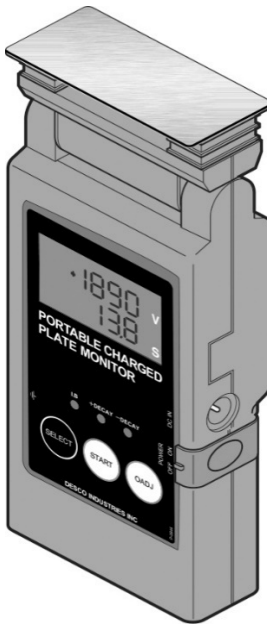




# Portable Charged Plate Monitor

## Operation and Maintenance Instructions



### Description

The SCS 770720 Portable Charged Plate Monitor (CPM) is a handheld meter designed to check the offset voltage and discharge times of air ionizers per ANSI/ESD SP3.3 and ESD TR53. The meter's integrated timer measures decay rates from  $\pm 1000V$  to  $\pm 100V$  to determine the ionizers' ability to neutralize both positive and negative electrostatic charges within the coverage area. The 180-degree rotary head with 2.75" x 1.25" plate allows the operator to read the display at various angles. The Portable Charged Plate Monitor is calibrated to NIST standards and include a certificate.

## Safety Precautions

This device is a precision electrical instrument. For the sake of safety, be sure to follow the instructions described in this manual. ⚠ mark are precautions that must be followed to use the product safely.



### **Danger**

This device does not conform to explosion-proof specifications. Do not install it in locations where flammable gases or solvents are handled, such as painting booths etc. Doing so may result in fire or explosion.



### **Caution**

This device is a precision electrical instrument. Avoid installing it in wet, oily, hot, and humid locations. In particular, avoid locations of high humidity and condensation. There is a possibility of fire due to breakdown.

## Installation

- Do not use this device in the following locations, as doing so may cause malfunctions.
  - Locations subject to high or low temperature, or high humidity
  - Dusty locations
  - Locations where the device may be exposed to organic solvents such as thinner
  - Locations where the device may be exposed to corrosive gas
  - Locations subject to flames or explosions
  - Locations subject to frequent vibrations
  - Locations subject to sudden changes in temperature or humidity
  - Locations subject to condensation
  - Locations where the device may be exposed to water or oil

## Maintenance

- Regularly remove any built-up dirt etc. from the charged plate. Built-up dirt can cause insulation faults.
- Make sure to turn the main power of the device OFF before cleaning.

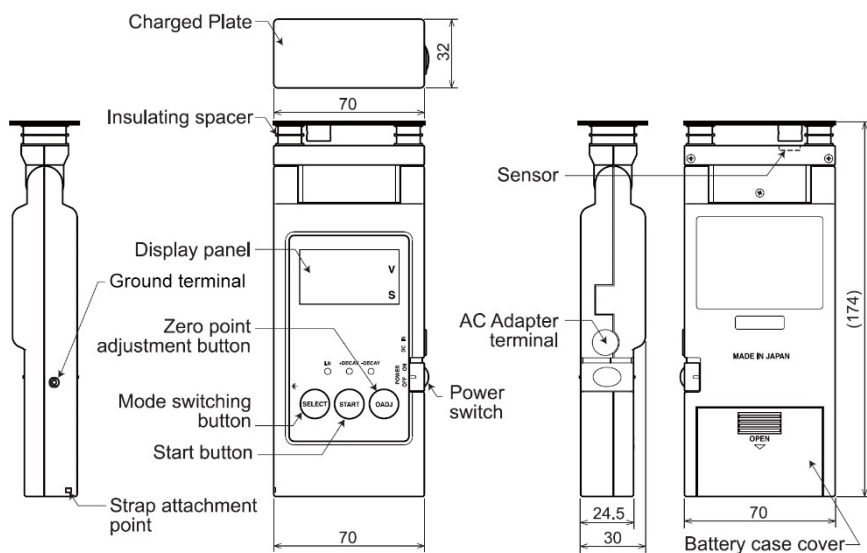
## Handling

- Make sure to connect the earth wire to an appropriate place. Accurate measurements are not possible if the earth wire is not connected.
- Do not touch or insert foreign materials into the sensor portion of this device.
- Do not blow ionized air directly into the opening of this device.
- Do not place heavy objects on the LCD display of this device.
- Do not disassemble or modify the device.
- The device may affect medical devices such as hearing aids or pacemakers.
- Do not insert any foreign objects into the device. Doing so may result in a short circuit or current leakage, and cause fire or electrocution.
- The battery discharges a small amount of electricity even when the device is turned off. If you do not intend to use this device for an extended length of time, remove the battery.
- If the device emits any abnormal odors or sounds, smoke, or heat, turn OFF the main power immediately, and contact your point of purchase. Failure to do so may result in fire or a short circuit.
- Do not remove name plates or labels.
- Do not do anything with the device that is not described in this manual.

## Packaging

- 1 Portable Charged Plate Monitor
- 1 Soft Case
- 1 Wrist Lanyard
- 1 Ground Cord
- 2 AA Alkaline Batteries
- 1 Certificate of Calibration

## Features and Components



## Important Points About Taking Measurements

### Grounding

This product requires a ground connection. Do not use this product without grounding it. Accurate measurements require a reliable ground connection.



If the meter contacts or is too close to a large, charged body, there is the danger of an electrical discharge. This may cause a breakdown of the device.

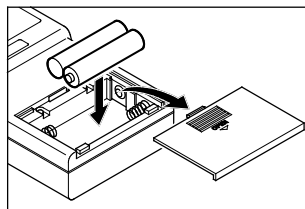
## Preparation

### 1. Insert the battery.

Remove the battery case cover and insert two AA batteries. Replace the cover.

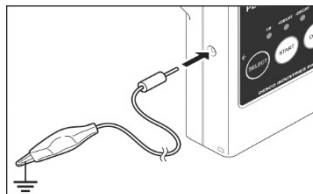
#### NOTE

- If you are using the optional AC adapter, remove the rubber cap from the adapter terminal before attaching the AC adapter.



### 2. Connect the ground cord to the ground terminal. Connect the opposite end to ground.

Connect the ground cord securely to the terminal, and connect its alligator clip to a grounded object. Accurate measurements required a reliable ground connection.

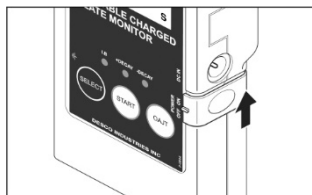


# Operation

## Measuring Ion Balance

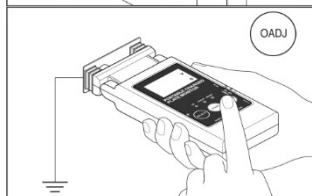
### 1. Turn the meter on.

Slide the power switch to the ON position.  
The meter will chirp then activate.



### 2. Zero point adjust the meter.

Bring the plate into contact with a grounded body, and press the 0ADJ button.



#### NOTE

- Zero point adjustment must be reset every time the meter is powered.

### 3. Set the desired mode.

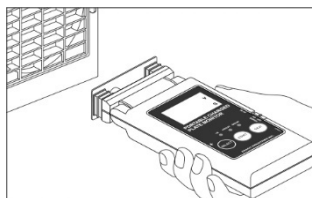
Press the SELECT button, and the meter will scroll through the modes shown in the table on the right.

To measure balance (offset voltage), use I.B mode.

Mode	LED display
I.B Mode	I.B
+DECAY Mode	+DECAY
-DECAY Mode	-DECAY

### 4. Point the plate at the measurement location.

The meter will measure the balance.



#### NOTE

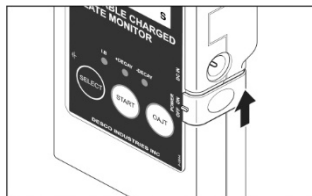
- If the display panel blinks "+1" or "-1", the charged voltage has exceeded the measurable range (over-range). If this occurs, stop measuring immediately, as this may cause damage to the meter.

### 5. To turn the meter off, slide the power switch to the OFF position.

## Measuring Neutralization (Discharge) Times

### 1. Turn the meter on.

Slide the power switch to the ON position.  
The meter will chirp then activate.

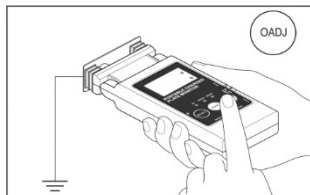


### 2. Zero point adjust the meter.

Bring the plate into contact with a grounded body, and press the 0ADJ button.

#### NOTE

- Zero point adjustment must be reset every time the meter is powered.



### 3. Set the desired decay range.

The meter changes modes each time the SELECT button is pressed. Select +Decay to measure positive discharge time. Select -Decay to measure negative discharge time.

The default setting measures from  $\pm 1,000V$  to  $\pm 100V$ .

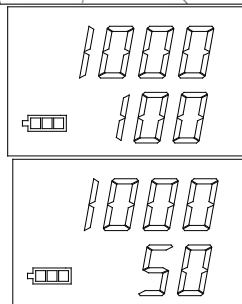
The setting may also be changed to:

- $\pm 1,000V$  to  $\pm 50V$

While holding the SELECT button, press the START button three times within one second.

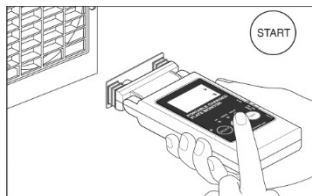
The display will indicate the selected decay range for two seconds then return to the standby mode.

Press the START 3 times for less than 1 second while holding down SELECT button.



4. **Point the plate in the airflow of the ionizer to be measured and press the START button.**

Voltage will apply onto the plate, and the meter will measure the amount of time needed to neutralize it.

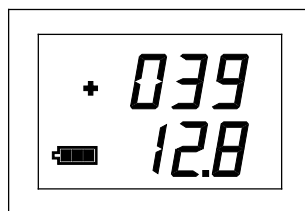


#### NOTE

- If the display panel blinks "+1" or "-1", the charged voltage has exceeded the measurable range (over-range). If this occurs, stop measuring immediately, as this may cause damage to the meter.

5. **The meter will chirp and display the neutralization time when the measurement is completed.**

The neutralization time in seconds is displayed at the bottom of the display.



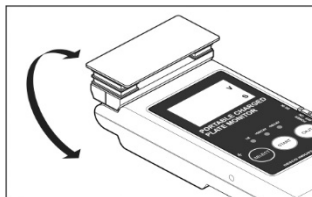
6. **To turn the meter off, slide the power switch to the OFF position.**

## Adjustment and Maintenance

### Rotating the Sensor Head

The 180-degree rotary head with 2.75" x 1.25" plate allows the operator to read the display at various angles.

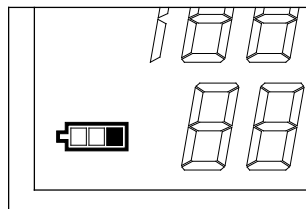
The sensor head rotates in 45-degree increments. When rotating the head, stop at angles where the sensor head clicks into place.



### Battery Indicator

The remaining battery charge is displayed on the lower left of the display panel.

Replace the battery when the icon shows only one bar remaining.

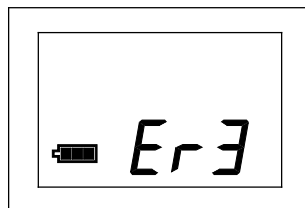


### Error Display

Er3 will appear on the display and a continuous audible alarm will sound should the meter fail to apply sufficient voltage onto the plate. This may be caused by dirty or moist insulating spacers. Clean and dry the insulating spacers to solve the error.

Contact Customer Service should the meter continue to alarm after cleaning the insulating spacers.

Insufficient voltage error:

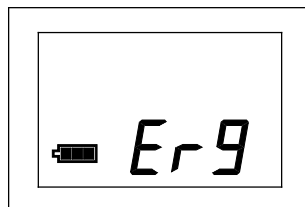


The Portable Charged Plate Monitor uses an oscillating chopper to take measurements. Er9 will appear on the display and a beeping audible alarm will sound should the sensor stop oscillating.

Restart the meter should this occur.

Contact Customer Service should the meter continue to alarm after restarting it several times.

Faulty sensor error:





## Calibration

Frequency of recalibration should be based on the critical nature of those ESD sensitive items being handled and the risk of failure for the ESD protective equipment and materials. In general, SCS recommends that calibration be performed annually.

In-house calibration verification can be performed by using a DC high voltage generator capable of outputting  $\pm 10$  to  $\pm 1,000$  V. Ground the Portable Charged Plate Monitor, operator, and DC high voltage generator. Connect the output of the DC high voltage generator to the Portable Charged Plate Monitor's metal plate. Apply the voltages listed below for each polarity. The Portable Charged Plate Monitor will display a value within the permissible range if it is within proper calibration. Contact [SCS Customer Service](#) should adjustments be necessary. Special equipment is required to adjust the Portable Charged Plate Monitor.

Calibration Voltage (V)	Permissible Range (V)
$\pm 10$	$\pm 7$ to $\pm 13$
$\pm 50$	$\pm 43$ to $\pm 57$
$\pm 100$	$\pm 88$ to $\pm 112$
$\pm 500$	$\pm 448$ to $\pm 552$
$\pm 1000$	$\pm 898$ to $\pm 1102$

## Troubleshooting

If the device does not operate correctly, it may be the result of one of the following.

The display panel is not active when the power is turned on.	
Cause 1	The battery has not been installed, or the positive and negative terminals have been connected the wrong way around.
Remedy 1	Correctly install the battery.
Cause 2	The battery has been completely drained.
Remedy 2	Replace the battery with a new one.

The plate voltage discharges rapidly.	
Cause	The insulating spacers are dirty, moist, or have oil on them.
Remedy	Clean and dry the insulating spacers.

The display does not change when approaching the measurement location.	
Cause	The sensor is faulty.
Remedy	If an error message is displayed or you cannot hear an oscillating sound from the sensor, the sensor must be replaced. Contact Customer Service and ask for an RMA to be issued.

## Specifications

Signal detection method	Oscillating chopper method
Display refresh frequency	0.2 seconds
Measurable potential range	0 to $\pm 1999$ V (resolution: 1 V)
Measurement time range	0.0 to 99.9 s
Continuous operating limit	Approximately 6 hours (with alkaline battery, I.B mode)
Sensor head rotation angle	180° (stops every 45°)
Display	LCD display
Mode switching	Switch modes by pressing SELECT button
Battery check	Remaining charge displayed in display panel
Battery	Two AA batteries, Power adapter (sold separately)
Operating temperature/ humidity range	10 to 40° C, 60% RH or less, non-condensing
Measurement accuracy	$\pm 10\%$ rdg $\pm 2$ digit
Dimensions	2.8 in. x 1.2 in. x 6.9 in. (70 mm x 30 mm x 174 mm)
Plate dimensions	2.8 in. x 1.3 in. (70 mm x 32 mm)
Static electricity capacity	20 pF $\pm$ 2 pF
Weight (including battery)	8 oz (240 g)
Country of Origin	Japan