

## ***ELECTROSTATIC FIELDMETER***



**Small hand-held Electro-Fieldmeter with digital display designed to measure electrostatic voltage potentials (with pre-selected distance) according the fieldmill influence principal.**

Item part numbers :

- 61-200-0220 : Eletrofield meter (EU plug)
- 61-200-0221 : Charge plate option
- 61-200-0222 : Complete set : Electrofield meter+Charge plate (EU plug)
  
- 61-300-0220 : Eletrofield meter (UK plug)
- 61-300-0222 : Complete set : Electrofield meter+Charge plate (UK plug)

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## Technical data

### Description

The unit is housed into an EMV - plastic enclosure . The Influence Measuring Electrode is star shaped. In front to it in a small distance apart a rotating grounded modulation propeller-wheel with the them shape is located. The Influence Electrode is jacket by a ring electrode system used also as mechanical shield for the propeller wheel and the sensor - plate. The measurement display is located on top of the unit. It is an 2x12 digit alphanumeric LC - display.

The unit consists of a built in microprocessor for the following tasks as:

- it considers automatically the measured field strength (V/m) and the pre-selected distance (cm) to calculate the voltage potential (Volt)
- single push - button control
- permanent Battery – voltage - control with automatic switch off
- CPS - mode

Dimensions	app. 70 x 122 x 26mm (L x l x H)
Weight	app. 130 gr.
Distance between plate condenser	20 mm
Adjustment error	< 5 %
Battery	9V Alkaline battery or NiMH - accu
Operating time	app. 10 hours with the 9V alk.battery

Measure range :	Distance 1 cm →	0..... 8 kV	Resolution max 1 V
	Distance 2 cm →	0.....16 kV	Resolution max 2 max.
	Distance 5 cm →	0.....40 kV	Resolution max 10 max.
	Distance 10 cm →	0... 80 kV	Resolution max 10 max.
	Distance 20 cm →	0...160 kV	Resolution max 20 max.

## Operating instruction

### Principle of operation

The Electro-Fieldmeter is working with a parametric amplifier. The charge caused by electrostatic induction is converted to an alternating current proportional to the field strength. A selective working amplifier measures the current without loss in relation to the field strength.

There is no use of any radioactive materials in the unit

### Applications

**Detection and control** of electrostatic fields or charges.

**Measuring:** electric field strength electric charges, electrostatic charges, extremely high-resistant voltage sources.

### Function Key

on	1 x press shortly „function/on“
hold	1 x press shortly „function/on“ to activate or deactivate
distance	1 x press and hold „function/on“ until „change cm“ appears
	1 x press shortly „function/on“ to select the distance or switching in CPS - Mode
	wait for app. 2 sec to take over new function
off	2 x press shortly „function/on“ button

### **Operating**

Press the „function/on“-key to switch on the unit. Remove the protection cup from the modulator ! Press the „function/on“-key twice in short intervals to switch the unit off. The unit will switch off automatically when the „function/on“-key was not used for about 3.5 minutes.

### **Hold**

The unit has a hold-function keeping the measured value stored on the display . Press the „function/on“-key once shortly to activate the hold function - „hold“ will appear then in the first row of the display, while the stored value is shown in the second row. To exit the hold-function, press the „function/on“- key once again shortly and the actual measurement value will appear on the display.

### **Measurement ranges**

The distance of 2cm always is indicated when switching – on the instrument. If this distance is used, the unit has to be positioned in the distance of 2cm monitoring the object. This distance is ideal in most cases, as voltage levels up to 16 kV can be measured (please note Technical Data). The distance should be increased, if the object is high charged or when the object has a rough surface. The lowest measurement distance of 1cm should be selected, when low charges are present and the surface of the object has a smooth surface.

### **Change measurement distance**

Press and hold the „function/on“-key (approximately 2 sec.) until „change distance“ will appear in the second line. The pre-selected distance in cm will be displayed in the first line. Press the „function/on“-key shortly to change the distance. With each short press of the „function/on“-key the proposed distance will appear as follows:

**2cm => 5cm => 10cm => 20cm => cps - mode => 1cm ...**

When the right distance is shown in the display, please wait (do not press the „function/on“- key) until the actual measurement value will appear in the second line. The new selected distance is now also shown in the first line. Please consider this selected distance for the following measurements. The distance will be measured from the electrode positioned 6.4mm apart from the housing on the modulator side. It is more practical to add 6.4 mm to any selected distance starting from the front - plate of the unit.

**Please note:** the distance will change back to 2cm after each switching off and on again !

### **Distance support**

With any equipment you will get 2 distance supports. The distance supports can be screwed into the front - plate at the modulator side, which will always provide the right measurement distance for the standard setting of „distance = 2 cm“

### **Display**

The alphanumeric Liquid Crystal Display (LCD) consists of 2 lines for 12 digits each. The measurement distance in cm will be shown in the first line, while the voltage reading in volts is displayed in the second line. When the level of 999 volts is reached, the display will switch automatically into the kV-mode. The display of the voltage reading appears always in 3 digits, such as: 578 V 3,85 kV 24.0 kV and 274 kV. Select a greater distance if „overflow !“ appears on the screen !

### **Battery voltage control**

The EFM 022 has a permanent battery-voltage control. If the battery voltage is less than 7,6 V „Low Battery“ appears in the first line of the LCD and the 9V block-battery (or the accu) has to be replaced!

If the battery voltage will become less than 7,1 V, then „auto off“ will appear for approximately 2 sec in the second line and the unit will switch off to avoid a total discharge and acid leakage.

**Note:** Please use Alkaline or rechargeable - NiMH 9V - batteries only!

If rechargeable batteries are preferred, please use a suitable battery - charger for recharging the batteries separately. Please note the manufacturer`s advises !

### **Grounding**

The unit has to be connected to ground for correct measurements of voltage levels and polarity. Use the grounding socket (4) of the unit for the connection to earth potential. The unit consists of a conductive housing, thus allow the use without grounding cable if the operator is on earth potential (e.g. wears conductive shoes, uses a wrist strap or touches grounded parts).

### **Supplied options :**

#### **The basic shipment contains the following parts:**

- A Transport Case with antistatic Foam Interior
- B Electro Fieldmeter
- C 9V Alkaline – Battery& Battery Charger
- B Ground Connector cable with clamp
- C Instruction Manual
- D Calibration Certificate



With the Charge Plate Kit becomes from the EFM 022 a charge plate monitor , to the supervision of air ionization appliances after the EN 100015 as well as EOS/ESD S.3.1

The charge electrode corresponds to the norms from the capacity (20pF), but not from the dimensions. For directly measure conform to the norms, use our CPM 374.

With the CPS 022, however reproducible measurements can be performed.

It becomes the decay-time from + 1.000V.... + 100V or.- 1.000V....- 100V with an integrated start - stop - timer. The charge takes place over an external HV- Converter.

In the CPS-Mode voltages up to max. 2kV will be displayed.

#### Parts of delivery

- HV Converter
- 3 rechargeable batteries
- Battery charger
- CPS Socket
- Plate condenser
- Grounding cables (1.5m & 1m)
- Crocodile plug
- Suitcase

The EFM 022 from software version V4.0 is prepared for using the Charge – Plate - Monitor.  
Some older versions can be updated by the manufacturer

### Preparation of the unit

- Bring the CPS – Socket in position and put in the EFM 022 vertically
- Screw the ground plate on the EFM 022
- Press the field-plate onto the bolts in touch to the ground-plate
- Connect ground between the HV - Converter and the CPS – Socket
- Connect the CPS – Socket to ground
- Switch on the EFM 022 and wait until „Dist.= 2cm" and a measure value is displayed
- Press and hold the „function/on“-key (approximately 2 sec.) until „change cm“ will appear in the second line. The pre-selected distance in cm will be displayed in the first line. Press the „function/on“-key shortly to change the measurement distance, until “CPS - Mode” is displayed. With each short press of the „function/on“-key the proposed distance will appear as follows: 5cm => 10cm => 20cm => **CPS - Mode**
- please wait (do not press the „function/on“- key) until the cps-mode will appear in the second line.
- The unit is now ready to work as charge plate

### CPS - Measurement

- Through pressing of the button at the HV - Converter, a high voltage  $> \pm 1100V$  becomes at the two contacts of the appliance generates
- Through touching of the upper field plate with the corresponding contact (+ or -) the HV-Converter is loaded the plate. ( see picture )
- The unit recognizes the correct polarity automatically and now is ready for the measurement
- The internal timer is started with achievement of  $\pm 1000V$  on the field plate
- The internal timer now counts upward in 0,1sec steps, as far as on the field plate  $\pm 100V$  is reached
- In the upper line now it will displayed the pos. or neg. discharge time
- In the lower line, the current voltage is shown on the field plate, until the “function/on” button is pressed. Then, the voltage measured at this time on the upper plate is shown as offset voltage in the lower line
- Pressing the function/on“ – key again will reset the display, and it can be started a new measurement

## Maintenance

Do not touch the modulator system to prevent mechanical damages. Avoid any insulating build up as e.g. dust, paint or varnish dust, condensed water or similar influence.  
If it is necessary the modulator system may be cleaned with alcohol and a soft fuzzy-free cloth.

### Replace 9V - battery

The 9V block-battery has to be replaced when “Low Battery” appears at the display.  
Please switch the unit off before open the battery compartment. Take out the battery and remove the connector clip. Put the connector clip on the new battery and put it into the compartment. Close the compartment.

### **Zero Adjust**

A zero adjustment is normally not needed. In case, that the unit does not indicate U=00X while the modulator system is shielded (e.g. grounded person covers the modulator system with one hand), use the trimmer (6) for zero adjustment. The last digit can be ignored as the caused measurement failure is much lower than the specified tolerance.

### **Guaranty Performance**

By correct operation and in accordance to the instruction manual we allow a 24 month warranty . The warranty does not include: The Battery / NiMH – accu, damages by electrical discharge, incorrect grounding and mechanical damage of the Field Meter. If you opened the unit, you will lose the Guaranty !

### **Warning notice**

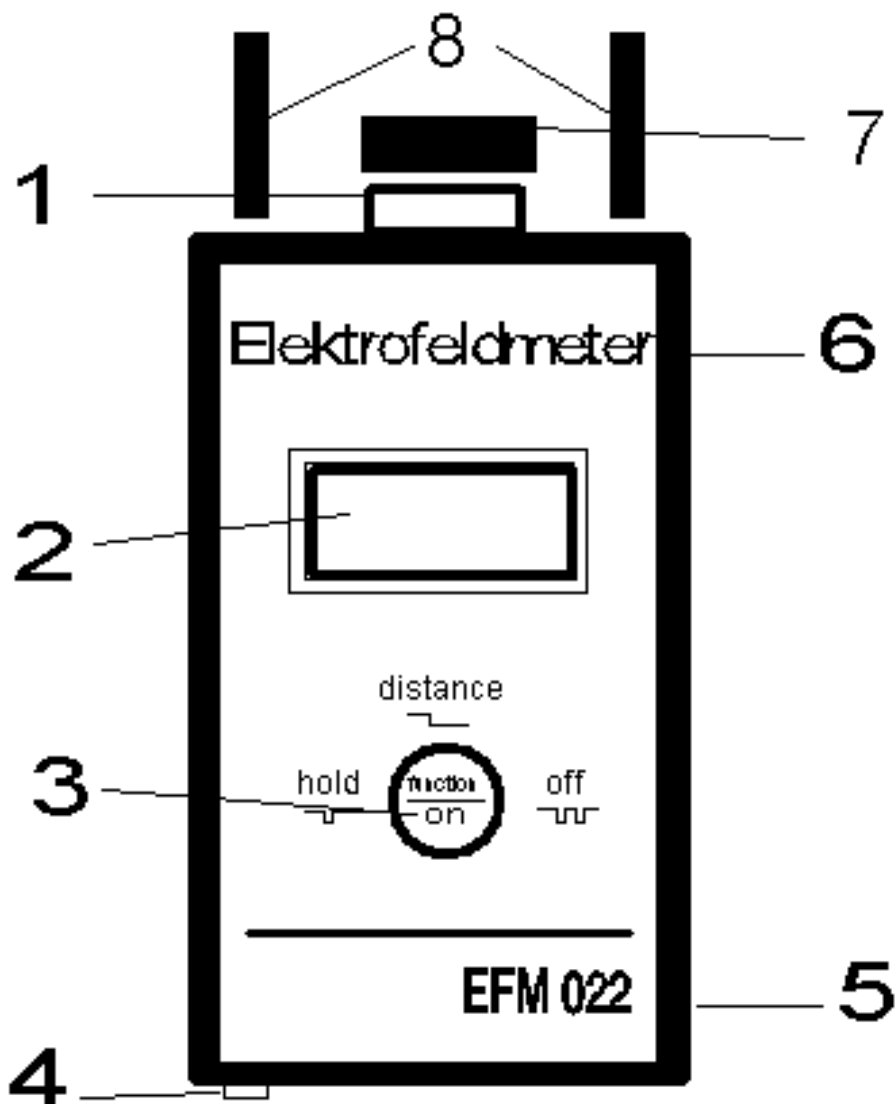
- √ It is not allowed to open the Electrofieldmeter. If you open it, you lost the guaranty.
- √ The Electrofieldmeter is not approved for measurements in explosion hazard areas.
- √ In the event of very high electrostatic charges, the Electrofieldmeter must be grounded. Look for an adequate distance to the test object.
- √ Avoid spark discharges onto the modulator system.
- √ The use of the unit in power plants is not permitted.
- √ The Electro-Fieldmeter is not equipped to detect alternating fields > 1Hz.

### **Calibration**

It is advisable to recalibrate the Electro-Fieldmeter once a year.



**Legend**



1. Modulatorsystem
2. LCD – Display (2 x 12) alphanumeric
3. Function Key
4. Grounding Socket
5. Battery Compartment
6. Zero Adjustment Trimmer
7. Protection Cup.  
remove for measuring !!
8. Distance spacer 2cm (screwed)