

# 6 INCH CHARGE PLATE MONITOR ASSEMBLY

## CPM-760A

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User Manual





# Table of Contents

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## PROSTAT® CPM-760A CHARGE PLATE MONITOR

Section	Topic	Page
I.	Introduction	4
II.	Cautions & Warning	4
III.	Components	4
IV.	Assembly for vertical measurement mode	8
V.	Assembly for horizontal measurement mode	12
	General Specifications	15

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## I. Introduction

The Prostat CPM-760A Six (6) Inch Charge Plate Monitor Assembly is a precision, portable measurement accessory having a plate capacitance of  $20 \pm 2.0$  pF. This unique collapsible assembly is capable of precise evaluation of ionization equipment, voltage generation analysis, or use as an instrument calibration reference plate.

- A. The CPM-760A Charge Plate Assembly is designed for evaluation or auditing room ionization systems, overhead ionization blowers, ionization blow off guns, and desk top ionization equipment in accordance with ESD Association's ANSI/ESD STM3.1 Ionization Standard, and EN 00015/1. It is intended for use in conjunction with Prostat PFM-711A or PFM-711B Field Meters, PCS-730 or PCS-730B Electrostatic Chargers, PDT-740B Static Decay Timer and other accessories.
- B. The CPM-760A can be used to measure: (1) ionization off-set voltage (balance); (2) ionization decay time; (3) voltage generation of personnel, footwear and flooring combinations, equipment; and, (4) other CPM related applications.
- C. When equipped with the optional Laboratory Stand, the CPM-760A may be used as a precision bench top reference plate for instrument calibration.

## II. Cautions & Warnings

- A. As with any electrical device, use proper electrical precautions to avoid personnel shock regardless of device application. The CPM-760A is intended for Charged Plate Operations below 1,500 volts.
- B. When used as a laboratory calibration reference plate in conjunction with external power supplies, observe all safety precautions for power supply high voltage operations.

### **WARNING**

When the CPM-760A sensing plate is energized personnel are easily exposed to the charging voltage. Personnel contact with the charged plate will discharge the plate and cause an electrostatic shock to the body. Personnel having heart disease, use a pacemaker, remote monitor, or employ other sensitive health care equipment should not use this device or other high voltage equipment

To avoid personnel shock, read the General Operation Instructions of the PCS-730 or PCS-730B Electrostatic Chargers, and other external power equipment prior to using the CPM-760A Charge Plate Monitor Assembly.

## III. Components

- A. The CPM-760A Charge Plate Monitor Assembly includes the following components:

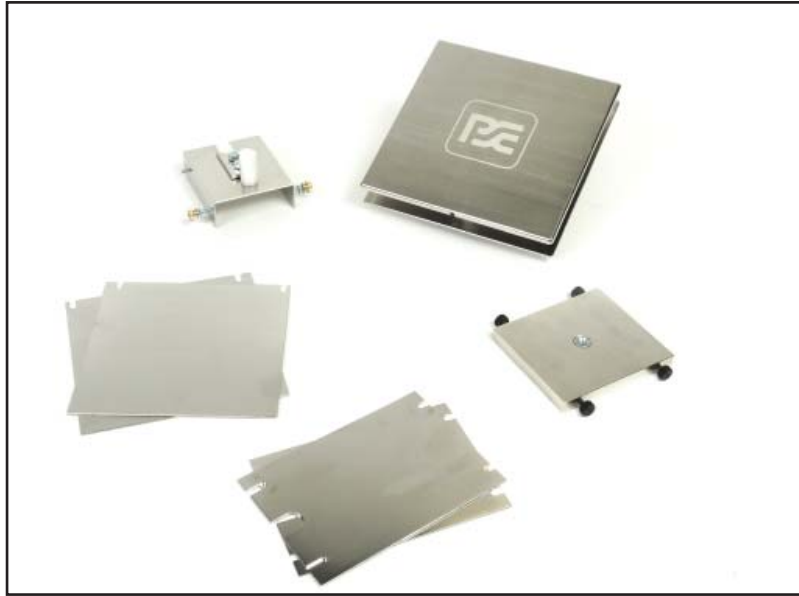


Figure 1: CPM-760A Charge Plate Assembly

### 1. Upper Plate Assembly:

Consists of two parallel six inch (6") plates separated with three Teflon spacers. The unit is fabricated using electro-plated aluminum to reduce weight and oxidation. The Upper Sensing Plate is approximately  $\frac{1}{4}$  inch thick with machined radius edges. The lower  $\frac{1}{8}$  inch plate is the upper assembly's Ground Reference Plate. Total capacitance of the Upper Plate Assembly is  $20 \pm 2.0$  pF. Each CPM-760A Upper Plate Assembly's capacitance is marked on the bottom of the Ground Reference Plate. Machined Parallel Mounting Bars are attached to the bottom side of the lower Ground Reference Plate for attaching the Instrument Cradle Fixture and Vertical Side Supports.



Figure 2: Upper Plate Assembly

## 2. Instrument Cradle Fixture:

Is a formed steel, U-shaped channel for holding a PFM-711A or PFM-711B Field Meters for either CPM measurements, or calibration. The Instrument cradle consists of a machined adjustable Instrument Saddle that is used to seat the Field Meter an exact distance from the Upper Sensing plate. The Instrument Saddle is calibrated and locked into position using two nut and lock washers, which are chemically sealed at the Prostat calibration laboratory.

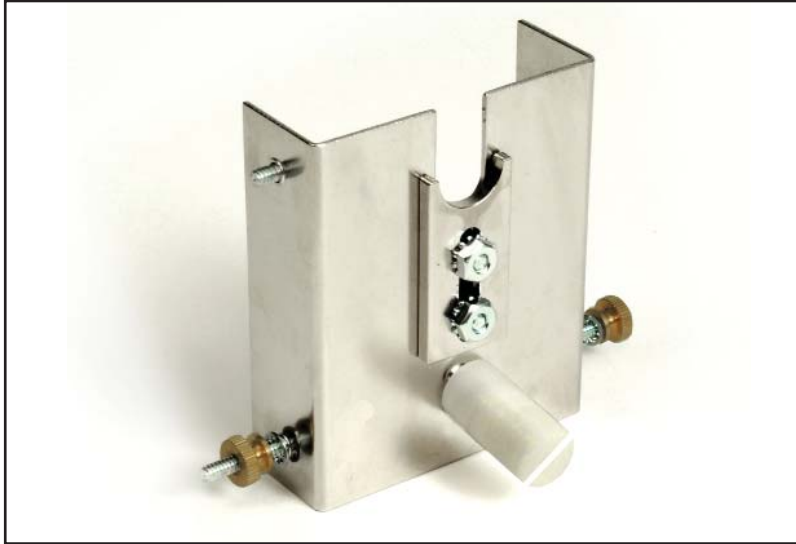


Figure 3: Cradle Fixture

### NOTE

The Instrument Cradle Fixture is designed to mate with the Upper Plate Assembly's Parallel Bars in only one way. To prevent unnecessary damage, Do Not Force the two units together.

- a. During normal evaluation or audit operations, the Field Meter is positioned into the Cradle Fixture with its 10mm Ground Snap firmly positioned into the Saddle. The Field Meter is held firmly in place with a conductive rubber band mounted across the end of the Field Meter and attached to the Cradle Fixture studs.
- c. When used for Field Meter instrument calibration, the Cradle Fixture and Instrument Saddle precisely position the instrument and exact distance (equivalent of one (1) inch) from the Upper Sensing Plate.
- d. A slotted white Teflon concentric rod is also mounted to the Instrument Cradle Fixture. It is only used during fixture calibration.

## 3. Vertical Side Supports (2 each):

Two Vertical Side Supports (5-1/16 x 3-1/2 inches; 12.9 x 8.9 cm) are fabricated of thin aluminum plates with protective electro-plating. Both Vertical Supports have defined mounting notches at each end. The end with three notches is mounted to the machined parallel bars beneath the ground reference plate. The opposite end has two mounting notches and is attached to the heavy Bottom Support Assembly. Vertical plates are mounted using black, machined thumb screws located in the Upper Assembly, Parallel Mounting Bars and Bottom Support Assembly.



**Figure 4: Vertical Side Supports**

**NOTE**

The Vertical Side Supports are designed to mate with the Upper Plate Assembly's Parallel Bars and Bottom Support Plate in only one way. To prevent unnecessary damage, Do Not Force the components together.

#### 4. Bottom Support Plate Assembly

The Bottom Support Plate (3-1/2 x 3-1/16 inch; 8.9 x 7.8 cm) is simply a 3/8 inch (1 cm) thick metal plate that forms the bottom support for the CPM-760A when used in its Vertical Measurement Mode. It also acts as a counter balancing weight when the unit is used in its Horizontal Measurement Mode. Equipped with four (4) black machined thumb screws, the Bottom Support Plate allows attachment of the Vertical Side Supports and Side Wing Plates. It also provides rigidity to the entire CPM-760A Assembly.



**Figure 5: Bottom Support Plate Assembly**

### 5. Side Wing Plates (2 each):

The Side Wing Plates are fabricated of thin aluminum plates with protective electro-plating. Both Side Wing Plates have two mounting notches along one edge. One notch is positioned 5/16 inch from the plate's upper edge and is attached to the machined parallel bars beneath the ground reference plate. The other end is notched 1/8 inch from the plate's lower edge, and attaches to the heavy Bottom Support Assembly. Mounting is made to the same black, machined thumb screws used to attach the Vertical plates.

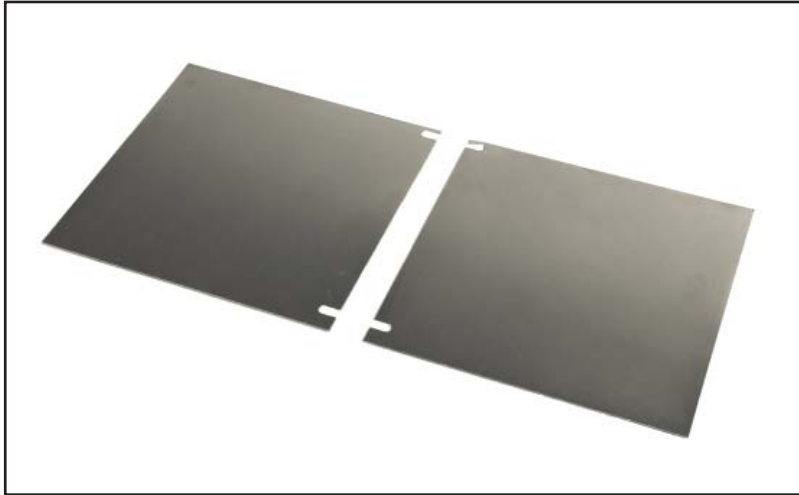


Figure 6: Side Wing Plates

## IV. Assembly for vertical measurement mode

- A. Position the Upper Plate Assembly on a cushioned worksurface with the Sensing plate down. Rotate the assembly such that the side with the one (1) Teflon cap screw head is facing toward you.

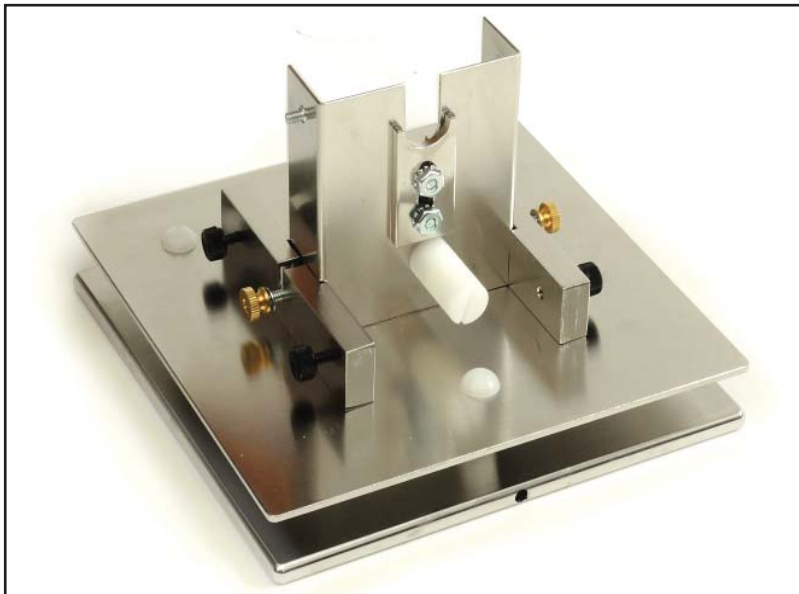


Figure 7: Upper Plate Assembly



- B. Unscrew the brass terminal locks and locking washers on both sides of the Instrument Cradle Fixture until they are at the ends of the threaded stud. Hold the Fixture so that the Saddle lock nuts and Teflon rod are toward you.
1. Carefully slide the Fixture into the Upper Assembly Parallel Mounting Bars, as shown in Fig. 7
  2. Be sure to position the brass terminal locks and locking washers on the outside surfaces of the parallel bars.

**NOTE**

The Instrument Cradle Fixture is designed to mate with the Upper Plate Assembly's Parallel Bars in only one way. To prevent unnecessary damage, Do Not Force the two units together.

**PRODUCT RELIABILITY PRECAUTIONS**

The Instrument Cradle Fixture is matched to the Upper Plate Assembly and both have the same serial number noted on attached labels. To avoid poor or inaccurate performance use only those components with matching serial numbers.

The Instrument Saddle is precisely calibrated prior to shipment. Do not loosen or reposition the locking nuts or Instrument Saddle assembly. To do so will destroy the calibrated precision of the CPM-760A causing inaccurate measurements and CPM plate reference errors when the CPM-760A is used for calibration of other instruments.

- C. Insert your Field Meter into the Instrument Cradle Fixture (Figure 8) until the 10mm snap mates firmly into the Instrument Saddle assembly (Figure 9). Once firmly seated, hold the instrument in place by attaching the black rubber band to both side studs and across the end of the Field Meter (Figure 10).



Figure 8: Inserting the PFM-711A or PFM-711B

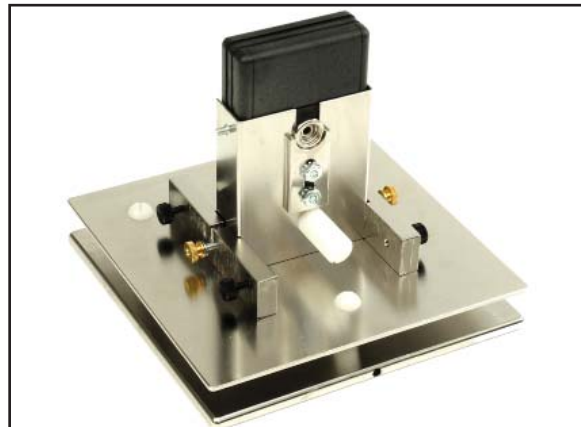
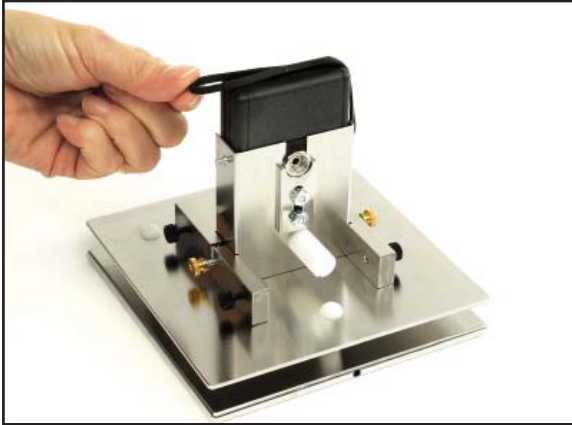
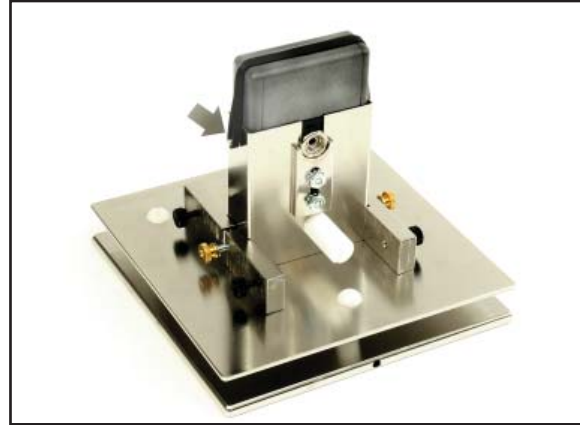


Figure 9: PFM-711A or PFM-711B Seated



**Figure 10: Black rubber band**



**Figure 11: Rubber band to studs**

- D. Loosen the four (4) black machined thumb screws on both sides of the Upper Plate Assembly's Parallel Mounting bars. Insert the two (2) Vertical Side Supports as shown in Figure 12. Do Not fully tighten the black, machined thumb screws at this time.



**Figure 12: Installing the 2 Vertical Side Supports**

- E. Loosen the four (4) black machined thumb screws on both sides of the Bottom Support Plate, and mount it between the two (2) Vertical Side Supports as shown in Figure 13. Following the sequence below, Tighten all eight black, machined thumb screws:



**Figure 13: Mounting the Bottom Support Plate**

1. Apply slight hand pressure to the Bottom Support Plate and tighten the four (4) Parallel Bars screws first. This will align the CPM-760A Assembly vertically.
2. Keeping slight hand pressure on the Bottom Support Plate, tighten its four (4) black, machined screws. This will align the assembly horizontally.

**CAUTION**

Be sure that your facility engineer or electrician has confirmed that the ground connections used for ESD applications meet local electrical code(s) and comply with ESD Grounding Standard S6.1 prior to use.

- F. Attach a ground to the Field meter's 10mm female snap (Figure 14). Be sure to plug the ground cord into a previously tested ESD common point ground.



**Figure 14: Grounding to the PFM-711A or PFM-711B**

- G. The CPM-760A Charge Plate Monitor is ready for use in its Vertical Mode. In this configuration the unit is highly suitable to measuring overhead ionizer and room ionization system off set voltage.
1. Connect a PDT-740B Static Decay Timer to the Field Meter's analog output to obtain decay time measurements. (See Figure 15.).



Figure 15: Connecting the PDT-740B Decay Timer

2. You may also use the Vertical Mode for body voltage and other measurements.

#### V. Assembly for horizontal measurement mode

- A. Complete all the steps described above for assembling the CPM-760A for Vertical Measurement Mode.
- B. Position the Upper Plate Assembly on a cushioned worksurface with the Sensing plate facing down. Rotate the assembly such that the side with the one (1) Teflon cap screw head is facing toward you. (See Figure 7).
- C. Loosen the two (2) Bottom Support Plate and two (2) Parallel Mounting Bar screws nearest you.
- D. Insert the Side Wing Plates into the Bottom Support Plate and Parallel Mounting Bars as shown in Figure 16.

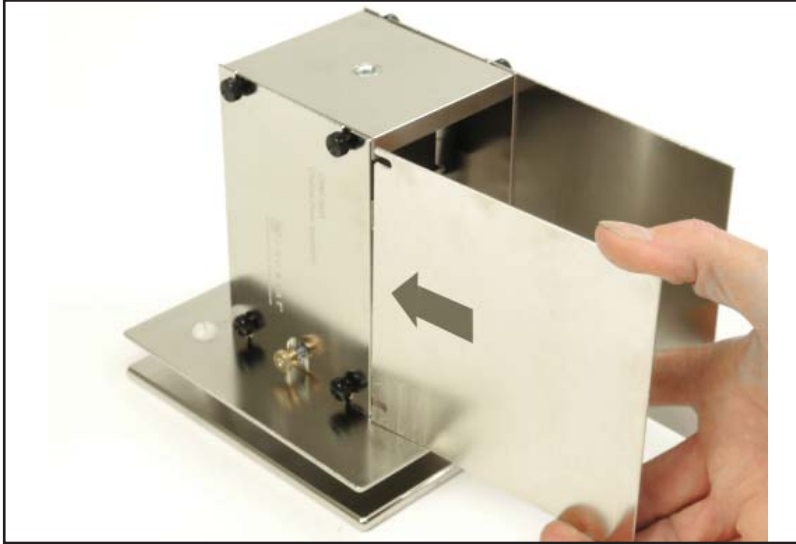
**NOTE**

Side Wing Mounting is made to the same black, machined thumb crews used to attach the Vertical plates.

1. One notch is positioned furthest from the Side Wing edge (5/16 inch) and is attached to the machined Parallel Mounting Bars.
2. The other end, notched 1/8 inch from the plate's lower edge, attaches to the heavy Bottom Support Assembly.

**NOTE**

If the Side Wing notches are improperly positioned the entire assembly will be unstable and tend to “rock” front to rear. If positioned in the Vertical Measurement Mode.



**Figure 16: Inserting Side Wing Plates**

3. Tighten the four (4) thumb screws to sufficiently hold the Side Wings in position
  4. Rotate the CPM-760A Assembly into the Horizontal Measurement Mode position shown in Figure 17. Be sure it is resting on a flat, level surface.
- E. If horizontal plate is loose:
1. Place slight hand pressure on the upper edges of the Vertical Side Plates as if to hold the CPM-760A down, against the worksurface. Slightly loosen only the Side Wing mounting screws, allow the Side Wings to firmly seat against the thumb screw shafts, then re-tighten the thumb screws firmly.



**Figure 17: The Charge Plate ready for use**

2. Make sure both Side Wings are properly seated as described above and the thumb screws firmly tightened. This procedure properly aligns the CPM-760A for precise positioning in the Horizontal measurement Mode.
- F. Attach a ground to the PFM-711A instrument's 10mm female snap (Figure 14). Be sure to plug the ground cord into a previously tested ESD common point ground.

**CAUTION**

Be sure that your facility engineer or electrician has confirmed that the ground connections used for ESD applications meet local electrical code(s) and comply with ESD Grounding Standard S6.1 prior to use.

- G. The CPM-760A Charge Plate Monitor is ready for use in its Horizontal Mode (Figure 17). In this configuration the unit is highly suitable to measuring desk top ionizing blowers or blow off gun off set voltage.
1. Connect a PDT-740B Static Decay Timer to the Field Meter's analog output to obtain decay time measurements.
  2. You may also use the Horizontal Mode for body voltage and other measurements.

**CPM-760A Charge Plate Assembly Specifications**

Isolated Plate:	Electro-plated Aluminum plate, 6.0 inches square.
Ground Plate:	Plated aluminum sheet, 6.0 inches square.
Plate Spacing:	Approximately 0.63 inches between Isolated and Ground plates. Plate spacers made from machined virgin, white Teflon Rod
Support:	Stored disassembled, plated aluminum sheet and steel lower stabilizing block.
Assembly:	Assembled with machine cap screws.
Capacitance:	Parallel Plate Capacitance 20 picofarads (pF) $\pm 2$ pF
Range:	0 to $\pm >5$ kV at a plate separation of 0.63 inch.
Accuracy:	$\pm 5\%$ 0 to 1,000 volts.
5 Minute Decay:	When charged to 1kV, floating plate voltage decays less than 5% (<50 volts) @ 50% Rh: over a 5 minute period.
Calibration:	Accomplished via adjustable instrument saddle and grounding device.
Grounding:	Via snap fastener of Model PFM-711A or PFM-711B and meter saddle assembly.
Assembly:	6.0" High in Vertical Test Configuration
Height:	9.0" High in Horizontal Test Configuration; Center of Plate 6.0" from Worksurface.
Weight:	2.5 pounds





## NOTES

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