

# Multi-Mount Continuous Monitor Installation, Operation and Maintenance



Made in the  
United States of America



Figure 1. Desco Multi-Mount Continuous Monitor

The Multi-Mount Monitor and its accessories are available as the following item numbers:

Item	Description
<a href="#">19228</a>	Multi-Mount Monitor, North America
<a href="#">19229</a>	Multi-Mount Monitor, with Jewel® Wrist Strap, North America
<a href="#">19234</a>	Multi-Mount Monitor, Universal Power Adapter
<a href="#">19236</a>	Multi-Mount Monitor, with Jewel® Wrist Strap, Universal Power Adapter
<a href="#">19258</a>	Power Adapter, 100-240VAC Input, 24VDC 150mA Output, IEC Inlet
<a href="#">19260</a>	Power Adapter, 100-240VAC Input, 24VDC 150mA Output, North America Plug
<a href="#">98220</a>	Calibration Unit, for Wave Distortion Monitors

## 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 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 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.

All Desco single-wire monitors with wave distortion technology include the Park Snap feature. Use the Park Snap to store the operator's wrist cord and enable standby mode while the operator is away from the workstation. Before disconnecting the coil cord from the wristband, the operator touches the Park Snap to disable the audio alarm for 6 seconds. Within the 6 second period, the operator can disconnect their wrist cord from their wristband and attach it to the Park Snap before the audible alarm sounds.

## 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 "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 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

## WORKSURFACE CHANNEL

The Multi-Mount Continuous Monitor's circuitry is sufficiently sensitive to detect extremely low current, allowing it to be used with mats having a resistance of up to  $1.0 \times 10^7$  ohms Rtg. When the Monitor is connected to an ESD Mat worksurface, the amount of current that flows is a function of the total resistance between the monitor and through the worksurface to ground. When the resistance of the worksurface is below a pre-set threshold, the monitor will indicate good. Conversely, if the resistance level is high when compared to the monitor's reference, the unit will alarm. This is an integrating resistance measuring circuit, therefore it is relatively insensitive to externally induced electromagnetic fields. The resistance threshold is factory set to 10 megohms. (It can be special ordered to other limits. Limits can be varied and set to 100 megohms maximum).

## Packaging

### **19228 Multi-Mount Continuous Monitor, 120VAC**

- 1 Multi-Mount Continuous Monitor
- 1 24VDC Power Adapter, North America Plug
- 1 6' Mat Monitor Cord (Black)
- 1 6' Mat Ground Cord (Green and Yellow)
- 2 Push and Clinch Snaps
- 2 Mounting Screws
- 2 Countersink Washers
- 1 Set of Hook and Loop Fasteners
- 1 Zip Tie
- 1 Certificate of Calibration

### **19229 Multi-Mount Continuous Monitor, 120VAC**

- 1 Multi-Mount Continuous Monitor
- 1 24VDC Power Adapter, North America Plug
- 1 [09100](#) Jewel® Elastic Wristband
- 1 6' Mat Monitor Cord (Black)
- 1 6' Mat Ground Cord (Green and Yellow)
- 2 Push and Clinch Snaps
- 2 Mounting Screws
- 2 Countersink Washers
- 1 Set of Hook and Loop Fasteners
- 1 Zip Tie
- 1 Certificate of Calibration

### **19234 Multi-Mount Continuous Monitor, 220VAC**

- 1 Multi-Mount Continuous Monitor
- 1 24VDC Power Adapter without Power Cord
- 1 6' Mat Monitor Cord (Black)
- 1 6' Mat Ground Cord (Green and Yellow)
- 2 Push and Clinch Snaps
- 2 Mounting Screws
- 2 Countersink Washers
- 1 Set of Hook and Loop Fasteners
- 1 Zip Tie
- 1 Certificate of Calibration

## 19236 Multi-Mount Continuous Monitor, 220VAC

- 1 Multi-Mount Continuous Monitor
- 1 24VDC Power Adapter without Power Cord
- 1 [09100](#) Jewel® Elastic Wristband
- 1 6' Mat Monitor Cord (Black)
- 1 6' Mat Ground Cord (Green and Yellow)
- 2 Push and Clinch Snaps
- 2 Mounting Screws
- 2 Countersink Washers
- 1 Set of Hook and Loop Fasteners
- 1 Zip Tie
- 1 Certificate of Calibration

NOTE: The power cord must be purchased separately for Multi-Mount Monitor items [19234](#) and [19236](#). See the following EMIT items for available power cords:

Item	Power Cord Type
<a href="#">50545</a>	Europe
<a href="#">50546</a>	United Kingdom



Figure 2. 220VAC power adapter included with the Desco [19234](#) and [19236](#) Multi-Mount Continuous Monitors. Power cord sold separately.

## Features and Components

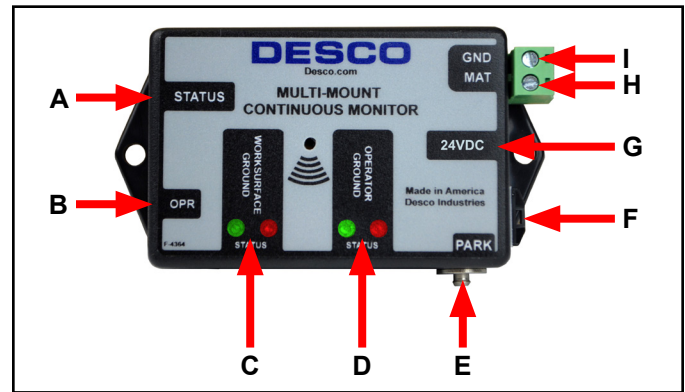


Figure 3. Multi-Mount Continuous Monitor features and components

**A. Status LEDs:** When the green LED is illuminated, the operator is properly grounded. When the red LED is illuminated, 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 illuminated, the worksurface mat is properly grounded. When the red LED is illuminated, the worksurface mat is not properly grounded.

**D. Operator Ground LEDs:** When the green LED is illuminated, the operator is properly grounded. When the red LED is illuminated, 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. Cable Tie Mount:** Pair with the included zip tie to secure the nearby power adapter cord and reduce strain on its plug.

**G. Power Jack:** Connect the power adapter here.

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

**I. Mat Ground:** Grounds worksurface mat.

## Installation

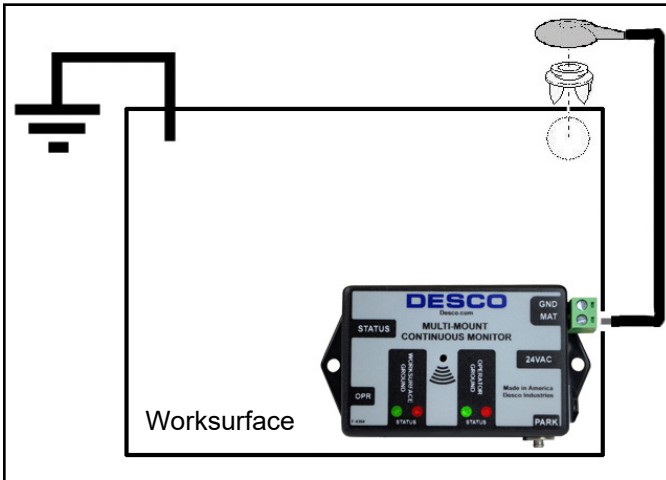


Figure 4. Installation method #1

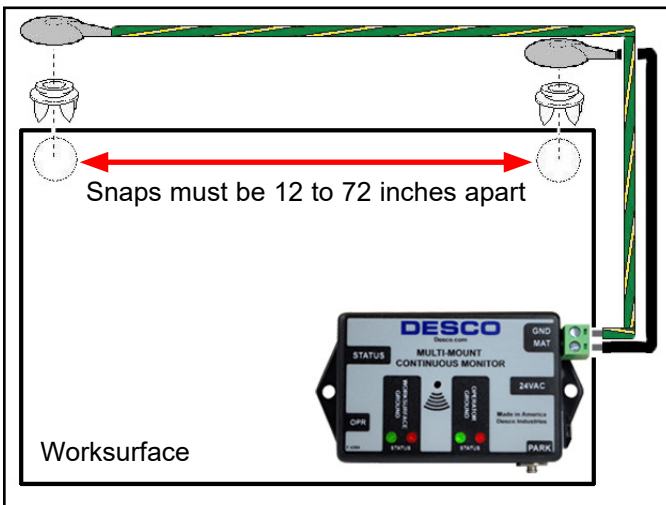


Figure 5. Installation method #2

1. Remove the monitor from the carton and inspect for damage.
2. Determine the mounting location of the Multi-Mount Continuous Monitor. Its LEDs should be visible to the operator. Use the included mounting screws or hook and loop fasteners if desired.
3. Attach the tinned wire end of the mat monitor cord to its appropriate terminal block connection located on the right-side of the monitor.
4. Route the mat monitor cord from 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 (see Figure 6).

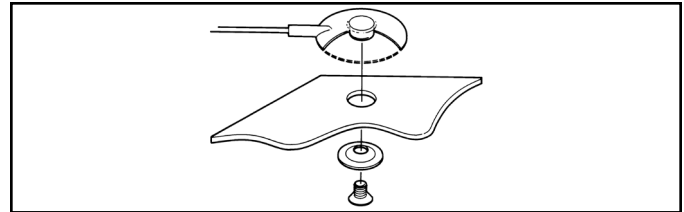


Figure 6. Screw allows ground cord to be bolted to mat to keep cord from disconnecting

5. The ground cord included with the Multi-Mount Continuous Monitor may be used to ground the worksurface mat if it is not already grounded. Attach the tinned wire end of the included ground cord to the appropriate terminal block connection on the right-side of the monitor.
6. Route the ground cord from 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. This snap must be installed 12 to 72 inches away from the snap used for the mat monitor cord.
7. Connect the power adapter to the power jack located on the right-side of the monitor. Route the wire from the supply to a nearby AC outlet and plug it 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.

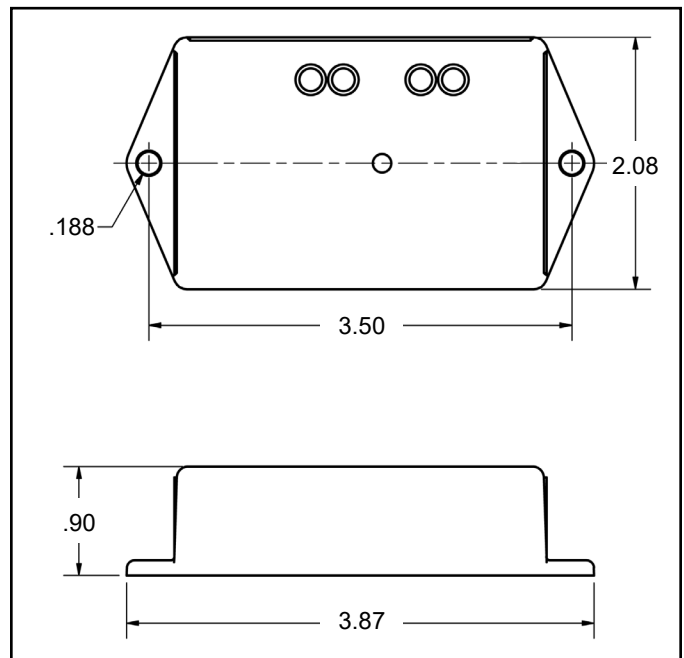


Figure 7. Mounting hole locations on the Multi-Mount Continuous Monitor (all dimensions are in inches)

## Operation

When the Multi-Mount Continuous Monitor is installed to an ESD protective worksurface 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 the operator is first plugged in.

The custom AC adapter connects the outlet ground to the barrel on the output plug. This is used to supply the Monitor with ground.

The worksurface resistance is measured between the two cords installed to the mat worksurface.

### USING THE MONITOR

1. Plug a wrist cord into the operator jack on the left side of the monitor. This automatically activates the selected operator channel. The red operator LED should turn on.
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 the wrist. 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 the wrist strap and confirm that it has a secure fit. If you have dry skin, apply an approved dissipative hand lotion such as Menda [35659](#) Reztore™ ESD Hand Lotion. When leaving the area, a person can take the coil cord along or leave it attached to the monitor in park position.

NOTE: Removing the banana plug from the monitor's operator jack will disable the audio alarm.

It is recommended that you use the Park Snap rather than continuously removing the banana plug from its jack. Doing so will increase the life span of the operator jack. If your process requires the constant insertion and removal of the banana plug, please contact your Desco Representative for alternate solutions.

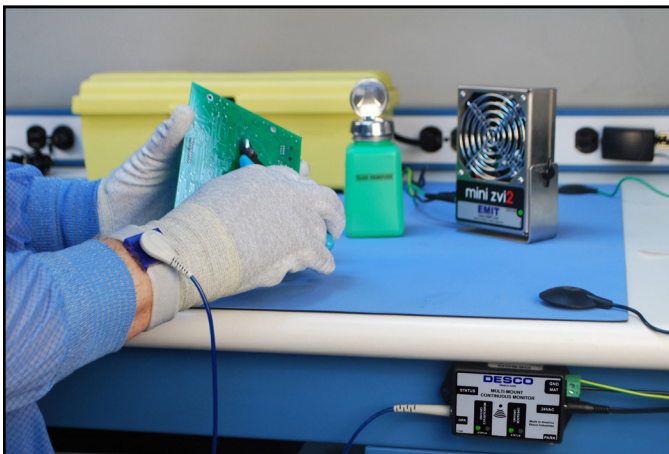


Figure 8. Using the Multi-Mount Continuous Monitor

## Calibration

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, Desco recommends that calibration be performed annually.

Use the Desco [98220](#) Calibration Unit for Wave Distortion Monitors to perform periodic verification (once every 6-12 months) of the Mini Monitor. The Calibration Unit can be used to check the test limits of the Multi-Mount Monitor without removing it from the workstation.

See [TB-2082](#) for more information.



Figure 9. Desco 98220 Calibration Unit for Wave Distortion Monitors

## Specifications

Input Voltage and Frequency (External Adapter)	AC/DC Power Adapter Power Input: 100-240VAC, 50/60 Hz  Power Output: 24VDC @ 150mA  Cable Length: 5 ft. (1.5 m)
Operating Temperature	50 to 95°F (10 to 35°C)
Environmental Requirements	Indoor use only at altitudes less than 6500 ft. (2 km)  Maximum relative humidity of 80% up to 85°F (30°C) decreasing linearly to 50% @ 85°F (30°C)
Dimensions	3.87" L x 2.08" W x .90" H (98 mm x 53 mm x 23 mm)
Weight	0.1 lbs. (0.05 kg)
Operator Test Range*	500 kilohms to 10 megohms impedance
Worksurface Test Limit**	10 megohms (±10%)
Operator Test Voltage	1.2V peak-to-peak @ 1.2µA, open circuit
Worksurface Test Voltage	5 to 7.5V, open circuit
Alarm Response Time	<50 ms
Country of Origin	United States of America

\*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.

\*\*The worksurface mat must have a conductive layer such as Dual Layer Rubber or Dissipative 3-Layer Vinyl with conductive buried layers. Desco workstation monitors are not recommended for use with homogeneous matting.

## Limited Warranty, Warranty Exclusions, Limit of Liability and RMA Request Instructions

See the Desco Warranty -

<http://desco.descoindustries.com/Limited-Warranty.aspx>