

# Mini Zero Volt Monitor Installation, Operation and Maintenance



Made in the  
United States of America



Figure 1. Desco Mini Zero Volt Monitor

The Desco Mini Zero Volt Monitor is available in the following models:

Item	Power Adapter
<a href="#">19101</a>	North America
<a href="#">19102</a>	None

## Description

Desco's Mini Zero Volt Monitor (ZVM) is a single station continuous monitor for operator, ESD worksurface and metal tool fixture ground. It continuously monitors the ground integrity and charge generation of one operator, as well as the ground integrity for one ESD workstation and one metal tool fixture. It eliminates the need for periodic testing and record keeping of wrist straps.

The Mini ZVM is designed with Dual Polarity Technology for true continuous monitoring (versus pulsed or intermittent) of wrist strap functionality (path to ground and presence of 1 Meg Resistor) and operator safety according to accepted industry standards without capacitance variations from personnel or environment. Dual Polarity Technology uses dual-wire wrist cords to place positive voltage on one line and negative voltage on the other, resulting in near zero voltage at the operator.

The Mini ZVM will also detect Direct Current Voltage (VDC) that is greater than  $\pm 2.5$  VDC if the operator generates or comes in contact with a voltage that would be dangerous to an ESD susceptible item. Each Mini ZVM is calibrated with accepted procedures and standards traceable to the National Institute of Standards and Technology (NIST) and includes a NIST certificate.

ANSI/ESD S20.20 section 7.3 states "Compliance verification records shall be established and maintained to provide evidence of conformity to the technical requirements." Per ANSI/ESD S1.1 Annex A.3 Daily (wrist strap system) testing may be omitted if constant monitoring used." Per ESD Handbook ESD TR 20.20 section 5.3.2.4.4 "Typical Test programs recommend that wrist straps that are used daily should be tested daily. However, if the products that are being produced are of such value that knowledge of a continuous, reliable ground is needed, and then continuous monitoring should be considered or even required."

## Packaging

- 1 Mini Zero Volt Monitor
- 1 Power Adapter, 12VDC, N. America (19101 only)
- 1 Mat Monitor Cord (Black)
- 1 Tool Monitor Cord (White)
- 1 Monitor Ground Cord (Green and Yellow)
- 1 Push and Clinch Snap
- 1 Washer
- 1 Flat Head Screw, 6-32 thread
- 1 Alligator Clip
- 1 Ring Terminal
- 2 Hook and Loop Fastener Strips
- 1 Certificate of Calibration

## Features and Components

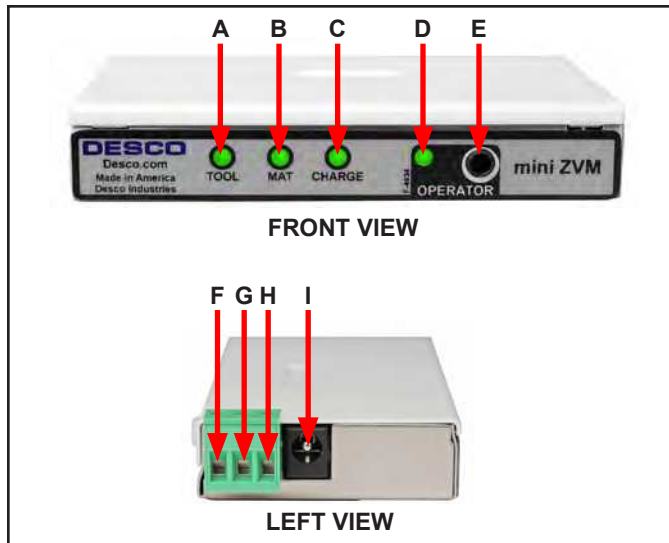


Figure 2. Mini Zero Volt Monitor features and components

**A. Tool LED:** When the LED is illuminated green, the tool is properly grounded. When the LED is illuminated red and the alarm sounds, the tool is not properly grounded.

**B. Mat LED:** When the LED is illuminated green, the worksurface mat is properly grounded. When the LED is illuminated red and the alarm sounds, the worksurface mat is not properly grounded.

**C. Charge LED:** When the LED is off, the charge on the operator is below the set limit. When the LED is illuminated red and the alarm sounds, the charge is over the set limit.

**D. Operator LED:** When the LED is illuminated green, the operator is properly grounded. When the LED is illuminated red and the alarm sounds, the operator is not properly grounded. The LED blinks red when the operator is not connected. This serves as a reminder to connect to the monitor when returning to the workstation.

**E. Monitored Operator Jack:** Where the operator connects to the monitor.

**F. Monitored Tool Terminal:** Monitors a grounded metal tool fixture. Connect the white tool monitor cord here.

**G. Monitored Mat Terminal:** Monitors a worksurface mat for proper dissipative resistance and static charges. Connect the black mat monitor cord here.

**H. Ground Terminal:** Common ground point for the monitor. Connect the green and yellow monitor ground cord here.

**I. Power Jack:** Connect the included 12VDC power adapter here.

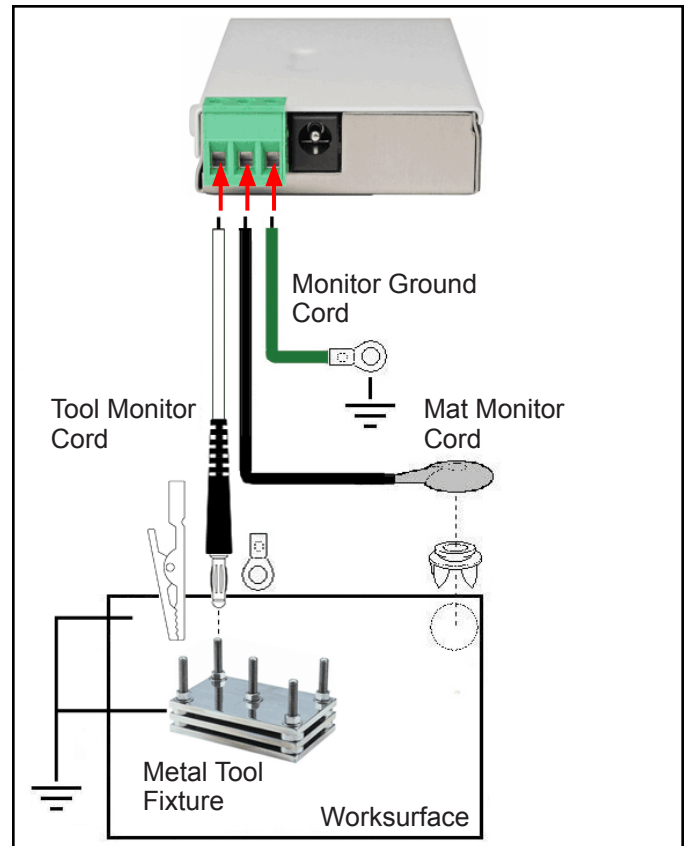


Figure 3. Installing the Mini Zero Volt Monitor

### Installation

1. Remove the monitor from the carton and inspect for damage.

**NOTE:** All Mini ZVM's are packaged with a wire shorting the tool terminal to the ground terminal. This is to prevent the tool circuit from alarming when not in use. Contact Desco Customer Service to be provided with instructions to turn off the tool monitor circuit.

2. Determine the mounting location of the Mini Zero Volt Monitor. The front panel should be visible to the operator. Use the included hook and loop fastener strips if preferred.

Desco offers the 19103 Mounting Bracket (not included) as an alternative method to mount the Mini ZVM.

3. Attach the tinned wire end of the mat monitor cord to its appropriate terminal block connection located on the side of the unit.
4. Route the mat monitor cord from the side of the monitor to the worksurface mat. Use either the included push and clinch snap or washer and screw to secure the cord to the mat. The worksurface mat requires a separate ground cord (not included).

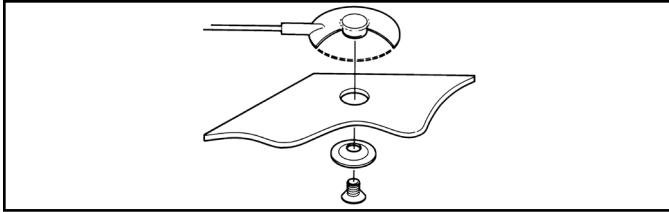


Figure 4. Screw allows ground cord to be bolted to mat to keep cord from disconnecting

5. Attach the tinned wire end of the included ground cord to the appropriate terminal block connection on the side of the monitor. Attach the ring terminal end to a ground point. It is important that this ground cord is attached to a different ground point than that of the worksurface mat. The face plate screw of a grounded AC wall outlet may provide a convenient connection point.
6. If applicable, attach the tinned wire end of the tool monitor cord to the appropriate terminal block connection on the side of the monitor. The included alligator clip or ring terminal may be applied to the banana plug for a secure connection to the grounded metal tool fixture that you choose to monitor.
7. Connect the DC power supply to the power jack located on the side of the unit. Route the wire from the supply to a nearby AC outlet and plug the power supply into the outlet. Make sure the voltage and frequency match those listed on the power supply. The monitor is now powered.

**NOTE:** Worksurface must have a conductive layer such as Dual Layer Rubber or Dissipative 3-Layer Vinyl or Micastat® Dissipative Laminate with conductive buried layers. Desco continuous monitors are not recommended for use with homogeneous matting.

## Operation

### USING THE MONITOR

**NOTE:** Elastic wrist straps are only compatible with the default operator test voltage of 1.25V. Metal wrist straps must be used if the operator test voltage is set to 50mV. Apply an approved dissipative hand lotion such as [Menda Reztore™ ESD Hand Lotion](#) to your wrist prior to use for optimum results.

1. The monitor's operator LED will be blinking red indicating that it is ready for the operator to connect.
2. Fit the wristband snugly onto your wrist.
3. Snap the wrist cord to the wristband.
4. Plug the wrist cord into the monitored jack labeled OPERATOR (see Figure 2). The corresponding operator LED will switch from blinking red to solid green. This indicates that the operator is properly grounded.
5. If this does not happen, examine the wrist cord for continuity or damage and your wrist band to ensure that it is securely fit.



Figure 5. Using the Mini ZVM

## Calibration

The Mini ZVM is calibrated to standards traceable to NIST. Frequency of recalibration should be based on the critical nature of those ESD sensitive items handled and the risk of failure for the ESD protective equipment and materials. In general, we recommend that calibration be performed annually.

Use the EMIT [50524](#) Limit Comparator for Dual-Wire Monitors to perform periodic testing (once every 6-12 months) of the Mini ZVM. The Limit Comparator can be used on the shop floor within a few minutes virtually eliminating downtime, verifying that the monitor is operating within tolerances.

See [TB-6542](#) for more information.



Figure 6. EMIT [50524](#) Limit Comparator for Dual-Wire Monitors

## Specifications

Operating Voltage	12 VDC
Operating Temperature	32°F - 104°F (0 - 40°C)
Monitor Dimensions	3.9" x 2.2" x 0.7" (9.9cm x 5.6cm x 1.8cm)
Monitor Weight	0.3 lbs (0.1 kg)

### DEFAULT TEST VOLTAGES

Operator	1.25 V
Worksurface	200 mV at 3 megohms
Tool	25mV
Typical Response Time	.058 seconds

### DEFAULT TEST LIMITS

Operator	Low Fail: < 1.72 megohms Pass: 2 - 9 megohms High Fail: > 11.5 megohms
Worksurface	Pass: < 3 megohms Fail: > 3.5 megohms
Tool	Pass: < 7 ohms Fail: > 10 ohms
Charge Detector	> ±2.5 VDC on operator

### OPTIONAL TEST VOLTAGES\*

Operator	50 mV
Worksurface	1.25 V at 3 ohms
Typical Response Time	.46 seconds

### OPTIONAL TEST LIMITS\*

Worksurface	Pass: < 2.5 ohms Fail: > 3.5 ohms
Charge Detector	> ±1.25 VDC on operator

### OPTIONAL SETTINGS\*

Worksurface Monitor	ON / OFF
Tool Monitor	ON / OFF
Charge Detector	ON / OFF

\*Contact Desco customer service for information on modifying these settings.

## Limited Warranty

Desco expressly warrants that for a period of one (1) year from the date of purchase Desco Continuous Monitors will be free of defects in material (parts) and workmanship (labor). Within the warranty period, a credit for purchase of replacement Desco Continuous Monitors, or, at Desco's option, the Continuous Monitor 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 one year life times the original unit purchase price. Call our Customer Service Department at 909-627-8178 (Chino, CA) or 781-821-8370 (Canton, MA) 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 Desco factory. Warranty replacements will take approximately two weeks.

If your unit is out of warranty, call our Customer Service Department at 909-627-8178 (Chino, CA) or 781-821-8370 (Canton, MA) for a Return Material Authorization (RMA) and proper shipping instructions and address. Desco 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 Desco 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.