SIMCO ION™
An ITW Company

IONIZATION SOLUTIONS

Periodic Verification System

Model 775PVS

User's Manual

About Simco-Ion

Simco-Ion develops, manufactures, and markets system solutions to manage electrostatic charge. As the world's largest provider of electrostatics management products and services, Simco-Ion improves its customers' business results by providing a total solution to their electrostatic discharge and electromagnetic interference challenges. Simco-Ion is a wholly-owned subsidiary of Illinois Tool Works (ITW) with its Technology Group located in Alameda, California. For more information about Simco-Ion visit www.simco-ion.com or call 800-367-2452. Simco-Ion is ISO 9001 and ANSI ESD S20.20 certified.

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Description

1.1 Model 775PVS System Description

The 775PVS System is comprised of three units: the Model 775 Fieldmeter, Model 775C Charger, and the Model 775P Plate Assembly. All three units work together to provide a mobile, convenient method of taking accurate measurements of electrostatic fields. The 775PVS System uses chopper-stabilized sensor circuitry to make accurate measurements of electrostatic fields.

The 775PVS System has been designed to make measurements that correspond to those made by the Charged Plate Monitor of the Ionization Standard, EOS/ESD-S3.1-1991. While the components of the 775PVS System provide handheld convenience and portability, they do not meet all of the requirements of the standard. For precise measurement, it is recommended to use a Charged Plate Monitor (CPM). Simco-Ion offers the CPM Model 280A.

The 775PVS System features both SAMPLE and HOLD measurement modes that allow measurements to be made in places that would be difficult to reach or see with other instruments. A set of ranging lights ensures accurate and repeatable measurements. The conductive case and ground snap facilitate grounding for increased accuracy. No range switching is required as the digital display covers the range of 0 ±19.99 kilovolts. An analog output jack provides a 1 volt output corresponding to a 10 kilovolt reading on the meter display.

The sections below describe the components of the 775PVS System.

1.2 Model 775 Fieldmeter

Simco-Ion Model 775 Fieldmeter is an accurate, compact electrostatic fieldmeter used for locating and measuring static charge potentials.

Controls

The 775 Fieldmeter has an on/off slide switch, a push button switch for SAMPLE/HOLD selection, and a rotary adjust ZERO control. The SAMPLE/HOLD switch has two positions: depressing the button latches it into SAMPLE mode while pressing it again releases it into its upper position which provides a display HOLD mode. The ZERO knob may be turned to the left or right to change the zero setting of the display.

1.3 Model 775C Charger

The Model 775C Charger is used to charge the isolated plate of the Model 775P Plate Assembly, making it possible to measure air ionizer discharge times. The 775C Charger consists of an isolated power supply and two stainless steel contact plates. These provide either a positive or negative charging voltage to the 775P Plate Assembly. A push-button switch turns on power to the unit.

Controls

The 775C Charger has a momentary push-button switch for turning on power to the unit. Depressing and holding the button supplies power to the output contacts. When the push-button is depressed, the front panel LED lights, indicating that power is on.

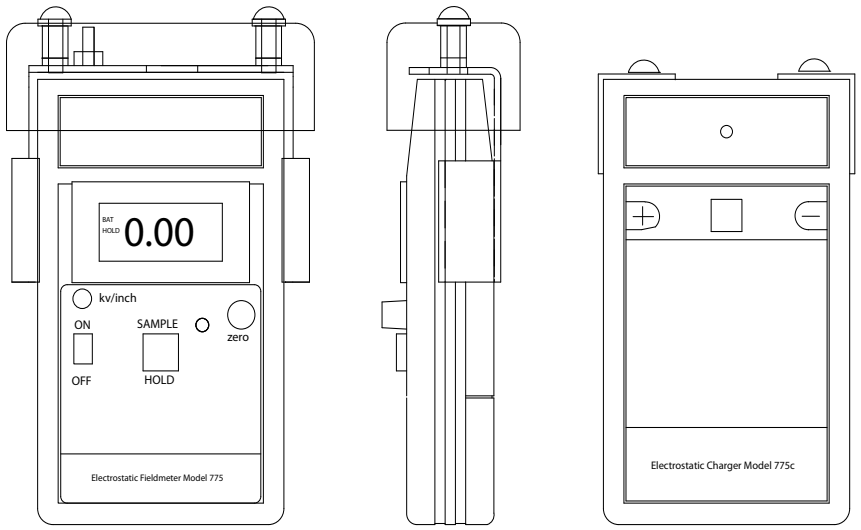
Output Contacts

Two output contacts are provided. They are connected to the internal isolated power supply. One contact is connected to ground and the desired output polarity appears at the other contact. The contacts and power switch are arranged in close proximity. This allows the operator to touch an output contact and depress the power switch release simultaneously with one hand.

1.4 Model 775P Plate Assembly

The Model 775P Plate Assembly, designed to match the small size and hand-held convenience of the 775 Fieldmeter, allows the 775 Fieldmeter to be used to monitor the balance of air ionization equipment.

The 775P Plate Assembly consists of an isolated stainless steel plate assembly that wraps around the front of the 775 Fieldmeter. The ground plate of the 775P Plate Assembly is designed to slide snugly into a groove in the case of the 775 Fieldmeter.



Model 775 Fieldmeter
with Model 775P Plate Assembly

Model 775C 1KV Charger

Figure 1. Components of the 775PVS System

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Operation

2.1 Unpacking and Inspection

Upon receipt of this system, inspect all packages and report any visible damage directly to the shipper. As the system components are unpacked, inspect each one for physical damage that may have occurred during the shipping process. Do not install or apply power to any damaged equipment.

2.2 Operating the Model 775 Fieldmeter

Power up and Battery Check

Push the slide switch actuator into its upper “on” position. The display will come on. To turn the meter off, slide the switch down to its lower “off” position.

After turning on power to the meter, check the display and make sure that the low battery indicator “BAT” is not showing on the display. If the “BAT” indicator is lit, see section **3.1 Battery Change** for instructions on replacing the battery before using the meter.

Zero the Meter

Turn on the meter with the on/off switch. Press the push-button switch down so that it latches in the lower (SAMPLE) position. Place the meter 1 inch from a grounded metal surface. If necessary, adjust the Zero control until the display reads zero.

Note:	The 775 is built in a conductive case that provides the ground reference for the measuring circuit. For accurate measurements and zeroing, ensure that the holder of the meter is discharged by touching ground, or that the meter is grounded using the ground snap on the rear of the case.

Taking and Holding a Reading

Place the meter one inch from the object to be measured. This distance is measured from the front edge of the meter case to the surface of the object. The meter now displays a reading of the electrostatic field in kilovolts per inch.

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Note:	In the SAMPLE position the RANGING LIGHTS are on. The RANGING LIGHTS are provided to help you place the meter at the correct distance from an object. The lights are factory-adjusted to produce a concentric ring bullseye pattern on a flat, opaque surface 1 inch from the front edge of the meter. This can most easily be seen by aiming the meter at a sheet of white paper.

With the meter in position one inch from the object being measured, press the right push-button so that it latches in the upper or “hold” position. This freezes the reading on the display and allows the meter to be moved to a position where it may be more easily read, or, saved for later reference. When the meter is in the hold position, the word “Hold” appears in the display.

Note:	In the Hold position the Ranging Lights are off. When the push-button is returned to the Sample position, the Ranging Lights go on and the word “Hold” disappears from the display.

Measurement Accuracy

The accuracy of measurement is dependent on a stable ground reference and the 1 inch measuring distance as previously noted. It is also dependent on the “aspect ratio”, relating the size of the object to be measured to the measurement distance. This ratio should be at least 3 for best accuracy, i.e. the object should be at least a 3 inch square when measuring at a 1 inch distance.

Accurate measurements may be made at other measurement distances by scaling the meter range and observing the proper aspect ratio. For example, at a measurement distance of three inches, multiply the meter reading by three to give a range of 0 to 59.97 kilovolts. For accuracy, the object being measured at this distance should be at least a 9 inch square.

2.3 Installing the 775P Plate Assembly

The 775 Fieldmeter case has two slots along its sides. The UPPER slot is toward the front of the case. To install the 775P Plate Assembly on the meter, slide the tabs of the black ground plate into the UPPER slot of the meter case as far as they can go.

Turn on the meter with the on/off switch. Press the push-button switch down so that it latches in the lower or SAMPLE position. Connect the stainless steel plate to the meter case (using your fingers or a clip lead). If necessary, adjust the ZERO control so that the display reads zero. Remove the ground from the isolated plate.

Note:	The 775 Fieldmeter is built in a conductive case that provides the ground reference for the measuring circuit. For accurate measurements it is necessary that the person holding the meter is discharged by touching ground, or that the meter is grounded using the ground snap on the rear of the case.

Place the meter in an ionized environment at the desired measurement point. The voltage indicated on the meter will be the ionizer balance or offset voltage.

Caution:	For pulsed ionizers, the voltage constantly changes. The pulse rate may be faster than the display circuit of the Fieldmeter can follow. The voltage displayed will then be a time average of the actual voltage. It may be necessary to connect a chart recorder to the analog output of the Fieldmeter to make more accurate measurements.

With the meter in position for the measurement, press the push-button switch so that it latches in the upper or “hold” position. This freezes the reading on the display and allows the meter to be moved to a position where it may be more easily read, or saved for later reference. When the meter is in the Hold position, the word “Hold” appears in the display.

For discharge time measurement, refer to the 775C Charger operating instructions below.

2.4 Operating the 775C Charger

Polarity Selection

Note the positive (+) and negative (-) polarity indicators on the front panel adjacent to the output contacts. To obtain a POSITIVE output, connect the negative (-) output contact to ground. Depress and hold the power switch. Positive output voltage of about +1300 volts appears at the positive (+) output contact. To obtain a NEGATIVE output, connect the positive (+) output contact to ground. Depress and hold the power switch.

Negative output voltage of about -1300 volts appears at the negative (-) output contact.

Grounding

For the 775C Charger to operate correctly, a ground path must exist between one of the output contacts and the ground reference of the 775 Fieldmeter and 775P Plate Assembly. Normally this ground path is provided by holding the 775C in one hand, and holding the 775 with the 775P attached in the other hand. If this is not possible, wire clip leads must be used between one output contact and the 775 ground contact.

Discharge Time Measurement

Place the 775 Fieldmeter and 775P Plate Assembly in the measurement position. Make sure to provide a ground between the 775 Fieldmeter and one of the output contacts of the 775C Charger.

Positive Discharge

Touch the negative (-) output contact and depress the push-button on the Charger. Quickly touch the isolated plate of the 775P Plate Assembly with the positive (+) output contact. The meter reads approximately +1.30 kV and immediately begins to decrease if air ions are present. Using a stopwatch or other means, determine the time needed for the voltage to drop from **+1.00** kilovolts to **+.10** kilovolts. This is known as the positive discharge time.

Negative Discharge

Touch the positive (+) output contact and depress the push-button on the Charger with the negative (-) output contact. Quickly touch the isolated plate of the 775P Plate Assembly. The meter will read approximately -1.30 kilovolts and will immediately begin to decrease if air ions are present. Using a stopwatch, or other means, determine the time needed for the voltage to drop from **-1.00** to **-.10** kilovolts. This is the negative discharge time.

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Maintenance

The only maintenance necessary for the 775PVS System is the occasional changing of the 9V battery in the 775 Fieldmeter, and cleaning the 775P Plate Assembly Teflon washers and insulators. Contact Simco-Ion with any maintenance questions.

3.1 Battery Change

Slide off the battery compartment door on the back of the 775 Fieldmeter. Carefully remove the battery from the compartment, noting the routing of the battery clip wires, and detach the battery clip. Replace with a 9V alkaline battery of the same type. Carefully reinsert the battery in the compartment, routing the wires so they do not interfere with the battery compartment door. Slide the battery compartment door back into position.

The 775 operates on a standard 9 VDC Alkaline battery. The battery life is in excess of 40 hours. When the battery becomes discharged, the word BAT appears in the display. To change the battery, slide open the battery compartment door on the back of the meter and remove the battery from the battery clip. Replace the battery with a fresh one and replace the battery compartment door. If the meter is to be stored for an extended period of time, disconnect and remove the battery.

3.2 Teflon Insulator Cleaning

Care should be taken when using the 775P Plate Assembly to avoid touching the Teflon insulators. Dirt or oils on the insulators will cause the plate to discharge by itself, even without ionization present. To ensure that the insulators are clean, charge the plate to at least 1000 volts in an area where there are no air ionizers in operation. Observe the reading on the Fieldmeter. It should not change by more than 10% in 5 minutes. If the voltage drops by more than 10% in 5 minutes, clean the insulators and retest.

3.3 Teflon Washer Cleaning

The 775P Plate Assembly Teflon washers should be cleaned periodically using a clean wipe and a solution of 50% isopropanol alcohol (IPA) and 50% deionized water. It may also be necessary to disassemble the Plate Assembly and clean the internal Teflon standoffs. Dry the assembly using gentle heat for at least 15 minutes after cleaning. The front panel and output contacts of the 775C Charger may be cleaned when necessary using a clean wipe slightly moistened with the IPA solution.

3.4 Storage

The 775PVS System components are stored in a custom-designed foam-filled carrying case. Cutouts are provided in the foam for each component

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Figure 2. PVS System in Storage Case

3.5 Service

The cases of the 775 Fieldmeter and the 775C Charger are sealed. **Breaking the seals voids the warranty**. If for any reason you believe the Fieldmeter, Plate Assembly, or Charger are not working correctly, contact Simco-Ion for assistance.

Caution:	There are no user-serviceable parts. Any unauthorized service voids the warranty and results in additional repair charges.

The 775 Fieldmeter is factory calibrated to an accuracy of better than 5%. No attempts should be made to recalibrate the unit without factory authorization. The accuracy of measurement is dependent on stable ground reference and measurement at a precise 1 inch distance. The 775 Fieldmeter and 775P Plate Assembly have a basic accuracy of ±5% measured with 1000 volts on the plate. An adjusting screw is provided on the 775P for calibration. Set the 775 Fieldmeter to ZERO as described in Operation - Model 775P - Step 2 above. Attach an accurate, current limited, source of 1000 volts to the isolated plate and turn the adjusting screw until the Fieldmeter reads **1.00** kilovolts.

The output voltage of the 775C Charger is factory preset to approximately 1300 volts. Over time, this voltage will gradually decrease due to the battery condition. Although an internal adjustment is provided, **do not change this adjustment to compensate for the battery condition. replace the battery when the output voltage drops below 1000 volts.**

If the output voltage appears to change suddenly between successive measurements, the most likely cause is an unreliable ground path between the Charger, Fieldmeter, and Plate Assembly. Verify the ground path, using wire leads if necessary, before replacing the battery.

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Specifications

Input	VDC alkaline battery, battery life in excess of 40 hours, battery included
Display	1/2 digits, 0.4” (1 cm) digit height
Output	Analog output through miniature jack, 1 V corresponds to 10 KV
Response	5 Hz at analog output, digital display updates 3 times per second
Features	Hold and low battery indicators, automatic polarity
Controls	On/off slide switch, SAMPLE/HOLD pushbutton, ZERO control
Range	±0.00 to 19.99 KV at 1” (2.5cm); higher voltages may be measured at distances >1”
Accuracy	±5%, chopper stabilized (accuracy unaffected by air ionization); least significant digit of display indicates tens of volts
Environment	Operates at 0-40
Ground	Ground through conductive case or snap fastener
Dimensions	4.2L x 2.4W x 0.9D in. (10.7 x 6.1 x 2.3 cm
Weight	5 oz with battery (141.8 g)
Certifications	CE

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Warranty & Service

Simco-Ion provides a limited warranty for the Model 775PVS System. New products manufactured or sold by Simco-Ion are guaranteed to be free from defects in material or workmanship for a period of two (2) years from date of initial shipment. Simco-Ion liability under its new product warranty is limited to servicing (evaluating, repairing, or replacing) any unit returned to Simco-Ion that has not been subjected to misuse, neglect, lack of routine maintenance, repair, alteration, or accident. In no event shall Simco-Ion be liable for collateral or consequential damages.

Caution:	The 775PVS is a precision electronic instrument. It must not be subjected to extremes of shock and vibration. Damage to the field sensor may result from dropping the unit from an excessive height onto a hard surface. Such damage is not covered by the warranty.

To obtain service under this warranty, please contact Simco-Ion Technical Support.

Notes

Notes

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