

# STATICO

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## RESISTIVE-BASE DUAL WORKSTATION/WRIST STRAP MONITORING SYSTEM

### MODEL No. SM-2



### Description

***SM-2 IS A RESISTIVE-BASE DUAL ESD GROUNDING WORKSTATION MONITORING SYSTEM, WHICH IS DESIGNED FOR THE PRECISE, AND EFFICIENT MONITORING OF A STATIC FREE WORKSTATION WITH THE HIGHEST PERFORMANCE RATING. THIS COMPACT SYSTEM MONITORS DUAL CONDUCTOR WRIST STRAPS, STATIC DISSIPATIVE WORK-SURFACE MAT, AND OPTIONAL LOW RESISTANCE "GND" ON TWO WORKSTATIONS SIMULTANEOUSLY. NIST CERTIFIED.***

## **SYSTEM FEATURES**

*Audiovisual status indicators for :*

*Dual-Conductor Wrist Strap (Operator)*

*Work-Surface Mat*

*Tool Resistance*

*Audiovisual Status Indicators:*

*When there is a Bad Connection from the Monitor to Operators' Remote Receptacles.*

*When the Operator is Plugged into a Non-Monitored Jack.*

*Typical Wrist Strap-Operator voltage: 100 mV (Max 0.9V) under Wrist Strap Open Condition.*

*Maximum Mat (Soft Ground) voltage: 900 mV*

*Maximum Tool (Hard Ground) voltage & current: 50mV & 0.2 mA.*

## **ELECTRICAL SPECIFICATIONS**

*Wrist-strap resistance alarm limit:*

*Low Alarm < 1.8 MOhm series resistance.*

*High Alarm > 10 MOhm or 35 MOhm series resistance.*

*Maximum wrist-strap operator voltage:*

*0.9 V under wrist strap open fault conditions.*

*Mat (Soft Ground) resistance alarm limit:*

*High Alarm > 3.5 MOhm series resistance.*

*Other alarm limits available.*

*Maximum Mat (Soft Ground) voltage:*

*Less than 1 V even under fault conditions*

*Tool (Hard Ground) resistance alarm limit:*

*High Alarm > 10 Ohm series resistance. Other alarm limits available.*

*Maximum Tool (Hard Ground) voltage:*

*Less than 0.05 V even under fault conditions*

*Maximum Tool (Hard Ground) current:*

*Less than 0.2 ma*

*Power Supply: 7-12V DC 150 ma*

## **MECHANICAL SPECIFICATION**

### **Dimensions**

WIDTH: 4 IN (100 MM)  
HEIGHT: 1 IN (25 MM)  
LENGTH: 3 IN (75 MM)

*Monitor Case Material:* STAINLESS STEEL  
*The System Include*

THE MONITOR (1 EACH).  
REMOTE OPERATOR/GUEST JACK, 6 FT LONG (2 EACH).  
3-POSITION OR 5-POSITION (REMOVABLE) PLUG FOR CONNECTING THE MAT, THE  
TOOL, AND THE REFERENCE ESD GND.  
OPTIONAL PLUG-IN POWER SUPPLY (9-15 VDC, 100-600 MA, 2.1MM CENTER  
POSITIVE OUTPUT).

## **Installation and Operating Instructions**

REMOVE DEVICE FROM THE CARTON AND INSPECT FOR DAMAGE. INCLUDED IN THE  
CARTON SHOULD BE:

1. SM-2 DUAL WORKSTATION MONITOR
2. TWO REMOTE TERMINALS
3. PLUG-IN POWER SUPPLY (9-15 VOLTS DC, 100-600 MA, 2.1MM CENTER POSITIVE  
OUTPUT)
4. TWO 10 FT, 4 WIRE TELEPHONE CABLES
5. INSTALLATION AND OPERATING INSTRUCTIONS

### **INSTALLATION**

PLEASE READ FOLLOWING INSTRUCTIONS BEFORE PROCEEDING WITH  
INSTALLATION.

1. INSTALL SM-2 MONITOR IN THE LOCATION WHERE ALARM INDICATORS WILL BE  
VISIBLE.
2. INSTALL REMOTE WRIST STRAP TERMINALS IN THE CONVENIENT LOCATION FOR  
OPERATORS.

3. PLUG TELEPHONE CABLE FROM THE LEFT REMOTE TO OP1 CONNECTOR ON THE BACK OF THE MONITOR.
4. PLUG TELEPHONE CABLE FROM THE RIGHT REMOTE TO OP2 CONNECTOR ON THE BACK OF THE MONITOR.
5. CONNECT GROUNDING ZERO OHM WIRE TO THE TERMINAL ON THE BACK OF THE MONITOR LABELED ESD GROUND.

IF THERE ARE NO GROUNDED ESD MATS TO BE MONITORED, CONNECT A WIRE FROM M1 AND M2 TERMINALS TO THE ESD GROUND TERMINAL ON THE BACK OF THE MONITOR AND SKIP STEPS 6 AND 7.

6. CONNECT MONITOR WIRE FROM THE FIRST GROUNDED MAT TO THE TERMINAL ON THE BACK OF THE MONITOR LABELED M1.
7. CONNECT MONITOR WIRE FROM THE SECOND GROUNDED MAT TO THE TERMINAL ON THE BACK OF THE MONITOR LABELED M2.

**NOTE:** MAT HAS TO BE GROUNDED WITH ZERO OHM WIRE FOR PROPER MAT MONITORING OPERATION. GROUNDING MAT WITH WIRE HAVING 1M RESISTOR MAY CAUSE ALARMS DUE TO THE ELECTRICAL NOISE.

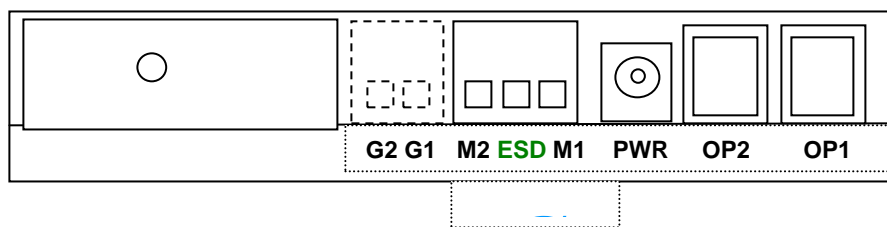
IF YOUR PARTICULAR WORKSTATIONS ARE GROUNDED WITH 1M RESISTANCE DUE TO SAFETY CONCERNS, PLEASE INDICATE THAT AT THE TIME OF THE ORDER. MONITOR WILL BE MODIFIED TO ACCOMMODATE THAT REQUIREMENT.

IF MONITOR HAS OPTIONAL LOW RESISTANCE MONITORING CALLED "GND" MONITORING, BUT THERE ARE NO GROUNDED CONNECTIONS NEEDED TO BE MONITORED, CONNECT A WIRE FROM G1 AND G2 TERMINALS TO ESD GROUND TERMINAL ON THE BACK OF THE MONITOR AND SKIP STEPS 8 AND 9.

8. CONNECT MONITOR WIRE THE FIRST GROUNDED CONNECTION TO THE TERMINAL ON THE BACK OF THE MONITOR LABELED G1.

9. CONNECT MONITOR WIRE THE SECOND GROUNDED CONNECTION TO THE TERMINAL ON THE BACK OF THE MONITOR LABELED G2.

10. PLUG POWER SUPPLY INTO THE PWR CONNECTOR ON THE BACK OF THE MONITOR AND INTO THE POWER LINE.



**Figure 1, Back View**

## **OPERATIONS**

### **WRIST STRAP MONITOR OPERATION**

THE STATUS OF A DUAL WRIST STRAP RESISTANCE IS INDICATED BY A TRICOLOR LED.

#### **STAND-BY INDICATION.**

IF OPERATOR WRIST STRAP IS NOT PLUGGED INTO THE REMOTE, "OP" (OPERATOR) LED WILL BE TURNED OFF.

#### **LOW WRIST STRAP ALARM.**

IF OPERATOR WRIST STRAP IS PLUGGED INTO THE REMOTE AND RESISTANCE IS LESS THAN 1.8M, "OP" LED WILL BE YELLOW AND AUDIBLE ALARM WILL SOUND.

#### **NORMAL WRIST STRAP INDICATION.**

FOR NORMAL OPERATING RESISTANCE "OP" LED WILL BE GREEN.

#### **HIGH WRIST STRAP ALARM.**

1. IF OPERATOR WRIST STRAP IS PLUGGED INTO THE REMOTE AND RESISTANCE IS HIGHER THAN MAXIMUM, LED WILL BE RED AND AUDIBLE ALARM WILL SOUND.
2. IF REMOTE IS NOT PLUGGED INTO THE MONITOR, OR THERE IS A BREAK IN THE CONNECTION BETWEEN THE MONITOR AND REMOTE, "OP" LED WILL BE RED AND AUDIBLE ALARM WILL SOUND.
3. IF WRIST STRAP IS PLUGGED INTO THE AUXILIARY "AUX" SOCKET AND "OP" SOCKET IS NOT USED, HIGH ALARM WILL SOUND TO INDICATE THAT OPERATOR IS PLUGGED INTO A NON-MONITORED CONNECTION. IF OPERATOR IS PLUGGED INTO AN "OP" SOCKET, PLUGGING A SECOND WRIST STRAP INTO AN "AUX" SOCKET WILL NOT CAUSE AN ALARM.

### **MAT MONITOR OPERATION**

#### **NORMAL MAT INDICATION**

FOR NORMAL OPERATING RESISTANCE LED WILL BE GREEN.

#### **HIGH MAT ALARM**

IF MAT RESISTANCE IS HIGHER THAN MAXIMUM LIMIT, LED WILL BE RED AND AUDIBLE ALARM WILL SOUND.

## **GND MONITOR OPERATION.**

### **NORMAL GND INDICATION**

FOR NORMAL OPERATING RESISTANCE LED WILL BE GREEN.

### **HIGH GND ALARM**

IF GND RESISTANCE IS HIGHER THAN MAXIMUM LIMIT, LED WILL BE RED AND AUDIBLE ALARM WILL SOUND.

### **STANDARD ALARM SETTINGS**

ALARM SETTINGS FOR A WRIST STRAP ARE 1.8M FOR “LOW” ALARM AND 10M FOR HIGH ALARM.

ALARM SETTING FOR A MAT IS 3.5M FOR HIGH ALARM.

FOR OPTIONAL “GND” INPUTS ALARM SETTING FOR HIGH ALARM IS 10 OHM.

FOR ALARM SETTINGS DIFFERENT FROM STANDARD, CONTACT FACTORY OR LOCAL SALES REPRESENTATIVE AT THE TIME OF ORDERING.

### **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 RESISTANCE TEST BOX, PART NUMBER SM-2 TESTER.

### **PERFORMANCE AND TECHNICAL SPECIFICATION**

SM-2 IS DESIGNED TO BE USED INDOORS AT A TEMPERATURE RANGE 10°C TO 50°C.

OPERATOR WRIST STRAP IS GROUNDED THROUGH 2M RESISTORS INSIDE THE MONITOR.

ALARM LIMITS	MIN.	TYPICAL	HI
WRIST STRAP LOW LIMIT	1.6M	1.8M	2.0M
WRIST STRAP HI LIMIT	9M	10M	11.5M

MAT HI LIMIT	3.2M	3.5M	4.0M
GND (TOOL) HI LIMIT	9.5Ω	10Ω	10.5Ω

MAXIMUM OPERATOR VOLTAGE UNDER ALARM CONDITION 0.9V  
TYPICAL OPERATOR VOLTAGE LESS THAN 0.2V

MAXIMUM MAT VOLTAGE UNDER ALARM CONDITION 1.25V  
TYPICAL MAT VOLTAGE UNDER 0.9V

MAXIMUM GND CURRENT 100 μA  
MAXIMUM GND VOLTAGE UNDER ALARM CONDITION 1 mV  
MAXIMUM GND VOLTAGE UNDER CIRCUIT OPEN CONDITION 50 mV

## **TECHNICAL SUPPORT**

### ***STATICO***

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USA.

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## **LIMITED WARRANTY**

**STATICO** EXPRESSLY WARRANTS THAT FOR A PERIOD OF ONE (1) YEAR FROM THE DATE OF PURCHASE,

**SM-2** WILL BE FREE OF DEFECTS IN MATERIAL (PARTS) AND WORKMANSHIP (LABOR). WITHIN THE WARRANTY PERIOD, A UNIT WILL BE TESTED, REPAIRED, OR REPLACED AT **STATICO**'S OPTION, FREE OF CHARGE. ANY UNIT UNDER WARRANTY SHOULD BE SHIPPED PREPAID TO **STATICO**, UPON ISSUANCE OF A RETURN MATERIAL AUTHORIZATION (RMA) NUMBER AND SHIPPING INSTRUCTIONS. INCLUDE A COPY OF YOUR ORIGINAL PACKING SLIP, INVOICE, OR OTHER PROOF OF PURCHASE DATE.

IF THE UNIT IS OUT OF WARRANTY, **STATICO** WILL QUOTE REPAIR CHARGES NECESSARY TO BRING YOUR UNIT UP TO FACTORY STANDARDS.

**NOTE:** WRIST STRAP REMOTES TERMINALS ARE SUBJECT TO MECHANICAL WEAR AND CONSIDERED TO BE "CONSUMABLE ITEMS".

THEY HAVE SEPARATE WARRANTY OF 6 MONTH. REPLACEMENT PART NUMBER IS "SM-2 REMOTE".

### **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 THAT IS SPECIFICALLY DISCLAIMED. THE EXPRESS WARRANTY WILL NOT APPLY TO DEFECTS OR DAMAGE DUE TO ACCIDENTS, NEGLIGENCE, MISUSE, ALTERATIONS, OPERATOR ERROR, OR FAILURE TO PROPERLY MAINTAIN, CLEAN OR REPAIR PRODUCTS.

### **LIMIT OF LIABILITY**

THE USER SHALL DETERMINE THE SUITABILITY OF THE PRODUCT FOR THEIR INTENDED USE, AND THE USER ASSUMES ALL RISK AND LIABILITY WHATSOEVER IN CONNECTION THEREWITH.

## **CONNECTION OF MAT 1 AND MAT 2 TO THE SM-2 MONITOR AND ESD GROUND.**

