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DESCO TECHNICAL BULLETIN TB-2073

**Workstation Real Time Continuous Monitor
 Operation, Installation and Maintenance**



Made in America

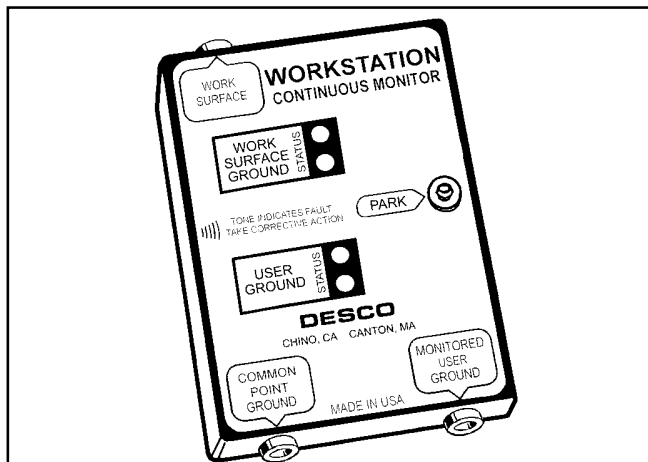


Figure 1. Desco Workstation Real Time Continuous Monitor, Item Numbers 19210 and 19211

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 Workstation Real Time Continuous Monitor provides 100% monitoring of both the operator and the work surface. This unit provides continuous monitoring of one user wearing a wrist strap and also functions to ensure the grounding integrity of ESD protected work surfaces. This device will continuously monitor the user until the wrist strap or work surface becomes dysfunctional or unsafe according to accepted industry standards, at which point the monitor will issue an audible signal notifying the user of a problem. The Workstation Real Time Continuous Monitor also verifies whether an outlet ground is good. When plugged in, the unit automatically runs a self-test. If the outlet is wired incorrectly, both red LEDs turn on and the alarm sounds. The unit will also ground a second user or supervisor.

The Model 19210 operates on 120 VAC, 50/60 Hz, while the Model 19211 operates on 220 VAC, 50/60 Hz.

ADVANTAGES OF WORKSTATION CONTINUOUS MONITORING OVER PERIODIC TESTING

Many customers are eliminating periodic testing and are utilizing workstation continuous monitoring to better ensure that their products were manufactured in an ESD controlled environment. Full time workstation continuous monitoring is superior to pulsed monitoring as well as periodic testing, and can save a significant amount of money in testing costs and rejected products. 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. Workstation Real Time 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 Paragraph 6.2.2.2. test logging requirements.

WAVE DISTORTION DETECTION TECHNOLOGY PROVIDES TRUE 100% CONTINUOUS MONITORING

From all the technical alternatives available, Desco has chosen wave distortion technology for all 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 Workstation Real Time Continuous Monitor will reliably determine if the circuit is complete.

Wave distortion technology can be referred to as "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 Workstation Real Time Continuous Monitor cannot be "fooled". It will provide a reliable alarm only when the wrist strap or work surface becomes dysfunctional or unsafe according to accepted industry standards. The Workstation Real Time 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 Workstation Real Time 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 section on 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.

Installation

Remove the Monitor from the carton and inspect for shipping damage. Confirm that worksurface RTG (surface resistance) is 5×10^8 ohms or less. Each unit should include the following:

- 1 19210/19211 Monitor
- 1 09816 mat monitor cord
- 1 09863 snap push & clinch
- 1 Attached power cord

The Workstation Real Time Continuous Monitor may be mounted in a convenient position using the pressure-sensitive two piece hook and loop fastener supplied. It is normally mounted toward the front edge of a workstation where the LEDs are easily visible.

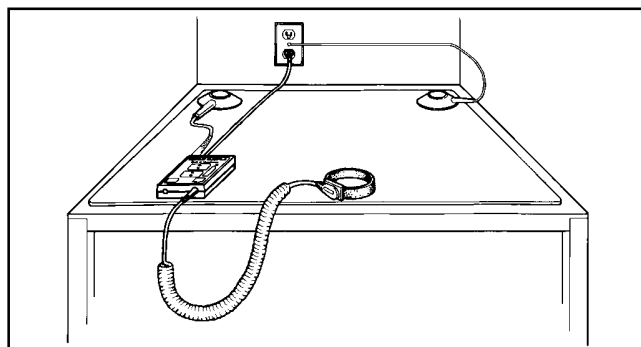


Figure 2. Installation of the Workstation Real Time Continuous Monitor. Shown as worn by operator.

Operation

When the Workstation Real Time Continuous Monitor is first plugged into a properly wired electrical outlet, both red LEDs will light and the alarm will sound.† The alarm will be sounding at this time since no wrist strap wearer or work surface is hooked up.

With a wrist strap on the wrist and the coil cord attached to the band, insert the banana plug of the wrist strap ground into the banana jack marked "User". This will cause the operator green LED to light if the wrist strap is functioning properly.

Now connect a mat ground cord to the work surface. (NOTE: The work surface should be already grounded with another mat ground cord.) Insert the banana plug of the mat ground cord (Item #09816) into the banana jack marked "Work Surface" (see Figure 3). This will cause the "Work Surface" green LED to light if the work surface is properly grounded, and within the specified limit.

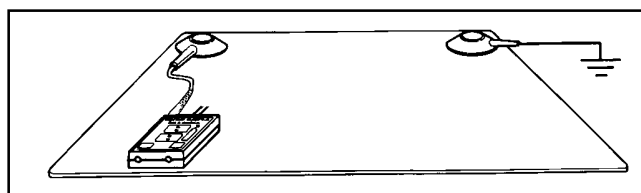


Figure 3. Installing ground cords on the work surface.

The user may disconnect the coil cord from the wrist band and leave the workstation by first touching the Standby Snap. This deactivates the alarm for six seconds and allows the operator to attach the coil cord to the Standby Snap. Using this procedure, the alarm will not sound, which otherwise could be interpreted as a problem. Note that if the coil cord is removed from the wrist band and not placed on the Standby Snap within six seconds, the alarm will sound.

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

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

Features

A. Work Surface Ground LEDs: When the green LED is lit, the work surface is properly grounded. When red LED is lit, the work surface is not properly grounded.

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

C. Monitored User Ground: The banana jack for the wrist strap being monitored.

D. Work Surface: The banana jack for the work surface being monitored.

E. Common Point Ground: Will ground either user or work surface.

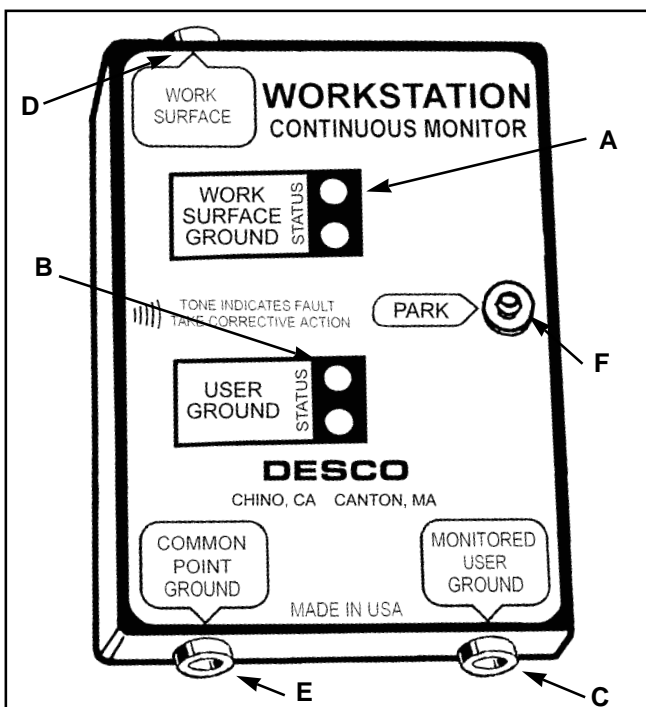


Figure 4. Workstation Real Time Continuous Monitor Features

F. Parking Snap: When touched by the wrist strap wearer, this snap will deactivate the alarm function for six seconds. This allows time for the wearer to disconnect the coil cord from the wristband and "park it" on this snap. While parked, the coil cord disables the alarm function to allow the wearer to leave the workstation. The "User Ground" LED will remain off while the cord is parked. Upon returning and removing the coil cord from the parking snap, the wearer has six seconds to hook up to the wristband before the alarm sounds.

Specifications

RESISTANCE LIMITS

Worksurface limit*	set to 500 megohms
Power Source	
19210	120 VAC, 50-60 Hz
19211	220 VAC, 50-60 Hz
Current Drain	<15mA RMS
Response time to alarm	<50 mS
Standby "parking" snap delay	6 seconds
Long Term Drift	1/2% per decade (1st decade is 1 hr)
Temperature	10-40 degrees C
Field Adjustment	None required
Size	3/4" x 3-1/4" x 4-3/8"

Maintenance and Calibration†

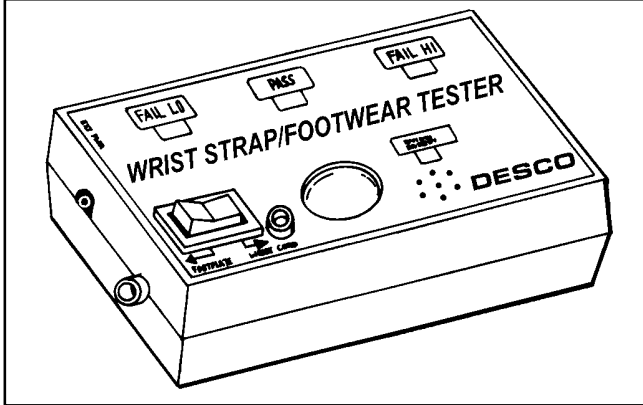
The Workstation Full Time Continuous Monitor is solid state and designed to be maintenance free. The 19210/19211 is calibrated to standards traceable to NIST. There are no user adjustments that can be made. Because of the impedance sensing nature of the test circuit, special equipment is required for calibration. We recommend that calibration be performed annually, using the #98220 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 #98220 is designed to be used on the shop floor at the workstation, virtually eliminating downtime, verifying that the continuous monitor is operating within tolerances.

*Limit can be varied and set to 1 gigohm maximum.

†This cannot be verified with standard DC test equipment. The Workstation Real Time Continuous Monitor is an impedance sensing device and the limits are determined by the magnitude and angle of the impedance.

Other Test Products Available from Desco

Combo Tester (Item 19250)



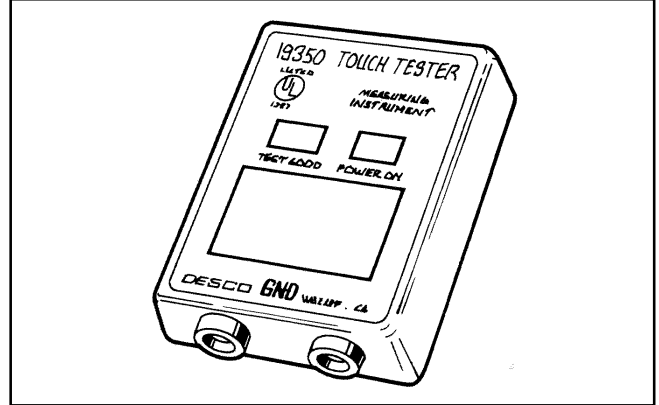
The 19250 Combination Tester is a 3-state touch tester designed for fast, frequent testing of ESD personnel grounding devices. The Combination Tester incorporates a unique dual test circuit design which improves accuracy of testing and eliminates the need for separate wrist strap and foot ground test units. The 19250 is equipped with a 750 kilohm - 10 megohm circuit, ideal for testing of wrist straps and a 750 kilohm - 100 megohm circuit designed for accurate testing of footwear. For more information ask for Technical Bulletin TB-2040.

Portable Wrist Strap Monitor (Item 19100)



The Desco Portable Wrist Strap Monitor continuously monitors the integrity of one operator and an ESD protective worksurface's discharge path to ground. The Monitor will provide virtually instantaneous notification of static control equipment failures, eliminating the need of periodic testing and costly record keeping. The Portable Wrist Strap Monitor is ideal for field service applications because it is battery operated. Also, for maximum portability, the belt clip allows the operator to fasten the monitor to his belt. However, if you wish to use the monitor with a field service kit or mat, two 10mm snaps on the bottom of the unit are installed for quick and easy grounding. For more information ask for Technical Bulletin TB-3001.

Touch Tester (Item 19350)



This economical Touch Tester has a pass range of 750 kilohm - 10 megohm ohm. The unit's compact design makes it perfect for the workbench. The tester contains a switch selectable audible alarm that makes this unit very user friendly. Two operators and a work surface can be conveniently grounded by this unit. This unit is available in two operating voltages, 120 VAC and 220 VAC. For more information on this tester ask for Technical Bulletin TB-2004.

Limited Warranty

Desco expressly warrants that for a period of five (5) years 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 five 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.