3M™ WS Aware Workstation Monitor

CTC061, CTC062

User's Guide

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1.0 SAFETY INFORMATION

Please 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 3M™ 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.

Explanation of Signal Word Consequences		
	**WARNING:**	Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
	**CAUTION:**	Indicates a hazardous situation, which if not avoided, could result in minor or moderate injury and/or property damage.
	NOTICE:	Indicates a situation which, if not avoided, could result in property damage.

Explanation of Product Safety Label Symbols			
	**GROUND**		**DOUBLE INSULATION**
	**DIRECT CURRENT**		**TERMINAL**
	**CAUTION**		**FOR INDOOR USE ONLY**

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 3M supplied parts.
- Do not attempt to service the power supply or monitor, there are no user serviceable parts; return to 3M 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 3M™ 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 3M 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.

2.0 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 overvoltage 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.

3.0 Package Contents

Check that the following items are included with the 3M™ WS Aware Workstation Monitor shipping box*:

1 ea. WS Aware Workstation Monitor
2 ea. Remote terminals for wrist straps
1 ea. Ring terminal for grounding
1 ea. 6x32¼" Screw
1 ea. Power Supply Unit
2 ea. 10' (3 m) mini-DIN cables for connection between 3M WS Aware Workstation Monitor and remote terminals
1 ea. User's Guide

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

4.0 General Product Specifications

Power Adapter	Universal Power Supply (included) Input: 100 - 240VAC, 0.6A, ~ 50 - 60Hz Output: 12VDC 1.5A, GlobTek Model GT-41080-1817.9-5.9 positive For most locations, this universal power adapter has replaceable clip-on blades.
Dimension (approx.)	3.2" W x2.25" H x1.30" D (81mm W x 57 mm H x 33 mm D)
Weight (approx.)	120 g

5.0 Functions of 3M™ WS Aware Workstation Monitor

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 3M 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.

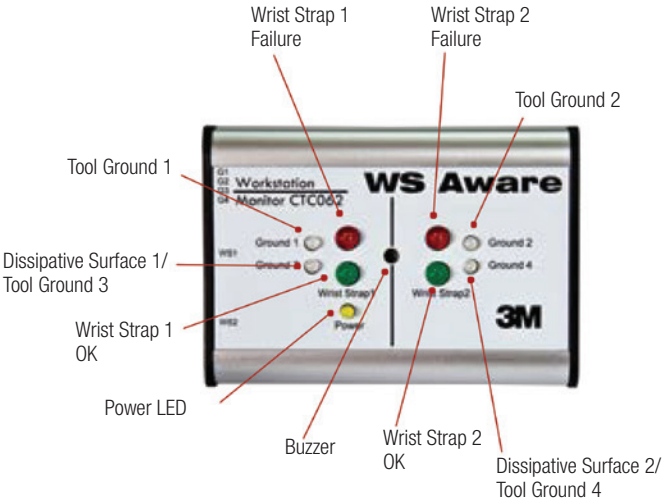
Ground terminal connect to facility ground.

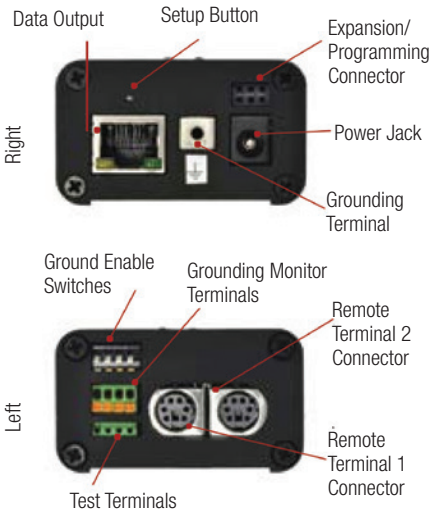
Ground Enable Switches enable or disable monitoring of ground. It is also used to adjust the resistance threshold.

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

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

6.0 Parts Description – 3M™ WS Aware Workstation Monitor





7.0 Installation of 3M™ WS Aware Workstation Monitor

Mounting Instructions

7.1 Set your 3M™ WS Aware Workstation Monitor in a clearly visible, convenient location where it doesn't interfere with your normal work.

7.2 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.

7.3 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.

7.4 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.

7.5 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.

7.6 If you wish to monitor the grounding of Static Dissipative Mats (model CTC061), use the 3M™ Monitor Cords 2380, connectors and plug in their wires to mat terminals as mentioned above.

7.7 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's Guide first.

7.8 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.

8.0 Remote Terminals

The 3M™ 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, Regular and the 3M™ Big Brother Terminal as shown. 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

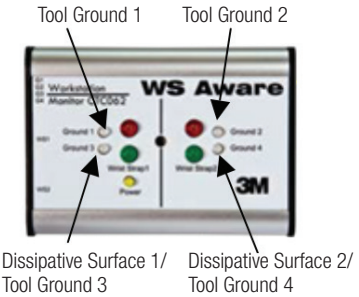
8.1 Unplug the DIN cable behind the terminal.
8.2 Remove the front cover by unscrewing two screws and two knurled nuts.
8.3 Pull out the PCB stack from the casing. The top PCB is connected to the bottom PCB by a 6-pin connector.
8.4 Detach the top PCB from the bottom socket.
8.5 Replace the top PCB with a new piece.

8.6 Reassemble the stack and front cover.
8.7 Remove the front cover by unscrewing two screws and two knurled nuts.
8.8 Plug in the DIN connector behind the terminal.

9.0 Wrist Strap Indication

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



10.0 Wrist Strap Output Signals

When connected to a Facility Monitoring System, the 3M™ WS Aware Workstation Monitor provides output indicating each state of a wrist strap monitor. This table shows the output current (and voltage with 250 Ohms resistor) corresponding to different states of wrist strap status. This is valid only for 4-20mA output version (-3).

WS1	WS2	Voltage (V)	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

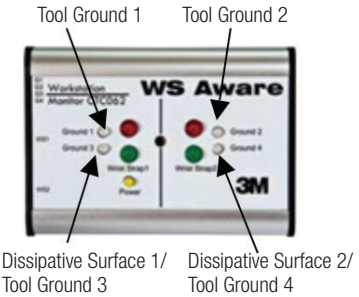
11.0 Monitoring of EMI on Tool Ground

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 3M for recommendations and for assistance in these matters.

12.0 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)	Yellow	Off
Ground Fail	Red	On



13.0 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.

Mat 1/Tool 3	Mat 2/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	Failed	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

14.0 Modes of Operation

The 3M™ 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 3M 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 3M™ 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. 3M provides a portable or stationary DAS. Please contact a 3M Sales Representative or an authorized distributor.

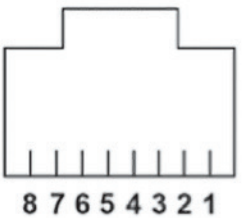
The WS Aware Workstation Monitor has the following interface options: Relay (RT model), 4-20mA (-3 model), and LAN (-5 model).

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 3M Sales Representative or authorized distributor for proper selection of ferrite filters.

15.0 Pinout of RJ45 Connector

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

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



Front view of RJ45 jack

16.0 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 3M Sales Representative or Authorized Dealer to request inspection and repair. Replace power supply if damaged using only 3M 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 3M 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 plug
WS Connection to Ground	2 MΩ
Number of Wrist Straps	2
Wrist Strap Voltage to Ground	Less than ~100 mVrms
Remote Terminals	2
Body Resistance Alarm Level	± 2.5V default
Indication/Alarm	LED, Buzzer
Ground Monitor	
CTC061 Model	Tools: 2 connections Mats: 2 connections
CTC062 Model	Tools: 4 connections
Connection Activation	
Tool Ground Alarm	10Ω default, DIP-switch enable/disable
Dissipative Ground Alarm	1GΩ default, DIP-switch enable/disable
Indicated Alarms	
Operator Resistance	35 Mohm
Operator Body Voltage	2.5 Volts
Mat Resistance	1000 Mohms
Tool Impedance	1-20 Ohms
Connectivity	
Analog Model	4-20mA
Relay Model	Logic level: 0,5V
Digital Model	RS485/Ethernet
Data Connector	RJ45 jack
General	
Power Supply	Universal 100 - 240VAC, 0.6A, 50-60Hz Output: 12VDC, 1.5A
Dimension (approx.)	3.2” W x2.25” H x1.30” D (81mm W x 57 mm H x 33 mm D)
Weight (approx.)	120g

Product Brochure

3M™ WS Aware Dual Workstation Monitor

The WS Aware Workstation Monitor provides continuous monitoring of grounding parameters on personnel, workbench, and equipment. It is available with a proximity sensor that detects the presence of an operator and alarm if an operator is not plugged into the monitor via a wrist strap. WS Aware Workstation Monitor is designed for use in environments producing ESD sensitive components. It uses a low test voltage to measure personnel grounding.

Applications

Disk Drive Assembly, Gmr Head Handling, Military, Semiconductor Fabrication, Fiber Optics, Flat Panel Fabrication, Laser Diodes, Electronic Assembly, Industrial Robotics, Medical, etc.

Features

Dual wrist strap monitor, two remote terminal, low test voltage on person, body voltage monitoring, tools monitoring, mat monitoring, connectivity to FMS, compact, etc.

Operator Grounding

The WS Aware Workstation Monitor is available with the 3M™ Big Brother Operator Sensor that detects the presence of an operator and raises an alarm if an operator is within reach of sensitive components but not plugged into the grounding jack via a wrist strap.

Low Voltage

WS Aware Workstation Monitor provides ~100 mVrms between the conductors of the wrist strap. The WS Aware Workstation Monitor is designed for use in environments producing sensitive components.

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 3M in writing, this information represents 3M's best knowledge and belief based upon information provided by third party suppliers to 3M.

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 3M's Regulatory Information Sheet, then 3M's entire liability and buyer's exclusive remedy, will be at 3M'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 3M. 3M 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)	(Cr (VI)	(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.

产品中有毒有害物质或元素的名称及含量

部件名称	有毒有害物质或元素					
	铅	汞	镉	六价铬	多溴联苯	多溴二苯醚
0603电容引脚	X	O	O	O	O	O
二极管焊接部	X	O	O	O	O	O
二极管电镀	X	O	O	O	O	O
印刷电路板焊盘/安装孔	X	O	O	O	O	O
0603 电阻引脚	X	O	O	O	O	O
0603 电阻电镀部	X	O	O	O	O	O
电位器中的电阻油墨	X	O	O	O	O	O
装置的焊接部	X	O	O	O	O	O
IC焊接部	X	O	O	O	O	O
蜂鸣器焊接部	X	O	O	O	O	O
音频插孔	X	O	O	O	O	O

O: 表示该有毒有害物质在该部件所有均质材料中的含量均在SJ/T11363-2006 标准规定的限量要求以下。
X: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出SJ/T11363-2006 标准规定的限量要求。

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 3M. Unauthorized modifications may void the authority granted under Federal Communication Rules and Industry Canada Rules permitting the operation of this device.

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.

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Important Notice
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Warranty; Limited Remedy; Limited Liability.
This product will be free from defects in material and manufacture for one year from the time of purchase. **3M MAKES NO OTHER WARRANTIES INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE**. If this product is defective within the warranty period stated above, your exclusive remedy shall be, at 3M's option, to replace or repair the 3M product or refund the purchase price of the 3M product. **Except where prohibited by law, 3M will not be liable for any indirect, special, incidental or consequential loss or damage arising from this 3M product, regardless of the legal theory asserted.**

3M

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