WSM-GG3

Work Station Monitor – Ground Gard 3

Operation, Installation, and Maintenance

Made in America

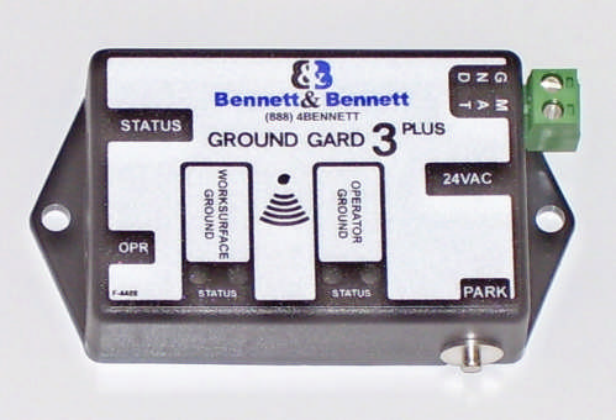

Figure 1. WSM-GG3 Workstation Monitor

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 WSM-GG3 Work Station 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 WSM-GG3 Work Station Monitor suitable for most any machinery or workbench even in hard to reach locations.

The WSM-GG3 Work Station 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 feature 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. The WSM-GG3 Work Station Monitor eliminates 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, Bennett & Bennett 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 WSM-GG3 Work Station 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 WSM-GG3 Work Station 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 WSM-GG3 Work Station 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 WSM-GG3 Work Station 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.

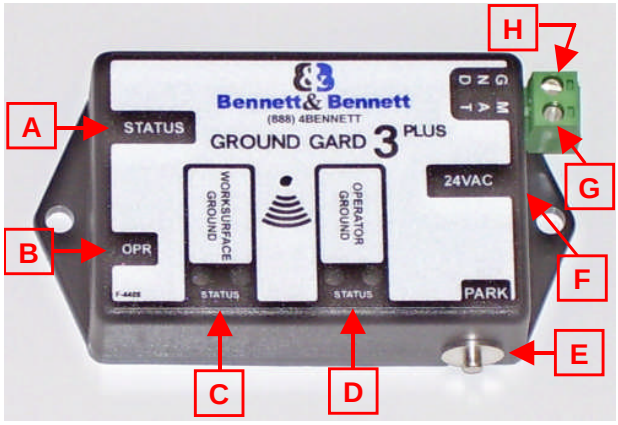

Figure 2. WSM-GG3 Work Station Monitor features and components

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.

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

*1 981 article by Donald E. Frank - Electrical Overstress / Electronic Discharge Symposium Proceedings

Installation

Remove the monitor from its packaging and inspect for any shipping damage. Confirm that the work surface has a conductive layer such as Dual Layer Rubber, Dissipative 3-Layer Vinyl, or Dissipative Laminate with conductive buried layers. Included with each WSM-GG3 Work Station 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 (19226 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.

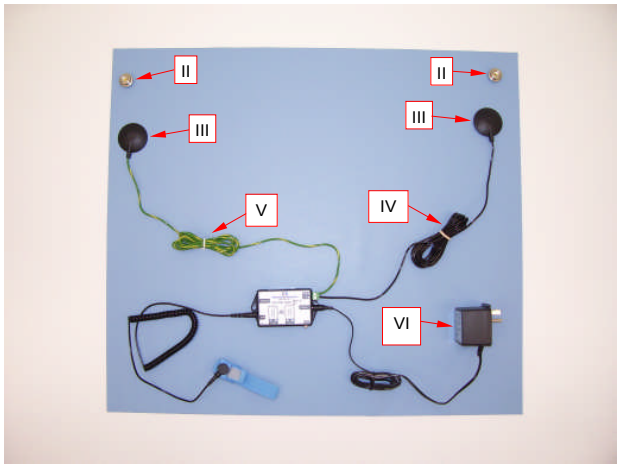

Figure 3. Installation of the WSM-GG3 Work Station Monitor

Operation

When the WSM-GG3 Work Station 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 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. 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. 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 WSM-GG3 Work Station Monitor monitoring circuitry is sufficiently sensitive to detect extremely low current when used with a worksurface with a conductive layer.

Specifications:

Operating Voltage	120 VAC, 50/60 Hz
Work Surface Range	10 Megohms
Response time to alarm	<50 ms
Operating Temperature	0 - 40°C
Size	3.86"L x 2.10"W x .910"H

Note: Work surface must have a conductive layer such as Dual Layer Rubber or Dissipative 3-Layer Vinyl or Dissipative Laminate with conductive buried layers.

WSM-GG3 Work Station Monitor Continuous Monitors are not recommended for use with homogeneous matting.

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

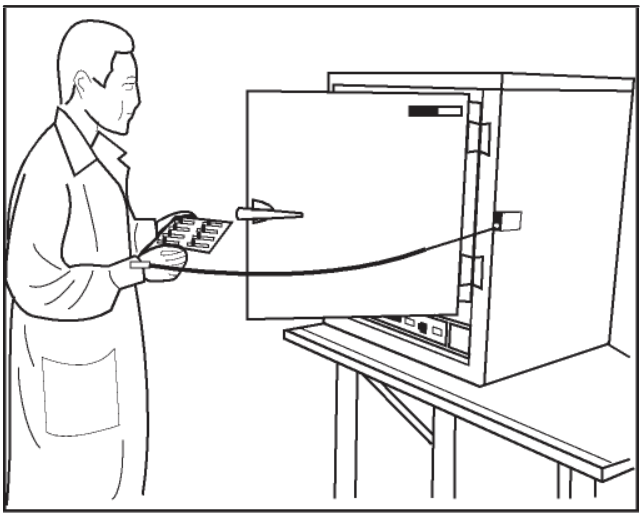

Figure 4. Using the WSM-GG3 Work Station Monitor

Maintenance and Calibration

The WSM-GG3 Work Station Monitor is solid state and designed to be maintenance free. The WSM-GG3 Work Station Monitor 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. Contact Bennett & Bennett for NIST traceable calibration options of the WSM-GG3 Work Station Monitor, and verification that the Work Station 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

Bennett & Bennett expressly warrants that for a period of one (1) year from the date of purchase WSM-GG3 Work Station Monitors will be free of defects in material (parts) and workmanship (labor). Within the warranty period, a credit for purchase of replacement WSM-GG3 Work Station Monitors or at Bennett & Bennett option, the WSM-GG3 Work Station 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 our Customer Service Department at 1-888-4BENNETT 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 Bennett & Bennett factory. Warranty replacements will take approximately two weeks.

If your unit is out of warranty, call our Customer Service Department at 1-888-4BENNETT for a Return Material Authorization (RMA) and proper shipping instructions and address. Bennett & Bennett 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 Bennett & Bennett 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.

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