



An ITW Company

IONIZATION SOLUTIONS



# **Ionizing Air Gun**

**Top Gun™**

User's Manual

# About Simco-Ion

Simco-Ion develops, manufactures, and markets system solutions to manage electrostatic charge. As the world's largest provider of electrostatics management products and services, Simco-Ion improves its customers' business results by providing a total solution to their electrostatic discharge and electromagnetic interference challenges. Simco-Ion Technology Group is a division of Illinois Tool Works (ITW), located in Alameda, California. For more information about Simco-Ion visit [www.simco-ion.com](http://www.simco-ion.com) or call +1 800-367-2452. Simco-Ion is ISO 9001-2008 certified.

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# Important Safety Information



Carefully read the following safety information before installing or operating the equipment. Failure to follow these safety warnings could result in damage to your ionization system and/or voiding the product warranty.

- ☒ Always wear safety glasses when operating blow-off gun.
- ☒ Do not operate unit in excess of specifications. This product is supplied with a 3-prong grounding plug, which must be inserted in an appropriate, properly wired and grounded receptacle. Do not defeat the electrical ground. For safety, the use of extension cords is not recommended.
- ☒ Do not operate unit in flammable or explosive atmospheres. Poorly maintained Ionizers could produce minuscule electric arcs along the emitter. This may cause detonation in an explosive environment.
- ☒ Do not operate unit in wet environment.
- ☒ Do not operate without airflow. Lack of airflow may cause internal overheating, component damage and/or failure.
- ☒ Do not allow filter-nozzle to contact alcohols or glycols.
- ☒ There are no user-replaceable parts inside this blow-off gun other than the filter-nozzle and fuse. Any unauthorized service will void the warranty and may result in additional repair charges. Contact your local Simco-Ion representative if the blow-off gun requires service or repair.

# Informations de Sécurité Importantes



Lisez attentivement les consignes de sécurité suivantes avant d'installer ou d'utiliser l'équipement. Le non-respect de ces avertissements peut entraîner des dommages à votre système d'ionisation et/ou d'annuler la garantie du produit.

- ☒ Toujours porter des lunettes de sécurité lors de l'utilisation purge pistolet.
- ☒ Ne pas faire fonctionner l'appareil au-delà des spécifications.
- ☒ Ce produit est fourni avec un 3-broches fiche de mise à la terre, qui doit être insérée dans un accès approprié et correctement câblé et mis à la terre prise. Ne pas défaire la mise à la terre électrique. Pour des raisons de sécurité, l'utilisation de cordons d'extension n'est pas recommandée.
- ☒ Ne pas faire fonctionner l'unité dans des atmosphères explosives ou inflammables. Ioniseurs mal entretenues pourraient produire des arcs électriques minuscules long de l'émetteur. Cela peut provoquer une détonation dans un environnement explosif.
- ☒ Ne faites pas marcher d'unité dans l'environnement mouillé.
- ☒ Ne pas faire fonctionner sans flux d'air. L'absence de débit d'air peut provoquer une surchauffe en interne, des dommages au composant et / ou l'échec.
- ☒ Ne pas laisser filtre buse Contact alcools ou des glycols.
- ☒ Il n'y a pas de pièces remplaçables par l'utilisateur à l'intérieur de ce pistolet de soufflage autres que le filtre-buse et le fusible. Toute réparation non autorisée annule la garantie et peut entraîner des frais de réparation supplémentaires. Contactez votre représentant Simco-Ion locale si le pistolet de soufflage nécessite maintenance ou de réparation

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# 1

## Description

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- 1.1 Top Gun Ionizing Air Gun
- 1.2 Air Gun Assembly
- 1.3 Power Unit Assembly

# 1.1 Top Gun Ionizing Air Gun

Simco-Ion's Top Gun Ionizing Air Gun combines air ionization with a forceful compressed air blast in a convenient hand held gun. Top Gun provides the ability to clean and neutralize electrostatically charged items; neutralizing the charges also prevents re-attraction of the particulate. Top Gun also allows for neutralization of charges that may damage static sensitive components by electrical overstress or electrostatic discharge (EOS/ESD).



Figure 1. Top Gun Ionizing Air Gun with Sidekick

## 1.2 Air Gun Assembly

Simco-Ion's Top Gun is an ionizing air gun that produces an intense air flow rich in both positive and negative air ions. Directing the air flow on an item that has a static electricity charge will neutralize the charge and clean the item. It is ideal for cleaning items that have developed a static charge due to handling or fabricating processes. If the item has a negative static charge, it will draw positive ions from the air flow. If the item has a positive static charge, it will draw negative ions from the air flow. The air ions are attracted to the oppositely charged item thereby neutralizing the static charge on the item.

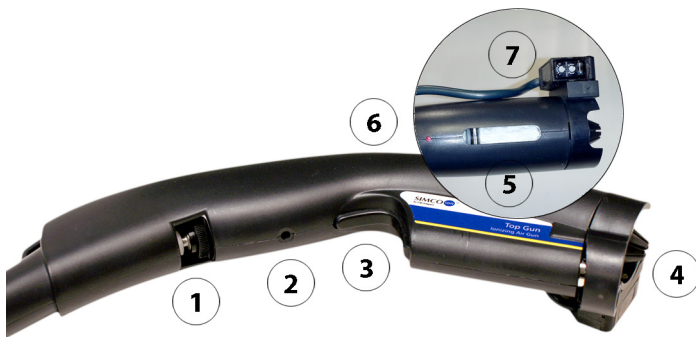


Figure 2. Top Gun Air Gun

1. Flow Control Knob
2. Ion Balance Adjustment
3. Trigger Switch
4. Ion Balance Reference Ring
5. Filter
6. Bi-Level LED
7. Optical Sensor (optional)

Top Gun uses low current, high voltage to energize an ionizing cartridge located just beneath the filter-nozzle. In this position, ionized air from the cartridge is routed into the air flow from the nozzle. The transformer that provides power for the cartridge is located in the power unit along with the solenoid and control circuit. This makes the gun as light as possible. Ion balance is controlled by



a reference ring on the front of the ionizing cartridge. Adjustment of ion balance can be accomplished at the gun.

Top Gun uses a light touch trigger for operation. Pressing the trigger activates a control circuit which operates the air flow solenoid and the low current, high voltage transformer, which are both located in the power unit. A bi-level LED in the gun indicates stand-by/operation status.

## 1.3 Power Unit Assembly

Top Gun can use clean dry compressed air, nitrogen or carbon dioxide at pressures up to 100 psi. Compressed gas is connected to a power unit that contains a solenoid to turn gas flow on and off. High quality polyurethane tubing conducts the gas to the gun. At the gun, flow is controlled from a whisper to a blast by an integral needle valve using the gun control knob. The compressed gas is filtered just prior to leaving the gun in an integrated, replaceable filter-nozzle. The nozzle has been carefully designed to yield a forceful blast while providing the lowest possible noise levels.



Figure 3. Top Gun Power Unit

1. Ion Balance Adjust
2. Remote Control/Footswitch/Optical Sensor Connector
3. Power Cord Connector with Fuse Drawer
4. Mounting Hole Flange
5. Compressed Air Connector
6. Top Gun Cable/Hose Connector



# 2

## Installation

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2.1 Mounting the Power Unit

2.2 Compressed Air & Line Voltage Connections

2.3 Mounting the Gun Hanger

2.4 Optional Remote Control Connection

## 2.1 Mounting the Power Unit

The power unit can be mounted on any convenient surface such as a wall or work bench leg using the mounting flanges. The rear flanges have a mounting hole pattern that will match a variety of pre-punched holes often found on work bench legs or perforated angle stock. If mounted in a convenient location, with power and air connections facing down, the power unit itself can be used as a hanger for the blow-off gun cable. The front flange is designed to retain the coiled gun cable.

## **2.2 Compressed Air & Line Voltage Connections**

### **Compressed Air Connection**

Compressed air, nitrogen or carbon dioxide is supplied to the power unit through a 1/4" NPT female connector. The connector contains a screen to stop large debris from entering the unit. Do not remove this connector. Support the connector with a wrench while installing the user supplied compressed air fitting. Connect the compressed air using appropriate tubing and fittings, the flow diameter of the tubing and fittings should not be less than 3/16" (4 mm). If tubing or fittings with inadequate flow diameter are used, performance will be reduced. The compressed air must be clean, dry and oil free. The maximum allowable input pressure is 100 psi (7 bar). Use of an external pressure regulator and filter / dryer is recommended.

### **Power Connection**

Top Gun accepts AC input of 120 VAC or 230 VAC 50/60 Hz single phase. Top Gun must be grounded for safe and proper operation. Top Gun is available with different line cords to meet the main power connection plug requirements in many areas of the world. Connect the supplied power cord to an appropriate 3-terminal grounded AC power receptacle.

## 2.3 Mounting the Gun Hanger

The gun hanger can be mounted on any convenient surface such as a wall, side of a table top or work bench leg. The hanger can also be mounted on the front of the power unit using the pre-punched holes. Secure hanger with screws and washers:



Figure 4. Top Gun Air Gun Hanger

## 2.4 Optional Remote Control Connection



### CAUTION! ELECTRICAL SHOCK HAZARD

Conductors carrying AC power line voltage and high voltage are exposed when covers are off and power is connected.

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### PRUDENCE! RISQUE DE CHOC ÉLECTRIQUE

Conducteurs transportant AC le courant secteur puissance et haute tension sont exposés lorsque les couvertures sont désactivées et la puissance est reliée.

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The power unit is equipped for remote actuation of airflow and ionization. If remote actuation is required, the connection must be done by qualified service personnel. **Disconnect line voltage and compressed air from power unit.** Remove cover screws and open chassis to expose power unit circuit board. Remove the knock-out plug near the power and air connections. Install an appropriate strain relief with cable or conduit. The remote control will actuate on contact closure, the switch or relay must be rated for 100 volts DC and be isolated from ground. Connect wiring from switch or relay to the two 1/4" x 0.032" tabs on circuit board (J4 & J5) using insulated quick disconnects. Close chassis and replace cover screws. Note: the bi-level LED in the gun will remain at stand-by status when the remote control is used.



### CAUTION! ELECTRICAL SHOCK HAZARD!

Remote control circuit uses approximately 100 VDC.

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### PRUDENCE! RISQUE DE CHOC ÉLECTRIQUE

Circuit de commande à distance utilise environ 100 VDC.

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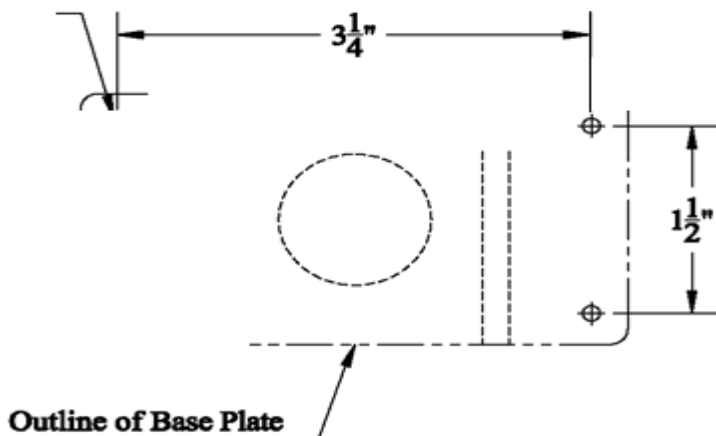
## 2.5 Top Gun with Sidekick

If you ordered your Top Gun with Sidekick, then you have also received the flexible semi-rigid neck stand we call Sidekick along with a footswitch.



Figure 5. Top Gun Ionizing Air Gun with Sidekick

The Sidekick flexible stand may be mounted onto any flat benchtop or wall surface. Position the nozzle at the desired location, typically 2" to 12" away from the object to be neutralized and cleaned. Secure through the attached metal "U" base with a combination of #8-32, or equal size, screw/ washer/ nut hardware (mounting hardware is not provided). You can use the following dimensions as a guide for mounting Sidekick to your surface. Screw holes should be 1/8 inch diameter.



Not to scale.



The nozzle and cable must be protected from impact with moving machine components.



La buse et le câble doit être protégé des impacts avec déplacement composants de la machine.

# 3

## Operation

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3.1 Performance

3.2 Using Top Gun

3.3 Using the Sidekick Footswitch

3.4 Using the Optional Optical Sensor

## 3.1 Performance

Top Gun reduces a static charge of  $\pm 1000$  V down to 100V in less than 1.3 second at a distance of six inches (15 cm) using 30-psi air pressure. Discharge times vary upon air pressure used. Reference the ESD Association ANSI/ESD Standard STM3.1-2006 for test procedure. Balance is within  $\pm 15$  V of zero at a distance of six inches.

## 3.2 Using Top Gun

Hold the nozzle of Top Gun at the desired distance (typically 2 to 12 inches from object to be cleaned) and press trigger to activate air flow and ionization. Use a back and forth motion to clean object, the ionization will neutralize any static charges.

When the trigger is pressed, the LED on gun will increase in intensity indicating operation of the electrical circuitry. The LED is normally illuminated at a reduced intensity to indicate the gun is ready for operation.

The air flow can be set as desired using the flow control knob in the gun handle. With full pressure applied to the power unit, the flow can be controlled from a whisper to a blast with the flow control knob.



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This gun complies with the Occupational Safety and Health Act (OSHA), 29 CFR ch. XVII, Part 1910.242B, entitled "Compressed air used for cleaning". This part reads "Compressed air shall not be used for cleaning purposes except where reduced to less than 30 psi and then only with effective chip guarding and personal protective equipment". The gun complies with the air pressure limit through pressure relief slots in the nozzle; however, effective chip guarding and personnel protective equipment must be provided by the user.

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Occupational Safety and Health Act (OSHA), 29 CFR ch. XVII, Part 1910.95, entitled "Occupational noise exposure" specifies a maximum permissible noise exposure of 3 hours per day at 97 dB. At maximum pressure the gun produces a noise level of 97 dB; therefore, wear hearing protectors if the Top Gun is operated continuously for more than three hours per day.

## **3.3 Using the Sidekick Footswitch**

If you have ordered Top Gun with Sidekick, then you have also received the footswitch. The switch connects to the power supply and when depressed, activates both airflow and power to the ion emitter assembly. A red LED on the nozzle indicates power.

## 3.4 Using the Optional Optical Sensor

For automated assembly operation, Top Gun may be ordered with an infrared Optical Sensor. The Optical Sensor automatically activates Top Gun when an object is in range. The Optical Sensor has an "adjustable range" from 1-30 inches.

Plug the sensor cable into the power unit (if not already done so out of the shipping carton). To use the Optical Sensor, simply pass or hold an object to be ionized in front of Top Gun. Top Gun (orange LED is lit) will trigger and stay on until the object is removed from in front of the sensor. The green LED is lit when the optical sensor is on. The lower dial should be set to the "L" position (on the Light reflection). This triggers Top Gun when an object passes in front of the sensor. If the lower dial is set to the "D" position (for Dark), then the sensor will trigger Top Gun (orange LED is lit) if the object is removed in front of the nozzle. If desired, the top dial may be adjusted to change the sensitivity of the sensor (min to max).

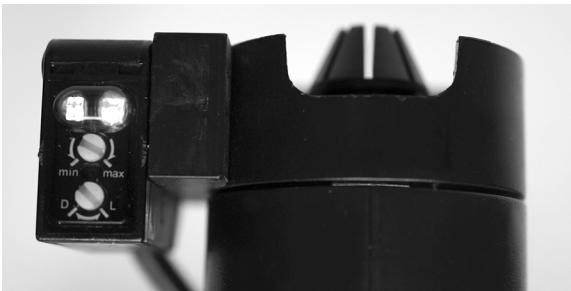


Figure 6. Top Gun with Optical Sensor

# 4

## Maintenance

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- 4.1 Maintenance Requirements
- 4.2 Emitter Cleaning & Inspection
- 4.3 Filter-Nozzle Replacement
- 4.4 Balance & Ion Output Test
- 4.5 Replacing the Electrical Safety Fuse



## 4.1 Maintenance Requirements

Top Gun requires very little maintenance. Occasional cleaning of the case and emitter points and periodic replacement of the air filter is all that is required. Always be sure to protect all components from liquids and corrosive chemicals and avoid dropping the gun on hard surfaces. Carefully follow these maintenance instructions.



Disconnect power and air supplies before cleaning or replacing components.

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Débranchez le cordon d'alimentation et alimentations en air avant le nettoyage ou le remplacement de composants.

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### Recommended Cleaning Materials

- Cleanroom-compatible cleaning cloths (polyester cloth is recommended)
- Cleanroom-compatible cloth swabs
- Cleaning solution of 50% IPA (electronic-grade isopropyl alcohol)/50% de-ionized water or Simco-Ion's Emitter Point Cleaner (#22-1000)

## 4.2 Emitter Cleaning & Inspection

The typical ion emitter point cleaning interval is one month, depending on conditions. The need for point cleaning is indicated by an apparent lack of sharpness at the point tip caused by debris buildup.

The ion emitter point is located in the center of ionizing cartridge at front of gun, just beneath the nozzle. Disconnect line voltage from power unit. Carefully clean the point using a cotton or foam swab lightly moistened with IPA solution. Be sure not to leave any cotton fibers on the point if a cotton swab is used. Allow the point to dry before using Top Gun. The point should be sharp and straight, not bent or otherwise damaged for proper operation.

## 4.3 Filter-Nozzle Replacement

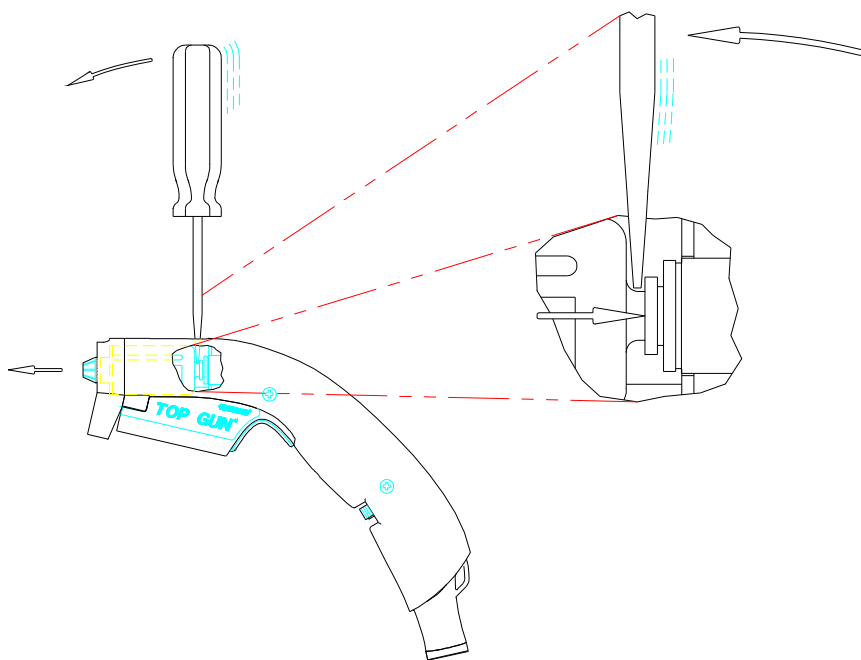
The compressed air filter uses a special filter media that changes color as contaminants are trapped. When the filter media changes to a red color or air flow is restricted, filter-nozzle replacement is indicated.



Figure 7. Top Gun Replacement Filter

Simco-Ion offers two types of replacement filters for Top Gun. The standard filter is 99.97% coalescing retention of 0.3 to 0.6 micron aerosols and 0.3 particulates. The filter has been chosen for the best combination of filtering efficiency and allowable airflow. A premium replacement filter is also available and has a 99.99% coalescing retention and 0.01 micron particles (a greater restriction of airflow, thus slower discharge times). See Section 5.2 Parts and Accessories for ordering part numbers.

Disconnect line voltage from power unit and shut off compressed air. Use a flat blade screwdriver with a blade width approximately 3/16" (5 mm) to release the filter-nozzle. Insert the screwdriver through filter view slot at top of gun, behind the back of the filter. Push the handle of screwdriver forward with a gentle "prying" motion. This will depress the lock collar behind the filter to release filter, while ejecting the filter-nozzle out the front of the gun.



If the filter does not release, grasp the nozzle and rotate the filter as far as it will easily turn. Insert screwdriver and use gentle “prying” motion to free lock collar. Be very careful not to damage the chassis of Top Gun while using this procedure to replace the filter.



It may be necessary to repeat the above steps, turning filter in the opposite direction to release a jammed lock collar. It may also be necessary to assist the screwdriver with ejecting the filter by grasping and pulling on the nozzle while depressing the lock collar with the screwdriver.

Install a new nozzle-filter by pushing it into the filter chamber until it stops.

## 4.4 Balance & Ion Output Test

Ion balance (offset voltage) and ion output (discharge time) are measured using a charge plate monitor such as the Simco-Ion Model 280A Charged Plate Monitor. The standard for this test procedure is ANSI/ESD STM3.1. The typical testing interval is six months. Inspect air filter and clean the ion emitter point before testing.

### Ion Balance

Position nozzle of gun 2" (50 mm) from center of sensing plate on charged plate monitor. Set-up charge plate monitor to measure ion balance according to the manufacturer's instructions. Activate gun by pressing trigger, adjust input air pressure to 50 psi (3.5 bar) and fully open flow control knob in gun handle. The ion balance potentiometer is just beneath the trigger on the gun, adjust it with a standard trim pot tool or insulated screwdriver. Allow ion balance reading to stabilize and adjust ion balance if necessary. If ion balance cannot be adjusted to zero, the ion balance offset may need to be adjusted.



### Ion Balance Offset

Center ion balance potentiometer on the gun. Activate gun by pressing trigger. The ion balance offset potentiometer is accessed through a hole on the side of the power unit, adjust it with a standard trim pot tool or insulated screwdriver. Adjust the ion balance offset potentiometer for an ion balance as close to zero as possible. It may be necessary to adjust the ion balance potentiometer on the gun to achieve an ion balance of zero.



### Ion Output

Position nozzle of gun 2" (50 mm) from center of sensing plate on charged plate monitor. Set-up charged plate monitor to measure discharge time according to the manufacturer's instructions. Activate gun by pressing trigger, adjust input air pressure to 50 psi

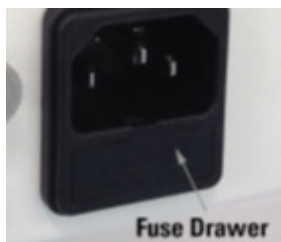
(3.5 bar) and fully open flow control knob in gun handle. Perform positive and negative discharge time tests (1000 to 100V) and average the results. Check results against data in Section 3.1 Performance.

If a charged plate monitor is not available, you can use a hand-held fieldmeter such as the Simco-Ion FMX-004 or Model 775 to check ion output using the following procedure:

1. Charge a piece of plastic by rubbing it with cloth until a static charge can be read with the meter.
2. Adjust air pressure to 50 psi (3.5 bar) and fully open the flow control knob in the gun handle.
3. Activate the gun and blow air on the plastic at 2" (50 mm) for 2 seconds.
4. Remove the plastic from the ionized air stream and measure the static charge. The plastic should be neutralized.

## 4.5 Replacing the Electrical Safety Fuse

Top Gun is provided with a 250V, Time-lag, 5 x 20 mm fuse located in a fuse drawer on the power inlet module.



**CAUTION!** Turn OFF Top Gun and disconnect it from power before attempting to access the fuse drawer.

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**ATTENTION:** Désactiver le modèle Top Gun et débranchez-le de la source d'alimentation avant de tenter d'accéder à le tiroir à fusibles.

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Replace the 400 mA SLO fuse only with an identically rated part. If replacing the fuse does not restore the unit to operation, leave the unit turned OFF and disconnected from power. Contact Simco-Ion technical support for additional information.

# 5

## Specifications

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5.1 Specifications

5.2 Parts & Accessories



# 5.1 Specifications

<b>Input Voltage</b>	120 VAC, 60 Hz, 0.2A; 230 VAC, 50/60 Hz, 0.1A
<b>Discharge</b>	1.3 sec @ 6" (15.2 cm), 30 psi ( $\pm 1000$ -100V); 0.5 sec @ 2" (5 cm), 60 psi ( $\pm 1000$ -100V) <sup>1</sup>
<b>Balance</b>	0 $\pm$ 15V
<b>Power Inlet</b>	IEC320 with 400 mA SLO fuse
<b>Air Inlet</b>	1/4" NPT (female)
<b>Gas Input</b>	100 psi (7 bars) max, Clean dry air, nitrogen or carbon dioxide
<b>Air Consumption</b>	2.4 scfm @ 30 psi (68 l/min, 2 bars); 4.6 scfm @ 60 psi (130 l/min, 4 bars); 7.4 scfm @ 100 psi (210 l/min, 7 bars)
<b>Output Pressure</b>	Pressure relief in nozzle, complies with OSHA requirements
<b>Audible Noise</b>	76 dB @ 30 psi (2 bars), 89 dB @ 60 psi (4 bars), 97 dB @ 100 psi (7 bars) measured 24" (600 mm) from nozzle
<b>Operating Env.</b>	Temperature 50-95°F (10-35°C); humidity 30-60% RH, non-condensing
<b>Ozone</b>	0.001 ppm measured 18" (450 mm) from gun operating @ 15 psi (1 bar); test conducted in accordance with EPA EQOA-0577-019 using Dasibi Ozone Monitor model 1003AH
<b>Cable</b>	7' (2.13 m) and 14' (4.26 m)
<b>Filter</b>	99.9% efficient, 0.3 micron or larger air particles; 99.9% coalescing efficiency
<b>Enclosure</b>	Gun: static dissipative polycarbonate/ABS alloy; cable: static dissipative polyurethane; power unit: powder-coated steel
<b>Dimensions</b>	6.45H x 5.20W x 3.35D in. (does not incl. flanges) (164H x 132W x 85D mm)
<b>Weight</b>	Gun: 6.5 oz (185g); cable: 1.25 oz/ft (115 g/m); power unit: 6.5 lb (2.7 kg)



1. Tested in accordance with ANSI/ESD STM3.1-2006.

# 5.2 Parts & Accessories

Part No.	Description
4106197-01	Top Gun Blow-off Gun with 7' (2.4m) Cable
4106235-01	Top Gun Blow-off Gun with 14' (4.8m) Cable
4106337-01	Top Gun Blow-Off Gun with Sidekick
5050692	Gun Hanger Kit
5050696	Filter-nozzle Kit (2 filter-nozzles)
5051416	Filter Premium Replacement Kit (2 per pkg)
4106206	Guard Ring Assembly
4108962	Guard Ring Assembly for models with Optical Sensor
4107399	Foot Activation Switch
22-1000	Emitter Cleaners (Box of 50)

# Warranty & Service

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Simco-Ion provides a limited warranty for the Top Gun Ionizing Air Gun. New products manufactured or sold by Simco-Ion are guaranteed to be free from defects in material or workmanship for a period of two (2) years from date of initial shipment. Simco-Ion liability under its new product warranty is limited to servicing (evaluating, repairing, or replacing) any unit returned to Simco-Ion that has not been subjected to misuse, neglect, lack of routine maintenance, repair, alteration, or accident. In no event shall Simco-Ion be liable for collateral or consequential damages. Consumable items such as, but not exclusive to, emitter points, emitter wires, batteries, filters, fuses or light bulbs are only covered under this warranty if found defective as received with the new product.

To obtain service under this warranty, please contact Simco-Ion Technical Support at [techsupport@simco-ion.com](mailto:techsupport@simco-ion.com) or +1 (510) 217-0470.



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