



Made in the United States of America

## Multi-Mount Continuous Monitor Operation, Installation, and Maintenance



Figure 1. Vermason's Multi-Mount Continuous Monitor

### Description

Leading companies use continuous monitors as a cost effective component in satisfying some of the audit and check requirements of EN 61340-5-1.

Wrist strap testing "Where continuous monitoring is used, no additional testing is required." [EN 61340-4-1, per A.5.2]

"The wrist band will normally be worn for several hours at a time so it needs to be comfortable while making good contact with the skin. It is a good idea to check the wrist strap every time it is applied. Constant on line monitors can be used so that any breaks will be immediately found." [EN 61340-5-2 section 5.2.7]

"The main advantage to a constant monitor is the immediate indication that the employee receives if the wrist strap falls open. With an unmonitored system, the employee will not be aware of a wrist strap failure until the start of the next shift. This has reliability benefits for an ESD program as it might help reduce or eliminate ESD damage.

There are also other process benefits from using constant monitors such as the elimination of the need to maintain daily test logs and a reduction in the time for employees to make the daily test. For units that also monitor the connection of a work surface to protective earth, it is also possible to reduce or eliminate the checking of the work surface as part of the periodic audit of the process." [CLC/TR 61340-5-2:2008 User guide Annex B.1.3 Constant monitors]

The Vermason Multi-Mount Continuous Monitor continuously monitors the integrity of one operator and one working surface. 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 Vermason Multi-Mount Continuous Monitor is available in one model:

Model	Voltage AC	Calibration
<a href="#">222605</a>	220	NIST

The Multi-Mount Continuous Monitor is a real time instrument that ensures that critical ESD generators in a ESD protected are effectively grounded.

The instant an operator's wrist strap or working surface 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 EN 61340-5-1 test logging.

### WAVE DISTORTION DETECTION TECHNOLOGY PROVIDES TRUE 100% CONTINUOUS MONITORING

From all the technical alternatives available, Vermason 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 Vermason Multi-Mount Continuous Monitor allows the use of any standard, single-wire wrist strap and coiled cord.

The monitor/wrist strap/cord system life-cycle costs are by far lower than alternative systems which require dual-wire cords and special wrist straps. Over a five year period, the dual-wire system can be 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".\*

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.



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. Working Surface Ground LEDs:

When the green LED is lit, the working surface mat is properly ground. When the red LED is lit, the working surface 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 coiled cord from the wrist band and park it on this snap. While parked, the coiled 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 coiled cord from the parking snap, the operator has six seconds to hook up to the wrist band before the alarm sounds.

**F. 10mm 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 coiled cord from the wrist band and park it on this snap. While parked, the coiled 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 coiled cord from the parking snap, the operator has six seconds to hook up to the wrist band before the alarm sounds.

**G. 24 VAC Power Jack:** Connect the power adapter here.

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

**I. Mat Ground:** Grounds working surface mat.

## Installation

Remove the monitor from its packaging and inspect for any shipping damage. Confirm that the working surface is 1 x 10E7 ohms or less and has a conductive layer 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:

- 1 Multi-Mount Monitor
- 1 6' Mat Monitor Cord (Black)
- 1 6' Mat Ground Cord (Green and Yellow)

- 2 Push and Clinch Snaps
- 2 Mounting screws
- 2 Counter Sink Washers
- 1 Set of hook and loop fasteners
- 1 Power Adapter
- 1 Certificate of Calibration

- I. A convenient 220 VAC outlet should be located and tested for proper wiring and grounding. We recommend Vermason items [224713](#) and [224714](#) AC Outlet Analyzer to verify proper wiring and ground.
- II. 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.
- III. Install Screws and Washers or Push and Clinch snaps 12 to 72 inches apart from each other on the work surface mat. Make sure that they pierce and clinch the bottom side of the mat. (See Figure 3).
- 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.

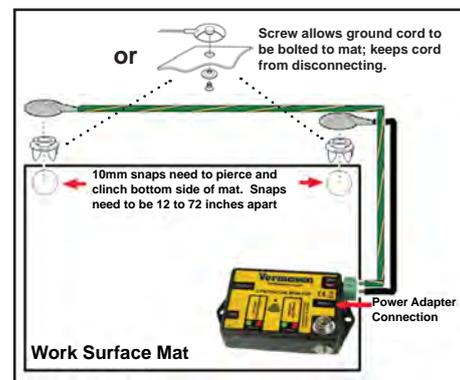


Figure 3. Installation method #1 of the Multi-Mount Continuous Monitor

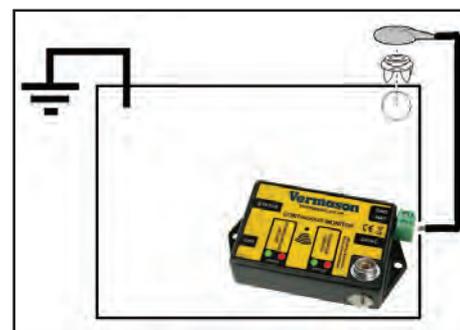


Figure 4. Installation method #2 of the Multi-Mount Continuous Monitor

\* The working surface resistance is measured between the two cords installed to the mat working surface (See Figure 3).

## Operation

When the Multi-Mount Continuous Monitor is installed to an ESD protective working 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.

### 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 working surface. 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 Vermason 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 the operator wrist cord is removed from unit and will instantly shut off when the cord is attached to the parking snap.

NOTE: It is recommended that you use the Parking Snap rather than continuously removing the Banana Plug from its jack. If your process requires the constant insertion and removal of the Banana Plug, please contact your Vermason Representative for alternate solutions.

### 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.

### WORKING 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

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

(98.0mm L x 53.3mm W x 23.1mm 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.

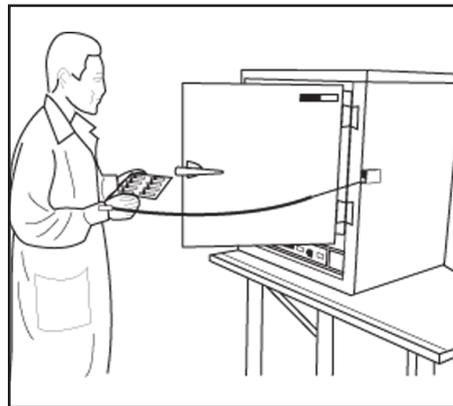


Figure 5. Using the Multi-Mount Continuous Monitor

Note: Working surface must have a conductive layer such as Dual Layer Rubber or Dissipative 3-Layer Vinyl or Micastat® Dissipative Laminate with conductive buried layers. Vermason 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 [222605](#) 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 Vermason [222750](#) 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 [222750](#) is designed to be used on the shop floor at the workstation, virtually eliminating downtime, verifying that the continuous monitor is operating within tolerances. Vermason recommends calibration annually.

### Limited Warranty

Vermason expressly warrants that for a period of one (1) year from the date of purchase, Vermason Continuous Monitors will be free of defects in material (parts) and workmanship (labour). Within the warranty period, a unit will be tested, repaired or replaced at Vermason's option, free of charge. Call Customer Service at 0044 (0) 1462 672005 for a Return Material Authorisation (RMA) and for proper shipping instructions and address. Any unit under warranty should be shipped prepaid to the Vermason factory. You should include a copy of your original packing slip, invoice, or other proof of purchase date. Warranty repairs will take approximately two weeks.

If your unit is out of warranty, Vermason will quote repair charges necessary to bring your unit to factory standards. Call Customer Service at 0044 (0) 1462 672005 for a Return Material Authorisation (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 Vermason 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.