CTE701 Verification Tester Operation Instructions

Made in the
United States of America

Figure 1. SCS CTE701 Verification Tester

The SCS CTE701 Verification Tester can be used with the following items:

Item	Description
770067	WS Aware Monitor
770068	WS Aware Monitor
CTC061-3-242-WW	WS Aware Monitor
CTC061-RT-242-WW	WS Aware Monitor
CTC062-RT-242-WW	WS Aware Monitor
770044	Ground Master Monitor
CTC331-WW	Iron Man® Plus Monitor
CTC334-WW	Ground Man Plus Monitor
CTC337-WW	Wrist Strap and Ground Monitor
773	Wrist Strap and Ground Monitor

Description

The SCS CTE701 Verification Tester is used to perform periodic test limit verification of the SCS WS Aware Monitor, Ground Master Monitor, Iron Man® Plus Monitor, and Ground Man Plus Monitor. Verification may be accomplished without removing the monitor from its workstation. The Verification Tester is National Institute of Standards and Technology (NIST) traceable. Frequency of verification is based on the critical nature of the ESD susceptible items handled. SCS recommends annual calibration of workstation monitors and the CTE701 Verification Tester. The CTE701 Verification Tester meets ANSI/ESD S20.20 and Compliance Verification ESD TR53.

Packaging

1 CTE701 Verification Tester
1 Black Alligator-to-Banana Test Lead, 3 ft.
1 Red Mini Grabber-to-Banana Test Lead, 3 ft.
1 Black 3.5 mm Mono Cable, 2 ft.
1 9V Alkaline Battery

SCS - 926 JR Industrial Drive, Sanford, NC 27332
East: (919) 718-0000 | West: (909) 627-9634 • Website: StaticControl.com

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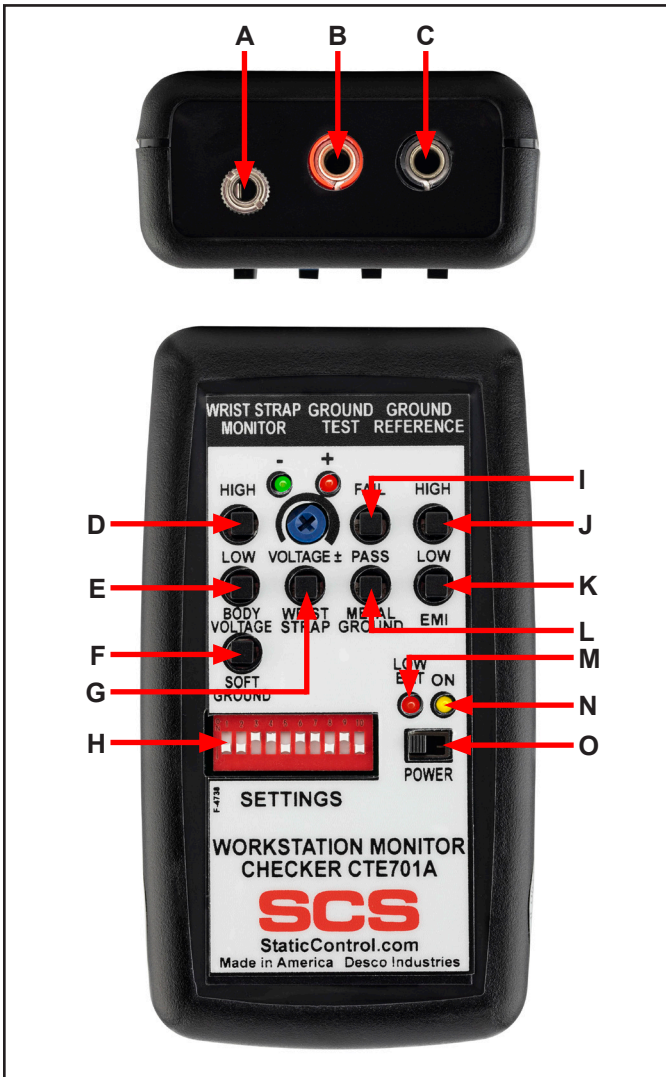Employee Owned

Features and Components

Figure 2. CTE701 Verification Tester features and components

A. Operator Dual-wire Jack: Connect one end of the included 3.5 mm mono cable here, and the other end into the monitor's operator jack.

B. Soft/Metal Ground Banana Jack: Connect the banana plug terminal of the red test lead here, and the other end to the monitor's mat or tool ground circuit.

C. Reference Ground Banana Jack: Connect the banana plug terminal of the black test lead here, and the other end to equipment ground.

D. High Body Voltage Test Switch: Simulates a BODY VOLTAGE FAIL condition on the monitor's operator circuit when pressed.

E. Low Body Voltage Low Test Switch: Simulates a BODY VOLTAGE PASS condition on the monitor's operator circuit when pressed.

F. Soft Ground Test Switch: Simulates a MAT PASS condition on the monitor when pressed.

G. Wrist Strap Test Switch: Simulates a OPERATOR PASS condition on the monitor when pressed.

H. Test Limit DIP Switch: Configures the test limits on the CTE701 Verification Tester.

I. High Metal Ground Test Switch: Simulates a TOOL FAIL condition on the monitor when pressed.

J. High EMI Test Switch: Simulates an EMI FAIL condition on the monitor's tool circuit when pressed.

K. Low EMI Test Switch: Simulates an EMI PASS condition on the monitor's tool circuit when pressed.

L. Low Metal Ground Test Switch: Simulates a TOOL PASS condition on the monitor when pressed.

M. Low Battery LED: Illuminates when the battery needs to be replaced.

N. Power LED: Illuminates when the CTE701 Verification Tester is powered.

O. Power Switch: Slide to the left to power the Verification Tester OFF. Slide to the right to power the Verification Tester ON.

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Installation

The CTE701 Verification Tester's 10-position DIP switch is used to configure its test limits for soft ground, metal ground, EMI, and operator.

Soft Ground

The soft ground resistance is configured with switches 1-4. Pressing the SOFT GROUND pushbutton will result in a load with slightly lower resistance than the test limit.

| Test Limit | Switch | | | |
	1	2	3	4
1 gigohm	OFF	OFF	OFF	ON
400 megohms	OFF	OFF	ON	ON
100 megohms	OFF	ON	ON	ON
10 megohms	ON	ON	ON	ON

Metal Ground

The metal ground impedance is configured with switches 5-8. Pressing the HIGH METAL GROUND pushbutton will load 1 ohm higher than the configured test limit. Pressing the PASS METAL GROUND pushbutton will load 1 ohm less than the test limit. For example, if the monitor to be checked is set to 10 ohms, the Verification Tester will verify that it passes at 9 ohms and fails at 11 ohms.

| Test Limit | Switch | | | |
	5	6	7	8
1 ohm	ON	ON	ON	ON
2 ohms	OFF	ON	ON	ON
3 ohms	ON	OFF	ON	ON
4 ohms	OFF	OFF	ON	ON
5 ohms	ON	ON	OFF	ON
6 ohms	OFF	ON	OFF	ON
7 ohms	ON	OFF	OFF	ON
8 ohms	OFF	OFF	OFF	ON
9 ohms	ON	ON	ON	OFF
10 ohms	OFF	ON	ON	OFF
11 ohms	ON	OFF	ON	OFF
12 ohms	OFF	OFF	ON	OFF
13 ohms	ON	ON	OFF	OFF
14 ohms	OFF	ON	OFF	OFF
15 ohms	ON	OFF	OFF	OFF
16 ohms	OFF	OFF	OFF	OFF

EMI

The EMI high frequency signal is configured with switch 9. The CTE701 Verification Tester provides two different levels of high frequency signal: elevated and normal. Pressing the HIGH EMI pushbutton will load a high signal level within its range. Pressing the LOW EMI pushbutton will load a low signal within its range.

Signal Level	Switch 9
Elevated	ON
Normal	OFF

Wrist Strap

The wrist strap resistance is configured with switch 10. The CTE701 Verification Tester provides resistance of a certain value across the wrist strap terminal input in order to simulate a wrist strap. A good quality dual-wire wrist cord has a 1 megohm resistor in each of its conductors. The Verification Tester is designed to simulate dual-wire wrist straps with and without resistors. The 12 megohms setting simulates a wrist strap with two 1 megohm resistors in series.

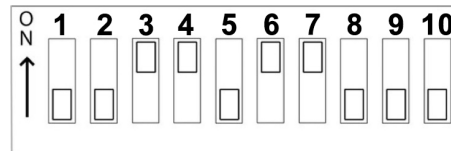| Test Limit	Switch 10
12 megohms	OFF
10 megohms	ON

Operation

Iron Man® Plus Workstation Monitor

CONFIGURING THE VERIFICATION TESTER
Configure the Verification Tester's DIP switch to the settings shown below. This will make its test limits match the factory default limits of the monitor.

VERIFYING THE OPERATOR CIRCUIT

1. Use the black test lead to connect the Verification Tester to equipment ground.

2. Power the Verification Tester ON.

3. Use the 3.5 mm mono cable to connect the Verification Tester to the monitor's operator jack. The monitor's operator LED will illuminate red, and its alarm will sound.

Figure 3. Connecting the Verification Tester to the Iron Man® Plus Workstation Monitor's operator jack

4. Press and hold the Verification Tester's WRIST STRAP test switch. The monitor's operator LED will illuminate green, and its audible alarm will stop. This verifies the operator circuit's impedance limit.
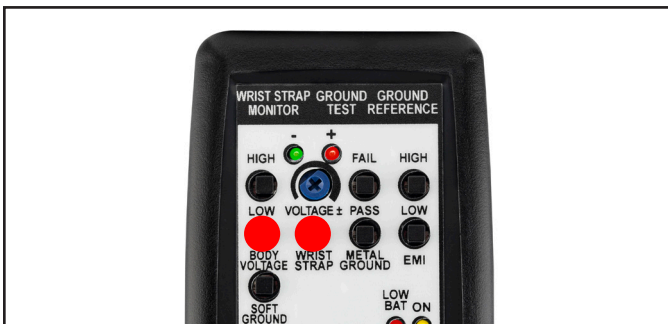

Figure 4. Pressing the WRIST STRAP test switch

5. Continue to press and hold the Verification Tester's WRIST STRAP test switch. Simultaneously, press and hold the Verification Tester's LOW BODY VOLTAGE test switch. The monitor's operator LED will remain green, and no audible alarm will sound. This verifies the operator circuit's low body voltage limit.

Figure 5. Pressing the WRIST STRAP and LOW BODY VOLTAGE test switches simultaneously

6. Continue to press and hold the Verification Tester's WRIST STRAP test switch. Simultaneously, press and hold the Verification Tester's HIGH BODY VOLTAGE test switch. The monitor's green operator LED will illuminate continuously, its red LED will blink, and an audible alarm will sound. This verifies the operator circuit's high body voltage limit.

Figure 6. Pressing the WRIST STRAP and HIGH BODY VOLTAGE test switches simultaneously

7. Disconnect the mono cable from the monitor.

VERIFYING THE MAT CIRCUIT

8. Connect the red test lead to red banana jack located at the top of the Verification Tester.

9. Disconnect the monitor's white mat monitor cord from its worksurface mat and turn it over to expose its 10 mm snap.

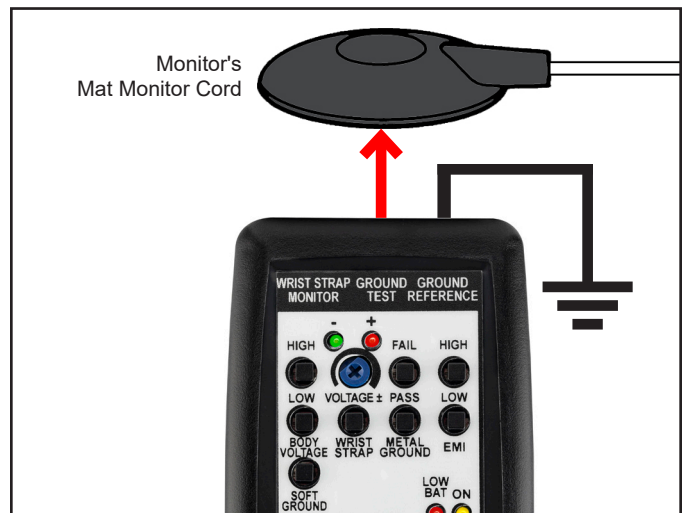10. Clip the red test lead's mini grabber to the 10 mm snap on the white mat monitor cord.

Figure 7. Connecting the Verification Tester to the Iron Man® Plus Workstation Monitor's mat monitor cord

11. Wait approximately 5 seconds for the monitor's mat LED to illuminate red and sound its audible alarm.

12. Press and hold the Verification Tester's SOFT GROUND test switch. The monitor's mat LED will illuminate green, and its audible alarm will stop after approximately 3 seconds. This verifies the mat circuit's resistance limit.

Figure 8. Pressing the SOFT GROUND test switch

13. Disconnect the red test lead from the monitor's white mat monitor cord.

14. Reinstall the white mat monitor cord to the worksurface mat.
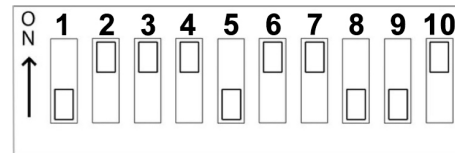
VERIFYING THE IRON CIRCUIT
Note: A variable DC power supply must be used to complete this procedure. The CTE701 Verification Tester cannot verify the iron circuit in the Iron Man® Plus Workstation Monitor.

15. Turn the voltage alarm trimpot at the back of the monitor fully clockwise. This configures it to ±5 V.

16. Power the variable DC power supply. Configure it to 5.0 V.

17. Connect the negative terminal from the variable DC power supply to ground. Connect its positive terminal to the yellow alligator cord connected to the monitor's BOARD terminal. The monitor's Iron LED should illuminate red and its audible alarm should sound.

18. Set the variable DC power supply to 4.0 V. The monitor's Iron LED should illuminate green and its audible alarm should stop.

19. Disconnect the variable DC power supply from the monitor and ground. Connect its positive terminal to ground and its negative terminal to the monitor's yellow alligator cord.

20. Verify that the variable DC power supply is still set to 4.0 V. The monitor's Iron LED should illuminate green.

21. Set the variable DC power supply to 5.0 V. The monitor's Iron LED should illuminate red and its audible alarm should sound.

WS Aware Monitor

CONFIGURING THE VERIFICATION TESTER
Configure the Verification Tester's DIP switch to the settings shown below. This will make its test limits match the factory default limits of the monitor.

VERIFYING THE OPERATOR CIRCUIT
1. Use the black test lead to connect the Verification Tester to equipment ground.

2. Power the Verification Tester ON.

3. Use the 3.5 mm mono cable to connect the Verification Tester to the monitor's operator jack. The monitor's operator LED will illuminate red, and its alarm will sound.

Figure 9. Connecting the Verification Tester to the WS Aware Monitor's operator jack

4. Press and hold the Verification Tester's WRIST STRAP test switch. The monitor's operator LED will illuminate green, and its audible alarm will stop. This verifies the operator circuit's impedance limit.

Figure 10. Pressing the WRIST STRAP test switch

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5. Continue to press and hold the Verification Tester's WRIST STRAP test switch. Simultaneously, press and hold the Verification Tester's LOW BODY VOLTAGE test switch. The monitor's operator LED will remain green, and no audible alarm will sound. This verifies the operator circuit's low body voltage limit.
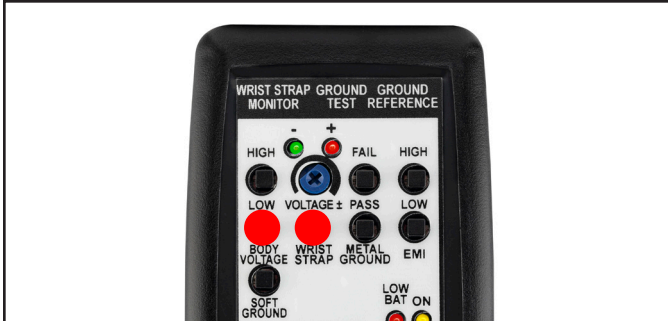

Figure 11. Pressing the WRIST STRAP and LOW BODY VOLTAGE test switches simultaneously

6. Continue to press and hold the Verification Tester's WRIST STRAP test switch. Simultaneously, press and hold the Verification Tester's HIGH BODY VOLTAGE test switch. The monitor's green operator LED will illuminate continuously, its red LED will blink. This verifies the operator circuit's high body voltage limit.
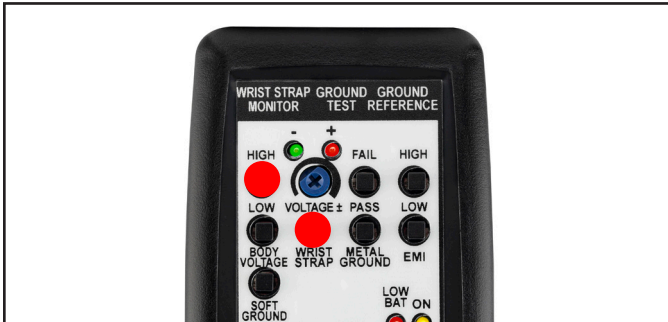
Figure 12. Pressing the WRIST STRAP and HIGH BODY VOLTAGE test switches simultaneously

7. Disconnect the mono cable from the monitor.

VERIFYING THE MAT CIRCUIT

8. Connect the red test lead to red banana jack located at the top of the Verification Tester.

9. Disconnect the monitor's white mat monitor cord from its worksurface mat and turn it over to expose its 10 mm snap.

10. Clip the red test lead's mini grabber to the 10 mm snap on the white mat monitor cord.
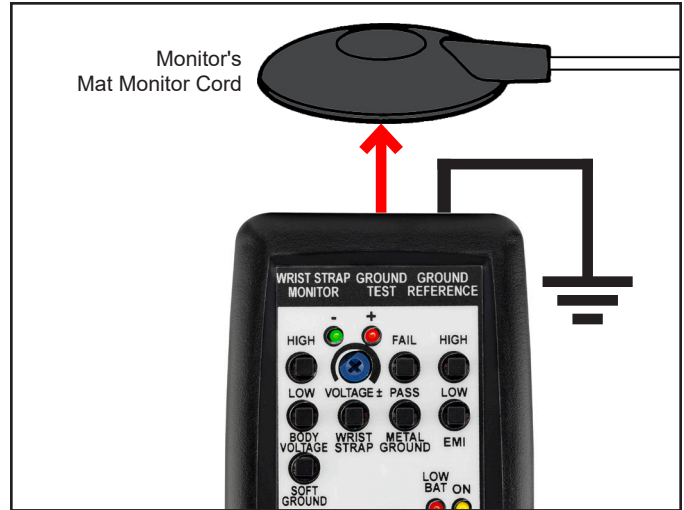

Figure 13. Connecting the Verification Tester to WS Aware Monitor's mat monitor cord

11. Wait approximately 5 seconds for the monitor's mat LED to illuminate red and sound its audible alarm.

12. Press and hold the Verification Tester's SOFT GROUND test switch. The monitor's mat LED will illuminate green, and its audible alarm will stop after approximately 3 seconds. This verifies the mat circuit's resistance limit.
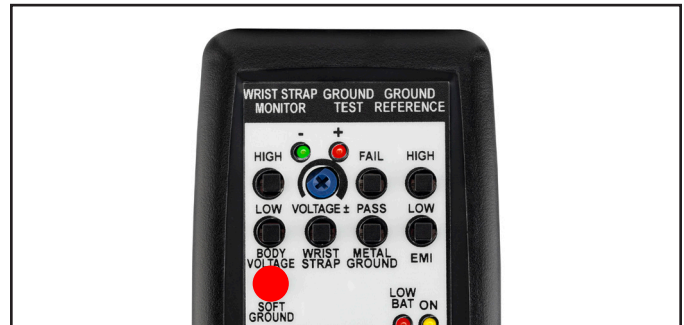

Figure 14. Pressing the SOFT GROUND test switch

13. Disconnect the red test lead from the monitor's white mat monitor cord.

14. Reinstall the white mat monitor cord to the worksurface mat.

VERIFYING THE TOOL CIRCUIT

15. Disconnect the monitor's tool cord from its metal tool.

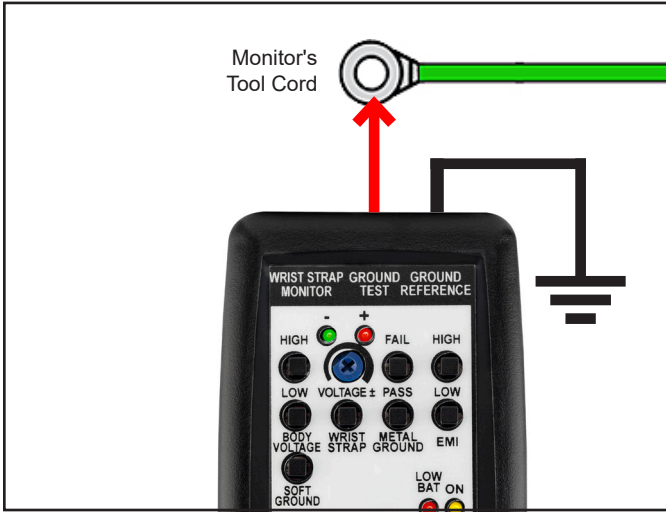16. Clip the red test lead's mini grabber to the tool cord.

Figure 15. Connecting the Verification Tester to WS Aware Monitor's tool cord

17. Wait for the monitor's tool LED to illuminate red and sound its audible alarm.

18. Press and hold the Verification Tester's METAL GROUND PASS test switch. The monitor's tool LED will illuminate green, and its audible alarm will stop. This verifies the tool circuit's impedance limit.
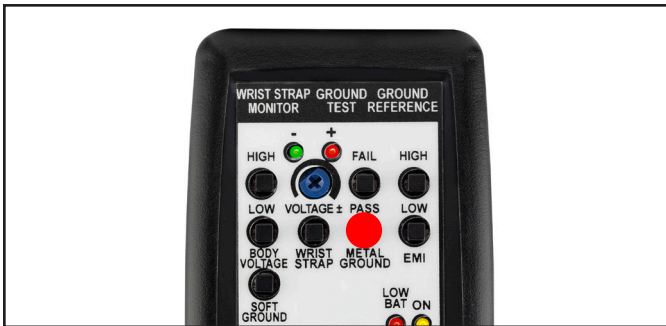

Figure 16. Pressing the METAL GROUND PASS test switch

19. Press and hold the Verification Tester's METAL GROUND FAIL test switch. The monitor's tool LED will illuminate red, and its audible alarm will sound. This verifies the tool circuit's impedance limit.
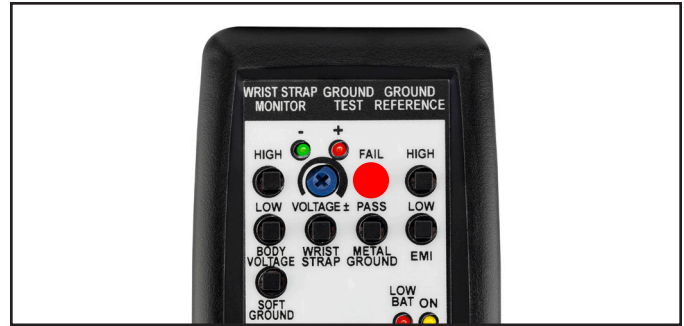

Figure 17. Pressing the METAL GROUND FAIL test switch

20. Press and hold the Verification Tester's METAL GROUND PASS test switch. Simultaneously, press and hold the Verification Tester's EMI LOW test switch. The monitor's tool LED will remain green, and no audible alarm will sound. This verifies the operator circuit's low EMI voltage limit.

Figure 18. Pressing the METAL GROUND PASS and EMI LOW test switches simultaneously

21. Press and hold the Verification Tester's METAL GROUND PASS test switch. Simultaneously, press and hold the Verification Tester's EMI HIGH test switch. The monitor's tool LED will blink red, and its audible alarm will sound. This verifies the operator circuit's high EMI voltage limit.


Figure 19. Pressing the METAL GROUND PASS and EMI HIGH test switches simultaneously

22. Disconnect the red test lead from the monitor's tool cord.

23. Reinstall the tool cord to the metal tool.

Ground Master Monitor

CONFIGURING THE VERIFICATION TESTER

Configure the Verification Tester's DIP switch to the settings shown below. This will make its test limits match the factory default limits of the monitor.
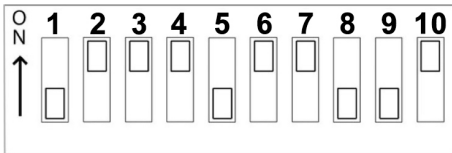
VERIFYING THE TOOL CIRCUIT

1. Disconnect the monitor's tool cord from its metal tool.

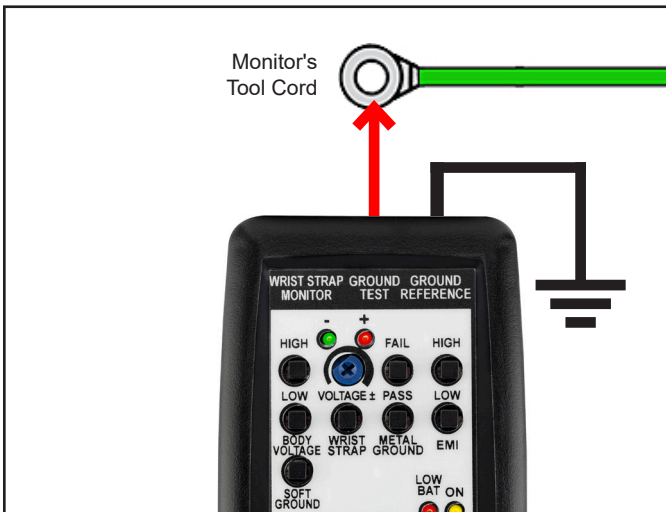2. Clip the red test lead's mini grabber to the tool cord.

Figure 20. Connecting the Verification Tester to Ground Master Monitor's tool cord

3. Wait for the monitor's tool LED to illuminate red and sound its audible alarm.

4. Press and hold the Verification Tester's METAL GROUND PASS test switch. The monitor's tool LED will illuminate green, and its audible alarm will stop. This verifies the tool circuit's impedance limit.

Figure 21. Pressing the METAL GROUND PASS test switch

5. Press and hold the Verification Tester's METAL GROUND FAIL test switch. The monitor's tool LED will illuminate red, and its audible alarm will sound. This verifies the tool circuit's impedance limit.

Figure 22. Pressing the METAL GROUND FAIL test switch

6. Press and hold the Verification Tester's METAL GROUND PASS test switch. Simultaneously, press and hold the Verification Tester's EMI LOW test switch. The monitor's tool LED will remain green, and no audible alarm will sound. This verifies the operator circuit's low EMI voltage limit.

Figure 23. Pressing the METAL GROUND PASS and EMI LOW test switches simultaneously

7. Press and hold the Verification Tester's METAL GROUND PASS test switch. Simultaneously, press and hold the Verification Tester's EMI HIGH test switch. The monitor's tool LED will blink red, and its audible alarm will sound. This verifies the operator circuit's high EMI voltage limit.
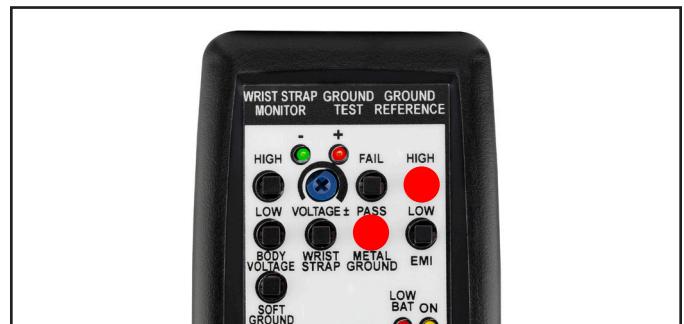

Figure 24. Pressing the METAL GROUND PASS and EMI HIGH test switches simultaneously

8. Disconnect the red test lead from the monitor's tool cord.

9. Reinstall the tool cord to the metal tool.

Ground Man Plus Workstation Monitor

CONFIGURING THE VERIFICATION TESTER

Configure the Verification Tester's DIP switch to the settings shown below. This will make its test limits match the factory default limits of the monitor.
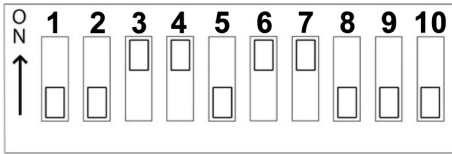
VERIFYING THE OPERATOR CIRCUIT

1. Use the black test lead to connect the Verification Tester to equipment ground.

2. Power the Verification Tester ON.

3. Use the 3.5 mm mono cable to connect the Verification Tester to the monitor's operator jack. The monitor's operator LED will illuminate red, and its alarm will sound.

Figure 25. Connecting the Verification Tester to the Ground Man Plus Workstation Monitor's operator jack

4. Press and hold the Verification Tester's WRIST STRAP test switch. The monitor's operator LED will illuminate green, and its audible alarm will stop. This verifies the operator circuit's impedance limit.

Figure 26. Pressing the WRIST STRAP test switch

5. Continue to press and hold the Verification Tester's WRIST STRAP test switch. Simultaneously, press and hold the Verification Tester's LOW BODY VOLTAGE test switch. The monitor's operator LED will remain green, and no audible alarm will sound. This verifies the operator circuit's low body voltage limit.

Figure 27. Pressing the WRIST STRAP and LOW BODY VOLTAGE test switches simultaneously

6. Continue to press and hold the Verification Tester's WRIST STRAP test switch. Simultaneously, press and hold the Verification Tester's HIGH BODY VOLTAGE test switch. The monitor's green operator LED will illuminate continuously, its red LED will blink, and an audible alarm will sound. This verifies the operator circuit's high body voltage limit.
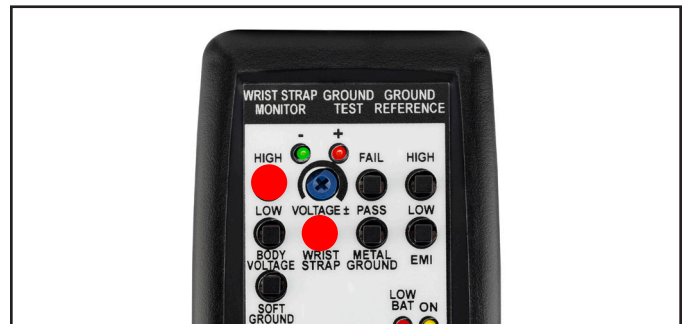

Figure 28. Pressing the WRIST STRAP and HIGH BODY VOLTAGE test switches simultaneously

7. Disconnect the mono cable from the monitor.

VERIFYING THE TOOL CIRCUIT

8. Disconnect the monitor's tool cord from its metal tool.

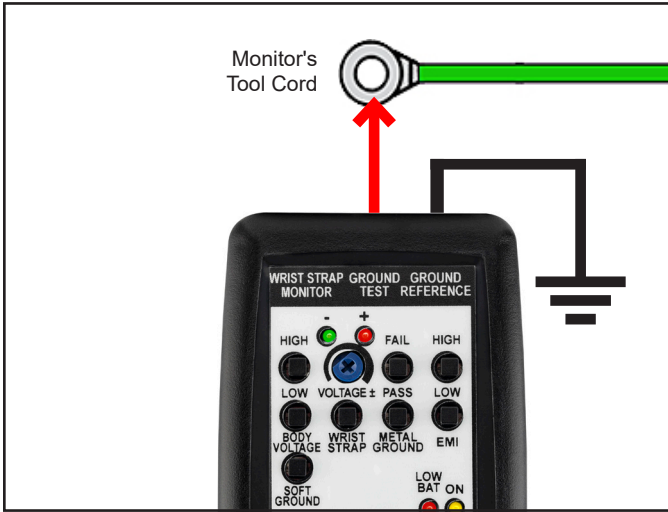9. Clip the red test lead's mini grabber to the tool cord.

Figure 29. Connecting the Verification Tester to Ground Man Plus Monitor's tool cord

10. Wait for the monitor's tool LED to illuminate red and sound its audible alarm.

11. Press and hold the Verification Tester's METAL GROUND PASS test switch. The monitor's tool LED will illuminate green, and its audible alarm will stop. This verifies the tool circuit's impedance limit.

Figure 30. Pressing the METAL GROUND PASS test switch

12. Press and hold the Verification Tester's METAL GROUND FAIL test switch. The monitor's tool LED will illuminate red, and its audible alarm will sound. This verifies the tool circuit's impedance limit.
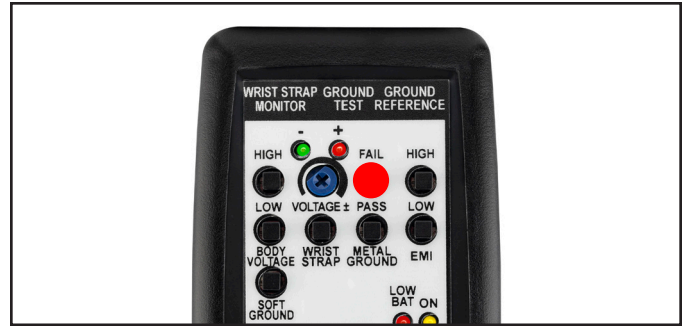

Figure 31. Pressing the METAL GROUND FAIL test switch

13. Press and hold the Verification Tester's METAL GROUND PASS test switch. Simultaneously, press and hold the Verification Tester's EMI LOW test switch. The monitor's tool LED will remain green, and no audible alarm will sound. This verifies the operator circuit's low EMI voltage limit.

Figure 32. Pressing the METAL GROUND PASS and EMI LOW test switches simultaneously

14. Press and hold the Verification Tester's METAL GROUND PASS test switch. Simultaneously, press and hold the Verification Tester's EMI HIGH test switch. The monitor's tool LED will blink red, and its audible alarm will sound. This verifies the operator circuit's high EMI voltage limit.

Figure 33. Pressing the METAL GROUND PASS and EMI HIGH test switches simultaneously

15. Disconnect the red test lead from the monitor's tool cord.

16. Reinstall the tool cord to the metal tool.

Maintenance

Battery Replacement
Replace the battery once the Low Battery LED illuminates red. Open the compartment located on the back of the tester to replace the battery. The tester uses one 9V alkaline battery. Ensure that the battery's polarities are oriented correctly to avoid possible circuit damage.

Specifications

Operating Temperature	50 to 95°F (10 to 35°C)
Environmental Requirements	Indoor use only at altitudes less than 6500 ft. (2 km)
	Maximum relative humidity of 80% up to 85°F (30°C) decreasing linearly to 50% @ 85°F (30°C)
Dimensions	4.9" L x 2.8" W x 1.3" H (124 mm x 71 mm x 33 mm)
Weight	0.2 lbs. (0.1 kg)
Country of Origin	United States of America

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

See the SCS Warranty -
StaticControl.com/Limited-Warranty.aspx

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