

# Instruction Manual

## Single Wire, Wrist Strap and Table Mat Ground Continuity Monitors



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### Description

Single Wire Wrist Strap and Table Mat Constant Ground Monitors , ACM Series Continuously verify the integrity of the ground system which is critical to an effective ESD protection program. Using specialized impedance sensing technology, the ACM0, ACM1 and ACM2 single wire monitoring products continuously check the total ground loop, including the operator, the wrist band and the coil cord. The systems are compatible with most wrist straps. Units are tested to NIST traceable standards and require no user adjustments.

#### Reliable, Repeatable Results

Accuracy and reliability are improved with the impedance technology incorporated into our constant monitors. False alarms disappear and adjustments are not necessary. Powered and grounded by an AC adapter, the system is fully automatic and begins sensing when a coil cord is plugged into the unit. A green light indicates a safe connection and a red light and audible alarm communicate an unsafe connection.

#### Continuous Monitors pay for themselves

ESD-S1.1 notes that it is not necessary to test wrist straps daily when using constant monitoring systems. Higher value-added products especially benefit from the certainty of continuous monitoring. The ACM0, ACM1 and ACM2 are perfect solutions for assuring workstation grounding protection.

## Installation

1. Remove all items from carton and confirm you have received all items contained in the "Parts Included List."
2. Choose a location on the work station to mount the monitor where LED lights are visible and alarm can be heard by operators. Frequently, monitors are mounted toward the front edge of workstation or under an eye level shelf.

**NOTE:** ACM1 and ACM2 have an optional requirement for a Common Point ground.

3. Mount monitor securely to workstation using the included screws, Velcro, or stainless steel bracket included with monitor model. Refer to installation diagrams.

**NOTE:** For ACM2 installation move to Step 4 for all other monitors skip to Step 5.

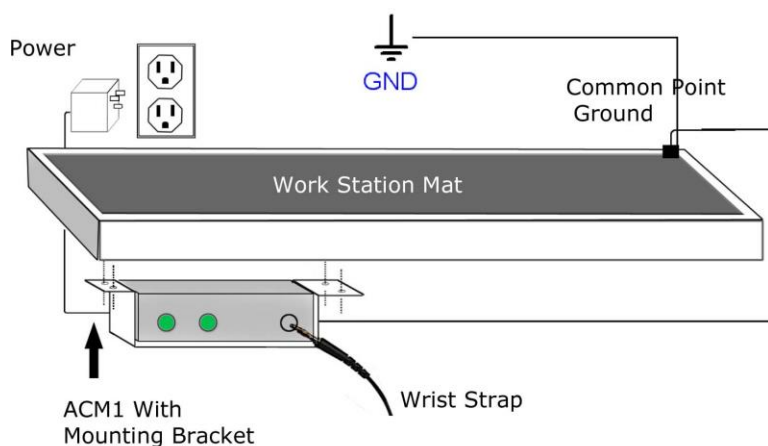
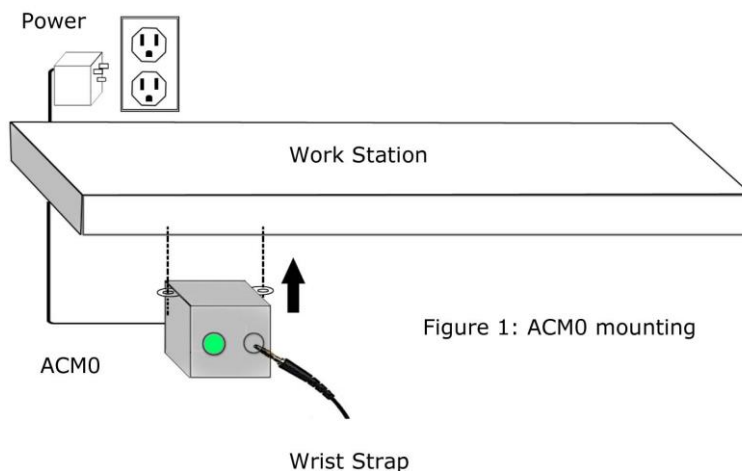
4. **ACM2 Only:** To install remote wrist strap monitors, locate a convenient location for operators and mount with included screws. Frequently remote monitors are mounted on the underside of work bench near the front edge.
5. **ACM1 and ACM2 ONLY:** Plug wire from the Common Point Ground in the banana jack labeled "Bench System Ground" on back of the monitor.
6. Insert the power cord into the inlet labeled "POWER" on the back of unit and connect the AC adapter to a proper power source.

**NOTE:** For ACM2 installation move to **Step 6** for all other monitors skip to **Step 7**.

7. **ACM2 ONLY:** Plug the first wrist strap's coiled cord into the banana jack labeled "LEFT WRIST STRAP" or "RIGHT WRIST STRAP" on the back of the monitor. Re-peat process with second wrist strap using remaining jack. The "Operator" lights on the front the of unit should turn GREEN when wrists straps are placed around the wrist.
8. **ACM0 and ACM1 ONLY:** Plug the wrist strap's coiled cord into the banana jack on the front of the monitor. The "Operator" lights on the front the of unit should turn GREEN when wrists straps are placed around the wrist.

**NOTE:** If wrists strap LED lights do not turn green when wrist strap is placed on wrist, touch the wrist strap to the Common Point Ground. If LED light turns green the wrist strap was not making good contact with the operators wrist.

## Installation Diagrams



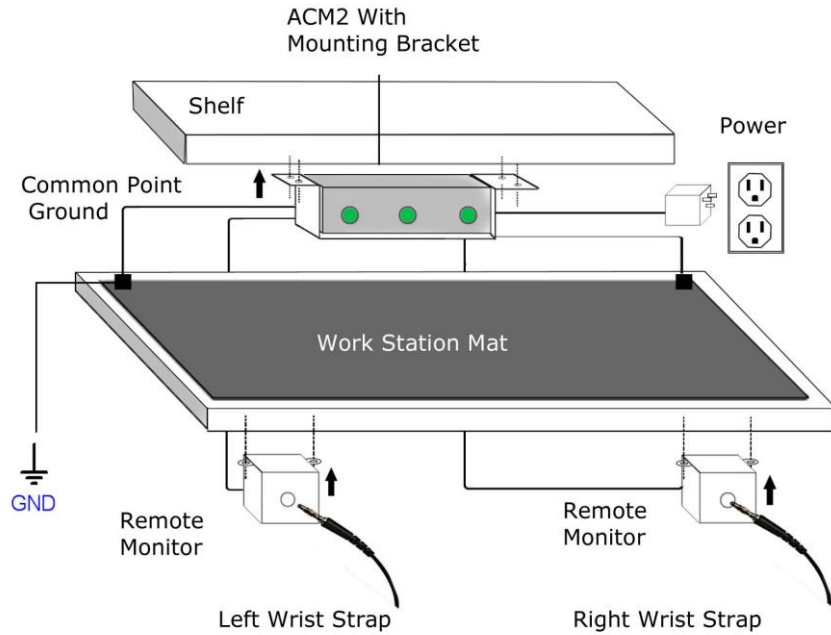


Figure 3: ACM2 mounting

**CALIBRATION AND PERIODIC TESTING:**

Alarm resistance limits are set by the precision resistors inside the tester and never need calibration. You can verify proper operation of the monitor by periodically testing monitor with an NIST traceable resistance limit comparator box from Bokar International.

**Operation**

**Wrist strap monitor operation.**

Monitoring begins when the coiled cord of the wrist strap is plugged into the monitor or remote jack. The status of a wrist strap resistance is indicated by a the tricolor LED and audible Alarm:

**Stand-by indication.**

If the wrist strap is removed or not being worn but is still plugged into monitor, an audible alarm will sound for 7-10 seconds, and the “OP” (operator) led will be will be blink RED.

**Normal indication.**

For normal operating resistance “OP” led will be GREEN.

**High alarm.**

If the operator wrist strap is plugged into the remote and resistance is higher than maximum, the “OP” led will be RED and audible alarm will sound.

**Bench System Ground (BSG) operation.**

If unit is equipped with (BSG) monitoring capabilities, monitoring begins when the coiled cord of the Common Point Ground is plugged into the (BSG) jack. The status of a (BSG) resistance is indicated by a the tri-color LED and audible Alarm:

**Normal (BSG) indication:** For normal operating resistance led will be GREEN.

**High (BSG) alarm:** If GND resistance is higher than maximum limit, led will be RED and audible alarm will sound.

**Product Specifications**

Performance Specifications	
Wrist strap open circuit voltage	0.7 VDC, +0.1VDC @ < 2mA
Mat open circuit voltage	5.0—7.5 VDC
Alarm indicators	Visual, audible (green: safe, red: unsafe)
Alarm set point	
Wrist strap	38 to 87pF (human body); with 1 Mohm wrist strap resistance
Mat	6.5 Mohm

<b>Unit monitoring capabilities</b>	
ACM0	One wrist strap/person
ACM1	One wrist strap + mat
ACM2	Two wrist straps + mat
ATM-9201, ATM-9202, ATM-9203	Periodic verification tools for units
<b>Dimensions (H x W x D) / Weight</b>	
ACM0	0.88" x 1.75" x 1.25" (2.24 x 4.45 x 3.18 cm) / 7.4 oz (210 g)
ACM1	1.00" x 2.40" x 2.30" (2.54 x 6.10 x 5.84 cm) / 7.8 oz (221 g)
ACM2	1.00" x 4.00" x 2.40" (2.54 x 10.16 x 6.10 cm) / 12.4 oz (352 g)
Mounting	Mounting materials included
<b>Power Supply: Please note that you need to specify AC line voltage when ordering</b>	
Input	120VAC—60hz or 230VAC – 50Hz
Output	12VDC, 200mA
Audible Alarm	10 beeps (max); 5 seconds
Adjustment	No adjustments required

## Parts included:

1. ACM0 series workstation monitor with mounting screws.
2. ACM2 only: Two (2) remote terminals boxes with mounting screws.
3. Power Supply: wall plug-in: 120 or 230V. Output: 12-15 Volts DC, 200 mA, 2.1mm center positive output).
4. ACM1 and ACM2 Only: Mounting Bracket and mounting screws.
5. ACM0 only: Two (2) mounting screws.

## Service and Warranty

Bokar International provides a limited warranty. All new products are guaranteed to be free from defects in material and workmanship for a period of one (1) year from the date of shipment. Liability is limited to servicing (after evaluating, repairing or replacing) any product returned to Bokar International. The company does not warrant damage due to misuse, neglect, alteration or accident. In no event shall Bokar International be liable for collateral or consequential damages.

To receive service under warranty, please contact Bokar International Technical Support.



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**Other:** [www.SMT-ESD.com](http://www.SMT-ESD.com) [www.SuperiorScrewdrivers.com](http://www.SuperiorScrewdrivers.com) [www.Super-Iron.com](http://www.Super-Iron.com)

**Latest Additions:** [www.ULT.de](http://www.ULT.de) (excellent German made Fume extractors)  
[www.PCBprototypingRobot.com](http://www.PCBprototypingRobot.com)



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