



## ***Continuous Workstation Monitors*** Model CM400 Series



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Instruction Manual

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## Service and Warranty

Ground Zero Electrostatics provides a limited warranty for the Model CM2015. 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 Ground Zero Electrostatics. The company does not warrant damage due to misuse, neglect, alteration or accident. In no event shall Ground Zero Electrostatics be liable for collateral or consequential damages.

To receive service under warranty, please contact Ground Zero Electrostatics Technical Support.

## About Ground Zero Electrostatics

Since 1998, Ground Zero Electrostatics has helped electronic manufacturing facilities to protect their products and processes from the many serious problems associated with static electricity.

Ground Zero Electrostatics offers a wide range of unique and outstanding products to detect, protect, eliminate and monitor electrostatic charges. Our products are integral components of an effective static control program.

## Product Specifications

## Description

### Monitors: CM400 Series

#### **Dimensions/Weight**

**CM400** 0.88" H x 1.75" W x 1.25" D  
(2.24 x 4.45 x 3.18 cm)  
**7.4 oz.**

**CM410** 1.00" H x 2.40" W x 2.30" D  
(2.54 x 6.10 x 5.84 cm)  
**7.8 oz**

**CM420** 1.00" H x 4.00" W x 2.40" D  
(2.54 x 10.16 x 6.10 cm)  
**12.4 oz**

Mounting Mounting materials included

#### **Power Supply**

Input 120VAC—60hz  
Output 12VDC, 200mA  
Audible Alarm 10 beeps (max); 5 seconds  
Adjustment No adjustments required

Continuously verifying the integrity of the ground system is critical to an effective ESD protection program. Using specialized impedance sensing technology, the CM400, CM410 and CM420 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 CM400, CM410 and CM420 are perfect solutions for assuring workstation grounding protection.

## Parts Included List

1. CM400 series workstation monitor
2. CM420 only: Two (2) remote terminals boxes
3. Plug-in Power Supply (12-15 Volts DC, 200 mA, 2.1mm center positive output)
4. CM410 and CM420 Only: Velcro or Mounting Bracket
5. CM400 only: Two (2) mounting screws

## Installation

1. Remove all items from carton and confirm you have received all items contained in the "Parts Included List." located on Page 8.
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: CM410 and CM420 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 located on Page 4 and 5

*NOTE: For CM420 installation move to **Step 4** for all other monitors skip to **Step 5**.*

4. **CM420 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. **CM410 and CM420 ONLY:** Plug wire from the Common Point Ground in the banana jack labeled "Bench System Ground" on back of the monitor.

## 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 megohm wrist strap resistance
Mat	6.5 megohm

### Unit monitoring capabilities

<b>CM400</b>	One wrist strap/person
<b>CM410</b>	One wrist strap + mat
<b>CM420</b>	Two wrist straps + mat
<b>CAL400</b>	NIST Calibrated Periodic verification tool for CM400
<b>CAL410</b>	NIST Calibrated Periodic verification tool for CM410
<b>CAL420</b>	NIST Calibrated Periodic verification tool for CM420

## 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 tricolor 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.

## Installation Cont.

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 CM420 installation move to **Step 6** for all other monitors skip to **Step 7**.*
7. **CM420 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. **CM400 and CM410 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

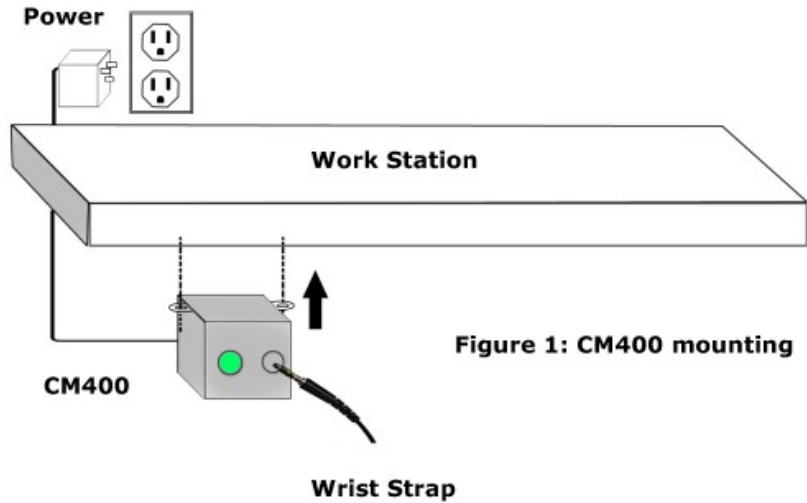


Figure 1: CM400 mounting

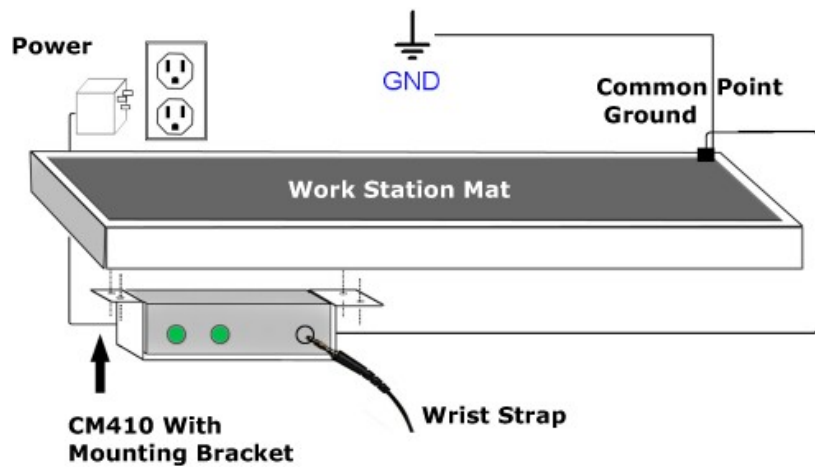


Figure 2: CM410 mounting

## Installation Diagrams Cont.

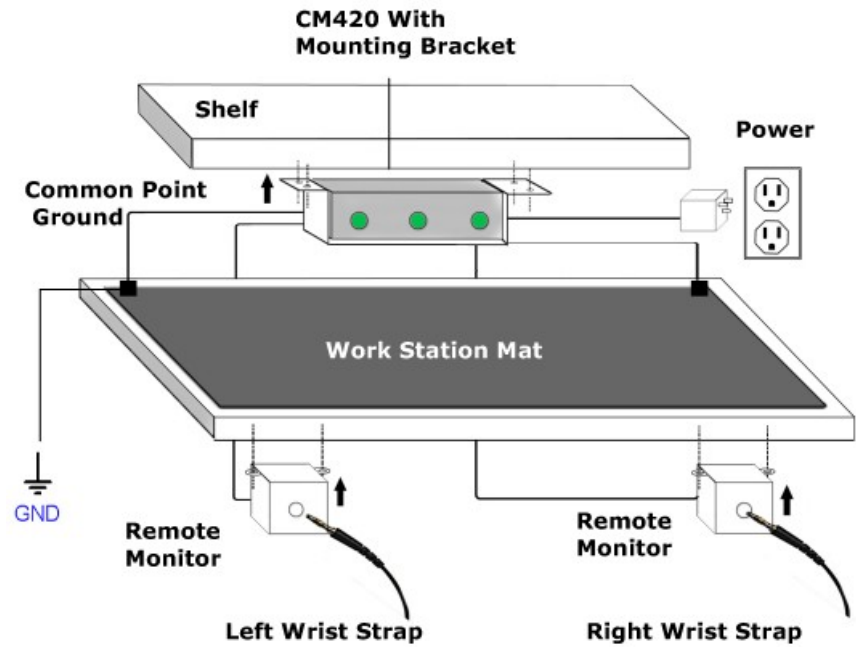


Figure 3: CM420 mounting

### CALIBRATION AND PERIODIC TESTING:

Alarm resistance limits are set by the precision resistors in-side 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 Ground Zero Electrostatics, from the Cal 400 Series.