

E-Field 1



ROM-Elektronik GmbH
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Thank you for choosing to purchase this equipment.

The E-Field 1 sets new standards in measuring technology for the potential-free measurement of AC electric fields. Professional measuring technology was implemented with a worldwide unique price-performance ratio. This was made possible by our many years of experience and the consistent use of innovative circuit elements as well as the latest production methods.

The device you have purchased allows a qualified assessment of loading electrical alternating fields in the range of min. 10 Hz to 400 kHz.

We thank you for the confidence you have shown us with the purchase of E-field 1. We are convinced that it will fully meet your expectations and want to provide you with useful knowledge on the device.

The E-field 1 enables you to make potential-free measurement of AC electric fields. The built-in filter ranges from 16 Hz bandpass to 50 Hz and 2 kHz highpass. The measurement ranges are at 200 V/m and 2000 V/m.

Manufacturer:

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The device may not be disposed of in household waste.

Safety instructions

It is imperative for you to read through this manual carefully before the first setup.

There are important instructions for safety, use and maintenance of the equipment.

To avoid the destruction of the measuring device, do not bring it into contact with water. In particular, the entry of water into the housing can damage the electronics. Do not store the device outdoors or use in the rain.

Clean only the outside with a damp cloth. Do not use cleaners or sprays.

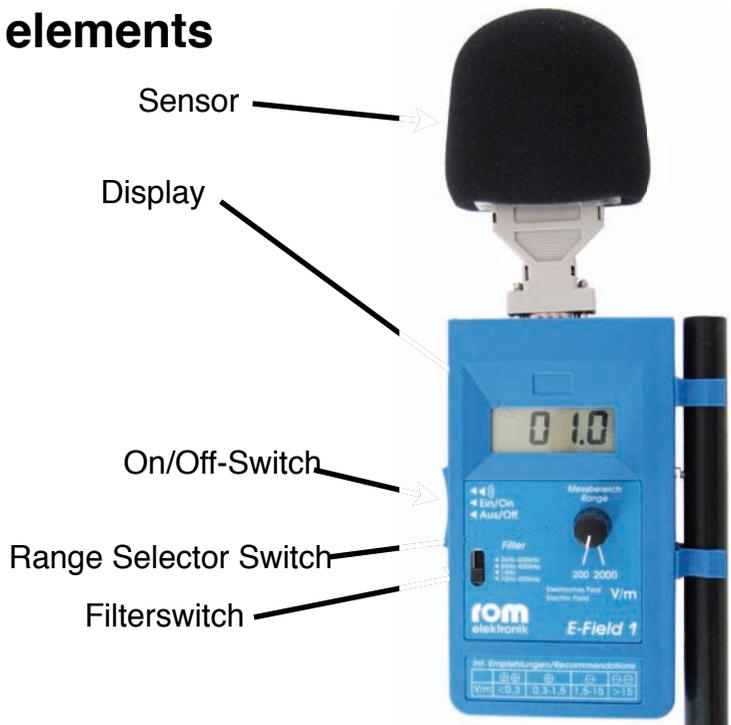
Prior to cleaning or opening the device, turn it off and remove all cables connected to the device. There are no user-serviceable parts inside the device.

Due to the high measuring accuracy, the electronics are sensitive to heat, impact and touch.

Therefore do not place it in direct sunlight or heat, etc. and do not allow it to drop.

Please use this device only for the intended purposes, and use only supplied or recommended accessories.

Operating elements



Display

It digitally displays the measured values and the device functions.

On / Off Switch

If the switch on the left side of the device is pushed upwards, the device is turned on. The switch has three possible positions: OFF-ON-ON with SOUND. To conserve battery power, it is advisable to turn off the E-Field 1 during longer measurement breaks.

Range Selector Switch

By turning the switch, the following measuring ranges can be selected: electric field in V/m (Volt per Meter)

- 0 - 200 V/m
- 0 - 2000 V/m

Filter for Frequency Analysis

The frequency filter module built into the E-Field 1 is especially optimized for the needs of structural biology.

It includes the following switch positions:

1. 10Hz to 400kHz = full bandwidth,
2. 16Hz = Band pass filter for the frequency of railway current
3. 50Hz to 400kHz = High-pass filter for power and its harmonics
4. 2kHz to 400kHz = High-pass filter, for the so-called "artificial" harmonics above 2 Kilohertz. This frequency range corresponds to the volume 2 of the TCO standard.



Battery Compartment

This is located at the back of the device. The device is to be inserted with a 9V alkali-manganese block battery or an equivalent battery.



Setup

Before the first measurement, please perform the following steps in sequence:

- Open the battery compartment on the back of the device and make sure that the device is turned off (on / off switch in lowest position).
- If the battery is wrapped in film, remove it. Then press the battery clip on the battery (observe polarity!). Insert the battery into the battery compartment and close it.
- Turn the device on (switch upwards).
- Turn the measuring range switch to the desired measuring range.

Properties of AC electric fields

In general, electrical fields can not be perceived with the human sense organs. They are "just there" under certain conditions and extend to very complex laws in three dimensional space. For the practical implementation of measurement, the following properties of alternating fields are of particular importance:

- A measurement is always sensitive to location and direction, i.e. even a small change in the location or the orientation of the measuring device can have serious effects on the measured value.
- Electric fields enter into solid materials, including walls, glass, etc., or even penetrate them.
- Alternating electric fields are generated wherever an AC voltage is applied, i.e. in the household, for example, to all power cords to a connected electrical device or its switch. And even if this device is turned off!
- In addition to the field strength, an AC electric field is defined more by its frequency. We differentiate those considered as low-frequency range from 16 Hz to 30 kHz and high-frequency fields, which include all higher frequencies. There are also static or DC

fields, for which a completely new measuring technology is required for the high-frequency radiation.

Comments on Measuring Technology

For a meaningful measurement, the following minimum requirements on the measuring technology for low-frequency alternating fields were setup in the SBM2008:

- Potential-free measurement of AC electric fields.
- Reproducible, high accuracy.
- Compensated frequency response over the entire specified frequency range, which should go at least from the railway current frequency with 16.67 HZ to the kilohertz range.
- High resolution: 0.1 V/m or better.

The measuring devices of ROM-Elektronik can meet all these requirements.

Preparation of measurement

1. Check the measuring device in accordance with the instructions in the chapter "Before setup".
2. Beforehand, a measurement of the AC electric field is to be conducted outdoors in order to determine the basic load. If a basic load over 2 V/m is displayed, a classification of the basic load can be performed beforehand. Switching off the circuits by means of the automatic circuit breaker in your own house fuse box determines which fields are from the house and which are from other field sources, for example, generated from high-voltage lines, railway power, transformers or installations adjacent neighboring homes. If external field sources are responsible, higher field strengths can be localized there.

3. For a home or workplace measurement all typical loads should be switched on, even those that turn on only temporarily, for example, refrigerators, electrical storage heating (also in adjoining rooms). By turning individual loads on and off, the main causes can be isolated.
4. A sketch of the location to be measured and logged measured values allow for a subsequent analysis of the situation. In this manner, appropriate corrective measures are derived.
5. The measurement starts in the measurement area "200 V/m" and switches only where the display overflows due to high field strength (only one 1 is to be seen in the display ist) in the general area "2000 V/m".
6. All measurements should be repeated at different times of day and days of the week to determine fluctuations.
7. The switchable, field strength proportional tone simplifies a sound measurement.

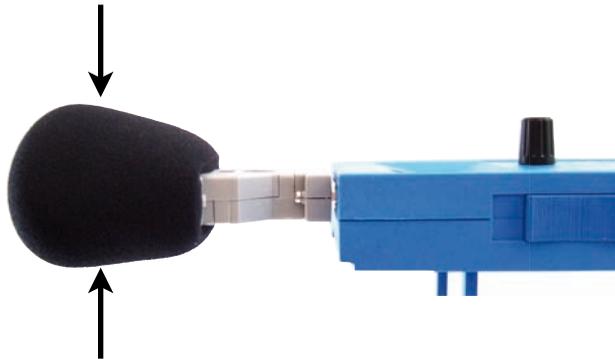
Performing the measurement

The measuring device is calibrated on a potential-free measurement of AC electric fields away from the body. i. e., the measuring device should be located as far away from the body as possible when measuring electric fields. For this, use the supplied mounting rods. The mounting rods are screwed together. In one of the supplied mounting rods, there is a small hole through which the screw fits on the device. This is necessary so that the E-Field 1 is attached securely to the rod.

By the directional characteristics of the measuring device, finding and locating the field source is possible by rotating the probe.



Sensor measurement direction



With the sensor of the E-Field-1 "points" to the suspected field sources or, if no specific field sources are known, the space systematically examined. Proceed as follows:

- for a first overview, go slowly around the room
- pause often and measure the field strengths to the back, left, right and above.
- the measurement in the direction of the highest reading in order to identify the field sources, or,
- if a typical location for a long delay is reached e.g. the bed or the workplace, check all directions according to the above instructions and hold the sensor in the position of the highest display.
- the measured value which is measured in the direction of the highest display can be used as a first approximation as the resulting field strength.

The probe should be led quietly and smoothly, as abrupt movements result in temporarily artificially high values of electric DC fields.

An examination of a sleeping place should also be measured in each case under "sleeping conditions", i.e. with a bedside lamp

turned off. The electric field may even increase upon switching off under certain conditions.

**Limit value recommendations up to 2 kHz:
below 1.5 V / m, preferably below 0.3 V / m.**

Changing the Battery

If LoBat is visible in the display, the battery should be replaced, because it may cause a distortion of the measured value.

Universal Applications

For the study of sleeping places, the analysis of electric AC fields is especially important because it occurs even when loads are switched off.

Corrective measures

Reduction of AC electric fields

- Unplugging unnecessary extension cords, distribution outlets and loads.
- Installation of a power-free switch, which automatically separates the power lines of a circuit from the home from the fuse box of the network as soon as the final load is switched off. Continuous loads, for example, the refrigerator, must first be connected to a separate line.
- Installation of shielded cables for new construction and renovation.
- Insulate walls, posing a particularly strong field lines caused by conductive plaster and paint. It should be noted that the insulating material must be properly grounded.

- Professional grounding of ungrounded metallic electrical appliances, such as desk lamps.

Liability and Warranty

Any liability arising from use of the device is excluded. The warranty period is 24 months from delivery date. During this time, all defects which are not due to improper handling are fixed immediately and free of charge. In case of repair, please send us the device with the proof of purchase.

Help and Support

If you need help using the device, then you can reach us at Fax no.: 08282/7305 or Tel.: 08282/7385 for questions about operating the device.

Technical Data

Frequency range:	min. 10 Hz to 400 kHz
Measurement range:	200 V/m to 2000 V/m
Resolution:	0.1 V/m
Basic accuracy (at 50 Hz vs. Normal calibration):	5%
Linearity error at 50 Hz:	0.2 V/m
Ambient temperature:	0 to 40 °C
Dimensions:	85mm x 117mm x 55mm
Weight:	ca. 300g
Power supply:	9V block battery or battery
Power consumption:	ca. 20mA