Multi-Mount Continuous Monitor Operation, Installation, and Maintenance

Made in America

Figure 1. EMIT Multi-Mount Continuous Monitor

Description

Leading companies use continuous monitors as a cost effective component in satisfying the paragraph 6.1.3 Compliance Verification Plan requirements of ANSI/ESD S20.20. The EMIT Multi-Mount Continuous Monitor continuously monitors the integrity of one operator. This monitor will provide virtually instantaneous notification of static control equipment failures, eliminating the need of periodic testing and costly record keeping. This unit is highly cost effective as it is designed to monitor any conventional single wire wrist strap and ground cord system. Its small package and mounting tabs with holes make it highly suitable to install on most any equipment or work bench surface. In addition, optional mounting is available using the provided adhesive-backed Velcro® strips. Using either mounting method makes the Multi-Mount Monitor suitable for most any machinery or workbench even in hard to reach locations.

The EMIT Multi-Mount Continuous Monitor is available in two models:

Model	Voltage AC	Calibration
50390	120	NIST
50391	220	NIST

The Multi-Mount Continuous Monitor is a real time instrument that ensures that critical ESD generators in a sensitive area are effectively grounded. The instant an operator's wrist strap or cord fails, the monitor will issue audible and visual (LEDs) alarms alerting the user and supervisor of the problem.

The Parking Snap features provides a means for the operator to disconnect wrist strap cord when normally leaving work area without audible alarm sounding. It also provides a means of wrist strap storage.

ADVANTAGES OF CONTINUOUS MONITORING OVER PERIODIC TESTING

Many customers are eliminating periodic testing and are utilizing continuous monitoring to better ensure that their products were manufactured in an ESD protected environment. Full time continuous monitoring is superior to periodic or pulsed testing, and can save a significant amount of money in testing costs and rejected product. Periodic testing detects failures after ESD susceptible products have been manufactured. The costs of dealing with the resulting catastrophic or latent defects can be considerable. Multi-Mount Continuous Monitors eliminate the need for users to test wrist straps and log the results; by their function, these monitors satisfy the ISO 9000 and ANSI/ESD S20.20 test logging. ANSI/ESD S20.20 Paragraph 6.2.2.2 Personnel Grounding Guidance states "A log should be maintained which verifies that personnel have tested their personal grounding devices." Per ESD-S1.1 Paragraph 6.1.3 "Daily (wrist strap system) testing may be omitted if constant monitoring is used."

WAVE DISTORTION DETECTION TECHNOLOGY PROVIDES TRUE 100% CONTINUOUS MONITORING

From all the technical alternatives available, EMIT has chosen wave distortion technology for many of its Continuous Monitor product offerings. Wave distortion circuitry monitors current/voltage phase shifts and provides true 100% continuous monitoring. Electrical current will lead voltage at various points due to the combinations of resistance and capacitive reactance. By monitoring these "distortions" or phase shifts, the wave distortion Multi-Mount Continuous Monitor will reliably determine if the circuit is complete.

Wave distortion technology can be referred to "vector impedance monitoring". This description is valid as the wave distortion technology measures the impedance at the monitored banana jack and looks for changes in either the capacitance or resistance of the circuit which includes the wrist strap and its wearer. It uses filtering and time domain sampling to filter out false signals caused by voltage offsets, 60 Hz fields and other electro-magnetic and electrostatic interference.

EMIT - 3651 Walnut Avenue, Chino, CA 91710 • (909) 664-9980 • Fax (909) 627-7449 • Web Site: DescoEMIT.com

In normal factory environments, and with persons whose capacitance with respect to ground is within design limits (5 feet tall 90 pound person to 6 foot 5 inch 250 pound person), the Multi-Mount Continuous Monitor cannot be "fooled". It will provide a reliable alarm only when the wrist strap becomes dysfunctional or unsafe according to accepted industry standards. The Multi-Mount Continuous Monitor is drift-free and designed to be insensitive to the effects of squeezing or stretching the coil cord.

ADVANTAGES OF WAVE DISTORTION AND SINGLE-WIRE TECHNOLOGY

The EMIT Multi-Mount Continuous Monitor allows the use of any standard, single-wire wrist strap and coil cord. The monitor/wrist strap/cord system life-cycle costs are by far lower than alternative systems which require expensive and fragile dual-wire cords and special wrist straps. Dual-wire cords are expensive and are the weak link of the system, the most likely component to need replacement. Over a five year period, this can make the dual-wire system three to five times as expensive as a system utilizing single-wire wrist straps and cords. See Maintenance and Calibration (page 4) to minimize life-cycle costs.

The dictionary defines constant as uniform and unchanging, and continuous as uninterrupted. Nonetheless, some dual-wire resistance monitors utilize a pulsed test current and do not really provide continuous monitoring. For example, during each 2.2 second pulse cycle of a leading "constant" resistive monitor, electrical current is pulsed for only 0.2 seconds followed by an unmonitored interval of 2 seconds. This leaves the user/wrist strap unmonitored for over 90% of each cycle. Damaging static charges can easily occur in the portion of the time in between the pulses. The off period of 2 seconds equals 2 billion nanoseconds, and "it takes only about 25 volts applied for 100 nanoseconds to blow most memories or microprocessors".* The dual-wire system does not reliably meet all industry specifications, as the cords do not meet the EOS/ESD S-1.0 paragraph 4.1.6, 1 to 5 pound "breakaway force" requirement for operator safety.

By using the reliable wave distortion technology to determine if the circuit is complete, there are no false alarms. There is no need to adjust or tune the monitor to a specific user or installation. The miniscule amount of electrical current (less than 1 volt coil cord signal) required to generate the waveform has never caused reported skin irritation and is extremely safe for use in voltage sensitive applications such as disk drive manufacturing.

*1981 article by Donald E. Frank - Electrical Overstress / Electronic Discharge Symposium Proceedings

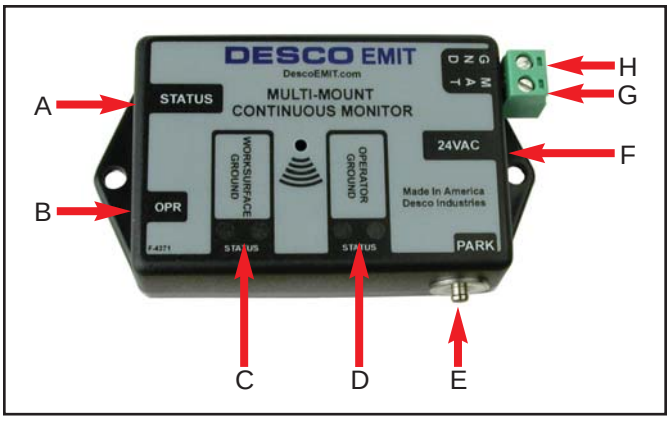

Figure 2. Multi-Mount Continuous Monitor features and components

Features and Components (See Figure 2)

A. Status LEDs: When the green LED is lit, the operator is properly grounded. When the red LED is lit, the operator is not properly grounded.

B. Monitored Operator Jack: Where the operator inserts the wrist cord banana plug.

C. Worksurface Ground LEDs: When the green LED is lit, the work surface mat is properly ground. When the red LED is lit, the work surface mat is not properly grounded.

D. Operator Ground LEDs: When the green LED is lit, the operator is properly grounded. When the red LED is lit, the operator is not properly grounded.

E. 4mm Parking Snap: When touched by the operator, this snap will deactivate the alarm for six seconds. This allows time for the operator to disconnect the coil cord from the wrist band and park it on this snap. While parked, the coil cord disables the alarm, allowing the operator to leave the workstation. The OPERATOR GROUND LED will remain off while the cord is parked. Upon returning and removing the coil cord from the parking snap, the operator has six seconds to hook up to the wrist band before the alarm sounds.

F. 24 VAC Power Jack: Connect the power adapter here.

G. Mat Connection: Monitors worksurface mat. **NOTE:** To disable worksurface monitoring, shunt this terminal to the neighboring GND terminal with a bus wire.

H. Mat Ground: Grounds worksurface mat.

EMIT - 3651 Walnut Avenue, Chino, CA 91710 • (909) 664-9980 • Fax (909) 627-7449 • Web Site: DescoEMIT.com

Installation

Remove the monitor from its packaging and inspect for any shipping damage. Confirm that the work surface is 1 x 10E7 ohms or less and has a conductive layers such as Dual Layer Rubber, Dissipative 3-Layer Vinyl, or Micastat® Dissipative Laminate with conductive buried layers. Included with each Multi-Mount Continuous Monitor should be:

2 Mat Monitor Cords (black and green)
2 Push and Clinch Snaps
2 Mounting screws
1 Velcro® Set
1 120 VAC Power Adapter (50390 only)
1 Certificate of Calibration

I. The Multi-Mount Continuous Monitor may be mounted to a convenient location using the included mounting screws or Velcro® set. See Figure 3 for installation set-up.

II. Install the Push and Clinch snaps 12-72 inches apart from each other on the work surface mat. Make sure that they pierce and clinch the bottom side of the mat.

III. Snap both ground cords to the push and clinch snaps installed to the work surface mat.

IV. Route the black ground cord to the monitor's green terminal block labeled MAT.

V. Route the green ground cord to the monitor's green terminal block labeled GND.

VI. Connect the power adapter to the monitor's power jack labeled "24VAC" and the other end to a proper voltage source.

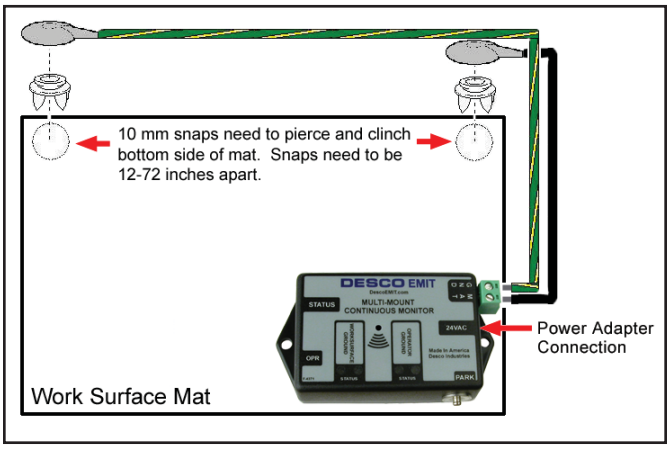

Figure 3. Installation of the Multi-Mount Continuous Monitor

Operation

When the Multi-Mount Continuous Monitor is installed to an ESD protective work surface and grounded via a power cord, the green WORKSURFACE GROUND LED and red OPERATOR GROUND LED should be illuminated. The monitor takes 6 seconds to activate its alarm circuitry when it is first plugged in.

• The work surface resistance is measured between the two snaps installed to the mat worksurface (See Figure 3).

TO USE THE CONTINUOUS MONITOR:

1. Plug a wrist strap cord, not attached to the wristband, into the monitored banana jack labeled OPR on the side of the unit (See Figure 2). This automatically activates the selected operator channel. The red operator LED should illuminate.

2. Remove the charges from your body by making contact with a properly grounded ESD worksurface. Snap the cord to the wristband, and fit it snugly onto your wrist. This should silence the audible alarm and cause the OPERATOR GROUND LED to switch from red to green. If this does not happen, examine the wrist cord for continuity or damage and your wrist band to ensure that it is securely fit. If you have dry skin, apply an approved dissipative hand lotion such as Reztore™ ESD Hand Lotion. When leaving the area, the user can take the wrist cord along or attach it to the monitor parking snap. The audible alarm will shut off in approximately 6-8 seconds when operator wrist cord is removed from unit and will instantly shut off when the cord is attached to the parking snap.

PARKING SNAP

The audible alarm is designed to alert both the operator and supervisor. The parking snap feature allows the operator to disconnect when leaving the work area without sounding the audible alarm. It also provides a means for wrist cord storage (red OPERATOR GROUND LED will illuminate). When the operator touches the parking snap, the audible alarm will disable for 6 seconds. The user can then disconnect the wrist cord from the wrist band and attach it to the parking snap for storage. If the operator removes the wrist cord plug from the OPR banana jack, the audible alarm will sound for 6-8 seconds.

WORK SURFACE CHANNEL

The Multi-Mount Continuous Monitor monitoring circuitry is sufficiently sensitive to detect extremely low current when used with a worksurface with a conductive layer.

Specifications:

Test range of monitored circuit	500K - 10M ohms†
Operating Voltage	
50390	120 VAC, 50/60 Hz
50391	220 VAC, 50/60 Hz
Work Surface Range	10 Megohms
Wrist strap open circuit voltage	1.2 volts peak to peak @ 1-2 MicroAmps
Mat test open circuit voltage	5 to 7.5 volts
Response time to alarm	<50 ms
Operating Temperature	0 - 40°C
Size	3.86"L x 2.10"W x .910"H

† This cannot be verified with standard DC test equipment. The continuous monitor is an impedance sensing device and the limits are determined by the magnitude and angle of the impedance.

EMIT - 3651 Walnut Avenue, Chino, CA 91710 • (909) 664-9980 • Fax (909) 627-7449 • Web Site: DescoEMIT.com

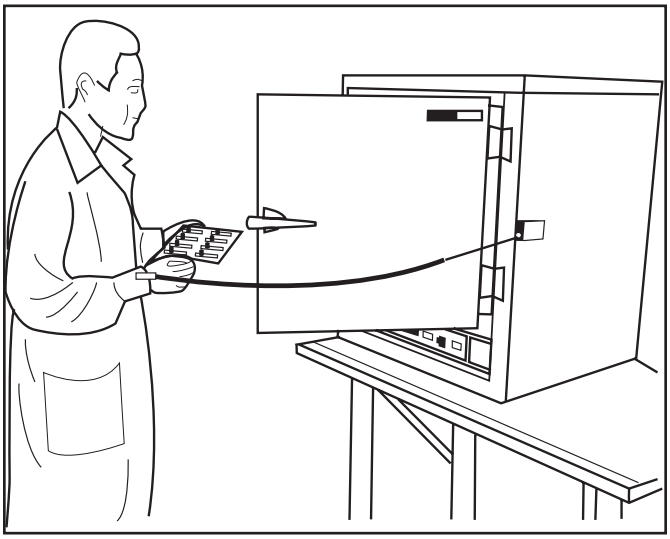

Figure 4. Using the Multi-Mount Continuous Monitor

Note: Work surface must have a conductive layer such as Dual Layer Rubber or Dissipative 3-Layer Vinyl or Micastat® Dissipative Laminate with conductive buried layers. EMIT Continuous Monitors are not recommended for use with homogeneous matting.

Maintenance and Calibration

The Multi-Mount Continuous Monitor is solid state and designed to be maintenance free. The 50390/50391 is calibrated to NIST traceable standards. There are no user adjustments neccesary. Because of the wave distortion sensing nature of the test circuit, special equipment is required for calibration. We recommend that calibration be performed using the EMIT 50512 Continuous Monitor Calibration Unit. The Calibration Unit is a most important product which allows the customer to perform NIST traceable calibration on continuous monitors. The 50512 is designed to be used on the shop floor at the workstation, virtually eliminating downtime, verifying that the continuous monitor is operating within tolerances. Per ANSI/ESD S20.20 Paragraph 6.2.2.2 Personnel Grounding Guidance, "Personnel should check constant monitoring devices (when used) to ensure that they are functional and operating before ESDS products are handled. In addition, constant monitoring devices should be functionally checked periodically to ensure that they are operating as designed."

Limited Warranty

EMIT expressly warrants that for a period of five (5) years from the date of purchase EMIT Continuous Monitors will be free of defects in material (parts) and workmanship (labor). Within the warranty period, a credit for purchase of replacement EMIT Continuous Monitors, or, at EMIT'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 five year life times the original unit purchase price. Call our Customer Service Department at 909-6664-9980 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 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 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.

EMIT - 3651 Walnut Avenue, Chino, CA 91710 • (909) 664-9980 • Fax (909) 627-7449 • Web Site: DescoEMIT.com