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United States of America

## Benchtop Zero Volt Ionizer Installation, Operation and Maintenance



Figure 1. EMIT Benchtop Zero Volt Ionizer, Stainless Steel



Figure 2. EMIT Benchtop Zero Volt Ionizer, Powder Coat

### Description

The EMIT Benchtop Zero Volt Ionizer is a compact and lightweight steady state DC auto-balancing Benchtop worksurface 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. 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 61340-5-2:1 clause 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 ESD TR20.20 Ionization, section 5.3.6.1 Introduction and Purpose / General Information)

The EMIT Benchtop Zero Volt Ionizer operates on Steady State DC. Steady State 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 section 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 required limit of less than +/- 35 volts offset voltage balance tested in accordance with ANSI/ESD STM3.1 and ESD TR53. All EMIT Benchtop Ionizers provides superior  $\pm 5$  to  $\pm 25$  volt auto-balancing.

The Benchtop Zero Volt Ionizer is available in four models:

Item	Voltage	Enclosure
50663	120 VAC	Stainless Steel
50670	220 VAC	Stainless Steel
50690	120 VAC	Powder Coat
50691	220 VAC	Powder Coat

## Packaging

- 1 Benchtop Zero Volt Ionizer
- 1 Power Cord (50663, 50690 only)
- 1 Emitter Point Cleaner Pack
- 1 Certificate of Calibration

## Features and Components

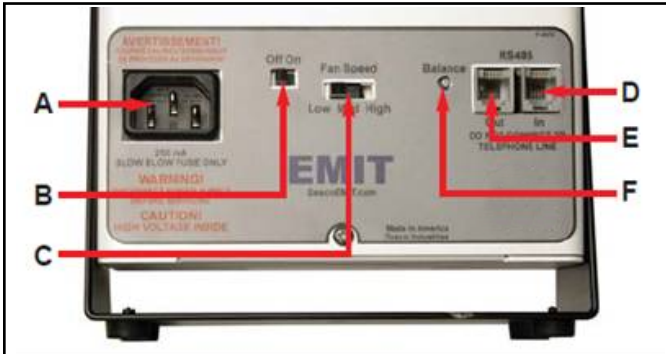


Figure 3. Bench Top Zero Volt Ionizers features and components

- 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. RS-485 IN:** For manufacturer use.
- E. RS-485 OUT:** For manufacturer use.
- 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

1. 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.
2. Position the ionizer so that maximum airflow is directed towards the items or area to be neutralized.
3. 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 TR20.20 section 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. ANSI/ESD S20.20 section 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 points). 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 Emitter Point Cleaners or a swab dampened with Isopropyl alcohol.

1. Turn the unit OFF and unplug the power cord.

2. Open the rear screen by loosening the screw and swinging the grill to one side.

3. Clean the emitter points using the included 60506 Emitter Point Cleaners or a swab dampened with Isopropyl alcohol.

4. Reattach the rear screen.

5. Plug in the power cord and turn the unit ON.

6. Verify the performance of the ionizer by using a charged plate monitor, or ionization test kit.



The emitter points should not require replacement during the life of the unit with normal handling. If necessary, item 60507 Replacement Emitter Points are available for order.

## Adjustments and Compliance Verification

### BALANCE OFFSET VOLTAGE ADJUSTMENT

The Benchtop 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.

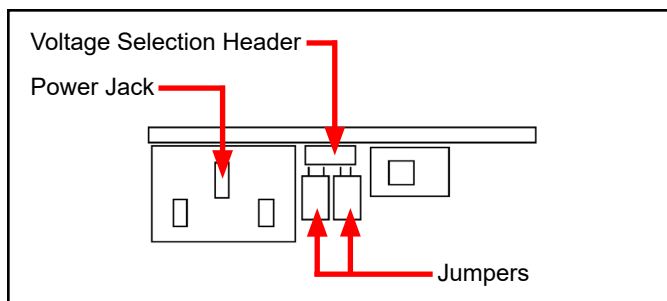


Figure 4. 110V jumper setting

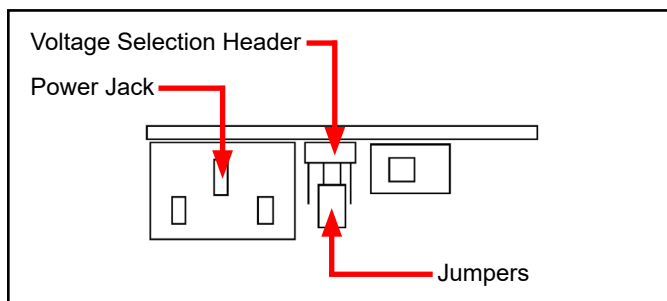


Figure 5. 220V jumper setting

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.

Auto-balancing closed-loop 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 the emitter points.

Compliance Verification should be per ESD TR53. 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. Measure offset voltage (balance) and both polarity's discharge times. Clean the emitter points (with electrical power off), adjust offset voltage (balance) to zero and then re-test for offset voltage (balance) and discharge times recording the measurements.

## Neutralization (Discharge) Times

All data was taken with the fan speed set to high. All time measurements are in seconds.

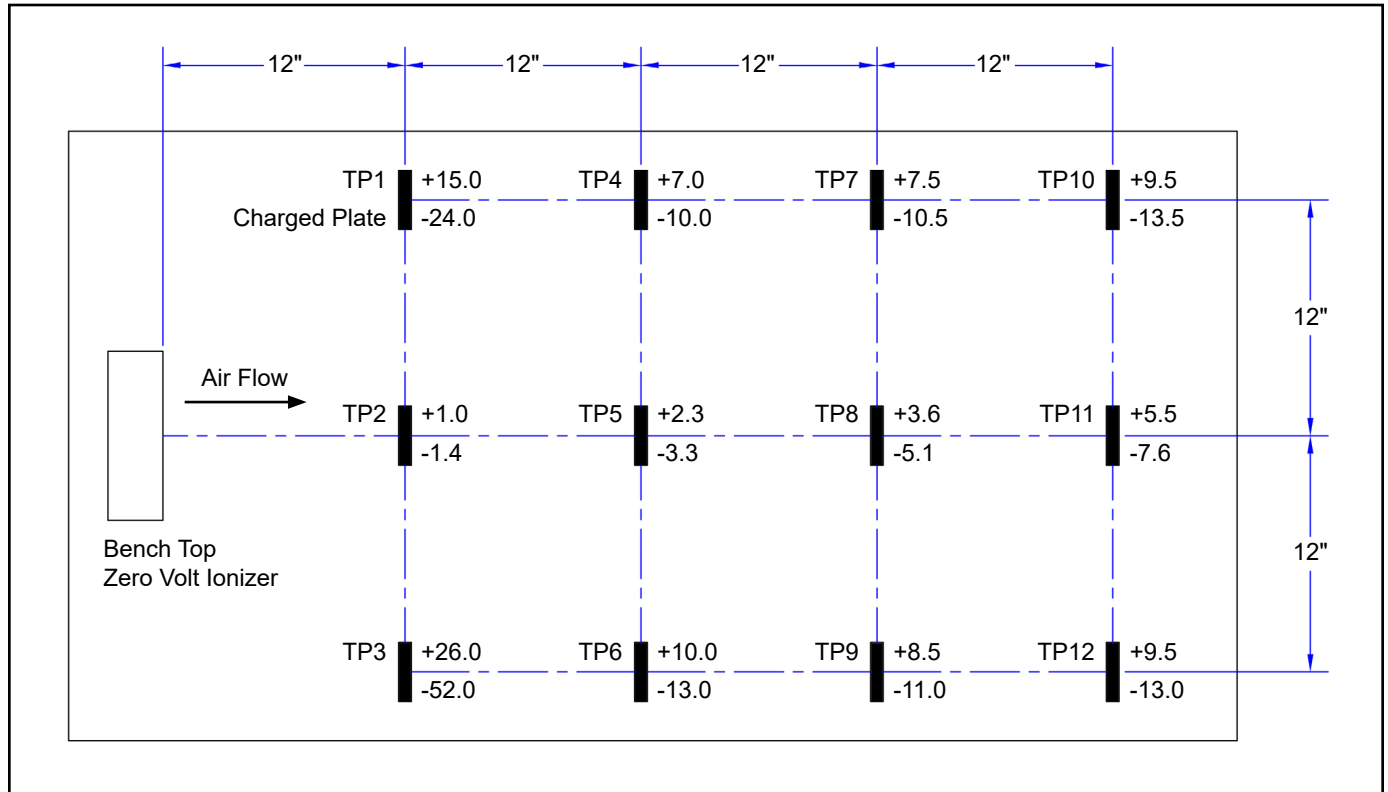


Figure 6. Neutralization (Discharge) Times at 120VAC / 220VAC, 60Hz input

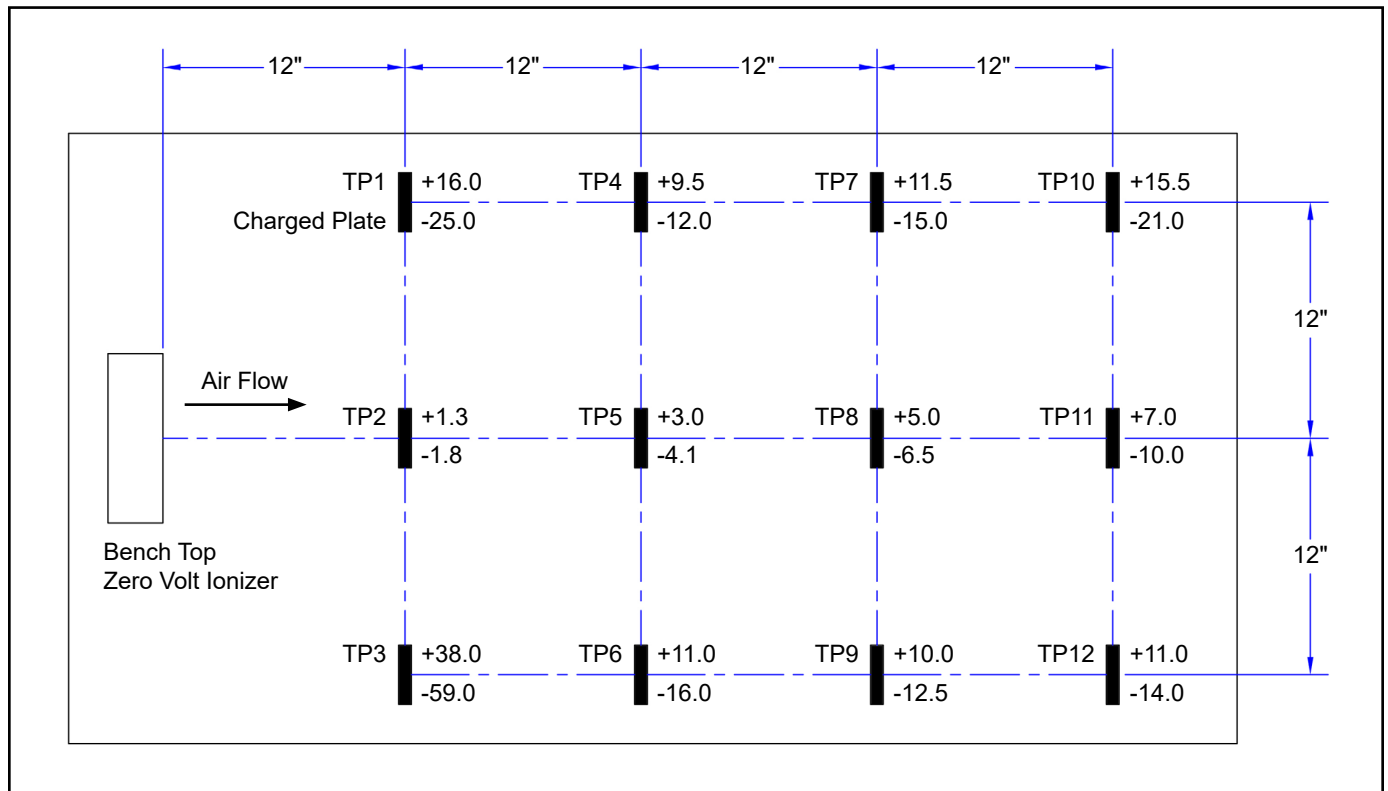


Figure 7. Neutralization (Discharge) Times at 100VAC, 50Hz input

## Specifications

The comparative efficiency of Benchtop ionizers is determined by a standard test published by the ESD Association: ANSI/ESD STM 3.1. Typical positive and negative decay times (1000V - 100V) measured using this standard are shown in Figures 6 and 7. 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 (offset voltage) at 12" in front of Ionizer (see Figures 6 and 7)

±3 Volts Typical

±25 Volts Maximum

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

### Chassis

Powder coated aluminum (50690, 50691)

Stainless steel housing (50663, 50670)

### Dimensions (with stand)

9.5" x 6.0" x 3.1"

24.1cm x 15.2cm x 7.9cm

### Emitter Points

.050" diameter

Made of pure tungsten for improved mechanical strength and ionization stability.

### Fuse

250mA slow blow

### High Voltage Power Supply

5.5kV DC nominal

### Input Power

AC line power

Internally selectable for 100/120 VAC - 50/60Hz or

220/230 VAC - 50/60Hz

### Ion Emission

Steady-state DC with sense feedback

### Mounting

Benchtop tilt adjust frame

### Ozone

< 0.05 ppm

### Weight

4.5 lbs (2.0 kg)

## Limited Warranty, Warranty Exclusions, Limit of Liability and RMA Request Instructions

See the EMIT Warranty -

[DescoEMIT.com/Warranty.aspx](https://DescoEMIT.com/Warranty.aspx)