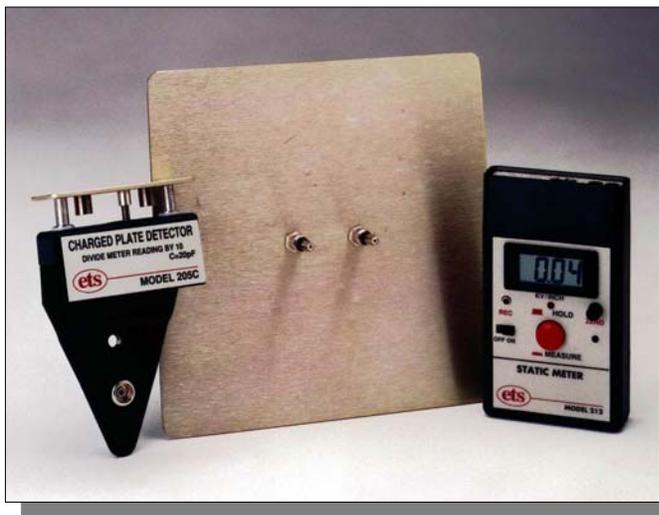


CHARGED PLATE DETECTORS

Model 205C and 205C-x10



Instruction Manual

4-09



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1.0 GENERAL

The Model 205C and 205C-x10 Charged Plate Detectors are used in conjunction with the ETS Model 212 Static Meter. They snap onto the front of the Meter providing a convenient and economical approach for performing electrostatic measurements requiring a charged plate monitor. Typical charged plate tests consist of measuring ionizer balance and decay, static propensity of floors and footwear, triboelectric charge evaluation of material and objects, plus evaluation of the effectiveness of personnel grounding systems. The optional Model 208B-1200 Volt Charging Source enables the system measure ionization neutralization time, voltage suppression, static dissipation and using the 208B-1000 Volt Charging Source Calibration Unit, system calibration.

2.0 EQUIPMENT DESCRIPTION

2.1 Model 212 Static Meter

The Model 205C and 205C-x10 are used in conjunction with the ETS Model 212 Static Meter, shown in Figure 2.1-1. The Meter incorporates a non-contacting, chopper type field sensor with “MEASURE and HOLD” functions. In the “MEASURE” mode, the Static Meter provides continuous measurement. The “HOLD” mode stores the last measurement, permitting operation in special situations such as measuring static charges inside an opaque bag or inside production equipment. The meter is “zeroed” easily with an external ZERO ADJUST control and normally does not have to be re-zeroed between measurements.

The chopper stabilized sensor enables the Model 212 to accurately measure electrostatic fields in areas using air ionization. The Meter is powered by a 9V battery and features a conductive case as well as a convenient snap-on wrist strap cord to provide a hard ground connection. The Model 212 standard measurement range when used as a field meter is $\pm 20\text{kV}$ at 1 inch (25mm) when measuring a large planar target in free space.



Figure 2.1-1: Model 212 Static Meter

2.2 Model 205C and 205C-x10 Charged Plate Detectors

These charged plate detectors attach to the front of the Model 212 Static Meter. The standard Model 205C along with the optional 6"x6" Detector Plate and the Model 212 shown in Figure 2.2-1 increases the sensitivity of the measurement system by a factor of 10 and is designed for low voltage measurements up to 2 kV. The Model 205C-x10, shown in Figure 2.2-2, decreases the sensitivity of the measurement system also by a factor of 10 and is designed for high voltage measurements up to 20 kV.

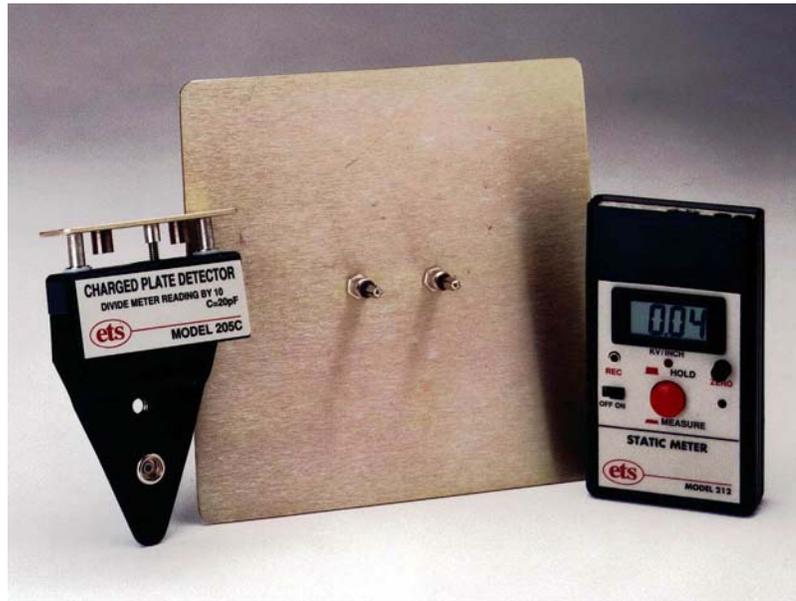


Figure 2.2-1: Standard Model 205C with optional 6"x6" Detector Plate



Figure 2.2-2: Model 205C-x10 Charged Plate Detector

2.2.1 Standard Model 205C

Applying 2000 Volts to the plate surface of the standard Model 205C will indicate full scale on the Static Meter (divide meter reading by 10. A meter reading of 20.00 kV indicates 2 kV on the plate). The standard Model 205C also has 20 pf capacitance specified in ESDA STM3.1 required for ionizer decay time measurements. It is designed for high resolution (± 1 V), low voltage applications usually found in ESD controlled areas. An optional 6"x6" (152x152mm) square detector plate attaches to the 1"x3"(25x76mm) Model 205C detector plate to provide full size charged plate monitor measurement capability. System drift is less than 2 Volts/second.

Note: If the Model 205C is used to measure ionization decay the rate will be approximately 10 times faster with the 6x6" (152x152mm) plate. This is a result of the area of the larger plate being approximately 10x larger than the smaller plate.

2.2.2 Model 205C-x10

The Model 205C-x10, shown in Figure 2.2-2, is designed for measurements up to a maximum of 20kV. Applications include static propensity and static charge generation in non-ESD controlled areas such as office buildings, factories, conveying systems etc. This unit does not have the specified 20pF capacitance since it is not intended to measure ionizer decay time. The detector plate is covered by a plastic cover to reduce electrostatic shock to the operator.

3.0 OPERATION

To utilize the Static Meter as a field measuring instrument only, simply depress the push button and bring the Meter towards the surface being measured. At a distance of 1 inch (25mm), read the magnitude and polarity. Depress the MEASURE/HOLD button again (Red LED on) to hold the reading. All measurements are normally referenced to the potential of the user, which may or may not be at ground. To obtain a solid ground reference, connect the Meter to ground using the supplied ground cable connected to the snap located on the bottom of the Meter.

To convert the Model 212 to a charged plate monitor, attach the either the standard Model 205C or the Model 205C-x10 Charged Plate Detector to the front of the Static Meter as shown in Figure 3.0-1. Slide the Charged Plate Detector over the front of the Static Meter and snap in place. The Model 212 ground cable can now be connected to the Model 205C ground snap if desired. To measure charge generated by any activity, connect a probe, wrist strap or other appropriate connection to the detector plate jack. Ground the detector plate momentarily then activate the Static Meter. Any voltage generated will be transferred to the plate and be measured by the Static Meter.

NOTE: Static charges on insulators cannot be transferred to the charged plate by wire.

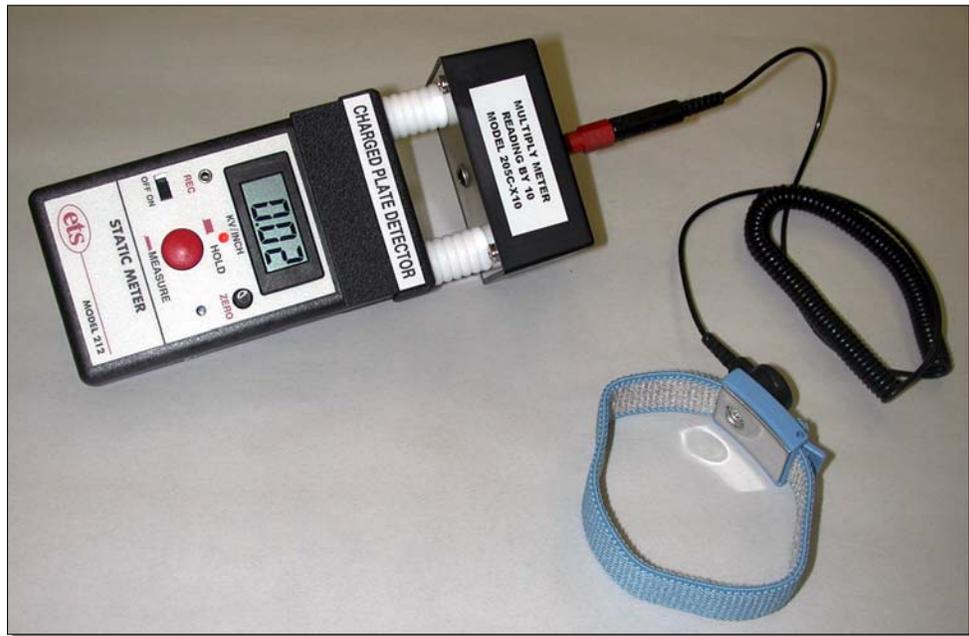


Figure 3.0-1: Charged Plate Monitor System Set Up

To perform a test first ground the detector plate momentarily, activate the Static Meter, then take a measurement. For those measurements requiring the handling of static dissipative materials, it is recommended that measurements be performed by two people: one person to operate the instrumentation and the other to handle the material. This is necessary to prevent any charge build-up on the material from being bled off through the grounded operator.

4.0 TEST PROCEDURES

The Model 205C Charged Plate Detector (along with the optional Model 208B Charging Source) is capable of performing many of the tests normally performed with laboratory equipment. The following describes recommended procedures for performing the most common CPM tests.

4.1 Ionizer Balance

This test is performed with the standard Model 205C. Hold the Static Meter with the Charged Plate Detector approximately 12 inches (305mm) in front of the ionizer. Momentarily ground the detector plate, then depress the push button. Turn on the ionizer and observe the meter reading for approximately 15 seconds. The meter should read less than ± 10 volts.

4.2 Static Propensity

This test measures the static charge build-up on personnel walking across a floor or performing a defined step test. It is used to evaluate flooring and footwear. However, this test procedure also applies to any personnel activity that results in a static charge being generated. Either the standard Model 205C or the Model 205C-x10 may be used for this test. In ESD controlled areas voltages generated are usually quite low and the standard Model 205C is the most appropriate unit.

In uncontrolled areas, especially when the relative humidity is very low many kilovolts can be generated and the Model 205C-x10 should be used.

The test set up consists of attaching the Charged Plate Detector to the front of the Static Meter. Connect a wrist strap or a probe to the Charged Plate Detector. The test subject puts on the wrist strap.

Before starting the test, the test subject should be momentarily grounded before taking a measurement. The voltage displayed on the Static Meter is the voltage generated by the test subject during the activity.

4.3 Triboelectric Charge Analysis

This test is used with the standard Model 205C plus the addition of the optional 6" x 6" detector plate. The whole assembly should be mounted onto a tripod. First momentarily ground the detector plate before taking a measurement. Take the material being tested and rub it with an appropriate second material, then place the test material on the detector plate. The voltage measured is a relative indication of the triboelectric charging characteristics of the material.

If the decay time of the test sample is desired, the Model 212 must be used in conjunction with a timing device such as a stopwatch.

4.4 Ionizer Neutralization Time

This test measures the time required for an ionizer to neutralize charge on an object. It is also referred to as "Ionizer Decay Time". This test requires the optional Model 208B Charging Source that has an output of 1200 Volts.

Place the Model 212 with the standard Model 205C 12 inches away from the front of the ionizer. Momentarily ground the detector plate. Activate the Model 208B and touch it to the detector plate. The Static Meter should indicate a reading greater than 1000 volts. Immediately turn on the ionizer and measure the time for the charge on the detector plate to bleed down to zero using a timing device such as a stop watch.

Note: When the Model 205C is used to measure ionization decay the rate will be approximately 10 times faster with the 6x6" (152x152mm) plate. This is a result of the area of the larger plate being approximately 10x larger than the smaller plate.

4.5 Static Dissipation

This test measures the time required for a charged person to bleed off charge when a static control procedure is implemented such as stepping onto a conductive floor or sitting down in a conductive chair. The test set up in Section 4.4 is used. The test subject wears a wrist strap or holds onto a probe for this test.

Momentarily ground the test subject then turn on the Charging Source and touch it to the test subject. The Static Meter should indicate a reading greater than 1000 Volts. With the test subject initially standing on an insulated surface, immediately step onto the surface being evaluated. Measure the time for the voltage on the test subject to bleed down to zero or some established level such as 100 V.

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