User's Manual

Electrostatic Field Meter

7100.EFM51

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Systeme gegen Elektrostatik
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Small hand-held Electrostatic Field Meter with digital display designed to measure electrostatic surface potentials and fields according to the field mill induction principle.

- The instrument measures the electrostatic voltage potential. A microcontroller calculates the field strength (V/m) with the pre-selected distance (1cm, 2cm, 5cm, 10cm and 20cm).
- In “E-Field meter” mode, the instrument displays the field strength in “kV/m”
- In “Max. Value” mode, at a test distance of 1 cm, the highest and lowest value will be stored.

Measurement Principle

The induced charge caused by the electrical field, generates a current proportional to the electrical field strength. The selective, parametric operating-amplifier measures the current without affecting the averaged time.

Technical Data

Dimensions:	70 x 122 x 26 mm (W x L x H)			
Weight:	130 g (without battery)			
Power Supply:	9V – Alkaline battery IEC 6F22 or rechargeable NiMH battery			
Measurement Range:	Distance 1 cm	➔	0..... 8 kV	max. resolution 1 V
	Distance 2 cm	➔	0..... 16 kV	max. resolution 2 V
	Distance 5 cm	➔	0..... 40 kV	max. resolution 10 V
	Distance 10 cm	➔	0... 80 kV	max. resolution 10 V
	Distance 20 cm	➔	0... 160 kV	max. resolution 20 V
	E-Field meter	➔	0… 800 kV/m	max. resolution 0,1 kV/m
	CPS Mode	➔	±1000V to ±100V	max. resolution 0,1 sec.
	Max. Value 1cm	➔	± 0… 8 kV	max. resolution 1 V

Display:	2 lines, 12 digits alphanumeric LCD display
Operating Time:	app. 10 hours at continuous operation with an Alkaline battery
Adjustment:	Within a plate capacitor’s homogeneous field, plate size 200 mm x 200 mm, distance between both plates is 20 mm, the rotating chopper system is centered in the grounded plate.

Warranty

We provide**12 months** limited warranty.
The warranty does not include the battery, mechanical damage or unauthorized opening of the instrument.

Operation

- Press the „function/on“ key “shortly” to switch on the instrument
- Press the key twice while in measuring mode to switch off the instrument
- Remove the protection cap before a measurement
- The unit will switch off automatically when the „function/on“ key was not pressed for app. 4 minutes (in CPS-Mode app. 18 min.)

Hold Function

- The hold-function freezes the display with the actual measured value.
- Press the „function/on“ key “shortly” while in measuring mode for “hold”.
- Press the key while in “hold” to return to measuring mode.

Measuring Ranges

1. **Measurement of electrostatic voltages**
   The instrument is preset to 2cm distance after switching on. To measure, it must be positioned at 2cm distance in front of the object. For high voltages or uneven surfaces the measuring distance should be increased.
2. **E-Field meter mode**
   The instrument indicates the field strength in V/m for the current position.

Measuring Distance / Measuring mode

Press and hold the „function/on“-key (approximately 2 seconds) until „change cm“ will appear. The pre-selected distance in cm is displayed in the first line. Pressing the „function/on“-key changes the measuring distance.
2cm => 5cm => 10cm => 20cm => E-Field meter => CPS-Mode => Max. Value => 1cm
After selecting the desired distance or mode, the instrument switches back to measuring mode if no key is pressed for a certain time.

Important!
The measuring range is preset to 2cm distance each time the instrument is switched on!
The instrument measures the field strength in V/m and calculates the voltage using the selected range:
Display value (V) = Field strength (V/m) x Distance (m)
i.e.. Display value= 1000V Distance= 10cm ➔ 1000V = 10000 V/m x 0,1m
In “E-Field meter” mode the instrument displays the field strength in “kV/m”.

Distance guides

The instrument is supplied with two 2cm distance guides which are fitted on the front plate.
The alphanumeric Liquid Crystal Display (LCD) consists of 2 lines of 12 digits each. The measured distance in cm or the measuring mode is displayed in the first line, while the test result is displayed in the second line. An „overflow !“ indication requires to increase the distance.

Battery control

The EFM 51 has a permanent battery-voltage-control. If the battery voltage drops below 7,5 V a „Low Battery“ warning is displayed and the 9V Battery must be replaced!
In case the battery voltage drops below 7,0 V the instrument switches off with „auto off“ message to avoid total discharge and acid leakage.
Note: Please use Alkaline or Lithium 9V Batteries only!
If rechargeable batteries are preferred, please use a suitable battery charger for charging the battery separately and follow the manufacturer’s instructions.

Grounding

The unit must be connected to ground to allow accurate voltage levels and polarity measurements. Use the grounding socket (4) for ground connection. The unit housing is conductive, and the instrument may be grounded through the operator if he is at ground potential.

Zero Adjust

In general, zero adjustment is not necessary. However the trimmer (6) can be used for zero adjust if the instrument does not indicate U=000 or U=00X when the rotating chopper is shielded by the protection cap. The last digit can be ignored, as it is much lower than the specified tolerance.

Maintenance

It is very important not to touch any parts of the rotating chopper. The sensor head must be free of dust and humidity.
If needed, the rotating chopper can be cleaned with alcohol and a lint-free tissue, when switched off.
Deforming the rotating chopper will damage the instrument!

Replacing the Battery

Replace the 9V battery when “Low Battery” appears on the display. Please switch off the unit before opening the battery compartment. Remove the battery and carefully disconnect the contact-clip.
Plug the contact-clip onto the new battery and put it back into the compartment; then close the compartment.

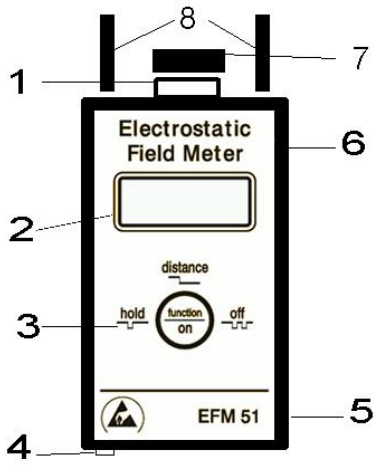
Warning

- The unit is not approved for usage in explosive areas!
- The usage in power plants is not allowed!
- This unit cannot measure alternating fields > 1 Hz!
- The Instrument must be grounded when high electrostatic charges are present.
- Sparking on the modular system can cause damage to the unit and need to be avoided.

The EFM51 includes:

- Electro Field Meter EFM 51 including the 9V battery and 2 cm distance guides
- Storage Bag including grounding cable and clip
- User’s manual in German and English
- Calibration Certificate

Legend



1. Rotating chopper
2. LCD – Display (2 x 12) alphanumeric
3. Function/on key
4. Grounding Socket (4mm)
5. Battery compartment (back-side)
6. Zero adjustment trimmer
7. Protection cap
8. Distance guides
   (removable for E-Field mode)