

## Portable Ionization Test Kit Operation and Maintenance



Made in America

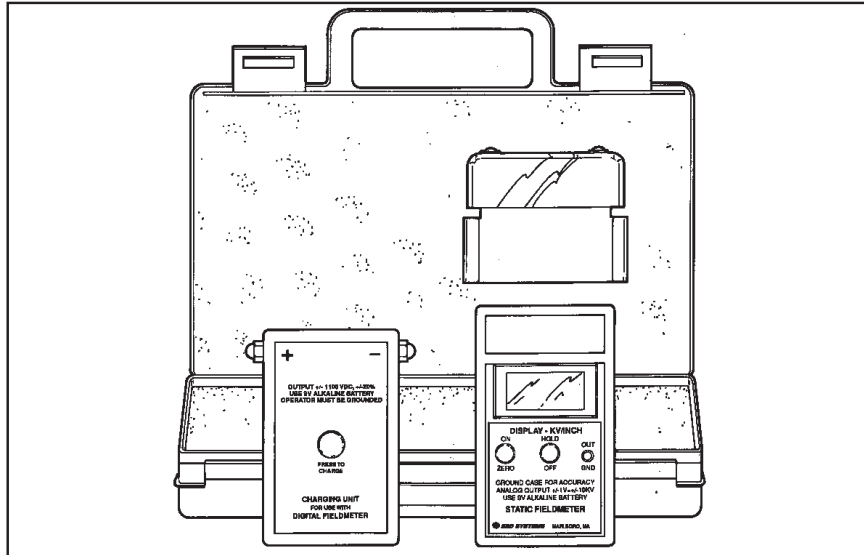


Figure 1. 42755 Portable Ionization Test Kit

### Description

Our Portable Ionization Test Kit is a portable and cost effective means of verifying the performance of a wide variety of ionization equipment. The Test Kit includes a 42721 Digital Fieldmeter, an Isolated Plate Assembly, and a Charger. The Charger is used to place a 1000V charge on the isolated adapter plate assembly, making it possible to also measure the neutralization performance of air ionization equipment.

**NOTE:** Our 42721 Digital Fieldmeter is designed to operate with our 42755 Portable Ionization Test Kit. It is not compatible with other brands.

Currently there are no established standards describing a periodic verification device or procedure for air ionizers. The ESD Systems.com

Portable Ionization Test Kit has been designed to make measurements that correspond to those made by using a charged plate analyzer and ESD Association's Standard 3.1. While the Ionization Test Kit provides convenience and portability, it does not meet all of the requirements of the ESD Association Standard. ESD Systems.com recommends our model 42630 Charged Plate Analyzer if precise measurements are required.

The Portable Ionization Test Kit includes a slide-on isolated plate assembly, a  $\pm 1000$  volt charging unit and a durable thermoplastic carrying case with custom cut-outs for all of the above components along with the model 42721 fieldmeter. The 42721 Digital Fieldmeter can be purchased separately.

### Inspection

Remove the kit from the carton and inspect for damage. Each kit includes:

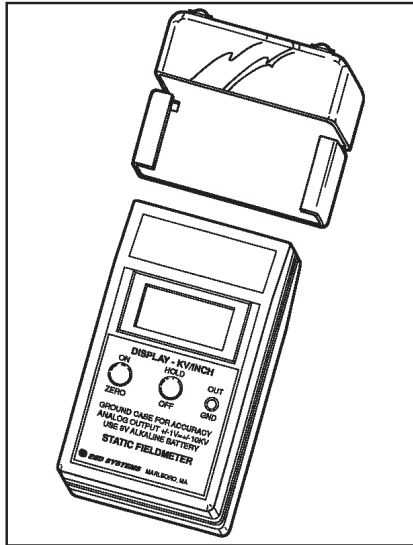
- 1 Digital Fieldmeter (Item 42721)
- 1 Isolated Plate Assembly
- 1  $\pm 1000$  Volt Charger
- 1 9 Volt alkaline battery (installed)
- 1 Carrying case

### Taking Balance Measurements

The Portable Ionization Test Kit has been designed to match the compact size and hand held convenience of the 42721 Digital Fieldmeter. Use the following procedure to verify the balance of air ionization equipment. This quick and easy procedure will indicate if the piece of ionization equipment is working within the manufacturer's specifications or user requirements. ***It is extremely important that ionizers be checked regularly for balance. An ionizer operating in an out-of-balance state can damage sensitive electronic components or assemblies.***

#### 1. INSTALLING THE ISOLATED PLATE ASSEMBLY -

The case of the Model 42721 Fieldmeter has two slots along its slides. The top slot is closest to the front of the instrument. Slide the tabs of the Isolated Plate Assembly into the top slot of the meter case as far as they go.



**Figure 2. Installing the Isolated Plate Adapter Plate Assembly on the 42721 Digital Fieldmeter**

## 2. ZERO THE INSTRUMENT -

Make connection between the Adapter Plate Assembly and the Digital Fieldmeter case either through your finger or a test lead. Face the Fieldmeter away from charged objects and press the ON/ZERO button. Hold until the display reads zero. The instrument may also be zeroed by pointing it toward a known grounded surface (such as the palm of the opposite hand) and depressing the ON/ZERO button. Although you must be careful not to contact the recessed sensor plate, the amount of spacing between the instrument and the target is not critical when zeroing the instrument.

*NOTE: The 42721 has a conductive case that provides a ground reference for the measuring circuit. For accurate measurements it is necessary that the person holding the meter be properly grounded.*

## 3. TAKE A MEASUREMENT -

Locate the meter in an ionized environment at the appropriate distance from the device under test (typically 12"). The static field displayed is the actual balance of the ionizer or voltage offset. **NOTE:** *When testing pulsed ionizer systems, the voltage displayed is constantly changing. This pulse rate may be faster than the display update rate of the fieldmeter, therefore the displayed voltage is an average of the actual voltage. This average reading is more accurate than analog style meters which only display positive or negative values.*

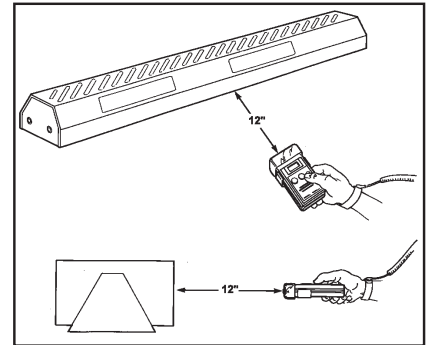
## AUTO SHUTDOWN TIMER

During normal operation (not during ZERO) a blinking decimal point indicates the AUTO SHUTDOWN TIMER is enabled. If the AUTO SHUTDOWN TIMER is disabled the decimal point will be on continuously.

Holding down the ZERO button, while unit is ON, for less than 3 seconds resets the AUTO SHUTDOWN TIMER (if enabled). The AUTO SHUTDOWN TIMER is enabled or disabled by turning on the unit and keeping the ON/ZERO button pressed then toggling the HOLD/OFF button. Enable/disable of the AUTO SHUTDOWN TIMER is indicated by the decimal point: DP on = timer on, DP off = timer off.

AUTO SHUTDOWN TIMER state is maintained during power off. AUTO SHUTDOWN TIMER can be continually toggled as long as the ON/ZERO button remains pressed, up to 20 seconds, after which the unit will turn off. A blinking decimal point indicates the AUTO

SHUTDOWN TIMER is active. During the last minute before power off ALL annunciators will blink at a fast rate. Pressing any button will reset the timer. Timeout is nominally 15 minutes.



**Figure 4. Taking a balance measurement.**

## Taking Discharge Measurements

In order to verify that an ionizer is operating properly it is also important that its ability to neutralize or discharge static electricity is measured. The following procedure will measure an ionizer's discharge time.

**1. OPERATING THE CHARGING UNIT -** The Charger has a momentary push-button that turns on the power to the unit. Holding the button down supplies power to the output terminals.

**2. OUTPUT CONTACTS -** Two output contacts are provided on the Charger. They are connected to an internal power source. When one contact is connected to ground the other contact will provide a charge of the indicated polarity. The Charger is designed so that an operator can press the power button and touch an output contact, simultaneously with the fingers of the same hand.

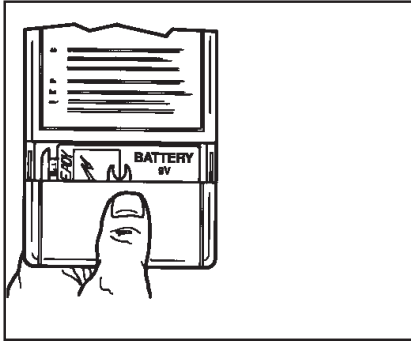


Figure 5. Charging unit controls.

**3. POLARITY SELECTION** - The terminals are labeled (+) and (-). To provide a POSITIVE voltage output, connect the negative (-) terminal to ground. Press and hold the power switch. To provide a NEGATIVE voltage output, connect the positive (+) terminal to ground. Press and hold the power switch.

**4. GROUNDING - IMPORTANT!**

For the charging unit to work correctly, the operator or the fieldmeter must be properly grounded. A ground path from an output contact must exist.

**5. IONIZER DISCHARGE TIME MEASUREMENTS** - Locate the 42721 and the Isolated Plate Assembly in the appropriate location for measurements.

**6. POSITIVE DISCHARGE MEASUREMENT** - For positive discharge measurement, touch the negative (-) terminal of the Charger while pressing the charging button on the Charger. Momentarily touch the positive terminal to the Isolated Plate Assembly. The 42721 reads approximately +1.10kV. By using a stop watch or other timing device, determine the time needed for the voltages to decrease from +1.10kV to + 0.01kV. This is the positive discharge time.

**7. NEGATIVE DISCHARGE MEASUREMENTS** - For negative discharge measurements, touch the (+) output terminal while pressing the charging button on the Charger. Momentarily touch the negative terminal to the Isolated Plate Assembly. Follow the instructions for the positive discharge measurement above.

**IMPORTANT:** A ground path must be provided between one of the output terminals of the charging unit and the ground reference of the Fieldmeter and Adapter Plate. This is normally provided by holding the Charger in one hand and the Fieldmeter with Adapter Plate in the other. If this is not possible, test leads must be used to connect one to the Charger output terminals and the Fieldmeter ground connection.

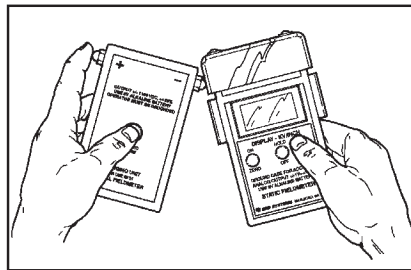


Figure 6. Taking decay measurements.

**Calibration**

The overall accuracy of the 42755 Test Kit is  $\pm 5\%$  nominal. Calibration of the Ionization Test Kit should only be performed by the factory. The 42755 is calibrated to NIST traceable standards. Contact our Customer Service Department for details.

**Maintenance  
BATTERY CARE**

**1. 42721 Fieldmeter** - Change batteries at least once a year. The unit should be off when replacing the battery. Normal battery life is about 40 hours of use. Replace the battery when the “BAT” indicator appears in the display above the “HOLD” indicator position for more than an instant.

**2. Charging Unit** - Replace the battery when the charging unit fails to charge the isolated plate to  $\pm 1.10kV$ .

See specifications for battery replacement type.

**CLEANING**

It is important to keep the insulators on the Isolated Plate Assembly clean and free of contaminants that may cause surface leakage. To test the performance of the Isolated Plate Assembly, charge the plate and note the discharge rate in a non-ionized area. The self discharge rate to 10% of original voltage should not be less than five minutes.

The area around the aperture of the Model 42721 must be kept clean to ensure accurate, drift-free readings. Never touch the aperture with anything. To remove dust or other particulate matter, use low-pressure instrument-grade air. To remove more severe contamination, spray or flush with the smallest practical amount of clean technical-grade of isopropyl alcohol. Then allow the instrument to air dry for several hours.

## Specifications

### ISOLATED PLATE ASSEMBLY

**Plate Capacitance:**

13 picofards  $\pm$  2 picofards

**Range:**

0 to  $\pm$  2kV, higher voltages may be measured

**Grounding:**

Connection through conductive case of Model 42721 Fieldmeter

**Weight:**

Approx. 1.5 oz.

### CHARGING UNIT

**Output:**

1100VDC nominal, <1:A Max.

**Output Terminals:**

Two acorn buttons labeled "+" for positive and "-" for negative

**Load Regulation:**

Better than 8% NL to FL where FL = 10<sup>9</sup> Ohms

**Battery Type:**

9 volt alkaline

**Battery Life:**

Approx. 40 hours

**Temperature Range:**

+0° to +30°C (+50° to +86°F)

**Relative Humidity:**

10% to 80% non-condensing

**Dimensions:**

3.75"L x 2.88"W x 1"D  
(9.53 x 7.32 x 2.54cm)

**Weight:**

Approx. 2.8 oz. (79 gm)

### TEST KIT

**Weight:**

Approx. 1.9 lbs.

**Limited Warranty**

ESD Systems.com expressly warrants that for a period of one (1) year from the date of purchase, our Portable Ionization Test Kits will be free of defects in material (parts) and workmanship (labor). Within the warranty period, a unit will be tested, repaired or replaced at our option, free of charge. Call Customer Service at 508-485-7390 for a Return Material Authorization (RMA) and proper shipping instructions. You should include a copy of your original packing slip, invoice, or other proof of purchase date. Any unit under warranty should be shipped prepaid to the ESD Systems.com factory. Warranty repairs will take approximately two weeks.

If your unit is out of warranty, ESD Systems.com will quote repair charges necessary to bring your unit to factory standards. Call Customer Service at 508-485-7390 for a Return Material Authorization (RMA) and proper shipping instructions and address.

**Warranty Exclusions**

THE FOREGOING EXPRESS WARRANTY IS MADE IN LIEU OF ALL OTHER PRODUCT WARRANTIES, EXPRESSED AND IMPLIED, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE WHICH ARE SPECIFICALLY DISCLAIMED. The express warranty will not apply to defects or damage due to accidents, neglect, misuse, alterations, operator error, or failure to properly maintain, clean or repair products.

**Limit of Liability**

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