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# Bench Top Zero Volt Ionizer Installation, Operation and Maintenance



Figure 1. EMIT Bench Top Zero Volt Ionizer, Stainless Steel



Figure 2. EMIT Bench Top Zero Volt Ionizer, Powder Coat

## Description

The EMIT Bench Top Zero Volt Ionizer is a compact and lightweight steady state DC auto-balancing bench top ionizer with integrated closed-loop feedback. The unit is normally placed at one end of the workbench or area to be neutralized. It may also be mounted to a wall or shelf. The ionizer's neutralization discharge time will be best approximately 12" to 48" directly in front of the unit and will increase as the distance from the unit increases.

Ionizers are useful in preventing electrostatic charge generation, ElectroStatic Discharge, ElectroStatic Attraction, as well as preventing equipment latch-up and safety related shock. Per ANSI/ESD S20.20 section 6.2.3.1. Protected Areas Requirement states: "Ionization or other charge mitigating techniques shall be used at the workstation to neutralize electrostatic fields on all process essential insulators if the electrostatic field is considered a threat." Air ionization can neutralize the static charge on insulated and isolated objects by producing separate charges in the molecules of the gases of the surrounding air. When an electrostatic charge is present on objects in the work environment, it will be neutralized by attracting opposite

polarity charges from the ionized air. Note that ionization systems should not be used as a primary means of charge control on conductors or people. (Reference: EN 61340-5-2:1paragraph 5.2.9)

"The primary method of static charge control is direct connection to ground for conductors, static dissipative materials, and personnel. A complete static control program must also deal with isolated conductors that cannot be grounded, insulating materials (e.g., most common plastics), and moving personnel who cannot use wrist or heel straps or ESD control flooring and footwear.

Air ionization is not a replacement for grounding methods. It is one component of a complete static control program. Ionizers are used when it is not possible to properly ground everything and as backup to other static control methods. In clean rooms, air ionization may be one of the few methods of static control available." (ESD Handbook TR20.20 Ionization, section 5.3.6.1 Introduction and Purpose / General Information)

The EMIT Bench Top Zero Volt Ionizer operates on DC, steady state. Steady DC systems consist of separate negative and positive ion emitters connected by a pair of high-voltage cables to their respective high-voltage power supplies. The spacing between emitters varies depending on the design, and DC power is constantly applied to the emitter points. The ionizer utilizes feedback from the internal sensor grill to continuously adjust the output to maintain balance

## Ionizer Selection

ANSI/ESD S20.20 paragraph 6.1.1.2. ESD Control Program Plan Guidance states: "The Plan should include a listing of the specific type of ESD protective materials and equipment used in the Program." When selecting an ionizer, life cycle costs should be considered, including:

- equipment cost
- installation cost
- operation and maintenance cost

EMIT ionizers meet the ANSI/ESD S20.20 minimum recommended technical requirement range of less than +/- 50 volts voltage offset tested in accordance with ANSI-EOS/ESD S3.1. All EMIT Bench Top Ionizers greatly exceed the requirement providing  $\pm 5$  to  $\pm 25$  volt auto-balancing.

The Bench Top Zero Volt Ionizer is available in three models:

Model	Voltage	Enclosure
50663	120 VAC	Stainless Steel
50670	220 VAC	Stainless Steel
50690	120 VAC	Powder Coat

## Packaging

- 1 Bench Top Zero Volt Ionizer
- 1 Power Cord (50663 and 50690 only)
- 1 Emitter Point Cleaner Pack
- 1 Certificate of Calibration

## Features and Components

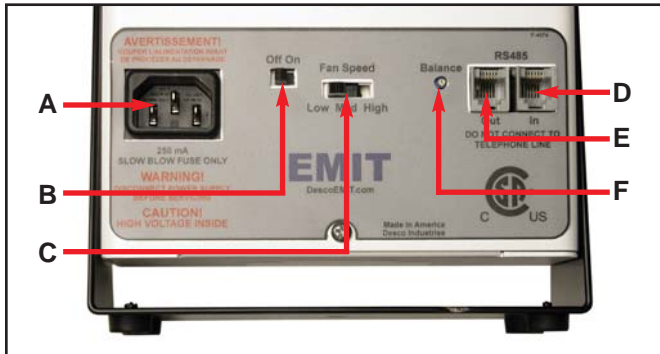


Figure 3. Bench Top Zero Volt Ionizer features and components

- A. Power Cord Connection:** Connect the power cord here.
- B. Power Switch:** Toggle the switch to the left to turn the ionizer OFF. Toggle the switch to the right to turn the ionizer ON.
- C. Fan Speed Switch:** Toggle the switch to the left to set the fan speed to LOW. Toggle the switch to the middle to set the fan speed to MEDIUM. Toggle the switch to the right to set the fan speed to HIGH.
- D. Data Input:** To be used with the EMIT 50667 Alarm Threshold Programmer. See Technical Bulletin TB-6543 for more information.
- E. Data Output:** Can be used to connect with other Bench Top Zero Volt Ionizers. Can be used for data collection. Contact manufacturer for more information.
- F. Balance Adjustment:** Turn the potentiometer clockwise for positive adjustment. Turn the potentiometer counter-clockwise for negative adjustment.

## Installation

Place the unit at a desired location where that the airflow will not be restricted. Be sure that the ON/OFF switch located on the rear of the unit is in the OFF position. Plug the power cord into the unit and then into the appropriate AC power source.

## Operation

- I. Set the fan speed switch on the rear of the unit to the LOW, MED, or HI position (see Figure 3). Higher airflow will result in faster neutralization rates.
- II. Position the ionizer so that maximum airflow is directed towards the items or area to be neutralized.

- III. Turn the unit ON. When the unit is first turned on, it conducts a self-test. The audible alarm will sound and the LED will cycle through the colors red, yellow, and green. The LED will remain green during normal operation.

## Maintenance

"All ionization devices will require periodic maintenance for proper operation." Maintenance intervals for ionizers vary widely depending on the type of ionization equipment and use environment. Critical clean room uses will generally require more frequent attention. It is important to set-up a routine schedule for ionizer service. Routine service is typically required to meet quality audit requirements." (ESD Handbook TR 20.20 paragraph 5.3.6.7 Maintenance / Cleaning)

EIA-625, recommends checking ionizers every 6 months, but this may not be suitable for many programs particularly since an out-of-balance may exist for months before it is checked again. The EMIT Bench Top Zero Volt Ionizer has a very desirable feature as it will provide visual and audible alarms when an out of balance exists. ANSI/ESD S20.20 paragraph 6.1.3.1 Compliance Verification Plan Requirement states: "Test equipment shall be selected to make measurements of appropriate properties of the technical requirements that are incorporated into the ESD program plan."

### CLEANING THE EMITTER POINTS

Under normal conditions, the ionizer will attract dirt and dust (especially on the emitter electrodes). To maintain optimum neutralization efficiency and operation, cleaning should be performed on a regular basis.

In the event of circuit failure, the unit will enter shutdown mode.

When the unit enters shutdown mode, ionization will be stopped, the LED on the front of the unit will illuminate a constant red, and the audible alarm will continuously sound. The user must then reset the unit by turning it OFF and back ON.

The emitter points should be cleaned using the included 50658 Emitter Point Cleaners or a swab dampened with Isopropyl alcohol.

- I. Turn the unit OFF and unplug the power cord.
- II. Remove the rear screen by removing the 4 screws.
- III. Clean the emitter points using the included 50658 Emitter Point Cleaners or a swab dampened with Isopropyl alcohol
- IV. Reattach the rear screen.
- V. Plug in the power cord and turn the unit ON.
- VI. Verify the balance of the ionizer by using a charge plate monitor.

The emitter electrodes should not require replacement during the life of the unit with normal handling. If necessary, item 50659 Replacement Emitter Points are available for order.

## Calibration and Adjustments

### BALANCE ADJUSTMENT

The Bench Top Zero Volt Ionizer is an auto-balancing unit. However, tuning or manual adjustment can be accomplished by inserting a small screwdriver or trimmer adjustment tool into the balance adjustment hole located at the rear of the unit (see Figure 3). To increase the output in a positive direction, turn the potentiometer clockwise. To increase the output in a negative direction, turn the potentiometer counter-clockwise.

### MAINTENANCE / ALARMS

#### WARNING - RISK OF ELECTRIC SHOCK

THESE SERVICING INSTRUCTIONS ARE FOR USE BY QUALIFIED PERSONNEL ONLY. DO NOT PERFORM ANY SERVICING OF INTERNAL PARTS UNLESS YOU ARE QUALIFIED TO DO SO.

NOTE: The AC power cord MUST always be disconnected before the unit is disassembled.

The input voltage may be verified or reset by removing the 3 screws located on the back of the unit then removing the back case.

The input voltage can be selected using the two internal jumpers shown in Figures 4 and 5.

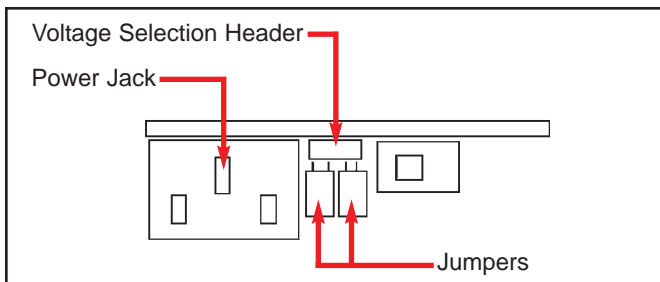


Figure 4. 110V jumper setting

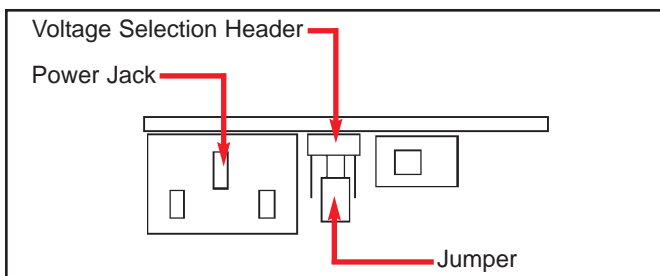


Figure 5. 220V jumper setting

If the supply voltage drops from 110 Volts to below 85 Volts or from 200 Volts to below 170 Volts, the unit will shut down, the audible alarm will beep and the LED will blink red. The unit will automatically reset when the minimum voltage is restored.

Feedback technology can save money and extend the maintenance interval of the ionizer. What the sensor detects is that the offset voltage (balance) has shifted and the circuits will attempt to compensate. In the case of corona ionizers, one of the reasons for a shift in offset voltage is frequently the particle buildup, commonly called a "fuzz ball", observed on ion emitter points.

Offset voltage (balance) and both polarity's discharge time should be checked on every ionizer periodically using an Ionization Test Kit or a Charged Plate Analyzer. Emitter points will erode over time. Clean the emitter points (with electrical power off), calibrate offset voltage (balance) to zero and then re-test for offset voltage (balance) and discharge times recording the measurements. The EMIT Zero Volt Ionizer offset voltage (balance) should be adjusted to approaching zero at this time.

## Specifications

The comparative efficiency of bench top ionizers is determined by a standard test published by the ESD Association: Standard S3.1. Typical positive and negative decay times (1000 V - 100 V) measured using this standard are shown below. The performance of the ionizer was measured with the unit positioned as shown, with the fan speed on high and without a filter.

### Air Flow

Three speed fan (125 fpm - 250 fpm, 50 cfm -100 cfm)

### Balance

±3 Volts Typical

±5 Volts Maximum

(Temperature Range: 65°F - 80°F, RH: 15% - 65%)

### Chassis

Powder coated aluminum housing

### Dimensions (with stand)

9.5" x 6.0" x 3.1"

### Emitter Points

.050" diameter

Made of pure tungsten for improved mechanical strength and ionization stability

### Fuse

250 mA slow blow

### High Voltage Power Supply

5.5 kV DC nominal

### Input Power

AC line power

Internally selectable for 110/115 VAC - 50/60Hz or 220/230 VAC - 50/60Hz

### Ion Emission

Steady-state DC with sense feedback

### Mounting

Bench Top tilt adjust frame

### Ozone

< 0.05 ppm

### Weight

4.5 lbs

### Neutralization (Decay) Time Table

Distance	12"	24"	36"	48"	
Time (seconds)	+101	+18	+13	+19	12"
	-125	-23	-17	-23	
	+2	+4	+7	+13	Center Line
	-2	-5	-9	-15	
	+23	+14	+15	+21	12"
	-36	-15	-16	-22	

#### Limited Warranty

EMIT expressly warrants that for a period of five (5) years from the date of purchase EMIT Bench Top Zero Volt Ionizers will be free of defects in material (parts) and workmanship (labor). Within the warranty period, a credit for purchase of replacement EMIT Bench Top Zero Volt Ionizers, or, at EMIT's option, the Bench Top Zero Volt Ionizer will be repaired or replaced free of charge. If product credit is issued, the amount will be calculated by multiplying the unused portion of the expected five year life times the original unit purchase price. Call our Customer Service Department at 909-664-9980 (Chino, CA) for a Return Material Authorization (RMA) and proper shipping instructions and address. Please include a copy of your original packing slip, invoice, or other proof of date of purchase. Any unit under warranty should be shipped prepaid to the EMIT factory. Warranty replacements will take approximately two weeks.

If your unit is out of warranty, call our Customer Service Department at 909-664-9980 (Chino, CA) for a Return Material Authorization (RMA) and proper shipping instructions and address. EMIT will quote repair charges necessary to bring your unit up to factory standards.

#### Warranty Exclusions

THE FOREGOING EXPRESS WARRANTY IS MADE IN LIEU OF ALL OTHER PRODUCT WARRANTIES, EXPRESSED AND IMPLIED, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE WHICH ARE SPECIFICALLY DISCLAIMED. The express warranty will not apply to defects or damage due to accidents, neglect, misuse, alterations, operator error, or failure to properly maintain, clean or repair products.

#### Limit of Liability

In no event will EMIT or any seller be responsible or liable for any injury, loss or damage, direct or consequential, arising out of the use of or the inability to use the product. Before using, users shall determine the suitability of the product for their intended use, and users assume all risk and liability whatsoever in connection therewith.