

# Tester, Combination, 3-State Operation, Installation and Maintenance

## Pass Range 750K - 35M

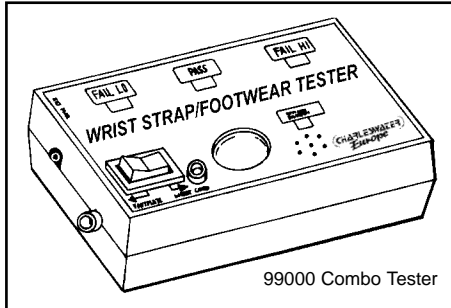


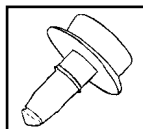
Figure 1. Charleswater 99000 Combo Tester

### Description

The Charleswater Combo Tester is a 3-state touch tester designed for fast, frequent testing of ESD personnel grounding devices. The Combo Tester incorporates a unique dual test circuit design which improves accuracy of testing and eliminates the need for separate wrist strap and foot gronder test units. The 99000 is equipped with a 750 Kilohm - 35 Megohm circuit, ideal for testing of wrist straps and footwear.

Test parameters are factory set but can be adjusted to match your own specifications. The Combo Tester is very simple to operate. A green light signals the user that everything is OK. A red light and an audible indicator means that the circuit resistance is either too low or too high.

The testers each include a 80020, which converts the banana plug on the face of the unit into a 10mm snap. NOTE: Once the 80020 has been put into the plug socket, it cannot be removed.



The tester operates on either a 9 volt battery or a special AC adapter. The combo tester is available in two models: the tester alone, or the tester with a stand. A footplate is also available for use with the 99000.

Model	Description
99000	Tester, Banana Jack
99004	Tester w/stand
99013	Footplate, stainless steel
99065	AC Adapter, 220V

**CAUTION: Use only the AC adapter designed for this unit. Using any other adapters may damage the unit and void the warranty.**

### Inspection

Remove the tester from the carton and inspect for damage.

Items included with model 99000:

- 1 Combo Tester
- 1 9 volt battery
- 1 80020 converter

Items included only with model 99004:

- 1 Combo Tester
- 1 Base Plate
- 1 Pedestal tube with bracket and boot installed
- 1 10cm banan plug connector
- 1 Vinyl insulator cap
- 1 Wall poster
- 1 5/32" hex wrench
- 1 9 volt battery
- 1 80020 converter

Model number 99004 is ideally suited for testing foot grounding devices. Item number 99013 can also be used in conjunction with the combo tester for testing of footwear.

### Installation of Model 99000

The Combo Tester may be used as a portable unit, or may be permanently mounted on either a table or a wall. Please refer to the following instructions when installing your tester.

### Stationary Installation

If you will be using the tester as a portable unit, you may prefer to mount the unit to a table or wall. Three keyhole slots on the back of the unit are included to allow you to attach the tester to a stationary surface.

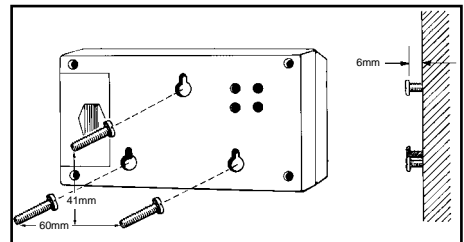


Figure 2. Mounting hole locations

1. Select location for mounting tester. Install three #6 or #8 screws spaced as illustrated in figure 3, into a wall or other vertical surface. Make sure that the screw heads do not project out more than 6.35 mm from mounting surface. The template on page four is actual size.
2. Mount the tester on the screws, pulling down to lock it in place.

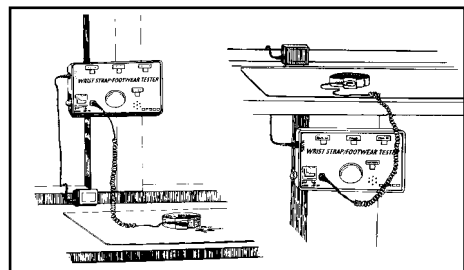


Figure 3. Stationary installation of the Combo Tester

### Operation

The Combo Tester can be operated either on battery or AC power. The unit comes equipped with a 9 volt alkaline battery. For AC operation, plug the optional AC adapter into the mini phone jack located on the upper left hand corner of the tester. An AC adapter is sold separately as item number 99065 (220 volt).

## LOW BATTERY INDICATOR

The Combo Tester includes a low battery indicator alarm circuit. If both the audible alarm and indicator LED turn on during use, discontinue testing and replace the battery. The tester will continue to operate with a weak battery, but results should not be considered accurate.

The battery can be easily replaced by removing the battery compartment cover on the back of the unit and installing a new 9 volt battery.

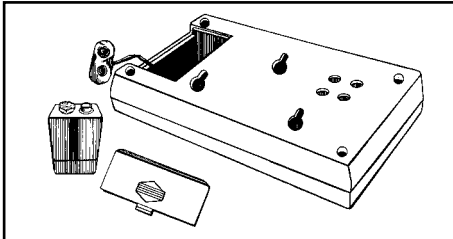


Figure 4. Replacing the battery

## General Instructions

In the following test configurations, the 99000 can be used to test wrist straps while they are worn. Model 99004 will also allow the user to test footwear.

### WRIST STRAP TESTING WITH MODELS 99000

This test safely checks that a continuous path between the operator, wrist strap and ground cord exists.

A. While wearing the wrist strap, plug the banana plug end of the cord into the jack on the face of the unit.

B. Press rocker switch toward "WRIST CORD".

C. Press the test button so that the unit activates. Hold down for 2-3 seconds. Note: Often the initial intermittency will be failure of strain relief connection to resistor as simulated by ESD S1.1 paragraph 5.7 Bending Life Test.

**Note:** DO NOT TOUCH ANY OTHER METAL WHILE PERFORMING TEST.

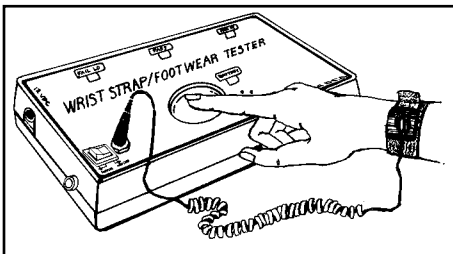


Figure 5. Testing of wrist strap grounding assemblies

D. Lighting of the green "PASS" LED indicates that the wrist strap and ground cord assemblies are functioning properly.

E. If either red "FAIL LO" or "FAIL HI" LEDs light and the audible indicator sounds, the wrist strap wearer should check the wrist strap assembly immediately.

### TESTING FOOT GROUNDING DEVICES

In order to test footwear you will need the model 99000 with the 99013 footplate, or the 99004. The following instructions are intended for use while wearing foot grounding devices. When testing conductive shoes, or foot grounders worn on both feet, test each foot separately to ensure proper operation and complete protection.

A. Place the Foot Plate on the floor in front of the Combo Tester.

B. Plug the plate's ground cord into the jack on the left hand side of the unit.

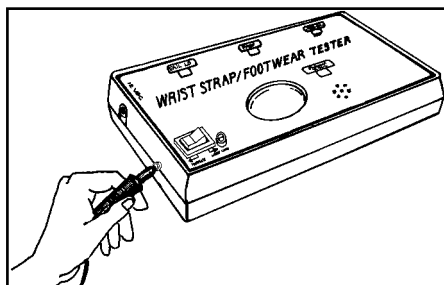


Figure 6. Installing ground cord to "footplate" jack

NOTE: Steps A and B are not required with the 99004.

C. Place the rocker switch toward "FOOTPLATE".

D. Place one foot on the plate. If the floor is conductive, lift the foot you are not testing off of the floor during this test. Make sure there is no cord plugged into the "WRISTCORD" jack.

E. Press the test button so that the unit activates.

F. Lighting of the green "PASS" LED indicates that the foot ground assemblies are functioning properly.

G. If either red "Fail LO" or red "Fail HI" LEDs light and the audible indicator sounds, the wearer should check the foot grounding device immediately.

H. Repeat steps C through F with other foot.

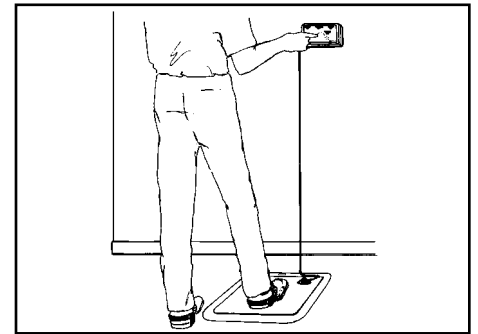


Figure 7. Testing foot grounding devices with 99000/99013

### Free Standing Test Fixture Assembly and Operation (Model 99004)

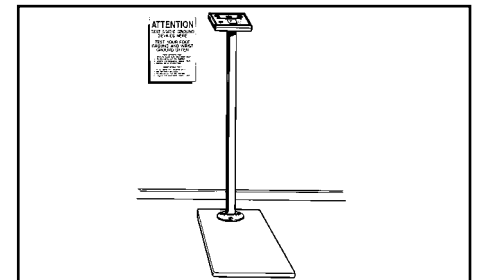


Figure 8. The Free Standing Test Fixture

The 99004's rugged steel pedestal tube is powder coated in a non-conductive white finish that helps to prevent false readings if contacted by skin or loose smocks.

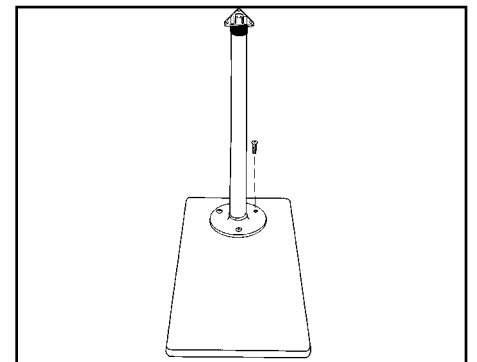


Figure 9. Attaching pedestal to baseplate

### Assembly

A. Remove 3 screws from baseplate.

B. Position pedestal on the baseplate with the tester mounting bracket pointing away from the operator. Attach pedestal to baseplate using the three screws provided. Tighten with hex wrench provided.

C. Open the battery compartment and attach the snap connector to the included 9 volt battery. Attach poster to the wall at eye level in front of the tester location.

D. Install the tester on the bracket by aligning keyholes on the back of tester with mounting studs on bracket. While pushing up on thumb screw, insert the mounting studs into the keyholes and slide the tester down. See figure 10.

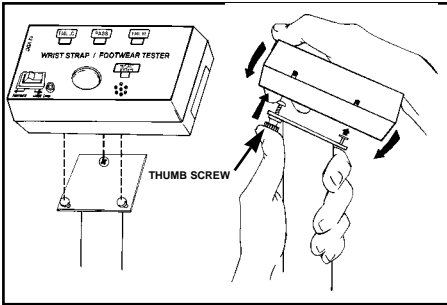


Figure 10. Installing tester on bracket

E. Install the 10cm banana plug connector to "FOOTPLATE" jack on the side of the unit. Insert ring terminal behind thumb screw.

F. Twist the thumb screw clockwise to secure the tester to the bracket.

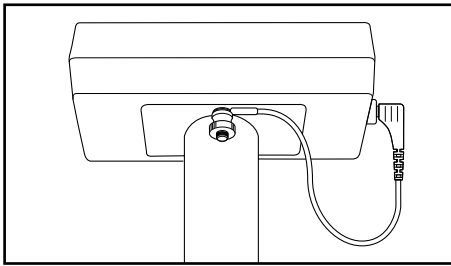


Figure 11. Secure tester to bracket

### WRIST STRAP TESTING

This test verifies that a continuous path between the operator, wrist strap, and ground cord exists.

A. While wearing the wrist strap, plug the banana plug end of the cord into the jack on the face of the unit marked "WRIST CORD".

B. Press rocker switch toward "WRIST CORD".

C. Press the test button so that the unit activates. Hold down for 2-3 seconds while flexing coil cord area near resistor.

**NOTE: DO NOT TOUCH ANY OTHER METAL WHILE PERFORMING TEST.**

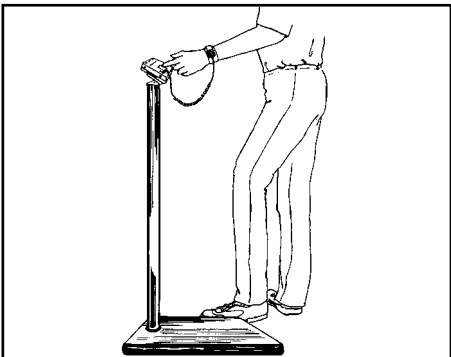


Figure 12. Testing of wrist strap grounding assemblies

D. Lighting of the green "PASS" LED indicates that the wrist strap and ground cord assemblies are functioning properly.

E. If either red "FAIL LO" or "FAIL HI" LEDs light and the audible indicator sounds, the wrist strap wearer should check the wrist strap assembly immediately.

### TESTING FOOT GROUNDING DEVICES

When testing conductive shoes or heel straps, test each foot separately to ensure proper operation and complete protection.

A. Press rocker switch toward "FOOTPLATE".

B. Place one foot on the baseplate. If the floor is conductive, lift the foot you are not testing off of the floor during this test. Make sure there is no ground cord plugged into the "WRIST CORD" jack.

C. Press the test button so that the unit activates. Hold down for 2-3 seconds while flexing coil cord area near resistor.

**NOTE: DO NOT TOUCH ANY OTHER METAL WHILE PERFORMING TEST.**

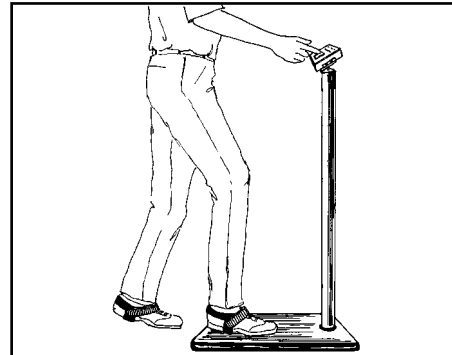


Figure 13. Testing foot grounding devices

D. Lighting of the green "PASS" LED indicates that the foot ground assemblies are functioning properly.

E. If either red "FAIL LO" or "FAIL HI" LEDs light and the audible indicator sounds, the wearer should check the foot grounding device immediately.

F. Repeat steps A through C with other foot.

### Calibration

The models 99000 and 99004 are calibrated to factory standards. We recommend that calibration is performed annually to ensure that the Tester is operating within limits. Due to its dual circuit design both test circuits of the Combo Tester must be calibrated individually.

Charleswater offers a calibration unit that is specifically designed to simplify the calibration procedure. This unit comes calibrated to factory standards. For additional information on the 99090, ask for Technical Bulletin PPE-5043.E.

### 750 Kiloohm - 35 Megohm TEST RANGE - WRIST STRAPS

The following resistance should give the display shown:

Resistance Value (+/- 5%)	Test Output
675 Kiloohm	Red (Fail Lo)
825 Kiloohm	Green (Pass)
35 Megohm	Green (Pass)
40 Megohm	Red (Fail Hi)

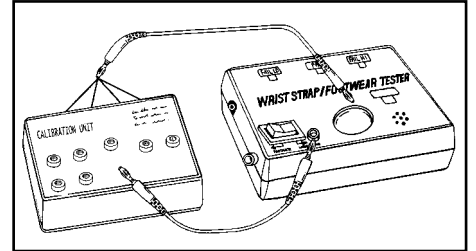


Figure 14. Calibration of the Combo Tester 750K to 35 M range with the model 99090

### 750 Kiloohm - 35 Megohm TEST RANGE - FOOTWEAR

The following resistance should give the display shown:

Resistance Value (+/- 5%)	Test Output
675 Kiloohm	Red (Fail Lo)
825 Kiloohm	Green (Pass)
35 Megohm	Green (Pass)
40 Megohm	Red (Fail Hi)

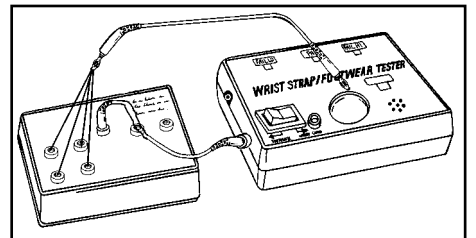


Figure 15. Calibration of the Combo Tester 750K to 35M range with the model 99090

To calibrate, simply test each resistance value shown above which are included in the 99090 Calibration Unit. Test across the test button and "WRIST CORD" jack for calibration of the 750 Kiloohm - 35 Megohm range. Test across the test button and "FOOTPLATE" jack for calibration of the 750K - 35M range. Be sure rocker switch is set correctly.

