

# CTC337 Wrist Strap and Ground Monitor Installation, Operation and Maintenance



Made in the  
United States of America



Figure 1. SCS CTC337 Wrist Strap and Ground Monitor

## Description

The SCS CTC337 Wrist Strap and Ground Monitor can be used in work areas or other locations to monitor the ground impedance of metal ground connection in process tools including but not limited to semiconductor, disk drive, flat panel and electronic equipment manufacturing environments. Ground impedance monitoring can be used for one metal ground point, such as within a tool. The Wrist Strap and Ground Monitor can be used to monitor the impedance-to-ground and voltage level on two persons wearing dual-wire wrist straps. The unit incorporates green and red LEDs and an audible alarm.

**Ground Impedance Monitor** – Continuously monitors for ground impedance on one channel that is connected to one process tool.

**Operator Connection** – The Wrist Strap and Ground Monitor provides continuous monitoring of operator connection to the monitor via loop resistance check of operator's physical presence using a dual wire wrist strap.

**Voltage on Person Wrist Strap Monitor** – The Wrist Strap and Ground Monitor has one additional feature that allows continuous monitoring for excessive voltage on each operator.

The Wrist Strap and Ground Monitor is available in one model:

Item	Description
<a href="#">CTC337-WW</a>	Wrist Strap and Ground Monitor, with World Wide Power Adapter

SCS offers the following accessories for the Wrist Strap and Ground Monitor:

Item	Description
<a href="#">CTA252</a>	Replacement Jack PCB, CTC337 Wrist Strap and Ground Monitor
<a href="#">CTE701</a>	Workstation Monitor Checker
<a href="#">CTA212</a>	Power Adapter, 100-240VAC Input, 12VDC 1.5A Output, All Plugs

## Packaging

- 1 Wrist Strap and Ground Monitor
- 1 Monitor Ground Cord (Green and Yellow)
- 1 Power Adapter, 12VDC, with interchangeable plugs (North America, UK/Asia, Europe)
- 1 Certificate of Calibration

## Installation

### Wire Attachment

Attach 18 AWG wires to the unit as described below. Strip back the vinyl insulation at each end of the wires to approximately 1/3 inch (8 mm). Twist the stranded wire on each end before inserting the wire into each connector location. In order to attach the wire, insert a small blade screwdriver into the orange slot above. Gently push inward and insert the stripped wire fully into the hole in the green connector. Hold the wire fully in and release the screwdriver to allow the wire to catch. Attach the green monitor ground cord to the ground connector on back of unit. Attach the impedance monitor wire to the "GND1" connector on the back of the unit.

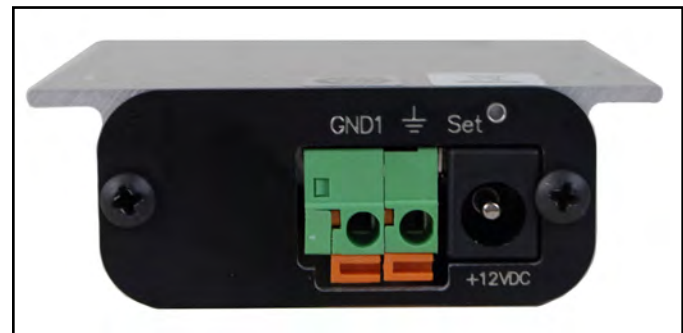


Figure 2. Rear view of Wrist Strap and Ground Monitor

### Power Adapter Connection

Connect the circular plug of the power adapter into the power jack on the back of the unit.

### Mounting

Determine the mounting location of the Wrist Strap and Ground Monitor. Attach the unit using one of the following recommended methods:

- Screws
- Dual Lock Reclosable Fastener

Note: The unit can be mounted upside down from the current orientation of the front and back covers. If you wish to change the orientation, rotate the printed circuit board and covers 180 degrees. This will allow the unit housing to be mounted from the wider plate with screw slots.

### Operation

#### Ground Impedance Alarm Level

Use the set switch and select through a combination of LED patterns on the front of the monitor to set the alarm level. The alarm level can be set to 1-10 ohms in 1 ohm increments. It can also be set to 10-20 ohms in 2 ohm increments. The two 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). Their alarm duration will be on momentarily to prevent missing a short increased resistance event. If the impedance level remains above the preset alarm level, the red LED and audible sound remains on.

Note: The Wrist Strap and Ground Monitor must be grounded in order to properly monitor the ground integrity of metal tools.

#### 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 a positive or negative voltage. The alarm is activated when the wrist strap is worn too loosely and the loop resistance level is exceeded. The red LED indicates the resistance limit without a voltage being generated on the person at the same time. The green LED indicates a proper connection of the operator. A green LED plus a blinking red LED will indicate if there is a body voltage generated; the 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's power is on. Use a paper clip to press the switch. One short beep on power up means that the sound is disabled. A series of two short beeps means that the sound is enabled.

### Enabling or Disabling Monitoring of Ground Line

In some instances, the monitor's tool ground channel may not be needed. This procedure will disable the GND1 terminal. The power adapter should not be plugged in at this time.

- Ground the monitor using the ground terminal at the back of the unit
- Ensure that nothing is connected to the GND1 terminal
- Press and hold the "Set" button using the end of a paper clip. While the button is pressed inward, connect the power adapter and then release the "Set" button.
- Wait for approximately 30 seconds. The Wrist Strap and Ground Monitor will beep during this time. After this, it will produce one beep and will automatically disable the GND1 terminal to which nothing was connected. You can repeat this procedure whenever the need to disable or enable the GND1 terminal is required.

### Setting Impedance Alarm Levels

By default, the Wrist Strap and Ground Monitor is set at the factory to 10 ohms alarm level. Follow the procedure below to change this setting.

- Repeat the steps above in Enabling or Disabling Monitoring of Ground Line section.
- Right after the beeping stops, continue pressing the "Set" button until the desired impedance level is achieved. See the following table.
- When the beeping stops, the four left most LED's will allow for the setting of the resistance value. The GND red LED is located at the top; the green LED is located at the bottom.
- Select the ground resistance value by pressing the "Set" button to advance the resistance limit. Turn the LED's on or off as indicated in the following table.
- Save the desired setting by not pressing the "Set" switch for about 7 seconds.

## Using the LEDs to Set the Resistance Alarm Level

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

18	
20	

## Calibration

### Equipment Required

For this test, the Wrist Strap and Ground Monitor should be disconnected from the monitored ground.

Use the SCS CTE701 Workstation Monitor Checker. Connect the ground input of the checker to the ground terminal of the Wrist Strap and Ground Monitor. Set the checker to a proper resistance alarm level (see user guide [TB-9031](#)). Connect the red tip of the checker to the GND1 terminal. Press the Fail button on the checker. The red LED of the corresponding ground of the monitor should remain on. Press the Pass button on the checker – the corresponding light on the monitor should be green.

The checker verifies the proper operation of dual wrist strap monitoring. Connect a 3.5 mm test cable to both the checker and to the operator jack of the monitor. At this point the monitor should indicate failure. Depress the Pass button on the wrist strap section. The monitor should indicate a good connection. While pressing the Pass button, press body voltage “high.” At this point the Wrist Strap LED would be blinking red.



Figure 3. SCS CTE701 Workstation Monitor Checker

## Functional Operation

### Ground Resistance Monitor

- Connect the ground wire to a known good electrical ground point.
- Connect the output wire to the tool if you intend to use it, otherwise leave it open.
- Connect the ground monitor input to the identified location. Be sure to connect the monitoring input to different physical locations than the point used for its grounding.

### Person Voltage and Resistance 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 red LED will be on. In order to provide good ground connection, the wrist strap must be worn tightly. The monitor's green LED indicates a good connection.

If for whatever reason, while properly connected, the operator developed excessive body voltage (in excess of  $\pm 2.5$  Volts), the green LED may still be on, but the red LED will blink without alarm sound. No LED will illuminate when the operator jack is left open.

## Maintenance

### Replacement and Removing Input Wrist Strap Dual Conductor Input Jack

If the wrist strap input jack begins to show wear after heavy usage, the input jack can be replaced by ordering the SCS CTA252 Replacement Wrist Strap Jacks. Remove the input jack in the unit by removing the locking collar and two screws on front cover. Slide the printed circuit board outside of the unit and unplug the pin connector with input jack board. Plug in new input jack board assembly and carefully slide the board back into the housing. Replace front cover and locking collar on the input jack.

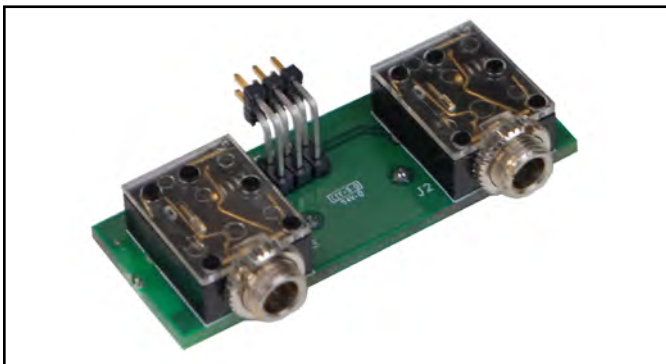


Figure 4. SCS CTA252 Replacement Wrist Strap Jacks

## Specifications

Ground Impedance Alarm Level	1 to 20 ohms
Wrist Strap Alarm - Body Voltage	$\pm 2.5$ V on operator
Wrist Strap Alarm - Operator Loop Resistance	10 megohms on operator (plus two 1 megohm resistors in the end of the ground cord that attaches to the wristband)
Visual Alarm Indicator (LED)	Green: OK Red: Fault Condition Note: Operator LEDs red and green will not illuminate if wrist strap is not plugged into jack.
Audible Alarm	Buzzer fault condition if enabled
Operating Environmental Range	Temperature: 50 to 110°F (10 to 43°C) Humidity: 75% R.H. maximum
Dimensions	2.42" W x 2.45" L x 0.85" H (61mm W x 62mm L x 22mm H)
Power Adapter 100-240VAC 50-60 Hz	Output: 12VDC @ 1.5A Output Plug Polarization: Center Positive Output Plug: 5.5 mm O.D. x 2.1 mm I.D. x 9.5 mm L

## Safety Information

Read, understand, and follow all safety information contained in this user guide prior to installation and use of the SCS Wrist Strap and Ground Monitor. Retain this guide for future reference.

### Intended Use

This user guide covers the SCS CTC337 Wrist Strap and Ground Monitor. The CTC337 Wrist Strap and Ground Monitor has two input jacks for monitoring impedance and voltage on a dual conductor wrist strap. It also monitors one metal ground in a workstation. The Wrist Strap and Ground Monitor operates from a universal AC power adapter. These systems are typically installed on a machine with multiple tools or on a workbench used for ESD-sensitive electronic assembly or repair.

The systems must be installed as specified in this user guide and are intended for use in an indoor commercial/industrial environment. The system has not been evaluated for other uses or locations.

### Warning

To reduce the risks associated with hazardous voltage, which if not avoided could result in electrical shock related injury; the risks associated with environmental contamination, which if not avoided could result in environmental contamination related injury; and the risk associated with false test results, which if not avoided could result in property damage:

- Read, understand and follow all safety information contained in this user guide for installation and use. Retain this guide for future reference.

To reduce the risks associated with hazardous voltage, which if not avoided could result in electrical shock related injury:

- Replace power adapter if damaged with SCS provided power adapter only.
- Do not modify or attempt to service the power adapter or use it if damaged.
- Use the power adapter in an indoor dry location only.

### Caution

To reduce the risks associated with environmental contamination which, if not avoided, could result in minor or moderate injury:

- Dispose of monitor in accordance with all applicable local and government regulations.

### Notice

To reduce the risks associated with property damage:

- Monitor must be checked periodically to verify each monitor circuit is functioning correctly.
- The Wrist Strap and Ground Monitor requires a suitable ground to function properly. Refer to the proper section of this User Guide for information on connecting to a suitable electrical ground point.
- Do not use the Wrist Strap and Ground Monitor for the electrical grounding of equipment. This device is intended to monitor the ground connection only.

## Regulatory Information

### FCC

Note: 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 a 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 their own expense.

Modifications to this device shall not be made without the written consent of SCS. Unauthorized modifications may void the authority granted under Federal Communication Rules and Industry Canada Rules permitting the operation of this device.

### 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.

### WEEE Statement

The following information is only for EU-member 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.

### CE Statement

Meets CE (European Conformity) requirements.



## 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 best knowledge and belief based upon information provided by third party suppliers to SCS.



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.