

ELECTRIC AND MAGNETIC FIELD ANALYSER

EHP-50C

Selective and broadband low frequency field analysis

- ▲ **Electric and magnetic low frequency field analysis up to 100 kHz**
- ▲ **Isotropic measurement with a dynamic range of 140 dB**
- ▲ **Small size and optical fibre connection for spot measurement**
- ▲ **Built-in FFT spectrum analysis**
- ▲ **Wideband mode**
- ▲ **Built-in rechargeable battery with great autonomy**
- ▲ **Interface to 8053 Display, PC and Pocket PC**



EHP-50C

LOW FREQUENCY ELECTROMAGNETIC FIELDS

Electrosmog is a popular term used to describe any phenomenon or problem associated with artificially generated electric or magnetic fields.

A range of electric or electronic devices may cause an environmental risk and – under certain conditions - generate potentially hazardous electric or magnetic fields; however, a particular attention is devoted to low frequency fields, such as those generated by power transmission lines, traction lines and, in general, high current equipment (large electric motors, huge manufacturing machines, power generators, etc.).

These low frequency fields are basically characterised by high values of electric and magnetic components in the very near field region, although the decline with distance is significant.

The risk of exposure to potentially harmful low frequency fields may be present elsewhere e.g. offices next to large machinery, homes close to a high voltage power line, etc.).

As several studies around the world confirm the potential risks involved in being radiated by strong low frequency electric or magnetic fields, IEC, CENELEC, ICNIRP and many other National Organisations are currently taking electrosmog and its possible consequences into high consideration: new standards are being prepared and all reasonable protecting measures are being taken to preserve workers' and citizens' health all over the world.

EHP-50C Electric and Magnetic Isotropic Field Analyser

The EHP-50C has been designed to offer all needed performance, capabilities and functions, and is shown as the best tool for measuring low frequency electric and magnetic fields, displaying, recording and analysing their values on Pocket PC or on the display unit 8053-Display. The PC program allows for setting the probe and download the measured data. The EHP-50C provides an advanced solution for field measurements in the 5 Hz to 100 kHz range with an unsurpassed dynamic range of > 140 dB and built-in spectrum analyser function.

The EHP-50C, according to the selected peripheral (PC, Pocket PC or 8053-Display unit), allows the user to select amongst three measurement modes: Wideband, which measures the contribution of all the frequency components in the selected frequency span; Highest, which measures only the highest level found within the Span; Spectrum, with marker functions.

Thanks to the spectrum analysis capability, with the EHP-50C it is possible to measure only the contribution from the selected source – e.g. a high voltage line – excluding other nearby disturbing frequencies.

The EHP-50C small cubic housing (approx. 1 dm³) accommodates everything: three magnetic loops and three plate capacitors orthogonally positioned for sensing the fields; an Analogue to Digital converter followed by a powerful DSP (Digital Signal Processor) performs the signal analysis; the CPU module that controls all the functions; an E²PROM, that stores the calibration data, the frequency and level calibration tables; an optical interface to allow easy connection to external displays via optical fibre link; a high capacity data logger for stand alone continuous acquisition; the control panel with the connections and the ON/OFF switch.



Stand-alone continuous acquisition with internal data logger for 24 hours

When a long monitoring campaign is a must – e.g. when measuring magnetic fields next to high, medium and low voltage transformers; measuring close to power lines or to machinery, air conditioning systems, large home appliances, etc. - the EHP-50C can be used in stand-alone mode without needing a PC, a Pocket PC or an 8053-Display connected to it. Once the measurement parameters have been programmed, by means of the PC software (supplied), the EHP-50C analyser can start its acquisition by storing the data over 24 hours in stand-alone mode with a sampling rate of 30 or 60 seconds. After 24 hours the EHP-50C will stop automatically. The data can then be downloaded to the PC. The PC software allows to select the measurement (electric or magnetic field), the full scale, the mode (Highest or Wideband), the frequency span and the sampling interval (one minute or 30 seconds).

OPERATION WITH POCKET PC

To further improve the flexibility and the portability of the solution provided, the EHP-50C also has a dedicated software running onto the specifically selected Pocket PC (HP model iPAQ hx2190). Data is received from the EHP-50C through the optical cable and can be easily displayed, analysed and stored.

The Pocket PC software features digital and analogue reading, span, range and E or H settings, Marker Peak and Delta Peak. It is delivered on a standard 32 Mb Secure Digital memory Card, that can also be used to save the spectra measurements as the corresponding numeric values.

THE 8053-DISPLAY UNIT

The EHP-50C can also be easily operated through the accessory 8053-Display Unit. All the functions are available: Measurement Modes, Field selection, Operating Modes, Markers, Frequency span, Logger, Alarms, Readings, Axis, etc.

By the DATA logger mode of the 8053-Display Unit, the User can record the measurements and save them in a file in the memory of the 8053-Display Unit. Depending on the settings, the EHP-50C stores the highest signal or the total contribution of all frequencies covered by the selected SPAN, and all the related data and information.

All collected data files are progressively numbered and contain:

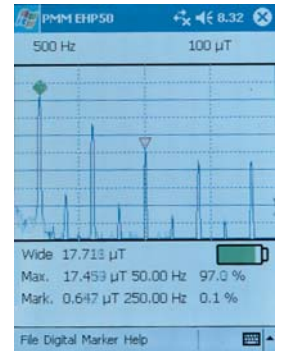
- Time duration
- Logger settings
- Date and time when the measurement began
- Average value
- Value of each single item of data stored
- User's comment.

The 8053-Display Unit also features a real-time graphic display of 100 dB dynamic range with marker functions, thus making its operation together with the EHP-50C Analyser very useful for on-site measurements.

In order not to have an influence on the field to be measured, the communication between the EHP-50C Analyser and the 8053-Display Unit is made through a rugged optical fibre cable.



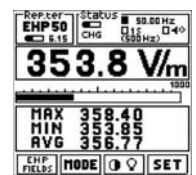
Spectrum display on Pocket PC



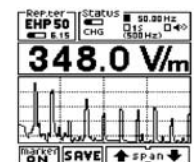
Bar-graph display on Pocket PC



EHP-50C with Pocket PC



The 8053-Display in Analog mode



The 8053-Display in Spectrum mode

LONG TERM OPERATION WITH 8053-DISPLAY

The EHP-50C has an efficient battery management system that allows operations in Logger mode for a very long time (see the table, right). During the time the Data Logger - Low Power is operated, the Analyser takes a measurement and transfers it to the internal non volatile memory of the 8053-Display, after which it goes into a state of low consumption until the next measurement is started. The time interval between measurements can be set from 10 to 900 seconds (15 minutes).

Span	Time int. = 60s Autonomy (hours)	Time int. = 300s Autonomy (hours)
100 Hz	>24	>72
200 Hz	>36	>110
500 Hz	>48	>130
1 kHz	>72	>150
2 kHz	>65	>150
10 kHz	>60	>130
100 kHz	>72	>150

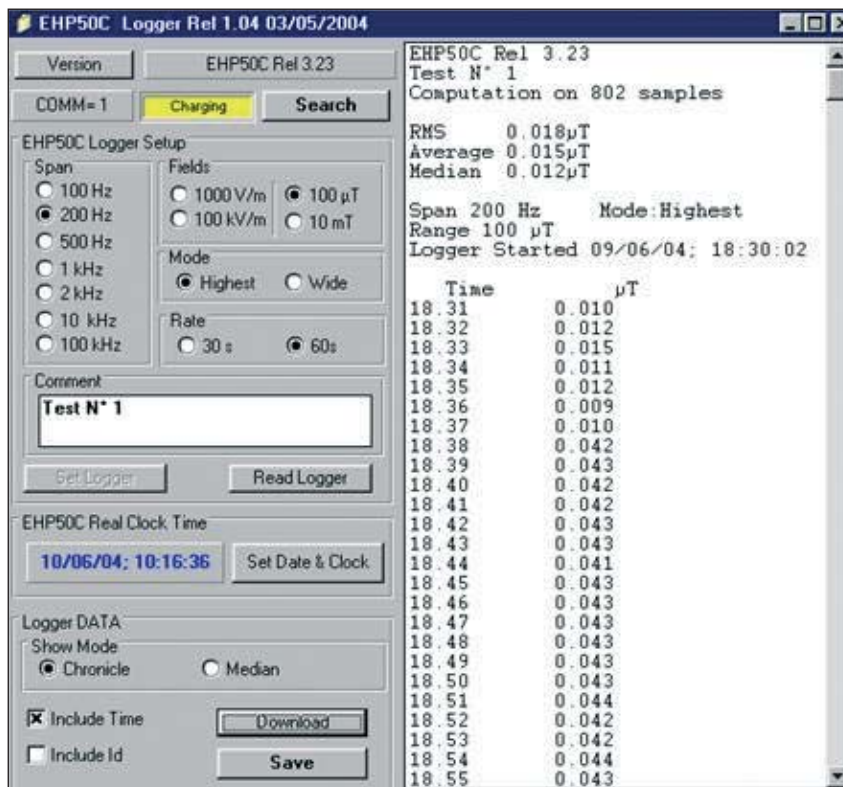
The 8053-Display Logger Interface

To enhance the monitoring capability of the EHP-50C, the data recorded in the memory of the 8053- Display Unit can be downloaded in a PC by the supplied Logger Interface Software. After downloading, the data can be saved and exported as text files. The spectrum in graphic format can be saved as a Bitmap.

Logger Interface control page

All parameters can be controlled and checked

All the saved records are in "TEXT" format and therefore they can be imported and handled with any word processor, spreadsheet or similar programs (e.g. WORD™, EXCEL™, etc.).



The screenshot shows the 'EHP50C Logger Rel 1.04 03/05/2004' software window. The interface is divided into several sections:

- Version:** EHP50C Rel 3.23
- COMM=1:** Charging (highlighted), Search
- EHP50C Logger Setup:**
 - Span:** 100 Hz, 200 Hz (selected), 500 Hz, 1 kHz, 2 kHz, 10 kHz, 100 kHz
 - Fields:** 1000 V/m, 100 μ T (selected), 100 kV/m, 10 mT
 - Mode:** Highest (selected), Wide
 - Rate:** 30 s, 60s (selected)
- Comment:** Test N° 1
- EHP50C Real Clock Time:** 10/06/04; 10:16:36 (Set Date & Clock)
- Logger DATA:**
 - Show Mode: Chronicle (selected), Median
 - Include Time: (Download)
 - Include Id: (Save)
- Summary Data:**
 - EHP50C Rel 3.23
 - Test N° 1
 - Computation on 802 samples
 - RMS 0.018 μ T
 - Average 0.015 μ T
 - Median 0.012 μ T
 - Span 200 Hz Mode: Highest
 - Range 100 μ T
 - Logger Started 09/06/04; 18:30:02
- Data Log Table:**

Time	μ T
18.31	0.010
18.32	0.012
18.33	0.015
18.34	0.011
18.35	0.012
18.36	0.009
18.37	0.010
18.38	0.042
18.39	0.043
18.40	0.042
18.41	0.042
18.42	0.043
18.43	0.043
18.44	0.041
18.45	0.043
18.46	0.043
18.47	0.043
18.48	0.043
18.49	0.043
18.50	0.043
18.51	0.044
18.52	0.042
18.53	0.042
18.54	0.044
18.55	0.043

EHP-50C Specifications		
Functional Specifications	Electric Field	Magnetic Field
Frequency range	5 Hz /100 kHz	
Measuring Ranges	1 kV/m / 100 kV/m	0.1 mT / 10 mT
Overload	200 kV/m @ 50 Hz	20 mT @ 50 Hz
Resolution	0.001 V/m on 8053B Display/internal 1 nT on 8053B Display / internal	0.1 V/m with 8053B Data Logger 10 nT with 8053B Data Logger
Sensitivity	0.01 V/m	1 nT
Absolute Error	±0.5 dB @ 50 Hz and 1 kV/m	±0.5 dB @ 50 Hz and 0,1 mT
Flatness (40 Hz – 10 kHz)	±0.5 dB	±0.5 dB
Isotropy	±1 dB	
Linearity @ 50 Hz	±0.2 dB (1 V/m ÷ 100 kV/m)	±0.2 dB (200 nT ÷ 10 mT)
SPAN	100 Hz, 200 Hz, 500 Hz, 1 kHz, 2 kHz, 10 kHz, 100 kHz	
Starting Frequency	1.2 % of the SPAN	
Stop Frequency	Equal to the SPAN	
E-Field Rejection	---	> 20 dB
H-Field Rejection	> 20 dB	---
FFT	Real Time FFT analysis	
Internal Data Logger	1 measurement every 30 or 60 seconds	
Internal memory	1440 data with 1 minute storing, 2880 data with 30 second storing. The data can only be transferred to a PC	
General Specifications		
Calibration	Internal EEPROM	
Temperature Error (referred to 23°C)	±0.05 dB/°C between -10 and +23°C @40% RH ±0.01 dB/°C between +23 and +50°C @40% RH	
Humidity Error (referred to 40%)	±0.05 dB between 20% and 50% @+23°C ±0.05 dB between 50% and 80% @+23°C	
Internal Battery	Rechargeable NiMH batteries (5 x 1,2 V)	
Operating Time	> 10 hours in normal mode > 150 hours in low power mode 24 hours with internal data logger (SPAN > 200 Hz) in stand alone mode	
Recharging Time	< 4 hours	
External DC supply	10 / 15 V, about 200 mA	
Optical Fibre Link and operating distance	Up to 80 metres	
Firmware update	Via serial port	
Operational and Storage temperature	-10 °C / 50 °C -- Storage -20 °C / 70 °C	
Size and Weight	92 x 92 x 109 mm -- 525 g	
Tripod Support	Threaded insert π	

8053-Display Unit Specifications		
Functional Specifications	Electric Field	Magnetic Field
Display	Backlight LCD, 72 x 72 mm, 128 x 128 pixels	
Interfaces	Optical Fibre; RS-232	
Internal memory	32700 measurements	
Functions	RMS/AVG, 30 s up to 30 min.; alarm 0-100 % f.sc.	
Data logger modes	Sampling (1, 10 to 900 s); data change; over limit; manual;	
Clock	Internal real time clock	
Internal battery	Rechargeable NiMH batteries (5 x 1,2 V)	
External DC supply	10 / 15 V, about 500 mA	
Operational and Storage temperature	Operating -10 °C / 40 °C	Storage -20 °C / 70 °C
Size and Weight	108 x 240 x 50 mm	1.07 kg

Optional accessories	
FO-8053/10	Optical Fibre cable, 10 m
FO-8053/20	Optical Fibre cable, 20 m
FO-8053/40	Optical Fibre cable, 40 m
FO-8053/80	Optical Fibre cable, 80 m
TR-02A	Wooden Tripod 1 ÷ 2 m with soft carrying bag
TT-01	Telescopic mast (120 – 420 cm) with carrying bag
8053-Display	Display Unit
Kit EHP-50 Palm	incl. RS232 adapter and SD-RAM with PMM application SW

Standard accessories supplied with EHP-50C:

- FO-8053/10 Optical Fibre (10m);
- 8053-BC Battery charger
- 8053-OC Optical to RS232 converter;
- Plastic pole, 50 cm
- Mini tripod
- Optical shorting loop
- EHP-50C Logger PC software
- Operating Manual, Test & Calibration Certificates
- 8053-SCSoft carrying bag (can also hold the 8053 Display)

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