

# Ground Master Monitor Installation, Operation and Maintenance



Figure 1. SCS CTC065-5-WW Ground Master Monitor

## Description

The SCS Ground Master Monitor is an equipment ground continuous monitor for metal tools. It continuously monitors the path-to-ground impedance and electromagnetic integrity of eight metal ground connections of process tools in work areas. This includes semiconductor, disk drive, flat panel, and electronic equipment manufacturing environments. The monitor provides both visual and audible alarms and includes fuse protection for each channel.

The Ground Master Monitor continuously monitors eight metal tools for electromagnetic interference (EMI). EMI can cause equipment lockups and malfunction. The Ground Master Monitor will alarm if EMI is detected. Each Ground Master Monitor is calibrated with accepted procedures and standards traceable to the National Institute of Standards and Technology (NIST) and includes a certificate of calibration.

The Ground Master Monitor meets the Continuous Monitor requirements of ANSI/ESD S20.20 in accordance with ESD TR53. It meets the recommendations of ESD Handbook ESD TR20.20 which includes “if the products that are being produced are of such value that knowledge of a continuous, reliable ground is needed, and then continuous monitoring should be considered or even required”.

The Ground Master Monitor and its accessories are available as the following item numbers:

Item	Description
CTC065-5-WW	Ground Master Monitor, with Modbus Connectivity
CTA212	Power Adapter, 100-240 VAC Input, 12 VDC 1.5 A Output, All Plugs
CTC065-C	Ground Master Extension Cable Unit
CTE701	Workstation Monitor Checker

## Packaging

- 1 Ground Master Monitor
- 1 Monitor Ground Cord (Green and Yellow)
- 4 Replacement Fuses (250 VAC, 125 mA)
- 1 Ring Terminal
- 1 Screw, Pan-Head, 6-32 x 1/4"
- 1 Star Washer
- 1 Power Adapter, 12 VDC, with interchangeable plugs (North America, UK/Asia, Europe, China)
- 1 Certificate of Calibration

# Features and Components

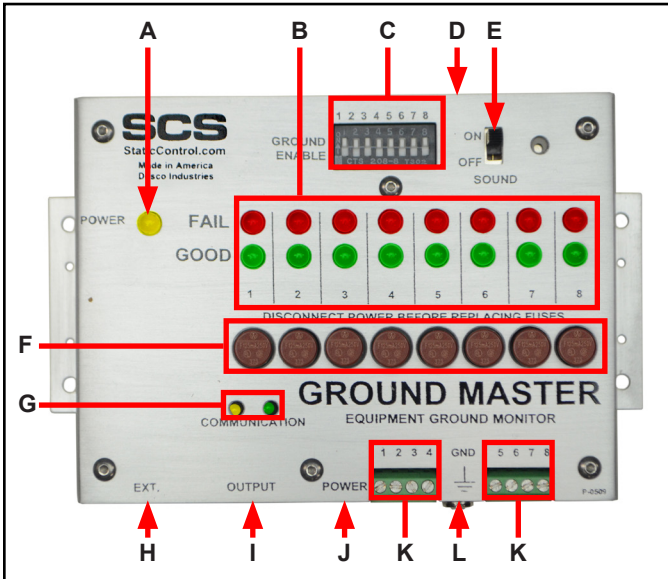


Figure 2. CTC065-5-WW Ground Master Monitor features and components

**A. Power LED:** Illuminates yellow when the monitor is powered.

**B. Tool LEDs:** Illuminates green when its respective tool is within the impedance and electromagnetic interference (EMI) voltage test limits. Blinks red when its respective tool exceeds the EMI voltage limit. Illuminates solid red and audible alarm sounds when its respective tool exceeds the impedance test limit.

**C. Tool Monitor Switches:** Slide the switch up to enable its respective tool monitor circuit. Slide the switch down to disable its respective tool monitor circuit.

**D. Test Limit Rotary Switch (top-side):** Sets the test limit of the tool monitor circuits from 1 to 20 ohms.

Setting	Test Limit
1	1 ohm
2	2 ohms
3	3 ohms
4	4 ohms
5	5 ohms
6	6 ohms
7	7 ohms
8	8 ohms

Setting	Test Limit
9	9 ohms
A	10 ohms*
B	12 ohms
C	14 ohms
D	16 ohms
E	18 ohms
F	20 ohms

\*default setting

**E. Audible Alarm Switch:** Enables and disables the monitor's audible alarm.

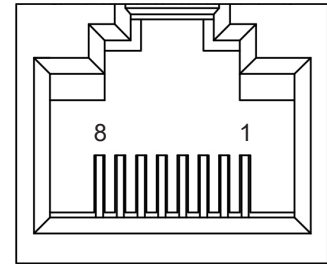
**F. Protective Fuses:** Protects the spread of harmful voltage to other tools via the Ground Master Monitor should one of the tools become exposed to excessive voltage. The appropriate fuse will disconnect the faulty tool from the Ground Master Monitor and from the other connected tools.

**G. Communication LEDs:** Blinks when the monitor is powered and communicating to SMP Server.

**H. Ext. Jack:** Slave port for serial daisy-chaining.

**I. Modbus Output Jack:** Provides Modbus connectivity to a data acquisition system and accepts 12-24 VDC power.

Pin	Signal
1	12-24 VDC
2	Ground
3	12-24 VDC
4	TXD1/D1
5	TXD0/D0
6	Ground
7	12-24 VDC
8	Ground



**J. Power Jack:** Connect the included 12VDC power adapter here.

**K. Monitored Tool Terminals:** Monitors metal tools for proper conductive impedance and electromagnetic interference (EMI) voltage. Use 18 AWG wire to connect the metal tools to these terminals.

**L. Ground Terminal:** Common ground point for the monitor.

## Installation

1. Remove the Ground Master Monitor from the carton, and inspect for damage.
2. Determine the mounting location of the Ground Master Monitor, and use its mounting tabs to secure it. Its display should be visible to the operator(s).
3. Bond the Ground Master Monitor to equipment ground by using the ground terminal screw located on its bottom-side.
4. Insert stripped terminations of 18 AWG wires (not included) into the monitored tool terminals located on the bottom-side of the Ground Master Monitor. Ensure that the tool monitor switches are enabled if using these monitored tool terminals.
5. Route the tool monitor wires from the bottom-side of the Ground Master Monitor to their respective grounded metal tools, and secure them. Keep the wires as short as possible. Do not loop or coil them as it may affect the measured impedance.
6. Connect a powered Modbus cable to the Modbus output jack located on the bottom-side of the Ground Master Monitor. The Ground Master Monitor is now powered.

## Operation

Use the table below to interpret the behavior of the Ground Master Monitor's tool LED's and audible buzzer (if enabled).

Green LED	Red LED	Buzzer	Status
ON	OFF	OFF	No failures
OFF	ON	ON	Impedance failure
ON	BLINK	OFF	EMI voltage failure
OFF	OFF	OFF	Monitor channel disabled

## Maintenance

### Cleaning

Disconnect the power adapter from the device. Clean the Ground Master Monitor using a dry brush or vacuum cleaner. Clean its contacts using a contact cleaner or brush, and tighten all connections. Do not reconnect the power adapter until cleaning is finished.

## Replacing the Fuses

The monitored equipment may become prone to excessive voltage and significant damage should it lose its connection to ground or be bonded to an improperly wired ground point. In order to prevent the spread of this excessive voltage to other equipment via the Ground Master Monitor, fuses are implemented for each individual ground connection. In the case of excessive voltage on the equipment, the appropriate fuse will disconnect the equipment from the Ground Master Monitor and from the other connected equipment. Ground failure on that particular ground will be immediately indicated.

Before replacing the fuse, always investigate the reason for the fuse blowing, and correct the problem. The fuse should never blow under normal circumstances.

NOTE: Never use wire jumpers in place of fuses. Use only factory-authorized fuses. Disconnect power before replacing any fuses. The fuses are manufactured by Littelfuse®, and its part number is 37301250410.

## Calibration

Frequency of recalibration should be based on the critical nature of those ESD sensitive items handled and the risk of failure for the ESD protective equipment and materials. In general, SCS recommends that calibration be performed annually.

Use the SCS CTE701 Workstation Monitor Checker to perform periodic verification (once every 6-12 months) of the Ground Master Monitor. The Workstation Monitor Checker can be used to check the test limits of the Ground Master Monitor without removing it from the factory floor.

See [TB-9031](#) for more information.



Figure 3. SCS CTE701 Workstation Monitor Checker

## Specifications

### Power

Power Adapter 100-240 VAC 50-60 Hz	Output: 12 VDC @ 1.5 A Output Plug Polarization: Center Positive Output Plug: 5.5 mm O.D. x 2.1 mm I.D. x 9.5 mm L
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### Metal Tool

Amount Monitored	8
Impedance Limit	10 ohms (default)
EMI Voltage Limit	223 mV average amplitude (@ 1.5 MHz)
Test Voltage	80 mV square pulse @ open circuit (80 Hz)
Test Current	<5 mA @ short circuit

### Connectivity

Input	18 AWG wire terminal blocks for metal tools
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### General

Alarm	LEDs and buzzer
Dimensions	3.54" x 5.52" x 1.18" (90 mm x 140 mm x 30 mm)
Weight	0.4 lbs. (0.18 kg)

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

See the Desco Asia Warranty -  
[DescoAsia.com/Limited-Warranty.aspx](https://DescoAsia.com/Limited-Warranty.aspx)