SIMCO FMX-003 Electrostatic Fieldmeter Instruction Manual

SIMCO®
An Illinois Tool Works Company

INSTRUCTIONS
Operation/Maintenance
FMX-003 Electrostatic Fieldmeter

IMPORTANT

SIMCO recommends that these instructions be read completely before installation or operation of this equipment. Failure to do so could result in personal injury and/or damage to the equipment. Products contained in this manual are covered by one or more of the following U.S. patents: 3,892,614; 4,092,543; 4,188,530; 4,216,518; 4,423,462; 4,529,940; 4,665,462; 4,716,371; 4,734,580; 4,774,472; 4,872,083; 4,860,159; 5,017,876; 5,153,811, 5,008,594, 4,836,044 and corresponding foreign patients. U.S. and foreign patents pending.

Contents

SECTION 1 Safety Instructions / Safety Information

- **DANGER** indicates an immediately hazardous situation that, if not avoided, will result in death or serious injury.
- **WARNING** indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury.
- **CAUTION** indicates a potentially hazardous situation that, if not avoided, will result in property damage.
- **NOTE** indicates precautions necessary to avoid potential equipment failure.

Safety Instructions

This equipment must be installed and maintained as outlined in this manual. This equipment is not constructed for classified (hazardous) environments. It cannot be used where it will be exposed to ignitable or corrosive materials.
The FMX-003 is intended for use in areas that are free of water, oil, solvents, and other conductive contaminants. Exposure to such contaminants will cause the failure of the electrical insulation system in the product. Formulation of dew on the field meter must be avoided.
Do not operate near corrosive fumes of acid/alkali or corrosive gases such as chlorine.
The FMX-003 must be properly grounded to function accurately.
The FMX-003 contains a sensor that is sensitive to mechanical vibrations and shock and is likely to become damaged if dropped. In such an event, it should be carefully examined and any necessary repairs be made by an authorized technician.
The FMX-003 contains a microcomputer chip. It should not be used in an environment with excessive electromagnetic noise.
The internal parts of the FMX-003 should never come in contact with foreign substances. Suspend measurement when the voltage reading is outside the measuring range.
If the range is exceeded, there is a possibility of damaging the sensor.
It is possible to use this product in ionized air. However, the specified accuracy of within 10% cannot be guaranteed.
When not in use, switch off the field meter to extend battery and equipment life. Do not press on the LCD display.
The FMX-003 has been calibrated for a measuring distance of 1″± 1/64″ (25mm ±0.5mm).

SECTION 2 Introduction

SIMCO FMX-003 field meter is a compact electrostatic field meter used for locating and measuring static charges. Its pocket size makes it handy to use and the three-button operation makes it easy to operate.
The FMX-003 measures static voltages within ±20kV(20,000V) at a distance of 1″. Results are simultaneously displayed numerically and in bar graph format. POWER on/off, ZERO adjustments, Ion Balance (IB), and HOLD are all push-button operations. The HOLD button allows the display to retain the static charge read- ing. This is especially useful where the display is difficult to see during measurement. Two LED guide ring lights help position the field meter at the right distance from a charged test object. The conductive case and ground snap facilitate grounding for accurate measurement. The circuitry of the FMX-003 has been designed to make measurements in areas using air ionization.

The FMX-003 features:

- Easy to read, easy to use operations
- Lightweight, compact design
- Range light assures accurate and repeatable measurements
- Automatic range switching up to ±20kV(20,000V) at 1″ (25mm)
- Digital and bar graph display
- Automatic power off after five minutes (may be disabled if preferred)

Receipt of Equipment

1. Carefully remove the equipment from the carton.
2. Inspect contents for damage that may have occurred during shipment. If any damage has occurred during shipment, the local carrier should be notified at once. The airport should be forwarded to SIMCO, 2257 North Penn Road, Hatfield PA19440, and (215) 822-2171.
3. Empty the carton to ensure that small parts are not discarded.

Return Shipments
Prior to returning goods, contact a SIMCO Customer Service Representative for a Return Authorization Number. This number should be included- ed on the packing list. All correspondence should also reference the Return Authorization Number. Any item being returned should be shipped prepaid and packed to provide adequate protection.

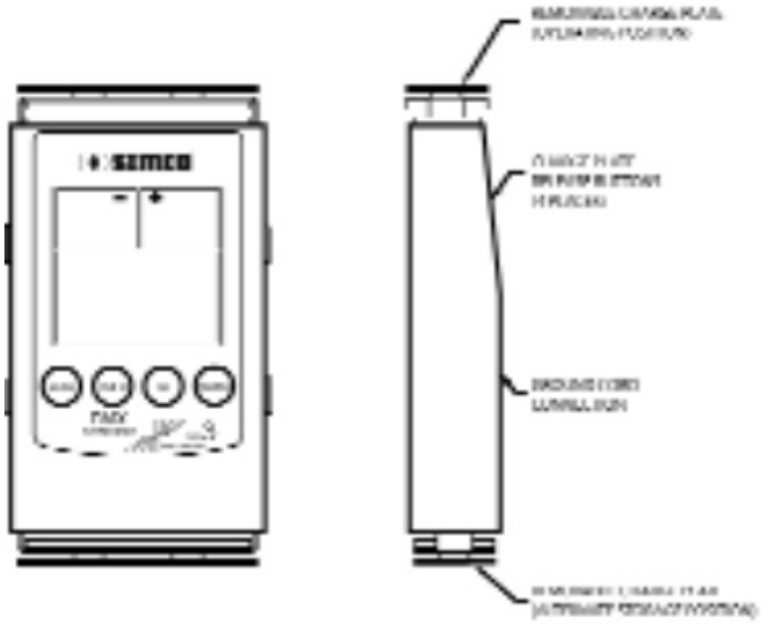

Figure 1

SECTION 3 Specifications

Measuring range:	0 to ±1.49 kV(Lo range) ± 1.0 to ± 20.0 kV(Hi range) (Range hysteresis: ± 1.0 kVto ± 1.5 kV) 0 to ± 200 V(Ion Balance measuring range)
Measuring distance:	1″±1/64″ (25mm ± 0.5mm); LEDs guide for correct distance (between a charged object and field meter)
Response time:	<1 s
LCD display renewal rate:	5 times/s
Accuracy:	20KV ± 10 %
Ambient conditions:	50º-100ºF, (10º – 40ºC); 0 – 60 %RH (non-condensing)
Display features:	Bar graph; red LCD positive polarity voltage, blue LCD negative polarity voltage
Bargraph precision:	±0.1 for low range ±1.5 kV for high (Hi) range; ±15 For ion balance range
Digital reading:	Auto-ranging, three digits .= 0 to ±1.49 kV .= ±1.0 keto ±20.0kV(Hi) = 0 to 200 (Ion Balance) Ion Balance mode display: [IB] is displayed Battery capacity display indicator HOLD switch to retain display after measurement Error sign [Error] appears if the sensor is damaged
Alarm feature:	A beep sound will be heard during the following actions: Power on: one beep Power on with Auto Off feature disabled: [Depress the power button for more than 3 seconds] three beeps Auto power-off: short beeps at the 1-second interval for 5 seconds before power off Over range: Continuous sound
Auto power-off:	The power turns off automatically after five minutes. [A.OFF] is displayed whenever this feature is disabled.
Powersource:	9 V , 6F22Ymanganese battery.
Battery life:	In excess of 30 hours.
Size:	4 7/8″ (123mm) (L) × 2 7/8″ (73mm) (W) × 1″ (25mm)(D)
Weight:	6 oz. (170g)
Case material:	Conductive resin (ABS)

SECTION 4 Preparation and Battery Replacement

Preparation

1. Peel off the protective plastic sheet from the display panel.

NOTE: Peeling the plastic sheet leaves the panel charged with static electricity. Neutralize the area with a static neutralizerorby wiping it with a cloth, and moistening it lightly with alcohol.

Battery Replacement

FMX-003 uses 9 V, 6F22YManganese battery. The life of the battery is about 30 hours. When the power switch is on, a battery capacity indicator displays the state of the battery on the front panel. Figure 2 shows the residual battery capacity as displayed.

Figure 2

NOTE: The dark area in the battery indicator display is not proportional to the remaining energy.

Replacement Procedure

The battery compartment on the back side of the field meter has a removable cover marked OPEN.

NOTE: Be careful while connecting or disconnecting the battery. To avoid breaking the contacts, do not pull the connection plug hard.

1. Press down on OPEN and slide the cover down.
2. Remove the old battery (if present).
3. Connect the new battery and insert it into the battery compartment.
4. Reattach the cover back to the battery compartment.

NOTE: Before closing the cover, make sure that no parts of the leads are outside the battery compartment.

SECTION 5 Operation

The FMX-003 has four push buttons. The buttons operate by pressing once lightly. There is no need to press the button repeatedly. Its effective life may be decreased by repeated misuse. The POWER button is red and turns the field meter on and off. If the FMX-003 is left on for 5 minutes, it will automatically turn itself off. To resume operations, press the red POWER button once. To disable the AutoOff feature and allow continuous operation, press the red Power button and hold down for at least 3 seconds when turning the field meter on. The HOLD button is green and holds the display of a measured charge. HOLD mode turns off the focusing LEDs. No measurements are possible when in the HOLD mode. The hold measurement feature enables the user to use the meter in inaccessible areas. When the green HOLD button is pressed once during a measurement, the digital numerical value and the bar graph will be held on the display. This function allows the operator to move the meter where it can be more easily read.

The HOLD mode is displayed above the battery capacity display. To cancel HOLD mode and resume measurement, press HOLD once more. The IB button is blue and prepares the field meter for Ion Balance measurement. Refer to Section 6 for details. The ZERO button is gray and sets the meter to zero charges. When the digital meter is turned on, the zero adjustments is inoperative if it is in HOLD mode or the meter reads more than ± 0.20.

NOTE: For reliable measurement, the fieldmetermust be grounded properly using the ground lead provided. The plastic case of the FMX003 Electrostatic Fieldmeteris made of conductive resin. The grounding terminal provides the reference potential for the electrical circuit. This terminal must be grounded properly for accurate measurement.

Operations

1. Turn the focusing LED and sensor toward an uncharged area.
2. Press the POWER button. A single beep for one second indicates proper operation. The battery capacity indicator and bar graph will be displayed.
3. The meter reading should be zero (0). Use the ZERO button if it is not.
4. Hold the field meter 1″ away from the charged surface. Two beams of light will form concentric circles when the

meter is the correct distance, 1″ away, from the surface.

NOTE: When taking a measurement 3″ from the surface, multiply the result by 2. When taking a measurement 6″ away from the surface, multiply the result by 3.

5. Abar graph and a digital display on the FMX-003 display the voltage of the charge. Press HOLDif you want to hold the display of the measured charge.
6. To turn off the meter:

   Press POWERif you have not used the hold mode.

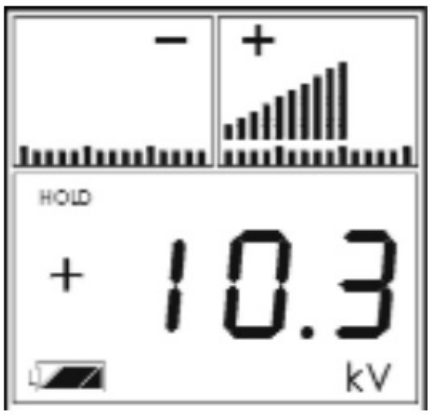

Figure 3

If you have pressed HOLDand to wish to retain the meter reading for the next use, press the power button to turn off the FMX-003.
If you have pressedHOLDand do not wish to retain the meter reading for the next use, press HOLDthen POWER.
If the FMX-003 is left on for five minutes, the unit will beep five times and then turn itself off automatically. To disable this feature, simply press and hold the red power button for at least three seconds when turning the FMX-003 on. Three beeps and the A-OFF display indicate that the feature has been disabled.

Results
A display of [+] or [-] next to the digital numeric value represents the polarity of the static electricity being measured. In addition, the color of the bars in the bar graph indicates the polarity of the static charge. Red and blue bars indicate positive and negative charges respectively.
During a static voltage measurement, if the digital display starts flashing along with a continuous beep, stop taking the measurement. The static charge is greater than the meter can measure. Attempts to measure too high a charge may damage the sensor.

SECTION 6 Operation of Ion Balance Measurement

NOTE: The FMX-003 Ion Balance measurement feature should not be used to measure the ion balance of static bars. It may be used to measure other static control devices for balance and to check for residual charges on surfaces.

The FMX-003 can also be used to measure ion balance voltage (residual voltage).

1. Depress the charge plate release button on either side of the field meter to remove the charge plate assembly.
2. Insert the plate assembly into the other end of the field meter (the end with the SIMCO logo) until it clicks into place.

   NOTE: Ion Balance plate must not move during the measurement.
3. The conductive case must be grounded using the supplied grounding lead. It is imperative for accurate ion

balance and to drain any charge that has developed prior to measurement.

4. To turn on the ion balance measuring circuit, press the blue IB button.
5. Turn the sensor toward an uncharged area.
6. The meter reading should be zero (0). Press the Zero button if it is not.
7. Hold the field meter centered in front of the ionizer at any convenient, repeatable distance, such as 1 foot.
8. Abar graph and a digital display on the FMX-003 display the ion balance information. Press HOLDif you want to hold the display of the measured charge.
9. To turn off the meter:
   Press POWERif you have not used the HOLDmode. If you have pressed HOLDand to wish to retain the meter reading for the next use, press the power button to turn off the FMX-003. If you have pressed HOLDand does not wish to retain the meter reading for the next use, press HOLDthen POWER.
10. Depress the charge plate release buttons on either side of the field meter to remove the charge plate. Store the plate on the opposite end but [pressing it until it clicks into place.

If the FMX-003 is left on for five minutes, the unit will beep five times and then turn itself off automatically. This feature can be disabled (refer to Section 5)

SECTION 7 Important Notes and Cautions

1. Store and use the field meter in a clean and dry environment. Foreign substances should never enter or touch the internal parts.
2. Vibration and impact may damage and/or affect the sensitivity of measurement of the instrument.
3. Do not attempt to take apart the field meter.
4. The measuring distance between the field meter and a test object should be 1″ ± 1/64″ (25mm ± 1mm). The calibration was carried out at this distance. The specified accuracy is valid for this distance.
5. Grounding of the instrument is essential for sensitive ion balance measurements.
6. To maintain the high insulation level of insulation of the plate, the FMX-003 should be stored in a place having less than 60 %RH. It should be kept inside a plastic zipper bag with desiccant.
7. This field meter is not an explosion-proof product. Do not use this product in flammable atmospheres such as paint thinner, benzene, gasoline, propane, natural gas, etc.
8. The instrument should be re-calibrated once a year. Contact SIMCO Customer Service when a recalibration of the field meter is necessary.

SECTION 8 Troubleshooting Guide

Fault	Possible Causes	Solution
Fieldmeter is on but when tutted toward a charges o bject, the number and the bar graph do not change.	The meter is in HOLD mode of o peration.	Cancel the HOLD mode by pressing the HOLD button once.
The display cannot be set to zero.	The meter is in HOLD mode. The true ZERO point has a shift er.	Cancel the HOLD mode by pressing the HOLD button once. If the meter reads 0.20 or more for an uncharge d object, a read adjustment may be needed. Co ntact your local representative or SIMCO Custo mer Service for reading adjustment, repair or re placement.
When the POWER button is pressed, the LCD displa y does not appear.	No battery, low battery capacity, or bad contact. Malfunction of the LCD display.	Replace the battery/Make a proper connection. Discontinue use and contact your local representative or SIMCO Customer Service for reading adjustment, repair, or replacement.
A pan of the LCD dis- play does not appear. The display shows an ER ROR. The alarm does not sound.	Malfunction of the LCD display.	Discontinue use and contact your local representative or SIMCO Customer Service for reading adjustment, repair, or replacement.
Indicated voltage is low or plate insulation resistance is less than the recommended value.	Adhesion to dirt or condensation on the ion balance plate.	Ultrasonically clean the plate insulation then dry thoroughly. If the above step does not improve performance, contact your local representative or SIMCO Customer Service for reading adjust ment, repair, or replacement.

SECTION 9 Warranty

SIMCO warrants its products to be free of defects in components, workmanship, or materials for a period of one year from the date of purchase. This warranty does not apply to any physical or electrical damage done to the product through misuse or abuse or negligence (such as any modifications made to the unit or service work done by any other than SIMCO authorized technicians). Any unit that has had its serial number altered or removed will be ineligible for warranty. All products returned must have an “RA” (Return Authorization) number regardless of warranty status. Call SIMCO for an assigned number. SIMCO will not be liable for loss or damage due directly or indirectly to an occurrence or use for which the product is not designed or intended. In no event shall SIMCO be liable for incidental or consequential damages except where state laws override. This warranty extends to the original purchaser and is not transferable. No per- son, agent, distributor, dealer or company is authorized to change, modify, or amend the terms of this warranty in any manner whatsoever. Information in this document is subject to change without notice and does not represent a commitment on the part of SIMCO. No part of this manual may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying and recording, for any purpose other than the pur- chaser’s personal use without written permission of SIMCO.

SIMCO®
An Illinois Tool Works Company

2257 North Penn Road Hatfield, PA19440 Phone: 215-822-2171 Fax: 215-822-3795 www.simcoION.biz	2257 North Penn Road Hatfield, PA19440 (215) 997-0590 (800) 538-0750 Fax: (215) 997-3450 Publication 5200907 June 2005

Documents / Resources

	SIMCO FMX-003 Electrostatic Fieldmeter [pdf] Instruction Manual FMX-003 Electrostatic Fieldmeter, FMX-003, Electrostatic Fieldmeter, Fieldmeter

References

- Static Control Solutions | Simco-Ion