ESM-100
3D Fieldmeter

Patented Measuring of Electric- and Magnetic Field with FFT

maschek.

Personal Protection

Electric current plays an important role in practically all areas of life. Nevertheless, tension and current generate electric and magnetic fields which for their part can lead to negative effects on health.

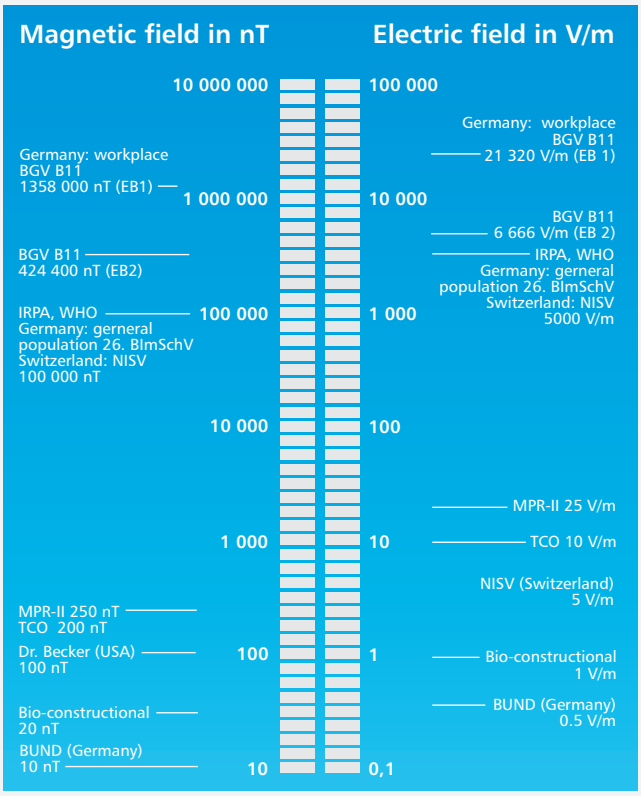
Legislators have reacted to this with various standards and regulations, such as 26. BImschV, DIN VDE 0848, BGV B11, EN50366, etc. and by so doing underline the relevance that electric and magnetic fields have for our health.

In order to gather data on these effects, measuring instruments are essential. As a result, the following considerations led to the development of the ESM-100 field strength measuring instrument:

To determine a person's real exposure it is necessary to measure the electric and magnetic fields simultaneously and in three dimensions, since both of them cause a flow of current in the body at the same time. Even in technical systems, both components may cause interference.

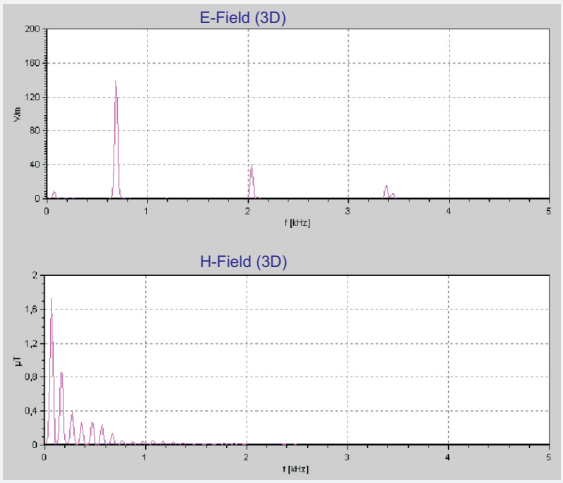
Measuring coils should be small in size in order to deliver sufficiently precise measurement results even at close range to a source of magnetic fields and in order to detect unhomogeneous fields.

Since fields may fluctuate and many maximum permitted values depend on the duration of a person's stay in their vicinity, a continuous 24-hour record by means of a datalogger without the need for a laptop is important.



Limit values of various Institutes at 50 Hz

Electro-automation



The 6-channel FFT version of the ESM-100 displays the spectrum of the 3-D electric and magnetic field of a LCD monitor

Modern-day, high-performance electronics is revolutionising nearly all areas of modern electrotechnology. It enables higher processing speeds, more efficient use of energy and completely new applications.

On the other hand, with increasing current strength and switching speeds, interference with sensitive control mechanisms increases dramatically.

In order to be able to trace these reliably and rapidly, electric and magnetic field measuring instruments are very helpful. In this case, too, the simultaneous measurement of electric and magnetic fields plays an important part, since both components alter unpredictably and independently of each other and their effects when added together can cause interference.

By means of the FFT option, the success of measures to suppress interference, such as using filters, shielding or modifying cable runs are immediately visible.

The measuring instrument

The ESM-100 3D H/E Field Meter is a unique, patented, hand-held measuring instrument which allows easy measuring of alternating electric and magnetic fields at the same time, independent of direction and corresponding to one common point.

With this device anyone is able to make professional, error-free measurements right from the start.

Using the small sensor, sources of interference can be measured precisely from close up without values being distorted due to averaging. In comparison with devices which measure magnetic and electric fields separately, measuring time is halved. Even if today, for instance, only the magnetic field seems to be of interest, the electric field is automatically measured along with it and is available tomorrow at the press of a button, retroactively for all the measurements stored.

Special features

- Simultaneous isotropic measurement of E and H fields
- Frequency range from 5Hz – 400kHz
- Measuring range 1nT – 20mT and 0.1V/m - 100kV/m
- 6 channel FFT and oscilloscope function
- Simple and intuitive operation to avoid measurement errors
- Possibility of handheld E-Field measurements
- High precision ±5% and high long time stability
- Standardized measurements according to e.g.: EN V 50166, DIN VDE 0848
- Long Term Recording over 24 h, independent of mains and computer
- Tripod connection for use as active measuring head
- Long Term Memory capacity for 65520 readings in the meter
- Four selectable filters
- Possibility of switching over to 1D measurement
- Programmable signal tone
- Well laid out display with illumination
- up to 45 hours of continuous operation
- Splash-proof and dust-proof according to IP65
- Developed and made in Germany

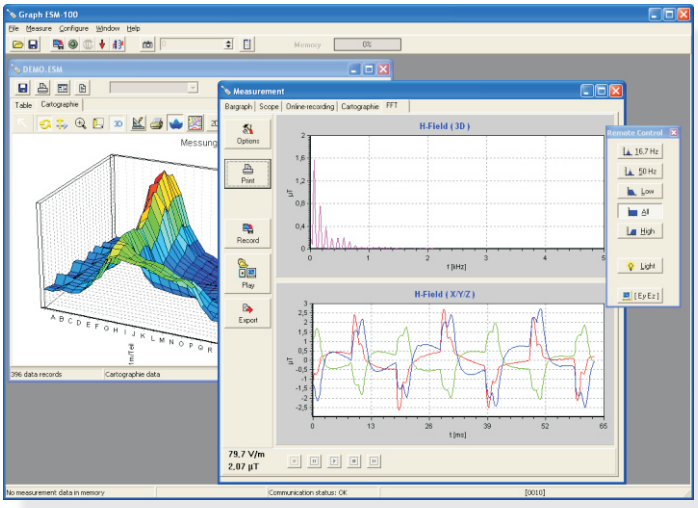
The software

has been specially developed for the ESM-100 measuring instrument and fulfills the needs and particularities of EMC measurements. It can be used error-free, easily and intuitively.

By means of tabs, you can follow the readings as on the instrument display or display them graphically in real time on the chart recorder. All measurements can be displayed, saved and exported.

A multiplicity of functions makes the job easier. You can carry out a Fast Fourier analysis (FFT) for all six measuring axes at the same time or display the measuring signal as an oscillogram. Scaling and labelling of the axes is done automatically.

The optionally purchasable cartographie module makes easy work of creating three-dimensional field strength diagrams.



With the aid of the optional GPS Logger, the readings can be displayed in graph form in Google Earth™.

Special functions such as displaying frequency-dependent limit values or load-dependent power factor correction for magnetic field measurements facilitate taking measurements as specified by Norms and Standards.

The software is ideally suited to the prescribed documentation on measurements, as well as to remote control of the ESM-100 via its fibre optic cable.

Advantages of the software

- Fast Fourier analysis of the six measuring axes
- Oscilloscope representation of the six measuring axes
- Display of frequency-dependent limiting values
- GPS-supported display of readings in Google Earth™
- Optional mapping of readings
- Real-time, graphic display of readings
- Display of readings in table form
- Text box for each reading
- Readout of ESM-100 memory
- Chart recorder with event triggering
- Magnetic field power factor correction
- Remote control of the ESM-100
- Export of graphs and tables
- Integrated Help function
- Easy and intuitive to operate

Technical Data

Range:	1nT - 20mT	0.1V/m - 100kV/m	(>100kHz up to 20µT and 2kV/m)			
Display range:	0nT - 20mT	0.0V/m - 100kV/m	(Filter '50' or '16,7')			
	10nT - 20mT	1.0V/m - 100kV/m	(Filter 'high' or 'low')			
	15nT - 20mT	1.5V/m - 100kV/m	(Filter 'all')			
Resolution:	1nT	100mV/m				
Range selection:	Automatic (auto-range)					
Frequency range:	5Hz - 400kHz (-3dB Limit)					
	Filter 'all'	5Hz - 400 kHz				
	Filter 'high'	2kHz - 400kHz	Filter 'low'	5Hz - 2kHz		
	Filter '50'	50Hz band-pass 12dB	Filter '16'	16.7Hz band-pass 12dB		
FFT function:	6 channel electric and magnetic field FFT (Hx, Hy, Hz, Ex, Ey, Ez), up to 64ks quasi simultaneous					
	FFT Samplerate:	2ks	8ks	16ks	64ks	400ks 800ks
	-3dB analog bandwidth:	1kHz	4kHz	8kHz	25kHz	200kHz 400kHz
	FFT Resolution:	256, 512, 1024 or 2048 points				
	FFT Intervals:	1s at 256 and 512 points, 2s at 1024 points, 5s at 2048 points FFT's				
	FFT Softwaredisplay:	3D-values or single axis				
Oszilloskop function	6 channel electric and magnetic field oszilloscop (Hx, Hy, Hz, Ex, Ey, Ez), 5Hz to 100kHz					
Accuracy:	±5% (sine, 50nT - 20mT, 5V/m - 100kV/m), ±5 Digits					
Measuring rate:	Decimal display 2Hz, Bargraph 10 Hz with 3 sec Peak hold					
Operation:	H-field: coils, isotropic	E-field: field plates, isotropic				
	Continuous true RMS measurement of all 6 axis					
Display:	Liquid crystal display with illumination					
	H and E fields displayed simultaneously in 3 dimensional values					
Functions:	Minimum and maximum value memory, one dimensional measurement (1D) of Hx and Ex					
	Charge control and Battery-fail display					
Long time recording:	RMS values: 65520 samples (6 channels RMS, time and set functions)					
	FFT values: 675 - 5040 sample (6 FFT's, 6 RMS values, time and set functions)					
Time interval:	1s, 2s, 5s, 10s, 30s and snapshot					
Analogue outputs:	4 x 0-600 mV_{rms} (input impedance >100kOhm) Hx, Ex (instead of Hy / Hz also Ey / Ez)					
Battery operation:	Nickel-metal-hydrid batteries (Ni-MH 6V/2500mAh), heavy metal free					
Operation time:	ca 25h with FFT recording, ca 45h without FFT, (LCD backlight disabled, fast charge in ca 3.5 hours					
Mains operation:	Automatic switching between mains operation, fast charge- and maintenance charge mode					
PC connections:	Fibre optic cable with USB connector					
Remote operation:	All essential functions via fibre optic cable with Graph ESM-100					
Temperature range:	-20 to +50 °C operating temperature					
Dimensions:	365mm x 83mm x 56mm					
Weight:	570g					

All accuracy data refers to the single axis in the homogenous field. All technical details at 20°C.

Products

- Field Meter ESM-100: measuring instrument with sensor, Windows™ software Garph ESM-100 with fibre optic cable 5m, charger, carrying case, manual, calibration certificate
- Spectrum Analysis ESM-100: option for 6-channel FFT 5Hz - 400 kHz and oscilloscope display 5Hz - 100kHz
- GPS Logger ESM-100: GPS-supported display of readings in Google Earth™
- Cartographie Module ESM-100: Windows™ additional software module for ESM-100 graphs
- Adaptor Cable ESM-100: connecting cable with 4 analogue outputs via BNC plugs, 2m
- Tripod ESM-100: special stand made of wood and plastic, up to measuring height of 1.8m, bag

Sales

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