Ground Man Plus Ground Monitor Operation and Maintenance

Made in the United States of America

Figure 1. Ground Man Plus Ground Monitor.

Description

Overview

The SCS Ground Man Plus Ground Monitor can be used at work areas or locations to monitor the ground impedance of process tools including, but not limited to semiconductor, disk drive and flat panel environments. Ground impedance monitoring can be used for up to three points for metal ground within a tool. The Ground Man Plus Ground Monitor can also be used to monitor the resistance to ground and voltage level on a person. The unit incorporates green and red LEDs and audible alarms.

The Ground Man Plus Ground Monitor is available in two models:

Item	Description
CTC334-WW	Ground Man Plus Ground Monitor, with World Wide Power Adapter
CTC334-T	Ground Man Plus Ground Monitor, without Power Adapter

SCS offers the following accessories for the Ground Man Plus Ground Monitor:

Item	Description
2368	Dual Conductor Fabric Wrist Band, Adjustable
2360	Dual Conductor Ground Cord, Coiled, 5ft.
2370	Dual Conductor Ground Cord, Coiled, 10ft.
CTE701	Workstation Monitor Checker
CTA251	Replacement Jack PCB, Ground Man Plus

Packaging

1 Ground Man Plus Ground Monitor
1 Monitor Ground Cord (Green and Yellow)
1 Power Adapter, 12VDC, with interchangeable plugs (North America, UK/Asia, Europe) (CTC334-WW only)

Ground Impedance Monitor

Continuously monitors for ground impedance on three separate channels that are connected to three process tools. The alarm level is set the same for all channels.

Output Signal

An output signal is available for connecting to the tool's computer or PLC. The 5V signal is either logic 1 or 0 for indicating the monitored ground resistance/impedance conditions and for the wrist strap.

Voltage on Person Wrist Strap Monitor

The Ground Man Plus Ground Monitor has a feature that allows continuous monitoring of voltage on a person through a dual conductor wrist band assembly.

Performance

Impedance Alarm Level

The alarm level can be preset from 1 to 20 ohms (from 1 to 10 ohms in increments of 1 ohm and from 10 to 20 ohms in increments of 2 ohms) by selecting through a combination of LED patterns indicated on the front on the unit. All three monitoring lines are set to the same selected impedance value.
If the measured impedance on a line is lower than the setting, a green LED will remain illuminated for that line(s). If the impedance is higher than the preset level, a red LED and audible alarm are activated for that line(s). If the impedance level remains above the preset alarm level, the red LED and audible sound remains on.

The SCS Ground Man Plus Ground Monitor only monitors proper connection to ground. The monitored equipment must be properly ground by itself. A wire must be attached from the Ground Man Plus Ground Monitor (GND terminals) to approved ground points to monitor grounding of process tools correctly.

Output Signal Level

The output connector provides a logic 1 (+5V) when all grounds are within limits and the unit is powered on. If any of the monitored grounds fail, a wrist strap fails, or power to the unit is lost, the output is logic 0 (0V).

Person Voltage and Resistance Monitor

The alarm level is monitored when a person is wearing a dual conductor wrist strap assembly and plugged into the front jack. There is a short hold on the body voltage

alarm so that it is not missed. The unit will respond to either positive or negative voltage. The alarm is also activated when the wrist band is worn too loosely and the loop resistance level is exceeded. The red LED indicates an over the resistance limit without a voltage being generated on the person at the same time. The green LED indicates proper connection of operator. A green LED plus blinking red LED will indicate if there is a body voltage generated; operator may still be connected properly. The green LED is off when a dual conductor ground cord is not plugged into the jack.

Enabling and Disabling Audible Alarm
The audible alarm can be enabled or disabled by momentarily pressing a recessed miniature push-button Set switch located on the back of the unit while the monitor is powered on. Use a pin to press the switch.

Environmental Conditions

This equipment has been tested and found to be safe to operate within these environmental conditions:

- This is not a warranty of equipment performance within these conditions.
- Indoor use only
- Ingress Protection: IPX0
- Altitude: Up to 2,000 m
- Mains supply voltage fluctuations up to ± 10% of the nominal voltage.
- Transient over voltages up to the levels of over voltage category II.
- Temporary over voltages occurring on mains supply.
- Pollution degree 2.
- Temperature: Maximum 110°F / 43°C Minimum 50°F / 10°C
- Humidity: Maximum relative humidity 80% for temperatures up to 31°C decreasing linearly to 50% relative humidity at 40°C .

Specification

Power	
AC/DC Adapter	Universal 100 - 240VAC, 0.5A, ~50 - 60Hz Output: 12VDC, 1.5A
General	
Dimensions (approx)	2.4" W x 0.85" H x 2.6" D (61 mm W x 21 mm H x 66 mm D)
Weight (approx)	75g

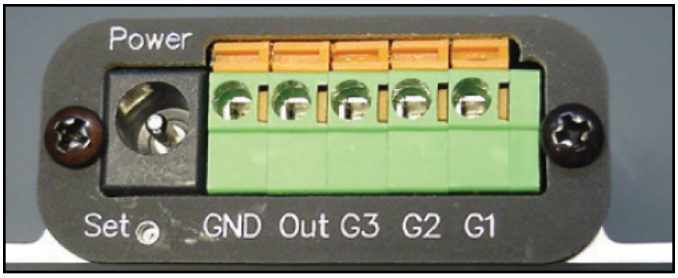

Figure 2. Rear view of Ground Man Plus Ground Monitor.

Installation

Wire Attachment
The AC adapter should not be connected during the wire attachment process. Attach 18 AWG wires to the unit as described below. Strip vinyl insulation at each end of the wires to approximately 1/3 in. (8 mm). Twist the stranded wire on each end before inserting wire into each connector location.

Attach ground wire to the GND connector on the back of the unit. Insert a small blade screw driver into the orange slot above. Push inward and insert the stripped wire fully into the hole in the green connector. Hold wire fully in and release the screw driver to allow the wire to catch.

If you are planning to use the Ground Man Plus Ground Monitor output to the tool, attach wire to the Out connector on back of unit. Insert the wire as described above.

Attach the impedance monitor wire(s) to the chosen ground line(s) G1, G2, G3 connector(s) on back of unit. Insert the wire as described above.

AC/DC Adapter Connection
Connect the circular plug of the AC/DC Adapter into the power jack on the back of the unit.

Mounting
Determine the mounting location of the Ground Man Plus Ground Monitor. Attach the unit using one of the following recommended methods:

- Screws
- SCS Dual Lock Fastener

Enabling or Disabling Monitoring of Ground Lines

Sometimes not all three ground points in the tool need to be monitored. This procedure will set up the number of ground lines (G1, G2, G3) that will be used, so that there is no need to put jumpers or shunts on the unused ground monitoring inputs. The AC Adapter should not be plugged in at this moment.

Attach GND line to known good ground
Attach monitor line(s) (G1, G2, G3) to ground that has been determined to use. Do not plug any wires into those ground monitor inputs that will be unused.

Press and hold the Set button using a pin. While the button is pressed inward, plug in the AC Adapter and then release the Set button.

Wait then for approximately 30 seconds. The Ground Man Plus Ground Monitor will beep during this time. After this time, the monitors will produce one beep and will automatically disable the lines to which nothing was connected. This procedure can be repeated whenever a change in the number of ground lines being monitored is required.

Enabling and Disabling Audible Alarm
The audible alarm can be enabled or disabled by momentarily pressing a recessed miniature push button Set switch located on the back of the unit while the monitor is powered on. Use a paper clip to press the switch.

Setting Impedance Alarm Levels

By default, the Ground Man Plus Ground Monitor factory set to a 10 ohms alarm level.

If this specification needs to be changed, the following procedure sets the impedance alarm level for all channels (G1, G2, G3).

Repeat the steps above in description section.

Right after the beeps stop; continue pressing the Set button until the impedance level is matched as shown in the table on the next page.

When the beeping stops, the four left-most LEDs (as shown in the photo on next page) allow for setting of resistance value. G1 & G2 red LEDs are upper location and G1 & G2 green LEDs are lower. Select the ground impedance value by pressing the Set button to advance the resistance limit. Turn the LEDs on or off as indicated in the table on the next page.

Not pressing the Set switch for about seven seconds after selecting causes the limit value to be saved and normal operation started.

Using LED's on Front of Unit to Set Resistance Alarm Level

Verification Check

Verification of G1, G2 and G3 monitoring.

Figure 3. LED lights used to set resistance alarm level.

1. Prepare the CTE701 Workstation Monitor Checker.
2. Disconnect the wire connected to G1, G2 and G3
3. Connect the ground input of the checker to the ground connector of the Ground Man Plus Ground Monitor. Set the checker to a proper resistance alarm level (see the CTE701 Workstation Monitor Checker User Guide).
4. Connect the red wire tip of the checker to the device terminal (G1, G2 and G3)
5. Press the Metal Ground Fail button on the checker. The red LED of either G1, G2 or G3 should remain on.
6. Press the Metal Ground Pass button on the checker. The green LED of either G1,G2 or G3 should turn green.
7. Repeat these steps for all enabled ground monitoring inputs.

Resistance Ohms	LED
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
14	
16	
20	

Operations

Ground Impedance Monitor

Connect the ground wire to an electrical known good ground point.

Connect the output wire to the tool, if you intend to use it; otherwise leave it open.

Connect the ground monitor inputs to identified locations in a process tool or several pieces of other equipment. Make sure to connect the monitoring inputs to different physical locations than those points used for their grounding.

Person Voltage and Resistance Monitor

This is a feature of the Ground Man Plus Ground Monitor. Plug the dual conductor ground cord of the wrist strap into the jack on the front of the unit. If the wrist strap is worn properly, a green LED will come on; otherwise the red LED will be on. In order to provide good ground connection, the wrist strap must be worn tightly and the green light on the Ground Man Plus Ground Monitor is an indication of that.

If, for some reason, while properly connected, the operator develops excessive body voltage (in excess of ± 2.5V in any polarity), the green LED may still be on, but the red LED will blink and the alarm sound will be on. No LED is on if a dual conductor ground cord is not plugged into the jack.

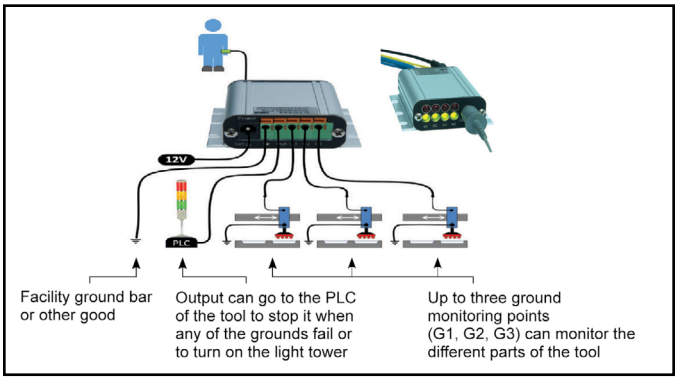

Figure 4. Installing the Ground Man Plus Ground Monitor.

Maintenance

Procedures for Cleaning and Decontamination

Unplug power from the device. Clean using a dry brush or lint free cloth around the device. In case of contact malfunction, clean contacts using a contact cleaner or a brush and tighten all connections. Plug in the power.

Repairs and Servicing

Do not attempt to repair the product yourself. Contact a SCS sales representative or authorized dealer to request inspection and repair. Replace power supply if damaged using only SCS supplied parts. Other than replacement of remote jacks, do not attempt to service the device. There are no user-serviceable parts.

Device Calibration

Contact a SCS sales representative or authorized dealer to request for product calibration if needed.

Safety Information

Read, understand, and follow all safety information contained in these instructions prior to the use of this device. Retain these instructions for future reference.

Intended Use

The SCS Ground Man Plus Ground Monitor is intended for use by electrical assembly personnel to monitor ground impedance for process and equipment tools.

The Ground Man Plus Ground Monitor is both a wrist strap monitor and a ground monitor. It provides operator grounding, and can be used at work areas or locations to monitor the ground impedance of process tools in semiconductors, disk drives, flat panels, and EMS and other environments. Ground impedance monitoring can be used for up to three points for metal grounds within a tool. The Ground Man Plus Ground Monitor can also be used to monitor the resistance to ground and voltage level on a person. The units incorporate green and red LEDs and audible alarms.

The systems must be installed as specified in the user's guide in an indoor commercial/industrial environment, and have not been evaluated for other uses or locations. If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Warning: To reduce the risks associated with hazardous voltage and fire:

- Do not use the power supply if damaged. Do not modify or attempt to service the power supply. Contact SCS authorized service center for replacement.
- Replace power supply if damaged using only SCS supplied parts.
- Do not attempt to service the SCS Ground Man Plus Ground Monitor, there are no user serviceable parts; Return to SCS for service.
- Do not position the CTC334 Ground Man Plus Ground Monitor accessories or other equipment where unplugging the power supply is difficult.
- Always locate the power source (socket or outlet) near the equipment. The power supply plug serves as the disconnect device.
- Do not use the Ground Man Plus Ground Monitor or its power supply outdoors or wet/humid environments.
- Do not use the Ground Man Plus Ground Monitor or its power supply outside of the operating conditions listed in this user guide.
- Use only a dry cloth when cleaning.

To reduce the risks associated with hazardous voltage:
- Use only the power supply provided by SCS and specified for the country of use.
- Before installing the Ground Man Plus Ground Monitor for use with any equipment, make sure that the Monitor is properly grounded.

To reduce the risks associated with medical device malfunction:
- Persons with heart pacemaker devices should never use this Ground Man Plus Ground Monitor.

Caution: To reduce the risks associated with environmental contamination:

- Dispose of Monitor and Power Supply in accordance with all applicable local and government regulations.

Regulatory Information

FCC

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

WEEE Statement

The following information is only for EU-members States:
The mark shown to the right is in compliance with Waste Electrical and Electronic Equipment Directive 2002/96/EC (WEEE). The mark indicates the requirement NOT to dispose the equipment as unsorted municipal waste, but use the return and collection systems according to local law.

cULus Statement

Meets cULus requirements.

CE Statement

Meets CE (European Confomity) requirements.

ICES Statement

This Class A digital apparatus complies with Canadian ICES-003.
Cet appareil numérique de la classe A est conforme à la NMB-003 du Canada.

China RoHS

Electronic Industry Standard of the People's Republic of China, SJ/T11363-2006, Requirements for Concentration Limits for Certain Hazardous Substances in Electronic Information Products.

This symbol, per Marking for the Control of Pollution Caused by Electronic Information Products, SJ/T11364-2006, means that the product or part does contain a substance, as detailed in the chart below, in excess of the following maximum concentration values in any homogeneous material: (a) 0.1% (by weight) for lead, mercury, hexavalent chromium, polybrominated biphenyls or polybrominated diphenyl ethers; or (b) 0.01% (by weight) for cadmium. Unless otherwise stated by SCS in writing, this information represents SCS's best knowledge and belief based upon information provided by third party suppliers to SCS.

Name and Content of Hazardous Substances or Elements

Part or Component Name	Hazardous Substances or Elements					
	(Pb)	(Hg)	(Cd)	(CrVI)	(PBB)	(PBDE)
Termination in capacitor 0603	X	O	O	O	O	O
Solder in diode	X	O	O	O	O	O
Finish in diode	X	O	O	O	O	O
Terminations in PCBs	X	O	O	O	O	O
Terminations in resistors 0603	X	O	O	O	O	O
Plating in resistors 0603	X	O	O	O	O	O
Resistor ink in potentiometer	X	O	O	O	O	O
Solder in instrument	X	O	O	O	O	O
Solder in IC	X	O	O	O	O	O
Solder in buzzer	X	O	O	O	O	O
Audio jack	X	O	O	O	O	O

O: Indicates that this hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement in the SJ/T11363-2006.
X: Indicates that this hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement in the SJ/T11363-2006.

Limited Warranty, Warranty Exclusions, Limit of Liability and RMA Request Instructions

See the SCS Warranty - http://staticcontrol.descoindustries.com/warranty.aspx