WS Aware Workstation Monitor Installation, Operation and Maintenance

Made in the United States of America



Figure 1. SCS WS Aware Workstation Monitor with Big Brother Remote Terminals

Functions

The WS Aware Workstation Monitor works with dual wrist straps that have a standard 3.0 mm audio mono plug. It verifies proper wearing of a wrist strap by measuring an operator's resistance.

A charge can be easily developed on a body during movements. WS Aware Workstation Monitor detects body voltage and alarms if it exceeds the preset level. Alarm thresholds for body resistance and body voltage are set at the factory but can be changed in the field. Please contact SCS Representatives or authorized distributors for details.

The WS Aware Workstation Monitor provides independent monitoring of four grounds – two tool grounds and two mat grounds. An option for four tool grounds is also available.

Red LEDs indicate that when wrist strap fails, or when proximity sensor fails, or when wrist strap is incorrectly plugged into the visitor's jack.

Green LEDs indicate that wrist straps are properly connected and worn.

Tool Ground LEDs (all models): Tri-color LEDs that show green when ground impedance is within limits, red when ground fails, blinking yellow when EMI threshold is exceeded and off when disabled.

Mat LEDs (CTC061 only): Dual-color LEDs that show green when ground resistance is within limits, red when there is failure and off when disabled.

Ground terminal connect to facility ground.

Ground Enable Switches enable or disable monitoring of ground. It is also used to adjust the resistance threshold.

Power LED: Indicates that WS Aware Workstation Monitor is on.

Audible Alarm Button: It is used to enable and disable the sound, and adjust the resistance settings.

Packaging

Check that the following items are included with the WS Aware Workstation Monitor shipping box
1 - WS Aware Workstation Monitor
2 - Remote terminals for wrist straps
1 - Ring terminal for grounding
1 - 6 x 32 1/4" Screw
1 - Power Supply Unit
2 - 10' (3 m) mini-DIN cables for connection between WS Aware Workstation Monitor and remote terminals

Note: Packages containing custom configurations will contain items not included on this list.

Installation

Mounting Instructions

1. Set your WS Aware Workstation Monitor in a clearly visible, convenient location where it doesn't interfere with your normal work.
2. Secure the wrist strap terminals in easy-to-reach but out-of-the-way locations, such as fastening them to the bottom of the workbenches. Since there are two remote terminals, place each of them in a convenient place for each operator.
3. GROUNDING - Ground your WS Aware Workstation Monitor using the supplied ring terminal and screw to the grounding terminal on the right side of the WS Aware Workstation Monitor. You will need a crimping tool and a desired length of wire. Please make sure that you connect the other end of the wire to a known good ground.

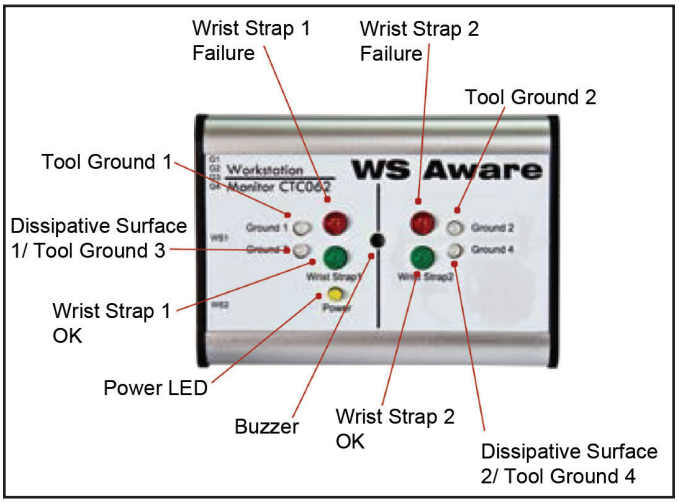


Figure 2. WS Aware Workstation Monitor features and components (front view)

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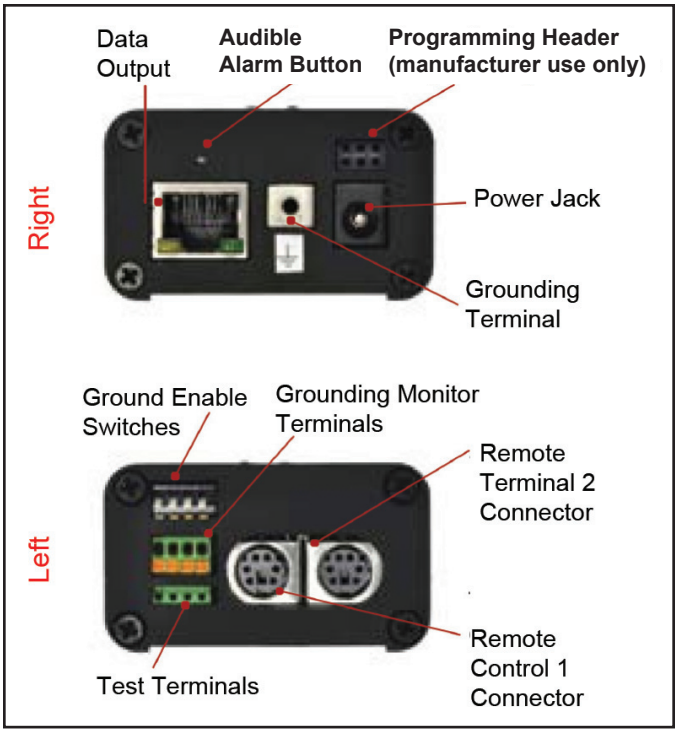


Figure 3. WS Aware Workstation Monitor features and components (right and left views)

4. Connect the WS Aware Workstation Monitor to its remote terminals using the supplied mini-DIN cables. Route the cables so that they are out of the way and do not interfere.
5. Using 25-28 AWG wire connect the tools that you wish to monitor to the ground monitor terminals on the left side of the WS Aware Workstation Monitor. Use a small screwdriver to press the orange levers when inserting or removing wires. Caution: This connection is for monitoring only and not for actual grounding.
6. If you wish to monitor the grounding of Static Dissipative Mats (model CTC061), use the SCS 2380 Monitor Cords, connectors and plug in their wires to mat terminals as mentioned above.
7. If you will be using your WS Aware Workstation Monitor with a Facility Monitoring System, you must read the appropriate section in the FMS User Guide first.
8. Finalize the connections. Plug the power adapter in a convenient outlet. WS Aware Workstation Monitor is now ready for continuous monitoring.

Enabling or Disabling Monitoring

Monitoring of each ground can be enabled or disabled via switches on the left side of the monitor. Pushing the switch lever down with a tip of a pen or with a small screwdriver enables monitoring of a particular ground. Lifting the lever disables it. When monitoring of a particular ground is disabled, an LED corresponding to that ground is off. Do not enable the ground that is not connected as it will create false alarms. For mat monitoring, it may take up to ~20 seconds for the mat ground alarm to react. This delay virtually eliminates false alarms.

Remote Terminals

The WS Aware Workstation Monitor uses two separate remote terminals, making it convenient for each operator. A remote terminal is connected by a mini-DIN 6-pin male/male cable. This cable can be unplugged making remote terminal easy to replace without rerouting the cable. Each remote terminal has two 3.0 mm jacks, one for the operator and another one for a visitor. While both jacks provide grounding for the wrist straps, only the operator's jack is monitored. If the wrist strap is plugged into the visitor's jack and the operator's jack is empty, an alarm will sound.

A green led on the front panel will light up when the wrist strap plugged into the remote terminal is working properly.

The WS Aware Workstation Monitor has two options of remote terminals: CTA242 Standard and CTA243 Big Brother. Big Brother Terminals detect the presence of an operator and sound an alarm if an operator has not plugged-in a wrist strap. A red LED on the Big Brother Terminal indicates the proximity of an operator regardless of alarm status.

Replacing the Remote Jack

1. Unplug the DIN cable behind the terminal.
2. Remove the front cover by unscrewing two screws and two knurled nuts.
3. Pull out the PCB stack from the casing. The top PCB is connected to the bottom PCB by a 6-pin connector.
4. Detach the top PCB from the bottom socket.
5. Replace the top PCB with a new piece.
6. Reassemble the stack and front cover.
7. Remove the front cover by unscrewing two screws and two knurled nuts.
8. Plug in the DIN connector behind the terminal.

Wrist Strap Indication

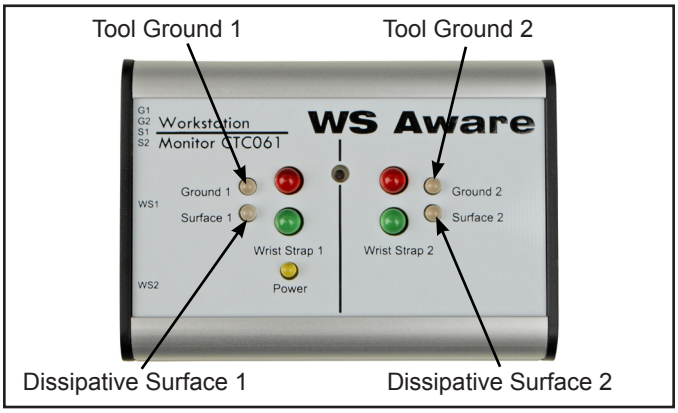


Figure 4. CTC061 WS Aware Workstation Monitor LED's for Dissipative Surfaces and Tool Grounds

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Monitoring of each wrist strap is done independently. When there is no wrist strap present, both LEDs for each wrist strap are off. When a wrist strap is plugged in, a red LED may blink for a second or two. If the wrist strap is worn properly, a green light will be on. When a wrist strap fails, a red light will be on. In case of body voltage exceeding the pre-set limit, a green light may still be on if the wrist strap is worn properly, but the red LED will blink.

Status	Green LED	Red LED	Buzzer
No Wrist Strap	Off	Off	Off
Wrist Strap OK	On	Off	Off
Body Voltage	On	Blinks	Off
Wrist Strap Fail	Off	On	Beeps

Wrist Strap Output Signals

WS1	WS2	Voltage(V1)	Current(mA)
Off	Off	5.0	20.0
Off	Good	4.6	18.4
Good	Off	4.2	16.8
Good	Good	3.8	15.2
Bad	Off	2.2	8.8
Good	Bad	1.8	7.2
Bad	Good	1.4	5.6
Bad	Bad	1.0	4.0

Monitoring of EMI on Tool Ground

Electromagnetic interference (EMI) can cause equipment lockups and malfunction. The WS Aware Workstation Monitor provides monitoring of EMI on tool grounds. It is possible to have a good connection to the ground and presence of large EMI signal on the ground at the same time. Though presence of EMI does not create a failure alarm, it is wise to investigate the cause and take measures to reduce EMI. Please contact SCS for recommendations and for assistance in these matters.

Ground Indication

The following indication is available for each ground:

Status	LED	Buzzer
Ground Disabled	Off	Off
Ground OK	Green	Off
Ground OK + EMI (Tool grounds only)	Orange	Off
Ground Fail	Red	On

Output Signals

The following table shows the output current (or voltage across 250 ohms load) corresponding to different states of ground. For a FMS to generate an alarm it is recommended to set a 4.75V or 19mA output signal since below this level, there is at least one failure condition. This is valid only for 4-20mA output for -3 models.

Mat1/ Tool 3	Mat2/ Tool 4	Tool 1	Tool 2	V	mA
Good	Good	Good	Good	5.00	20
Failed	Good	Good	Good	4.50	18
Good	Failed	Good	Good	4.25	17
Failed	Failed	Good	Good	4.00	16
Good	Good	Failed	Good	3.75	15
Good	Good	Good	Failed	3.50	14
Good	Good	Failed	Failed	3.25	13
Failed	Good	Failed	Good	3.00	12
Good	Failed	Failed	Good	2.75	11
Failed	Failed	Failed	Good	2.50	10
Failed	Good	Good	Failed	2.25	9
Good	Failed	Good	Good	2.00	8
Failed	Failed	Good	Failed	1.75	7
Failed	Good	Failed	Failed	1.50	6
Good	Failed	Failed	Failed	1.25	5
Failed	Failed	Failed	Failed	1.00	4

Modes of Operation

The WS Aware Workstation Monitor can work in a stand alone mode or connected to a DAS or a FMS.

Stand-Alone Operation

Connect the WS Aware Workstation Monitor according to previous instructions and plug its power adapter into a convenient outlet. Do not forget to connect the WS Aware Workstation Monitor to ground. WS Aware Workstation Monitor is now ready to inform you of problems with personnel and equipment grounding. In standalone mode, the WS Aware Workstation Monitor functions as ESD awareness tool for personnel. It can also be used for hands-on ESD training that is essential for a successful ESD management program.

Operation with Data Acquisition System (DAS)

DAS or FMS must be able to sample data from each WS Aware Workstation Monitor in order not to miss intermittent grounding problems. SCS provides a portable or stationary DAS. Please contact a SCS Sales Representative or an authorized distributor.

The WS Aware Workstation Monitor has the following interface options:

Relay (RT model), 4-20mA (-3 model), and Modbus (-5 model).

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If a long data cable is used, it is advisable to install ferrite clamp-on chokes on both ends of the cable in order to reduce electromagnetic interference induced on cables. Please contact a SCS Sales Representative or authorized distributor for proper selection of ferrite filters.

Pinout of RJ45 Connector
The WS Aware Workstation Monitor can work in a standalone mode or connected to a DAS or a FMS.

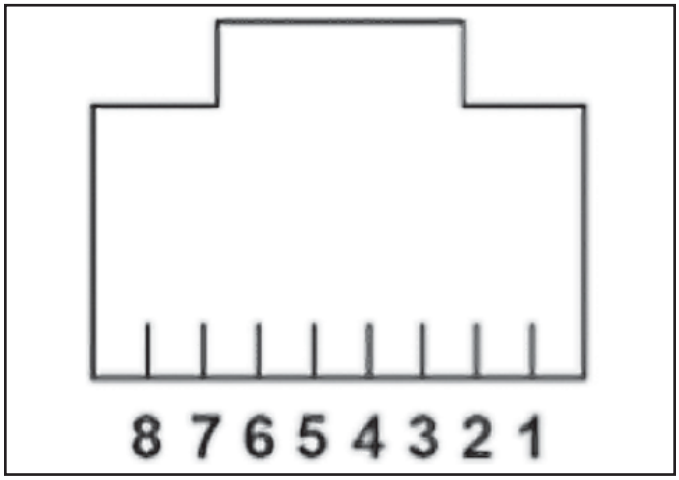


Figure 5. Front view of RJ45 jack.

PIN	RT	4-20mA Interface	RS485
1	NC	NC	NC
2	NC	NC	NC
3	+12V	+12V	+12V
4	NC	NC	TxD-/RxD-
5	NC	NC	TxD+/RxD+
6	Ground	Ground	Ground
7	NC	Monitoring output (tool/mat)	NC
8	Logic Out	Monitoring output (operator)	NC

Maintenance

Procedures for Cleaning and Decontamination
Unplug power from the device. Clean using a dry brush or vacuum cleaner 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.

Specifications

Properties	Values
Wrist Strap Monitor	
Wrist Strap Type	Dual, 3.0 mm
WS Connections	2 megaohms
Number of Wrist Straps	2
Wrist Strap Voltage to Ground	< 50mV peak-to-peak
Remote Terminals	2
Body Resistance Alarm Level	±2.5V default
Indication/Alarm	LED, Buzzer
Ground Monitor	
CTC061	Tools: 2 Connections Mats: 2 Connections
CTC062	Tools: 4 Connections
Connection Activation	
Tool Ground Alarm	10 ohms default, DIP-switch enable/disable
Dissipative Ground Alarm	1 gigaohm default, DIP-switch enable/disable
Operator Resistance	10 megohms (default)
Operator Body Voltage	±2.5V (default)
Mat Resistance	1 gigohm (default)
Tool Impedance	10 ohms (default)
Connectivity	
Analog Model	4-20mA
Relay Model	Logic level: 0 or 5V
Digital Model	RS485
Data Connector	RJ45 jack
General	
Power Supply	Universal 100-240VAC, 0.6A, 50-60Hz Output: 12VDC, 1.5A
Dimensions (approx.)	3.2" W x 2.25" H x 1.30" D (81 mm W x 57 mm H x 33 mm D)
Weight (approx.)	0.3 lbs (130 g)

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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 80% relative humidity for temperatures up to 31° C decreasing linearly to 50% relative humidity at 40° C.

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 WS Aware Workstation Monitor is intended for use by electrical assembly personnel to monitor ground impedance for process and equipment tools.
The WS Aware Workstation Monitor is both a wrist strap monitor and a ground monitor. It provides operator grounding, and monitors the resistance and body voltage of personnel. It monitors the ground connection of two dissipative mats and two tool grounds. It informs the user when excess charge is present. The systems must be installed as specified in this 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. Replace power supply if damaged using only SCS supplied parts.
- Do not attempt to service the power supply or monitor, there are no user serviceable parts; return to SCS for service.
- Do not position the monitor or other equipment where unplugging the power supply is difficult. Always locate the power socket or outlet near the equipment. The power supply plug serves as the disconnect device.
- Do not use the WS Aware Workstation Monitor or its power supply outside of the operating conditions listed in this user guide.

To reduce the risks associated with hazardous voltage:

- Use only the power supply provided by SCS and specified for the country of use.
- Make sure that the WS Aware Workstation Monitor is properly grounded.
- Do not simultaneously power the WS Aware Workstation Monitor with the power supply and the RJ45 data cable.
- Do not plug the WS Aware Workstation Monitor into your 10/100BaseT Ethernet factory network!
- Do not plug -3 versions into -5 interfaces and vice versa, this may cause irreversible damage to the WS Aware Workstation Monitor and FMS.
- Do not use a longer screw to replace the supplied parts.
- Use only a dry cloth when cleaning.

Caution

To reduce the risks associated with environmental contamination:

- Dispose of WS Aware Workstation Monitor and power supply in accordance with all applicable local and government regulations

Notice

To reduce the risk of damage to components or assemblies being handled:

- WS Aware Workstation Monitor must be checked periodically to verify each test mode is functioning correctly.
- Ensure proper operation of WS Aware Workstation Monitor by performing operational verification test as required.
- Always properly ground your tools and dissipative mats to known good ground before connecting WS Aware Workstation Monitor for monitoring.

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Regulatory Information

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.

This numerical reference should not be construed as a representation regarding the product's life or an extension of a product warranty. In the event any product is proven not to conform with SCS's Regulatory Information Sheet, then SCS's entire liability and buyer's exclusive remedy, will be at SCS's option either: (i) replacement of product with a conforming product, or (ii) refund of the purchase price paid by buyer for each nonconforming product, within a reasonable time after written notification of said nonconformance and return of said product to SCS. SCS shall not under any circumstances be liable for direct, incidental, special, or consequential damages (including but not limited to loss of profits, revenue, or business) related to or arising out of this certification, including, the use, misuse or inability to use the product. Unless stated otherwise in writing, the foregoing language cannot be waived, modified, or supplemented in any manner whatsoever.

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.

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.

Note: 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.

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This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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-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.

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

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

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