



# 790 Static Monitor



In our ever-changing high tech world, a company's reputation for providing dependable products of excellent quality is the one constant. Attention to fine detail is the key to ensuring that a high tech company here today will be enjoying the rewards of tomorrow. Among the many details of meeting these demanding specifications is the control of electrostatic discharge (ESD).

## The High Cost of Static Discharge

Static is generated all around us through simple movements, such as walking from one workstation to another, or pulling tape from a dispenser. A static charge builds up, causing a discharge, often called a static shock. Even a small discharge can measure several hundred volts and damage microelectronic components, which can cause these components to fail when installed in computers, cell phones and other devices. Semi-conductor devices damaged by static electricity can impact yield rates and product reliability if not properly handled. However, more costly than the damaged goods a company distributes is the damaged reputation it suffers with its customer base. The fact is most ESD damage can be prevented through a static control program which emphasizes constant monitoring to assure peak performance. To help achieve that goal of constant vigilance, 3M is pleased to announce the development of the 3M™ Model 790 Static Monitor.

## Cost-effective Static Monitor

3M recognizes that while high tech companies have to act quickly and wisely in their endeavor to establish a plan for constant monitoring, they must do so with an eye toward the bottom line. The 790 Monitor is a cost efficient unit that is small, compact and versatile in its usage, and may be mounted directly onto device handling equipment, testers, and auto insertion equipment. An operator simply inserts a dual conductor ground cord into one of the input jacks located on the monitor while working on an integrated circuit device handler. The 790 may also be mounted at individual workstations, and at auto insertion equipment used in contract manufacturing facilities.

Housed in static dissipative plastic, the 790 works by measuring the voltage potential on a person referenced to earth ground. The 790 uses a slide switch allowing the user to select the voltage level necessary for the specific job function being performed. For example, the 1V and 3V levels are used for highly critical applications in disk drive and wafer fabrication manufacturing, while the 6V and 9V levels can be used for less sensitive work areas such as PCB assembly. Included with the 790 is a mounting plate that allows it to be permanently mounted at an ESD workstation or directly to a device handler, tester, or auto insertion equipment. Power is supplied to the 790 through an AC adapter.

The 790 has two wrist strap input jacks located on its front, which allows two operators to use one 790 monitor unit at a workstation simultaneously. A green light indicates that the unit is "on" and that all monitored connections are within set limits. Two red lights and an audible alarm flash and beep at different rates to indicate 3 separate alarm conditions:

- Exceeding voltage level set limit
- Loss of contact between arm and wristband
- 790 disconnected from ground

These distinct alarms make it easy to identify which operator and the type of fault condition. The audible alarm can be adjusted to a low or high level to overcome background noise from other equipment that may be in use in the area. Ring terminals on the end of the 790's ground and chassis cords provide a permanent connection.

## Product Features

- Audible and visible alarms
- Compact system
- Pre-select test voltages 1V, 3V, 6V, & 9V
- Static-dissipative plastic housing
- Mounts easily to ESD worksurface
- Regulatory Compliance: UL & CE

The 3M 790 Static Monitor system includes a mounting plate with adhesive, an AC adapter, and two ground cords with a two-wire connector.

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# 3M™ 790 Static Monitor

## Required accessories and optional parts for 3M 790 Static Monitor

Model No.	Description	Size
2368VM	Dual Conductor Fabric Wrist Band	Adjustable
2381VM	Dual Conductor Metal Wrist Strap*	Small
2382 VM	Dual Conductor Metal Wrist Strap*	Medium
2383 VM	Dual Conductor Metal Wrist Strap*	Large
2384VM	Dual Conductor Metal Wrist Band	Small
2385VM	Dual Conductor Metal Wrist Band	Medium
2386VM	Dual Conductor Metal Wrist Band	Large
2360	Dual Conductor Coil Cord	5 ft.
2370	Dual Conductor Coil Cord	10 ft.
2371	Dual Conductor Coil Cord	20 ft.
3057	Stand-By Jack	_____

\*Includes Band & Cord

### Quality in Action

ISO requirements state the need for verification of performance of all test equipment. A 3M™ 790VK Verification Kit allows you to meet these requirements. The kit includes hardware items for connection to the 790 Monitor.

### Ordering Information:

For ordering information, technical information and product information, you can reach us at:

Phone: 1-800-328-1368

Fax: 1-800-828-9329

## 790 Properties

Item	Typical Properties
Monitor Size	3.5" x 4.0" x 1.25" (88,9mm x 101,6mm x 31,8mm), approximate
<b>Power Supply Requirements:</b>	
Input	120 Vac $\pm$ 10% (North America)
Outside North America	(As required)
Output	25 Vdc @ 50 mA rated load
Output Plug Polarization	Center negative
Output Plug Dimensions	5,5mm O.D. x 2,1mm I.D. x 9,5mm length
<b>Accuracy:</b> (The following parameters are valid for altitudes up to 2000 m. Pollution degree 2, Class 3, Equipment)	
Voltage Detection Levels	(1V $\pm$ 15%) (3V,6V, & 9V $\pm$ 10%)
Ground Disconnect	10 ohms $\pm$ 20%
<b>Environmental Operating Conditions:</b>	
Temperature	Maximum 104°F (40°C); minimum 50°F (10°C)
Humidity	Maximum 75% relative humidity

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# 3M

## 790 Static Monitor Instructions



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# Table of Contents

Intended Use.....	5
1.0 Theory of Operation.....	6-7
2.0 Attaching Ground & Chassis Cords .....	7-9
3.0 Ataching the 3M™ 790 Static Monitor to a Workbench or Equipment Chassis.....	10
4.0 Operating Your System.....	11-12
5.0 Connecting an Operator to the 790 Static Monitor .....	12-13
6.0 Verification Procedure.....	13-15
7.0 Specifications.....	15
8.0 Parts Included .....	15
9.0 Required Accessories and Optional Available Parts .....	16
10.0 Additional Wrist Strap Monitoring Information.....	17

***Read and understand all safety information before operating this equipment.***



## Intended Use

The 3M™ 790 Static Monitor is designed to monitor the operation of two wrist strap grounding systems and the ground connection of a specified equipment chassis. This product has been designed and tested for indoor use only and with 3M™ 2300VM Series Dual Conductor Wristbands and 2300 Series Dual Conductor Ground Cords. \* The monitor operates from a 120Vac adaptor that is included in the North America version. Outside North America, obtain an appropriate AC adapter meeting the specifications as stated in Section 7 Specifications under Power Supply Requirements. **The product has not been tested or proven safe for other uses.**



### CAUTION

- Incorrect grounding of an operator may cause electrostatic discharge (ESD) damage to components or assemblies being handled. For proper grounding of the operator when using the 3M 790 Static Monitor, use the three-prong AC adapter or the supplied chassis/ground cords specified in the user instruction manual.
- The 790 Static Monitor does not have the capability of verifying that the ground point is a suitable ground. Verify that the electrical ground point is suitable prior to use. If you are not sure what a suitable ground is, contact a licensed electrician before installation.
- When using two 790 Chassis/Ground Cords, attach each of the cords to separate ground bonding points. By attaching the cords to the same ground but at different physical locations, the monitor can check for loose or lost connections.
- At the end of product life, dispose of product in accordance with governmental regulations.

## Explanation of Symbols



Caution: refer to user instruction manual.



Chassis ground



Electrical ground.

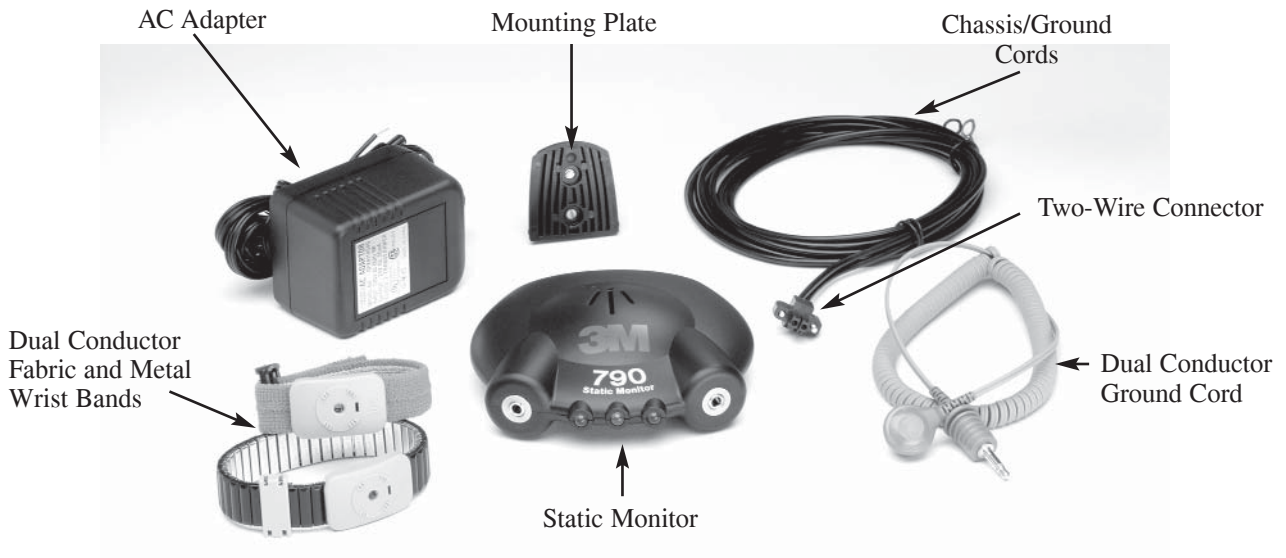


Power input connector polarity (center negative).



See user instruction manual for explanation of the indicator lamps.

\*3M Dual Conductor Cords & Wristbands (2300VM Series) are required for use with the 790 Monitor, ordered separately.



**Fig. 1 - Model 790 Static Monitor Station & Dual Conductor Wrist Strap Accessories.\*\*\***

## 1.0 Theory of Operation

The 3M™ 790 Static Monitor is designed to continuously monitor the voltage level on an operator(s) using a high impedance voltage measurement circuit. The measured operator's voltage is compared to one of four user selectable (1V, 3V, 6V, and 9V) internal reference voltages. An alarm will sound with a corresponding red flashing lamp(s), when an operator's voltage level (caused by static generation) exceeds the selected internal reference voltage.\* In addition, a wristband contact detection circuit is also employed to let the user know if the wristband is being worn improperly or has experienced a loss of continuity between the ground cord and wristband.

The ground connection of the 3M 790 Static Monitor is continuously monitored through a low DC current-loop measurement circuit. The ground connection of an equipment chassis can also be monitored when connected in series with the monitor's ground measurement circuit. An alarm will sound with corresponding red lamps, when this loop resistance exceeds 10 Ω. \*\*

If all monitored components are operating within the selected operating parameters of the 790 Monitor, a green lamp will illuminate.

The 790 Monitor uses a modified version of the 3M Dual Conductor Wristband (VM Series) and the standard 3M Dual Conductor Grounding Cord (See Accessories Section).

\*Voltage alarm levels –10% and –15%

\*\*Ground Disconnect –20%

\*\*\*Ordered separately





## Caution

The 3M™ 790 Static Monitor does not have the capability of verifying that the ground point is a suitable ground.

If you are not sure what a suitable ground is, contact a licensed electrician before installation.

## 2.0 Attaching Ground and Chassis Cords

Tools required – Small blade screwdriver.

Refer to Figures 2A, 2B, 3A, and 3B for this section.

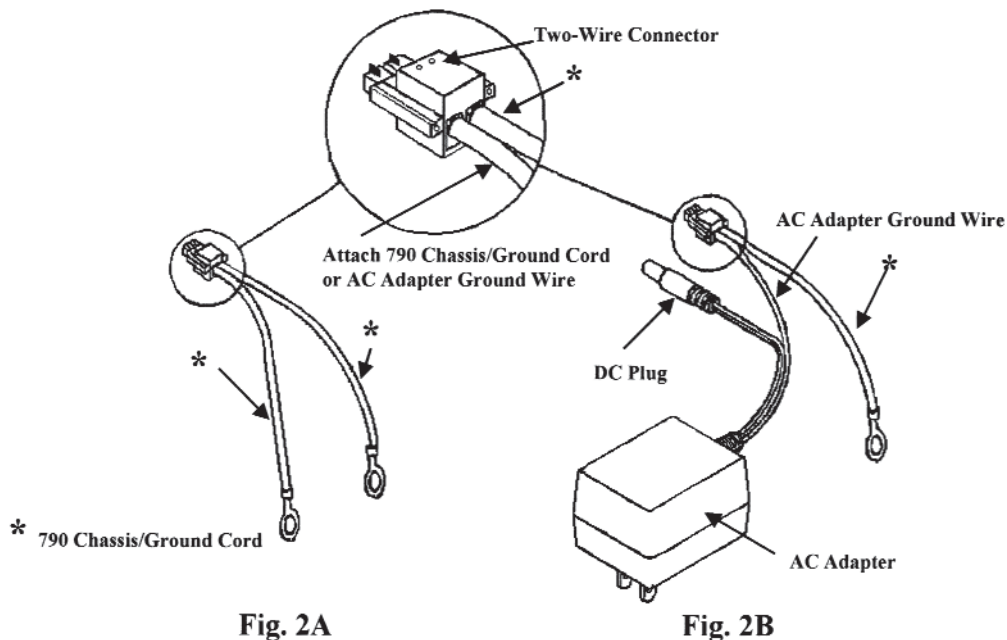


Fig. 2A and 2B-Attachment of Ground Cords

**Note:** Perform Step #1 below when monitoring directly to the ground connection (Fig. 3A).  
Perform Step #2 when monitoring the ground connection through a grounded chassis (Fig. 3B).

### 2.1 Installation of 3M 790 Static Monitor with Chassis Terminal Connected Directly to Earth/Electrical Ground

Determine how you want to ground the 790 Monitor:

- a. If you are grounding the 790 Static Monitor through the 3-Wire AC adaptor (North America) supplied, perform the following steps:
  - Attach the tinned ground wire of the AC adaptor to the ground terminal of the two-wire connector by inserting it into the opening and securing with screwdriver.
  - Attach one of the supplied 790 Chassis/Ground Cords (tinned end) to the chassis terminal of the two-wire connector in the same manner.
  - Attach the ring terminal end of the 790 Chassis/Ground Cord to an earth/electrical ground with a screw (not supplied).
  - Plug the two-wire connector into the jack at the rear of the 790 Static Monitor.



b. If you are grounding the 3M™ 790 Static Monitor through a 3M 790 Chassis/Ground Cord perform the following steps:

- Attach one of the supplied 790 Chassis/Ground Cords (tinned end) to the ground terminal of the two-wire connector by inserting it into the opening and securing with screwdriver.
- Attach the other 790 Chassis/Ground Cord to the chassis terminal of the two-wire connector in the same manner.



- Attach the ring terminal ends of both cords separately with two screws (not supplied) to an earth/electrical ground.
- Plug the two-wire connector into the jack at the rear of the 790 Static Monitor.



### Caution

When using two 790 Chassis/Ground Cords, attach each of the cords to separate ground bonding points. By attaching the cords to the same ground but at different physical locations, the monitor can check for loose or lost connections.

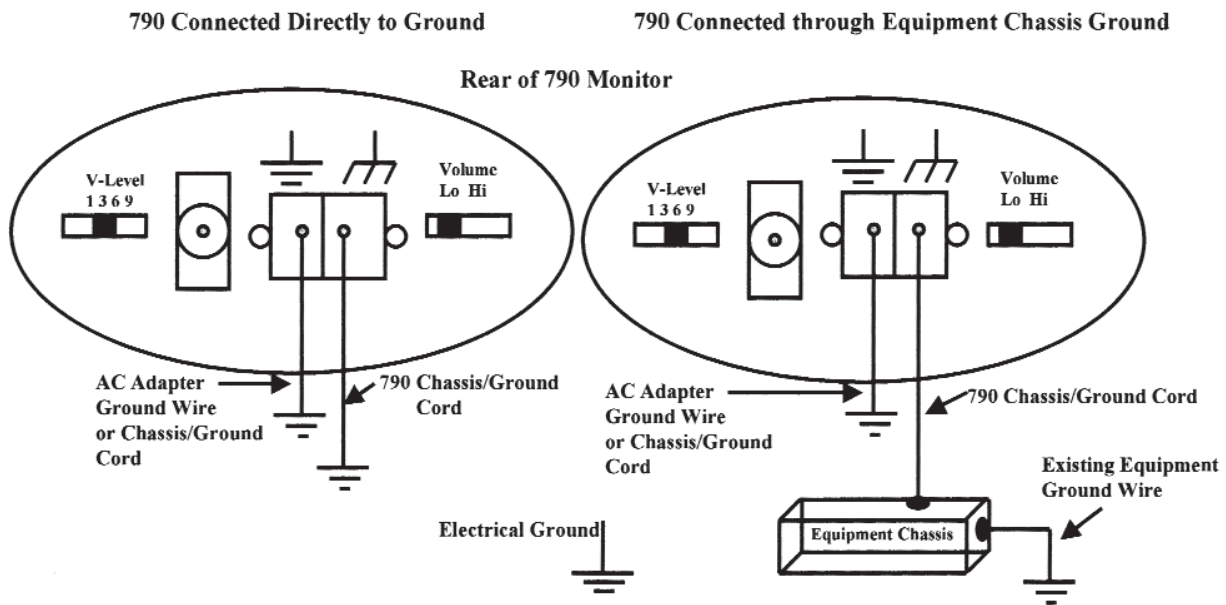


Fig. 3A

Fig. 3B

Fig. 3A and 3B - 790 Connected Directly to Ground or Through Equipment Chassis Ground

## 2.2 Installation of 3M™ 790 Static Monitor with Chassis Terminal Connected to a Grounded Equipment Chassis

Determine how you want to ground the 3M 790 Static Monitor:

- a. If you are grounding the 790 Static Monitor through the 3-Wire AC adaptor supplied, perform the following steps:
  - Attach the tinned ground wire of the AC adaptor to the ground terminal of the two-wire connector by inserting it into the opening and securing with screwdriver.
  - Attach one of the supplied 790 Chassis/Ground Cords (tinned end) to the chassis terminal of the two-wire connector in the same manner.
  - Attach the ring terminal end of the 790 Chassis/ Ground Cord to the equipment chassis with a screw (not supplied).
  - Plug the two-wire connector into the jack at the rear of the 790 Static Monitor.



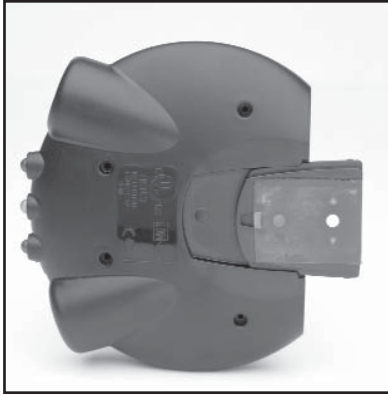
- b. If you are grounding the 790 Static Monitor through a 790 Chassis/Ground Cord perform the following steps:
  - Attach one of the supplied 790 Chassis/ Ground Cords (tinned end) to the ground terminal of the two-wire connector by inserting it into the opening and securing with screwdriver.
  - Attach the other 790 Chassis/Ground Cord to the chassis terminal of the two-wire connector in the same manner.
  - Attach the ring terminal end of the 790 Chassis/Ground Cord connected to the ground terminal of the two-wire connector, with a screw (not supplied) to an earth/electrical ground.
  - Attach the ring terminal end of the 790 Chassis/Ground Cord connected to the chassis ground terminal of the two-wire connector, with a screw (not supplied) to an equipment chassis.
  - Plug the two-wire connector into the jack at the rear of the 790 Static Monitor.



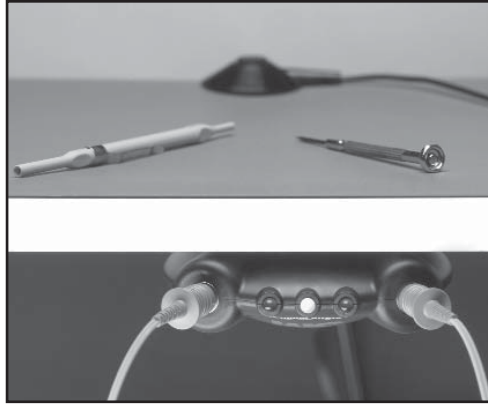
### Caution

When using **two** 790 Chassis/Ground Cords, attach each of the cords to separate ground bonding points. By attaching the cords to the same ground but at different physical locations, the monitor can check for loose or lost connections.

### 3.0 Attaching the 3M™ 790 Static Monitor to a Workbench or Equipment Chassis



**Fig. 4 - Attachment of Mounting Plate to 790**



**Fig. 5 - Monitor Attached to Workbench**



**Fig. 6 - Monitor Attached to Equipment Chassis**

#### **Refer to Figures 4, 5, and 6**

Locate the Mounting Plate.

¥ Attach the Mounting Plate in the desired location using one of the following methods:

- a. Foam tape (already applied to the Mounting Plate). Clean the surface to be mounted to with Isopropyl Alcohol. Remove release liner from tape before mounting.
- b. Two #8 pan head machine or wood screws (not supplied)

¥ Attach the 790 Monitor to the mounted plate as shown in Fig. 4. Align the plate with the opening on the bottom of the monitor and slide forward onto plate until it latches.

## 4.0 Operating Your System

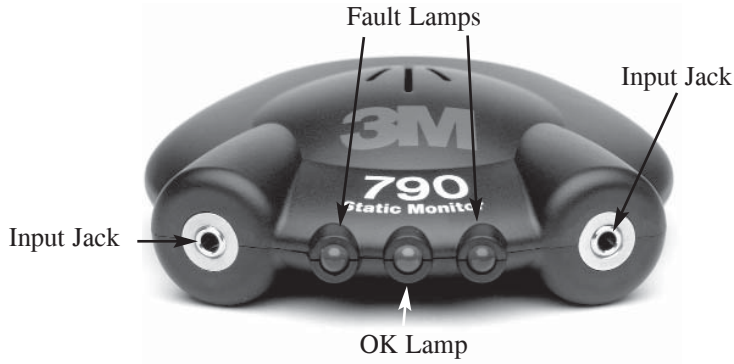


Fig. 7 - Front of 3M 790 Static Monitor

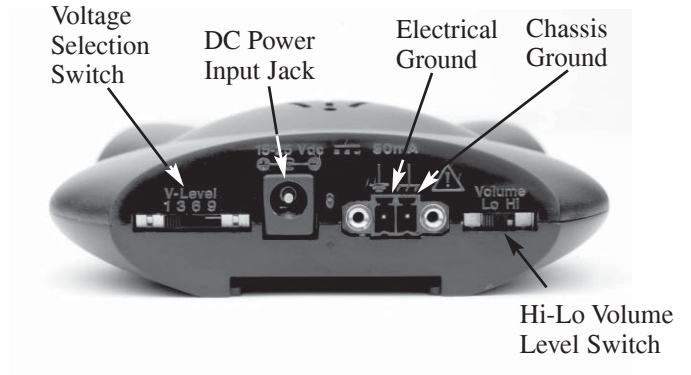


Fig. 8 - Rear of 3M 790 Static Monitor

### Refer to Figures 7 and 8

#### Power Up

Apply power to the 3M<sup>®</sup> 790 Static Monitor by inserting the round connector on the end of the AC adaptor, into the jack at the rear of the 790 Monitor. Plug the AC adaptor into an appropriate electrical outlet. The green lamp should illuminate, signaling that the unit is operational and that there are no alarm conditions. If the green lamp does not illuminate, but red lamps are illuminated with audible alarm sounding, check all cords and ground connections.

#### Audible Alarm Volume Level

Select the desired audible alarm volume level at the rear of the 790 by sliding the switch to the Hi or Lo position.

#### Selection of the Reference Voltage

The 790 Monitor allows for the selection of one of four internal reference voltages (1V, 3V, 6V, and 9V) with 1V being the most sensitive setting and 9V the least sensitive. Select a voltage level by sliding the switch to the appropriate position. These ranges have been designed to accommodate global ESD requirements. The selection of this operational parameter is based upon the user's ESD control program requirements.

#### Fault Conditions – Lamps & Audible Alarms

For wrist strap malfunctions, the 790 indicates different alarms for each operator; a slow audible beep/flashing lamp for the operator on the left input side and a fast audible chirping beep/flashing lamp for the operator on the right input side. For grounding/chassis-monitoring malfunctions, a continuous tone is emitted with both lamps illuminated.

- a. Red lamp(s) flashing with an audible alarm.

This alarm mode can be caused by two conditions and both are interrelated. If either the voltage level on the operator is greater than the pre-selected internal reference voltage or poor contact between the wristband and the arm exist, the alarm will activate.

If the monitor's alarm activates when the operator is not moving (normally a non-charging situation), the cause is most likely due to poor contact between the wristband and the arm. The alarming period would normally be long in duration (unless intermittent contact) during this type of condition. Check contact between the wristband and arm. Some operators may have difficulty in providing sufficient contact to the wristband because of dry skin or arm hair. They may need to use an approved skin moisturizer or reposition the wristband on the arm.

If the monitor's alarm does not activate while the operator is not moving, then the cause of the alarm was most likely due to a voltage being developed on the operator. A high resistance between the operator and ground would allow the operator to charge up as they moved about. The alarm period for this type of fault would normally be short and coincide with their body movement.

Alarming can also be caused by an intermittent or high resistance in the wrist strap's dual conductor ground cord. Replace a suspect cord with a known good ground cord or check the end to end resistance of the cord using an ohmmeter. Approximately 1 megohm of resistance should exist between the tip to tip and barrel to barrel contacts of the two plugs located on opposite ends of the cord.

***Note: The operators may complain that the alarm is sounding too often until they learn to adjust the wristband to fit securely or apply an approved skin moisturizer on a frequent basis. Please remember that the monitor is informing you that the operator is exceeding the established static control requirement for voltage to ground when wearing a static protective wrist strap assembly. These alarms alert the operator when sensitive electronics are possibly being exposed to static electricity. Prior to incorporating the static monitor into your static control process, the operator was unaware of these events.***

- b. Two red lamps illuminated (continuously) with an audible alarm.

This indicates that a high resistance condition (greater than 10  $\Omega$ ) exists between the 790 Chassis/Ground cord and ground. This will include the equipment chassis ground if being monitored. Check the ground cords for continuity and ground attachment points.

## 5.0 Connecting an Operator to the 3M™ 790 Static Monitor

(See Section 9 Accessories for selection of 3M Wristbands and Ground Cords)

¥ Attach a 3M Dual Conductor Wristband to the arm and adjust the band for a snug fit, following the instructions received with the wristband.

¥ Insert a 3M Dual Conductor Ground Cord (longer plug end) into either one of the input jacks located on the front of the 790. The wrist strap monitoring function is activated during this step. The green lamp extinguishes at this time and the corresponding red lamp will illuminate with an audible alarm.

¥ Insert the other end of the ground cord (shorter plug end) into the wristband socket. The red lamp and the audible alarm should be extinguished at this time.

***Note: Following the attachment sequence above provides an operator(s) with a simple go-no-go test of the wrist strap function every time they connect to the 790. A more detailed verification procedure of the 790 monitoring system is outlined in Section 6.***

## Quick Review of Functions

¥ If the 3M™ 790 Static Monitor's ground connection is maintained (including the chassis ground connection when monitored) and the operator's voltage is held below the pre-selected range, the cord, wristband, and contact to the arm of the wearer are all considered to be functioning correctly. At this time, the green lamp illuminates on the front of the monitor.

¥ If an operator(s) develops a voltage that exceeds the pre-selected voltage during normal work activities or the monitor loses its ground connection, the green lamp extinguishes, and red lamp(s) will illuminate with a corresponding audible alarm. This is an indication of an exceeded voltage condition on the operator, due to poor electrical contact between the arm and band or intermittent or broken ground cord.

¥ An operator's fault condition is easily identified by one of the two red lamps next to each input jack. The flashing red lamp(s) identifies the operator that is experiencing the fault condition. The red lamps and audible alarms flash and beep at different rates to help identify the location of the fault.

## 3M 3057 Standby Jack

Use of an optional 3M™ 3057 Standby Jack at the workstation extends the life of the monitor's input jacks. The operator disconnects the ground cord from the wristband and plugs into the 3057 jack that is mounted at the workstation. Plugging into the 3057 jack prevents the 790 from continuously alarming when disconnected from the wristband.

## 6.0 Verification Procedure

This procedure verifies the positive/negative voltage detection levels and ground monitoring performance of the 790 Static Monitor as stated in Section 7, Specifications of this manual.

### Equipment Required

#### Supplied by User

¥ DC Power Supply (DCPS) with connecting wires. Output 0 to +10Vdc minimum.

- DC Voltmeter (DCV) with digital display  $\pm 1\%$  accuracy and test leads. Use of a voltmeter is only required if DCPS does not include a digital display.
- Resistance Substitution Box (RSB), 1  $\Omega$  to 12  $\Omega$  (minimum)  $\pm 1\%$  or discrete resistors 8 and 12  $\Omega$   $\pm 1\%$  value.

### 3M™ 790VK Verification Kit (Ordered Separately)

- 3M™ 2360 Dual Conductor Ground Cord (5ft.).
- Two-Wire male connector with 24" tinned lead-wires.
- Test Wristband Socket.

### Procedure:

#### 1. Ground Disconnect / Hi & Lo Audible Alarm Volume Level Functions

Ground Disconnect Specification:  
10  $\Omega$   $\pm 20\%$

- a. Connect the RSB to the two-wire male connector with 24" tinned lead-wires. Insert the two-wire male connector into the mating jack located at the rear of the monitor.
- b. Connect the AC adaptor supplied with the 790 Monitor to the 25Vdc input power-jack located at the rear of the monitor and plug the AC adaptor into a wall outlet.

- c. Set the RSB as follows and observe all lamps and audible alarm:  
 8  $\Omega$  – Green lamp ON, Red lamps OFF, and audible alarm OFF.  
 12  $\Omega$  – Green lamp OFF, Red lamps both ON (Continuous illumination), and audible alarm ON (Continuous tone).

**Note:** Confirm Hi and Lo audible alarm volume levels during 12  $\Omega$  test condition by adjusting Hi & Lo slide switch located at the rear of the monitor while alarm is sounding.

## 2. Wrist Strap Function

### Open Circuit Test

- a. Adjust the RSB connected to the two-wire male connector to 8  $\Omega$  or less to silence the Ground Disconnect alarm. The green lamp should be ON at this time.
- b. Connect the 3M Dual Conductor Cord (longer plug end) into one of the wrist strap inputs. Leave the other end of the cord (shorter plug end) open circuited at this time. Verify that the green lamp is now OFF, red lamp nearest the wrist strap input being tested is flashing, and that the audible alarm is sounding.

**Note:** The red lamp on the left side of the monitor flashes at a slower rate than the lamp located on the right. Also the audible alarm will sound at the same rate as the indicating flashing red lamp(s). This function allows for identifying the fault location.

- c. Repeat this step for the other wrist strap input, verifying performance as stated above.

### Voltage Level Test

V-Level Specification: 1V (–15%) & 3V, 6V, and 9V (–10%)

- d. Unplug the AC adaptor from the wall outlet.
- e. Adjust DCPS output to 0Vdc.
- f. Connect a wire between the positive output terminal of the DCPS and to one of the back plates of the Test Wristband Socket. Connect a wire between the common of the DCPS to the other back plate of the Test Wristband Socket.

**Note:** Be careful not to cause a short condition between the two connecting wires.

- g. Insert the 3M Dual Conductor Cord (shorter plug end) into the test wristband socket and the other end of the cord (longer plug end) into one of the wrist strap inputs on the front of the 3M™ 790 Static Monitor.
- h. Plug the AC adaptor into the wall-outlet.
- i. Select the 1V level (using a small tip tool) on the V-Level switch located at the rear of the monitor.

	Voltage Level Tolerances	
V-Level Switch	+15%	-15%
1v	1.15 Vdc	0.85 Vdc
V-Level Switch	+10%	-10%
3 v	3.3 Vdc	2.7 Vdc
6 v	6.6 Vdc	5.4 Vdc
9 v	9.9 Vdc	8.1 Vdc



- j. Activate the output of the DCPS and adjust to 1.15Vdc. Verify that the green lamp has turned OFF, red lamp nearest the wrist strap input being tested is flashing, and that the audible alarm is ON.

**Note: The red lamp on the left side of the monitor flashes at a slower rate than the lamp located on the right. Also the audible alarm will sound at the same rate as the indicating flashing red lamp(s). This function allows for identifying the fault location.**

- k. Adjust the DCPS to 0.85Vdc. Verify that the green lamp is ON, red lamp nearest the wrist strap input being tested is OFF, and that the audible alarm is OFF.
- l. Repeat steps (j & k), however, now adjusting the 790 Monitor for V-Levels of 3, 6, and 9Vdc and the DCPS to the appropriate voltage level tolerances as stated in the above table. Alarm indications will follow as stated in the 1V level check.
- m. Repeat steps (j - l) using the other wrist strap input on the 790, verifying performance as stated above.
- n. Change voltage polarity to the Wristband Test Socket by reversing the wires previously connected in step f. above at the Test Socket or at the output terminals of the DCPS and verify performance repeating steps (i – m).

## 7.0 Specifications

Monitor Approximate Size: 1.25" H x 4.0" W x 3.5" D (31,8mm x 101,6mm x 88,9mm)  
Weight: 3oz. (84g)

### Power Supply Requirements:

Input: 120 Vac  $\pm 10\%$  (North America) Outside North America (As required)  
Output: 25 Vdc @ 50 mA rated load  
Output Plug Polarization: Center Negative  
Output Plug Dimensions: 5,5mm O.D. x 2,1mm I.D. x 9,5mm Length



### Caution

Purchased power supply must have all local required regulatory certifications. Line voltage within the power supply shall be isolated from low voltage by double or reinforced insulation.

The AC adaptor is required to operate the 3M™ 790 Static Monitor. If the ground wire of the AC adaptor is not used, it is recommended that the wire be taped back onto the main cable of the AC adaptor using electrical tape.

### Accuracy:

The following parameters are valid for altitudes up to 2000 m. Pollution degree 2, Class 3, Equipment:

Voltage Detection Levels: 1V  $\pm 15\%$ ; 3V, 6V, and 9V  $\pm 10\%$   
Ground Disconnect: 10  $\Omega$   $\pm 20\%$

### Environmental Operating Conditions:

Temperature: Maximum 104°F, (40°C) Minimum 50°F (10°C)  
Humidity: Maximum 75% R.H.

## 8.0 Parts Included

- 1 ea. 3M™ 790 Static Monitor
- 1 ea. Instruction Manual
- 1 ea. Mounting Plate with removable foam tape
- 1 ea. AC Adaptor
- 2 ea. 790 Chassis/Ground Cords
- 1 ea. Two-wire Connector

## 9.0 Required Accessories and Optional Available Parts

Model No.	Description	Size
2368VM	Dual Conductor Fabric Wrist Band	Adjustable
2381VM	Dual Conductor Metal Wrist Strap*	Small
2382VM	Dual Conductor Metal Wrist Strap*	Medium
2383VM	Dual Conductor Metal Wrist Strap*	Large
2384VM	Dual Conductor Metal Wrist Band	Small
2385VM	Dual Conductor Metal Wrist Band	Medium
2386VM	Dual Conductor Metal Wrist Band	Large
2360	Dual Conductor Coil Cord	5 ft.
2370	Dual Conductor Coil Cord	10 ft.
2371	Dual Conductor Coil Cord	20 ft.
3057	Stand-By Jack	—————
790VK	Verification Kit	—————
724P	Replacement AC Adapter	—————

**\*Includes Band & Cord**

## 10.0 Additional Wrist Strap Monitoring Information

*Suggested reading on wrist strap requirements and grounding of personnel:*

- JEDEC Standard, JESD625-A - Requirements for Handling Electrostatic-Discharge-Sensitive (ESDS) Devices.
- European Norm, IEC 61360-5-1 - Protection of Electrostatic Sensitive Devices.
- ESD Association, ANSI/ESD S20.20 – Protection of Electrical and Electronic Parts, Assemblies and Equipment (Excluding Electrically Initiated Explosive Devices).
- 3M Static Digest Issue No. 3, 2000 – What the Experts Say: Certification Adds Momentum to 20.20.
- 3M Static Digest Issue No.1, 1998 - Disc Drive Industry - Static Control Considerations.
- Grounding of Personnel in ESD Sensitive Environments – Published by DataStor Asia '98, PennWell Publishing Company, 10 Tara Blvd. 5<sup>th</sup> Floor, Nashua, NH 03062  
Tel: 603-891-9359
- Keeping ahead of electrostatic discharge – Published by Data Storage Magazine, November 1999.
- The effect of resistance to ground on human body ESD – Proceedings of the 10<sup>th</sup> International Conference, Electrostatics 1999, Cambridge, UK 28-31 March 1999, Institute of Physics Conference Series Number 163, ISBN 0 7503 0638 6
- Assessment of Energy – Presented at IDEMA ESD Symposium and Exploritorium, Santa Clara, CA, April 21, 1999.

***Note: The 3M references are available by calling 3M Electronic Handling & Protection Division Customer Service Department at 1-800-328-1368. Industry standards (EIA & EN), are available through Global Engineering Documents at 1-800-854-7179. All other references available through the identified publisher above.***

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