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DESCO TECHNICAL BULLETIN TB-3024

Multi-Mount Continuous Monitor Operation, Installation, and Maintenance



Made in America



Figure 1. Desco 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 Desco Multi-Mount Continuous Monitor is designed to mount on equipment where worksurface monitoring is not required. It continuously monitors the integrity of one operator. (See other models on page 4 where worksurface monitoring is also required.) The 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. **There are no additional wires to connect and 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 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 Desco Multi-Mount Continuous Monitor is available in two models.

Model	Voltage AC	Calibration
19222	120	NIST
19223	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, Desco 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.

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

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"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 Desco 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 & 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 Calibration (page 3) 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.

Installation

Remove the monitor from its packaging and inspect for any shipping damage. Included with each Multi-Mount Continuous Monitor should be:

- 1 120 VAC transformer
- 2 Mounting screws
- 1 Adhesive-backed Velcro strip

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

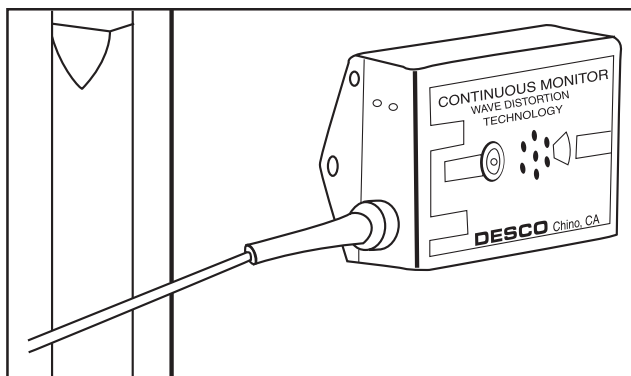


Figure 2. Installation of Multi-Mount Continuous Monitor on the side of a machine.

The Multi-Mount Continuous Monitor has a variety of mounting options. It can be installed under a work bench where the LEDs are easily visible. It can also be installed on a surface of a machine, oven, laminate, or other equipment. The mounting tabs with holes facilitate easy mounting of the unit.

A convenient 120 VAC outlet should be located and tested for proper wiring and grounding. We recommend Desco Item 98130 AC Outlet Analyzer to verify integrity of building ground point.

Plug the transformer into the outlet and connect the output plug into the back side of the monitor.

Operation

When the Multi-Mount Continuous Monitor is installed, the monitor's red Operator LEDs should be on.†

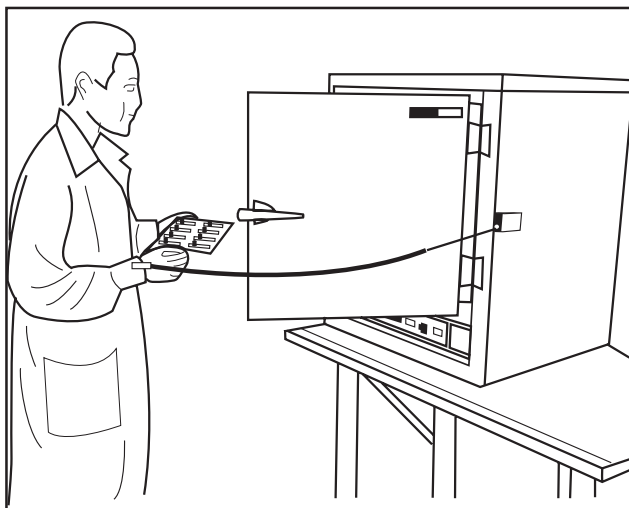


Figure 3. Example of continuous monitoring of an operator using the Multi-Mount Continuous Monitor.

†The monitor takes 6 seconds to activate its alarm circuitry when it is first plugged in.

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- The AC adapter must include the ground reference on the barrel of the output plug.
- The AC adapter therefore supplies the monitor with ground.
- This monitor simplifies the work area because no other wiring is needed.

TO USE THE MONITOR:

1. Plug a wrist strap cord, not attached to the wristband, into the monitored jack on the front of the unit. This will activate the monitor, but will allow you 8 seconds before the audible alarm circuit activates.

2. Snap the cord to the wristband and slip it on your wrist (it should fit snugly). This should silence the audio and cause the LEDs to switch from red to green. If this does not happen, check the coil cord for continuity or damage. Examine your wrist and ensure that it has a secure fit. If you have dry skin, use antistatic hand lotion such as Desco's Reztore™ ESD Hand Lotion, Item No. 81080. When leaving the area, a person can take the coil cord along or leave it attached to the monitor. In either case, the audio alarm will only sound for about eight seconds.

PARK SNAP

The audible alarm is designed to alert both operator and supervisor. The Park Snap feature provides a means for an operator to disconnect when normally leaving the work area, without the audible alarm sounding, and it provides a means of wrist cord storage (visual red LED will illuminate). By the operator touching the Park Snap, the audible alarm is disabled for about 8-10 seconds. The operator can remove the wrist strap cord and attach socket and cord to Park Snap for storage. Note: If cord is left plugged in to monitor and not parked, unit will continuously alarm.

Specifications:

Operating Voltage	
19222	120VAC, 50-60 Hz
19223	220VAC, 50-60 Hz
Response time to alarm	<50mS
Operating Temperature	0 - 40°C
Size	2.77"L x 2.07"W x .710"H

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. Desco 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 19222/19223 is calibrated to NIST traceable standards. There are no user adjustments necessary. 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 Desco 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

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 Customer Service at 909-627-8178 (Chino, CA) or 781-821-8370 (Canton, MA) for Return Material Authorization (RMA) and proper shipping instructions and address. 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, Desco will quote repair charges necessary to bring your unit up to factory standards. Call Customer Service at 909-627-8178 (Chino, CA) or 781-821-8370 (Canton, MA) for a Return Material Authorization (RMA) and proper shipping instructions and address.

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.