutralized.

## SECTION 7: Maintenance

The Guardian CR2000 has been designed for minimal maintenance. The only regular maintenance suggested is emitter point cleaning. Emitter point cleaning takes only moments with the built-in point cleaners. The Guardian CR2000 contains a balancing circuit that is inherently self-balancing. This circuit compensates for changes that would otherwise affect ion balance. Scheduled checking of ion output and balance should be considered to assure quality audit requirements.

### Emitter Cleaning

To clean ion emitter points: simply rotate point cleaner knob located at center of each outlet clockwise to the stop (approximately one turn) and release. The spring-loaded point cleaning brush will return to its parking spot. Remove or protect particulate-sensitive product during point cleaning.

Recommended frequency of cleaning is once a week.

### Ion Output Check

A charge plate monitor (CPM) such as Simco-Ion's EA-4 is required to test ion output. A convenience ground is located near the power outlet for instrument grounding; it accepts a standard banana plug. If a CPM is not available, a periodic verification instrument may be used to verify ion output.

### CAUTION ! ELECTRICAL SHOCK HAZARD !

- *Do not insert objects through intake or outlet grille.*
- *Do not try to verify operation of unit by drawing a spark from an ion emitter point. The design of the balancing circuit makes the "spark test" inconclusive.*

### Ion Balance Check

A charged plate monitor (CPM) such as Simco-Ion's EA-4 is required to test the unit for ion balance. A convenience ground is located near the power outlet for instrument grounding; it accepts a standard banana plug. Allow the unit to warm up for one hour to ensure the most accurate offset voltage measurement. Offset voltage should be measured and checked against the specified ion balance of 0+/-5 volts.

### Calibration

The Guardian CR2000 ion output is inherently balanced by design, so there are no calibration adjustments. If, after checking ion balance as outlined above, an unbalance or offset voltage exists in excess of 0+/- 5 volts, clean the emitters. If the problem persists, contact Simco-Ion Customer Service at (800) 538-0750 (USA) or (215) 997-0590.

## SECTION 8: Replacement Parts

Part Number	Description
4630204	H.V. Transformer, 100 VAC
4630195	H.V. Transformer, 120 VAC
4630197	H.V. Transformer, 230 VAC
4630201	LV Power Supply
4104515	Outlet Grille (includes point cleaner)
4107193	Fan, Center
4107194	Fan, Power Out End
4107195	Fan, Power In End (3-fan model only)
4106386	Ionizer Assembly
5050767	Line Cord Kit, 120 VAC, North American Plug (5-15P)
5050964*	Line Cord Kit, 230 VAC, North American Plug (6-15P)
5050768	Line Cord Kit, 230 VAC, Continental European Plug (CEE7)
5050784	Line Cord Kit, 230 VAC, British Standard Plug (BS1363)
4611018	Fuse, 10A, for British Standard Plug
4611020	Keyswitch
4670900	Lock Knob (2 required)
4710335	Inlet Grill
5050775	Mounting Kit (includes lock knobs)
5050774	Hanger Bracket Kit
5050542*	Daisy Chain Power Cord, 10' (3m)
5050543*	Hanging Chain Kit

\* Optional Item

## **SECTION 9: Warranty**

Simco-Ion warrants its products to be free of defects in components, workmanship, or materials for a period of two years from date of purchase. This warranty does not apply to any physical or electrical damage caused by misuse, abuse or negligence (such as any modifications made to the unit or service work done by any other than Simco-Ion authorized technicians). Any unit with altered or removed serial number is ineligible for warranty.

Simco-Ion will not be liable for loss or damage due directly or indirectly to an occurrence or use for which the product is not designed or intended. In no event shall Simco-Ion be liable for incidental or consequential damages except where state or regional laws override.

This warranty extends to the original purchaser and is not transferable. No person, agent, distributor, dealer or company is authorized to change, modify, or amend the terms of this warranty in any manner whatsoever.

All products returned must have an "RA" (Return Authorization) number regardless of warranty status. Call Simco-Ion for an assigned RA number.

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