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United States of America

## Mini Zero Volt Ionizer 2 Installation, Operation and Maintenance



Figure 1. EMIT 50642 Mini Zero Volt Ionizer 2

### Description

The EMIT 50642 Mini Zero Volt Ionizer (ZVI) 2 is a compact bench top ionizer used for neutralizing electrostatic charges on insulators and ungrounded conductors in a 6" x 24" coverage area. Its compact size (5.3" high x 3.5" wide x 1.7" deep with stand) allows it to be used in confined spaces such as environmental chambers and automated equipment. It may also be used at standard ESD workstations. Its fast discharge times (< 3 seconds at 12") and  $\pm 5$  Volt offset voltage exceed the required limits of ANSI/ESD S20.20 and ESD TR53. Steady-State DC emitters are spaced farther apart to prevent ion recombination, increase decay efficiency and provide a broader coverage area of ionization. The Mini ZVI 2's two-speed fan (33 CFM to 51 CFM) produces consistent performance at both the low and high speeds. Low airflow may be used when working with small parts and components that may move with higher airflow. The Mini ZVI 2 features a stainless steel enclosure and multi-mount stand to minimize contamination and corrosion when used in clean or sensitive areas.

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 Mini Zero Volt Ionizer 2 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. 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.

EMIT offers the following accessories for the Mini Zero Volt Ionizer 2:

| Item  | Description                      |
|-------|----------------------------------|
| 50658 | Emitter Pin Cleaner, 20 Pack     |
| 50668 | Replacement Emitter Pins, 8 Pack |
| 19263 | Power Adapter, 24VDC Output      |

### Packaging

- 1 Mini Zero Volt Ionizer 2
- 1 Power Adapter, 24VDC, with interchangeable plugs (North America, UK/Asia, Europe)
- 1 Ground Cord
- 1 Emitter Pin Cleaner Pack
- 1 Certificate of Calibration



Figure 2. Interchangeable power adapter plugs included with the Mini Zero Volt Ionizer 2

## Features and Components



Figure 3. Mini Zero Volt Ionizer 2 features and components

**A. Ground Jack:** Insert the banana plug end of the included ground cord to this jack. Connect the ring terminal end of the cord to equipment ground.

**B. 24VDC Power Jack:** Connect the power adapter here to power the Mini ZVI 2.

**C. Fan Speed Switch:** Slide the switch down to set the fan speed to LOW. Slide the switch up to set the fan speed to HIGH.

**D. Balance Adjustment Potentiometer:** Turn the potentiometer clockwise for positive adjustment. Turn the potentiometer counter-clockwise for negative adjustment.

**E. Status LED:** The LED will illuminate green when the ionizer runs normally. It will illuminate orange and sound the buzzer should the ionizer experience circuit failure or its emitter pins become too dirty to operate effectively.

## Installation

Place the unit at a desired location where that the airflow will not be restricted. The Mini ZVI 2's compact size and mountable stand allow it to be installed in confined spaces such as environment chambers and automated machinery.

Connect the ground cord to the ionizer's ground jack. Attach the ring terminal end of the ground cord to a ground point. The face plate screw of a grounded AC wall outlet may provide a convenient connection point.

## Operation

1. Set the fan speed switch to the LOW or HIGH position. 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. Connect the power adapter to the ionizer to turn it on. When the unit is first turned on, it conducts a self-test. The audible alarm will sound, and the status LED will cycle through orange and green. The LED will remain green during normal operation.



Figure 4. Using the Mini Zero Volt Ionizer 2 at a workstation.

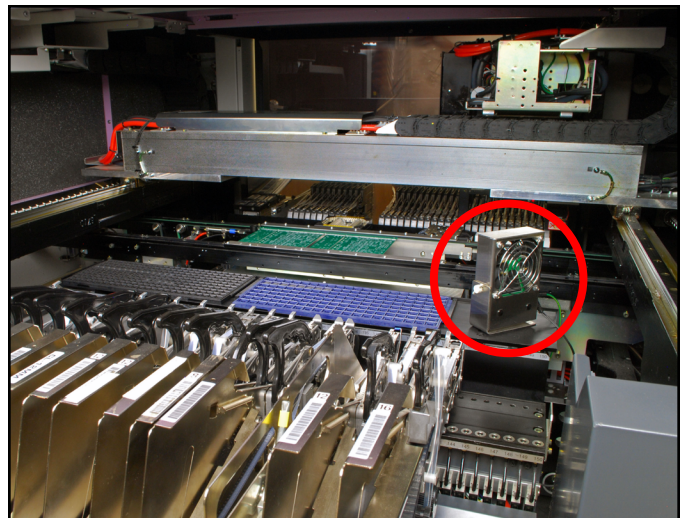


Figure 5. Using the Mini Zero Volt Ionizer 2 inside automated machinery.

## Maintenance

### 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 or dirty emitter pins, the Mini Zero Volt Ionizer 2 will alarm and its status LED will illuminate orange.

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

1. **Turn the unit OFF by disconnecting its power adapter.**
2. Remove the rear screen by removing the 4 screws.
3. Clean the emitter points using the included 50658 Emitter Point Cleaners or a swab dampened with Isopropyl alcohol
4. Reattach the rear screen.
5. Reconnect the power adapter to turn on the ionizer.
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 50668 Replacement Emitter Points are available for order.

## Adjustments and Compliance Verification

### BALANCE OFFSET VOLTAGE ADJUSTMENT

The Mini Zero Volt Ionizer 2 is an auto-balancing unit. However, tuning or manual adjustment can be accomplished by turning the balance adjustment potentiometer located at the left-side of the unit. 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.

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. 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.

NOTE: Discharge times in seconds are representative only and are not a guarantee. Discharge times are actual measurements recorded in a factory ambient environment.

Per ANSI/ESD S20.20, the test method for Product Qualification test is ANSI/ESD STM3.1, and for Compliance Verification is ESD TR53 which advises "Measurements should be made at the location where ESD sensitive items are to be ionized." A larger area may require additional ionizers. Per S20.20 the required limit for ionizer discharge time is user defined. Use Table to determine the number of ionizers to achieve ionization of area to be neutralized to meet your company's ESD control plan specified discharge times.

The comparative efficiency of bench top 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 Figure 5. The performance of the ionizer was measured with the unit positioned as shown, with the fan speed on high and without a filter.

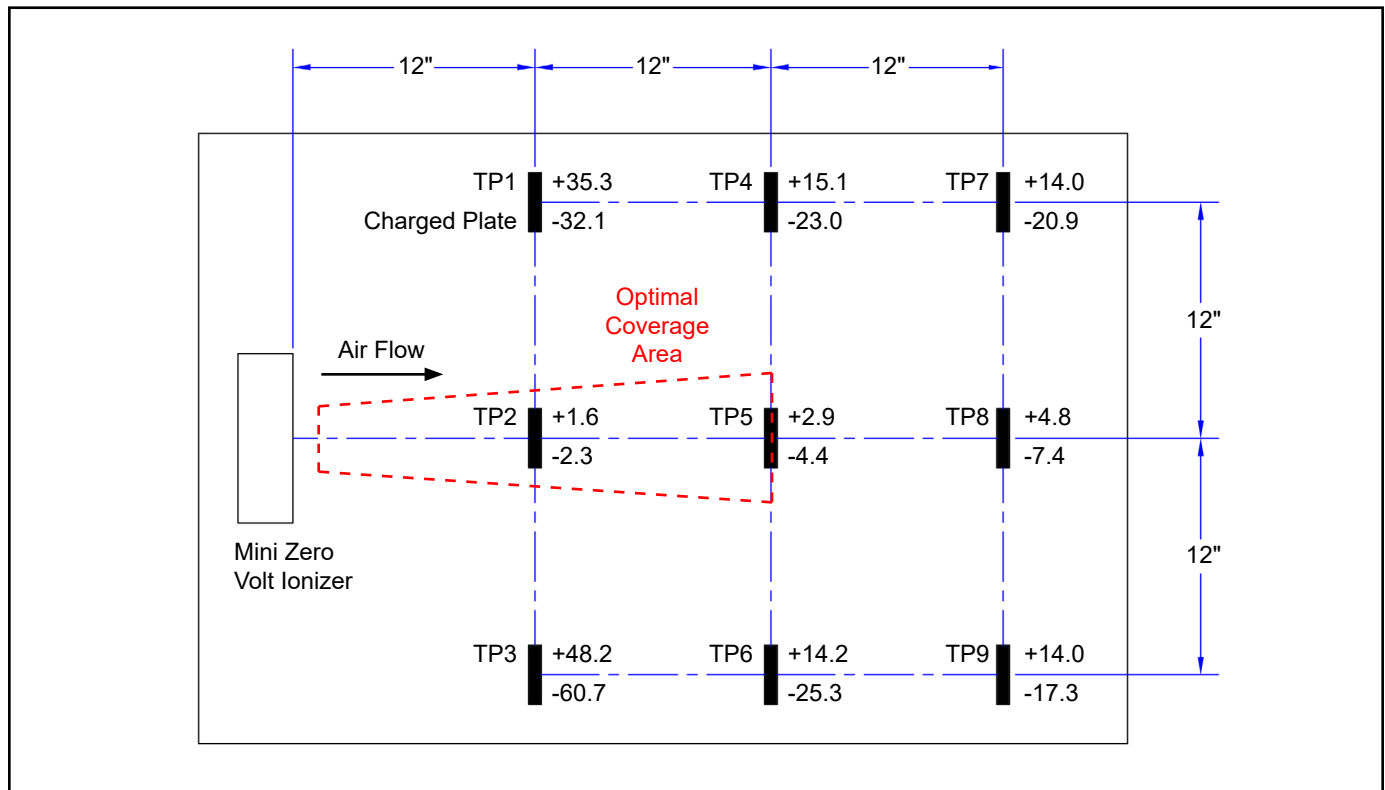


Figure 6. Neutralization (Discharge) Times

## Specifications

### Air Flow

Two speed fan (33 CFM, 51 CFM)

### Balance (offset voltage) at 12" in front of Ionizer

±5 Volts Typical

±25 Volts Maximum

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

### Chassis

Stainless steel housing and stand

### Dimensions (with stand)

5.3" x 3.5" x 1.7"

(14 cm x 9 cm x 4 cm)

### Emitter Points

.050" base diameter

Made of pure tungsten

### High Voltage Power Supply

5.5kV DC nominal

### Input Power

24 VDC, center positive, 2.5 x 5.5 mm power jack

### Ion Emission

Steady-state DC with sense feedback

### Mounting

Bench top tilt adjust frame

### Ozone

< 0.05 ppm

### Weight

1.1 lbs (0.5 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)