

# Stat-Arc™ hand-held electrostatic fieldmeter Model 255

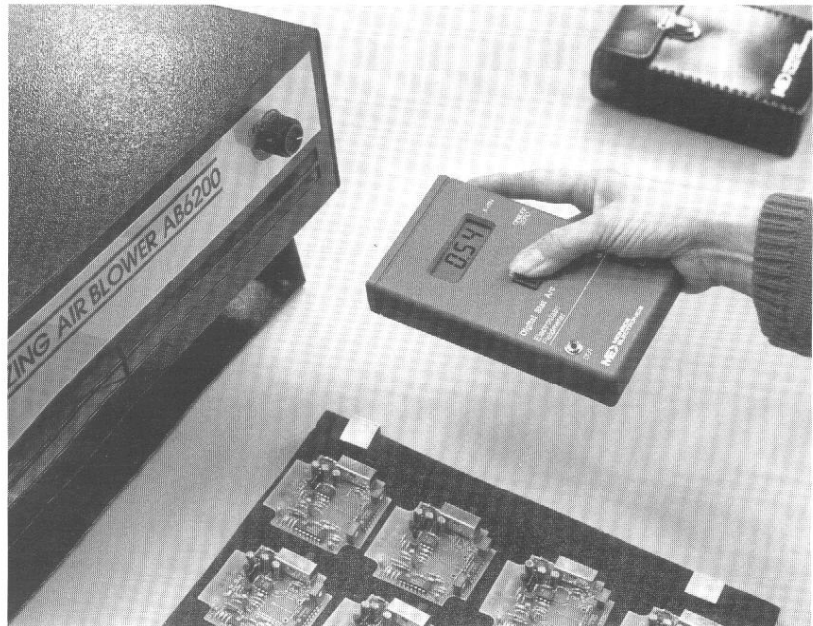
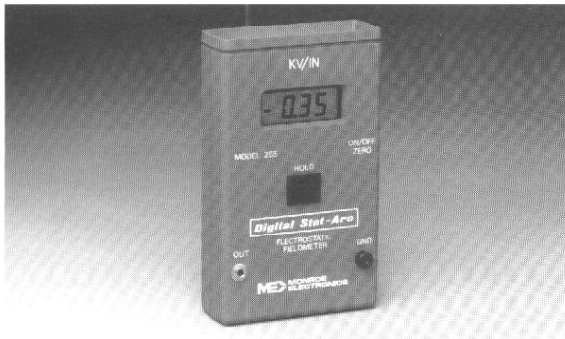
- Ideal for production-area surveys
- Chopper stabilized and drift-free even in ionized environments
- Precise, easy-to-read digital display
- Recorder output and long battery life for hours of unattended monitoring
- HOLD button freezes display to capture transient readings

## Wherever you need non-contact static measurement

The Model 255 puts bench instrument performance in the palm of your hand. It's unequalled for carry-around applications such as:

- Converters, printers or coaters** - to locate sources of static buildup and check operation of ionization systems
- Explosives and solid rocket fuel handling** - for detection of charge buildup and bonding checks
- Surveys of static-free workstations** - to ensure proper grounding
- Dry particle transport systems** - to check for flawed grounding of pipes and ducts

The recorder output and long-life battery also give the Model 255 the ability to conduct dynamic surveys of suspected static trouble spots.



## Simple to use

Only four easy steps give you accurate static charge measurement.

1. Turn the instrument ON.
2. Discharge your body by touching a grounded metal object.
3. Point the aperture toward a grounded surface and ZERO the instrument.
4. Aim the aperture toward the target surface at a distance of 1 inch from the groove surrounding the case. Read voltage and polarity of the charged surface on the display.

For additional measurements repeat steps 2 through 4.

To lock the display reading, press the HOLD button.

To prolong battery life, turn the instrument off when not in use.

## Check ionizers too.

To take quick measurements to determine the effectiveness of your ionization system, add the optional charged plate system, Model 255 CPS.

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## Specifications

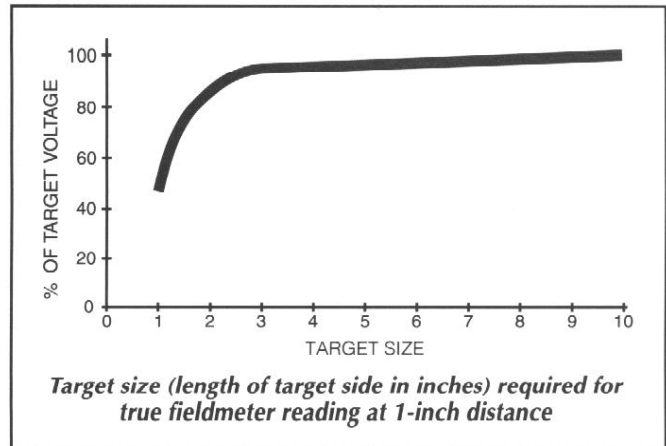
<b>Range:</b>	±20 kV/inch
<b>Sensitivity:</b>	10 volts/inch
<b>Static accuracy:</b>	Better than 5%
<b>Drift:</b>	Less than 20 volts/inch/hour, non-cumulative after stabilization
<b>Noise:</b>	Less than 10 volts/inch RMS referred to input
<b>Response speed:</b>	Less than 1 second, 10% to 90%
<b>Battery type:</b>	9-volt, Eveready #216 or equivalent NEDA #1604
<b>Battery life:</b>	8 hours
<b>Output:</b>	2 volts for full input (20,000 volts/inch)
<b>Case size (H x W x D):</b>	6 x 3-5/8 x 1-5/16 inches (15.2 x 9.2 x 3.3 cm)
<b>Weight:</b>	10 oz (.28 kg)

## The best warranty in the business

Since Monroe Electronics offers the finest, most complete line of ESD instrumentation, it's appropriate that we back our products with an equally superior warranty: 2 years on all parts and labor.

## The finest ESD instrumentation and support

For more than 30 years we have been the technology and quality leader in electrostatic detection and measurement - ever since we invented the feedback-nulled electrostatic voltmeter. Today we offer the world's only complete array of fieldmeters, voltmeters, resistivity meters and power supplies. Our customers range from NASA and the leading makers of photocopiers and laser printers to converters and microelectronics manufacturers worldwide.



But we know you need quality support as well as quality products. That's why we drive ourselves to provide the most knowledgeable applications and installation support - as well as superior customer service.

It's no accident that our distributors are among the finest in the industry. It's a natural match.

## How can we help?

Contact your Monroe Electronics dealer for price and delivery information on this and other ME products, or to schedule a no-obligation demonstration at your convenience. For the name of your nearest dealer, or for technical or applications assistance, contact Monroe Electronics at the address and phone numbers below.

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# Digital Stat-Arc Electrostatic Fieldmeter Model 255

## PRINCIPLE OF OPERATION:

The sensitive electrode "senses" the field to be measured through the aperture in the probe gradient plate. The AC signal induced on this electrode is proportional to its excursion path length and the strength of the ambient field. The polarity of the field determines phase. The signal and a reference signal from the oscillator are fed into a phase sensitive detector whose output feeds a DC integrating amplifier. The output of this amplifier is used to drive the electrode to a potential just sufficient to neutralize the net field at the sensitive electrode and is presented (suitably scaled) at the LCD meter and output jack. This feedback principle and null-seeking operation combine to make a remarkably stable and highly accurate instrument.

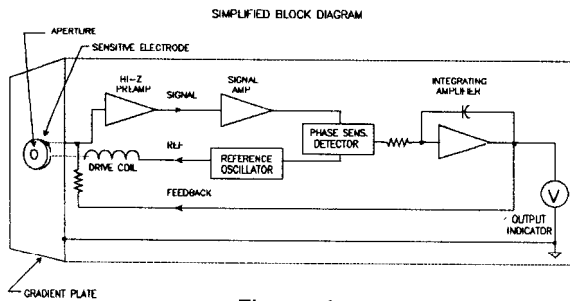


Figure 1

## OPERATING NOTES:

- The case of the instrument is made of a material which is sufficiently conductive to provide a grounding path via the person holding the instrument or a grounded wrist-strap in contact with the case. A grounding receptacle is provided on the panel of the instrument for the purpose of making a "hard" ground connection.
- The output jack accepts a standard 1/8" (3.18mm) monaural phone plug and is provided in order that the output of the instrument may be connected to an oscilloscope, recorder, external meter or other device. The level at this jack is  $\pm 2$  volts for full input (20kV/in.) for high impedance loads (100 k $\Omega$  or greater). It is protected against the application of power from external sources and has an impedance of approximately 100 $\Omega$ .

- For extended monitoring of materials, a +9 volt power supply (such as Radio Shack #273-1552) may be substituted for the battery.
- Factory calibration of Model 255 is done at a probe to surface spacing of one inch.

## FIELD OF VIEW:

Figure 2 illustrates that for a (square) target, the length of whose sides (S) are less than four or more times the operating distance, significantly less than 100% of the target voltage is within the field of view of the instrument's aperture. For best accuracy, the size of the target should be large relative to the measurement distance.

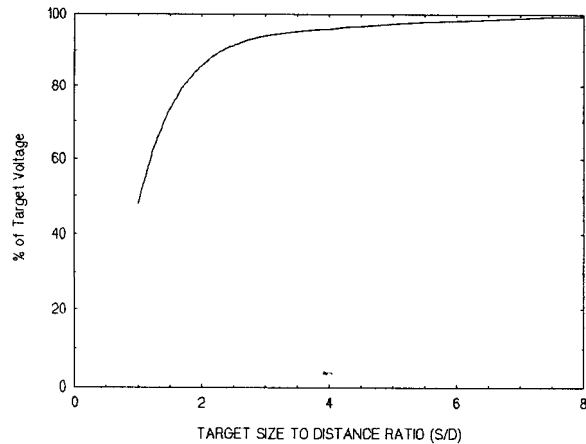


Figure 2

## ESTIMATION OF SURFACE VOLTAGE:

In many applications of the hand held fieldmeter it is sufficient only to determine if the field is weak or intense, whether a field's strength has changed over time or with change in some operating parameter and, possibly, to know the polarity of the field regardless of the physical dimensions of the source. A simple notation of the meter reading is adequate.

Surface voltage may be estimated over a spacing range of from about 1 to 5 inches using the conversion factors of Figure 3 assuming a target size to distance ratio of greater than four as discussed above.

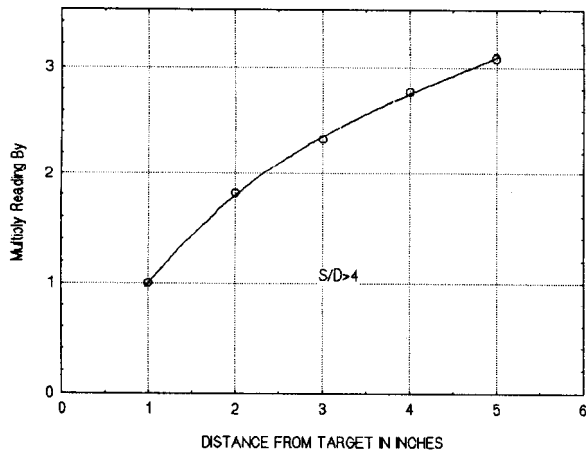


Figure 3

### ZERO ADJUSTMENTS:

The instrument has two ZERO adjustment controls. A COARSE ZERO multiturn potentiometer is located inside the battery compartment (see Figure 4). Adjustment range is about half that of the entire operating range of the instrument. A vernier ZERO control is provided on the right hand side of the case.

In normal use, the vernier ZERO will have sufficient range to zero the instrument in a zero field. In the event the range of this control becomes inadequate, the COARSE ZERO may be adjusted to produce a reading of zero in a zero field without affecting the calibration of the instrument.

A "zero field" may be produced by clamping the instrument in the left hand with the sensing aperture aimed at the palm. When the input element is so immersed in a zero field, the separation between the face of the gradient plate and the target are inconsequential to the measurement.

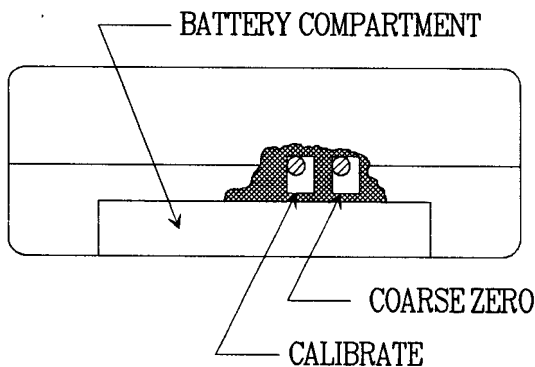


Figure 4

### CLEANING:

Foreign materials which may enter the volume associated with the vibrating electrode can generate undesired signals, offset or drift, thereby impairing the accuracy and utility of the instrument. It is imperative that this volume and the area around the aperture be kept scrupulously clean at all times. This can best be done by proper care, handling and storage of the instrument. Loose dust or other particulate matter may simply be blown away with low pressure instrument grade air.

More severe contamination may be removed by swabbing or flushing with the least practical amount of clean anhydrous isopropyl alcohol. Cleaning with any solvent should not be done on a routine basis.

### CALIBRATION:

Monroe Electronics instruments are calibrated prior to shipment from the factory. Re-calibration should be performed annually unless the instrument has been tampered with or repaired or more frequent calibration is specified by company policy or by contract.

The calibration procedure is as follows:

1. Switch Model 255 ON and point at the center of a large metal plate (12 inches or larger) at a spacing of 1 inch. Spacing is measured between the plate and the front surface of the gradient plate or the center of the groove surrounding the case. For best results, the instrument should be very carefully fixtured in this position.
2. Ground the metal plate.
3. Set ZERO knob to mid-position.
4. Adjust COARSE ZERO (see Figure 4, above) for an indication of 0.00kV/in.
5. Apply a known voltage (up to 19.99kV) to the plate.
6. Adjust CALIBRATE (see Figure 4, above) for an indicated value of that voltage.

Literature Reference LT-19 "A REVIEW OF CURRENT ELECTROSTATIC MEASUREMENT TECHNIQUES AND THEIR LIMITATIONS" by William E. Vosteen, presented at the ELECTRICAL OVERSTRESS EXPOSITION, April 24-26, 1984 and additional information on state-of-the-art electrostatic field and voltage measurement instruments is available upon request from:

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