ELECTRIC AND MAGNETIC FIELD ANALYZER

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 and PC**

EHP-50C

LOW FREQUENCY ELECTROMAGNETIC FIELDS

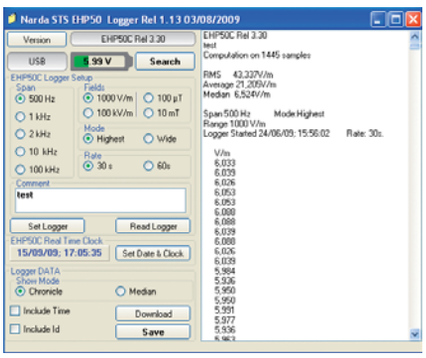
Electrosmog is a popular term used to describe any phenomenon or problem associated with artificially generated electric or magnetic fields.
A range of electric or electronic devices may cause an environmental risk and – under certain conditions - generate potentially hazardous electric or magnetic fields; however, special 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 electric and magnetic component values in the near field region, though decline over distance is considerable.
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 protection measures are being taken to preserve workers' and citizens' health all over the world.

EHP-50C Electric and Magnetic Isotropic Field Analyzer

The EHP-50C was designed to offer all necessary performance, capacity and functions, and is shown as the best tool for measuring low frequency electric and magnetic fields, displaying, recording and analysing their values on the display unit 8053-Display or PC screen. The PC program allows for remote control through optical fiber as well as for setting the probe and download measurements acquired in "Stand Alone" mode or stored in the 8053-Display. 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 analyzer function.
The EHP-50C, according to the peripheral selected (PC or 8053-Display unit), allows the user to choose from 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 capacity, with the EHP-50C you can just measure 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 dm^3) 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) analysing the signal; the CPU module that controls all the functions; an E^2PROM, 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 or an 8053-Display connected to it. Once the measurement parameters have been programmed, through the PC software (supplied), the EHP-50C analyser can start 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 enables you to select measurement (electric or magnetic field), full scale, mode (Highest or Wideband), frequency span and sampling interval (one minute or 30 seconds).



EHP-TS control software includes the application "EHP50C - Stand Alone mode"

8053-DISPLAY UNIT

EHP-50C can also be easily operated through the accessory 8053-Display Unit. All functions are available: Measurement Modes, Field selection, Operating Modes, Markers, Frequency span, Logger, Alarms, Readings, Axis, etc.
Through 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 influence the field to be measured, communication between the EHP-50C Analyser and the 8053-Display Unit is through a rugged optical fibre cable.

8053-Display: actual, MAX, MIN and average values

Total value and single axis

E-field value at marker frequency on spectrum display

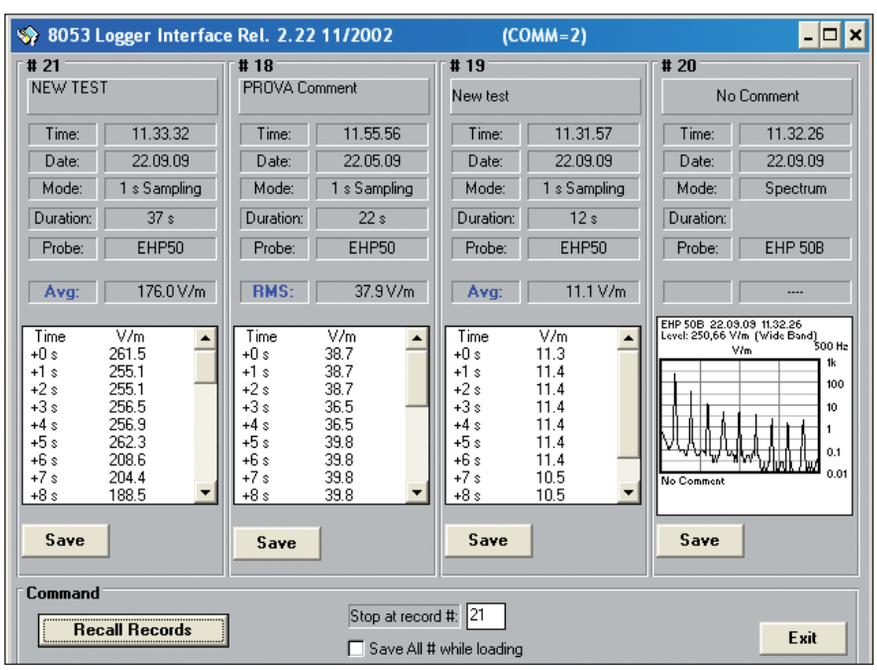
Long term operation with 8053-Display

The EHP-50C has an efficient battery management system enabling 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

8053-Display Logger Interface

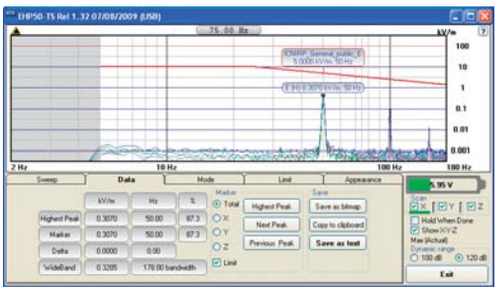
To enhance the monitoring capacity of the EHP-50C, the data recorded in the memory of the 8053- Display Unit can be downloaded to PC by the supplied Logger Interface Software. After downloading, the data can be saved as text files to be easily imported and handled with any word processor, spreadsheet or similar programs (e.g. WORD™, EXCEL™, etc.)...
The spectrum in graphic format can be saved as a Bitmap.



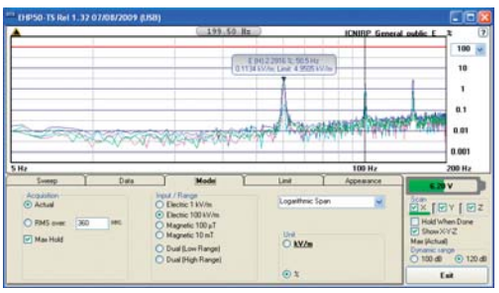
8053-Display: Logger Interface software

EHP-TS application software (1)

The recently developed EHP-TS software allows the user to control Narda analyzers such as EHP-50C and EHP-200 through a Personal Computer.
The optical cable coming from the analyzer (Max lenght: 40m) can be easily connected to the PC by the optical to USB converter USB-OC provided if longer distance is required the optional 8053-OC optical to RS232 converter can be used for optical fibre length up to 80m..
A user friendly graphical interface includes commands to set all parameters.
To understand them better, controls are grouped in five selectable sections while the spectrum measurement is continuously displayed and updated. Both electric and magnetic field spectrum measurements can be displayed on the same graph.
Sweep, Mode, Limit and Appearance sections are used to set all measurement and display parameters while Data section, with the Marker controls, shows numerical results like field strength and frequency at the marker and highest peak positions.
A wideband measurement is displayed too, including all the contribution within the spectrum shown.
Several units, as well as percent of limit, can be selected to display measurement results which, along with user comments, can be saved as either bitmap or text files to be easily imported in other software applications like spreadsheets or word processor.

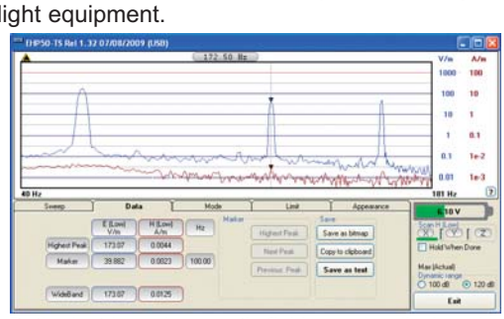


Limit value can be shown at Marker frequency. Data section shows numerical results. It includes Marker controls and Save buttons.



Spectrum graph can be shown as percent of selected limit. Mode section allows to select different acquisition modes as well as range, unit and linear or logarithmic frequency scale.

Following the so called precautionary principle, many countries adopted their own reference lmits. Besides having ICNIRP limits already available, EHP-TS allows the user to create and save custom limits which may reflect local regulations as well as user specific needs.
All values of the selected limit are always included, for reference, in any .bmp or .txt saved file. Availability of lightweight devices equipped with Windows™ operating system like UMPC and similar, makes EHP-TS software the ideal solution to perform accurate on field spectrum analysis with minimum effort and light equipment.



Both electric and magnetic fields can be displayed on the same graph.

(1) - *earlier versions of EHP50 analyzer (EHP-50, EHP-50A, EHP-50B) must be hardware updated to operate in conjunction with EHP-TS control software. For information contact your Narda distributor.*

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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 8053-Display and in "Stand Alone" mode 0,1 V/m with 8053-Display data logger	1 nT on 8053-Display and in "Stand Alone" mode 10 nT with 8053-Display data logger
Sensitivity	0.01 V/m	1 nT
Flatness (40 Hz – 10 kHz)	±0.5 dB	±0.5 dB
Typical 3D anisotropy	6.5% (0,54dB)	1.4% (0.12dB)
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	

Typical uncertainty

Magnetic probe (1)	**Magnetic flux density range**	**Total expanded uncertainty (k=2)**	
		Without contribution of uncertainty of calibration U_{EHP50C} (%)	**With contribution of uncertainty of calibration U_T (%)**
Frequency at 50Hz	0.1µT to < 0.3µT	4.1	4.2 (2)
	0.3µT to < 10.0µT	3.3	3.5 (2)
	10.0µT to < 100µT	3.7	4.3 (3)
	100µT to 500µT	4.1	4.8 (4)
Frequency from 40Hz to 10kHz	0.1µT to < 0.3µT	6.5	6.7 (2)
	0.3µT to > 10.0µT	6.1	6.3 (2)
Electric probe (1)	**Electric field range**	**Total expanded uncertainty (k=2)**	
		Without contribution of uncertainty of calibration U_{EHP50C} (%)	**With contribution of uncertainty of calibration U_T (%)**
Frequency at 50Hz	10 V/m to 500 V/m	7.8	8.2(3)
	10 V/m to < 100 kV/m	8.4	8.8(5)
Frequency from 40Hz to 10kHz	10 V/m to < 500 V/m	9.5	9.9(5)

The uncertainties stated in this document have been determined according to EA-4/2 [4]. They were estimated as expanded uncertainty obtained multiplying the standard by the coverage factor k=2, corresponding to a confidence level of about 95%. The total uncertainty of the probe derived from typical contributions of linearity, anisotropy, frequency response, temperature, relative humidity and with/without contribution of uncertainty of calibration.

(1) The temperature range is from -10°C to 23 °C and relative humidity is from 20% to 50% **(2)** The uncertainty of calibration used is 1,5%
(3) The uncertainty of calibration used is 2,0% **(4)** The uncertainty of calibration used is 2,7% **(5)** The uncertainty of calibration used is 2,5%

EHP-50C Specifications	
General Specifications	
Calibration	Internal EEPROM
Temperature Error (referred to 23°C)	±0.05 dB/°C between -10 and +23°C @40% RH
Humidity Error (referred to 40%)	±0.01 dB/°C between +23 and +50°C @40% RH ±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 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 (up to 40m when using USB-OC)
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 standard 1/4
Recommended calibration interval	24 months
Country of origin	Italy

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	

ORDERING INFORMATION

EHP-50C	Part Number (P/N)
EHP-50C Electric and Magnetic field analyzer Includes: - EHP-50C Basic Unit - 8053-SC Soft carrying case, holds basic unit and accessories including 8053-Display (650.000.035) - AC/DC battery charger (650.000.036) - International AC plug adapters (UK:650.000.037, USA:650.000.038, Australia: 650.000.039, Italy: 650.000.040) - FO-8053/10 Cable, fiber optic 10m (650.000.053) - FO-10USB Cable, fiber optic 10m (650.000.177) - Optical-USB converter (650.000.176) - Optical bridge connector (650.000.019) - Plastic rod support, 50cm (231.800.012) - Mini tripod, bench top (650.000.151) - EHP-TS control software, CD-ROM - Operating Manual EHP-50C - Certificate of calibration - Return for repair form	650.000.153
ACCESSORIES	
8053-OC Optical to RS232 converter	650.000.062
8053-OC-PS power supply	650.000.179
FO-8053/20 Cable, fiber optic 20m	650.000.055
FO-8053/40 Cable, fiber optic 40m	650.000.052
FO-8053/80 Cable, fiber optic 80m	650.000.128
FO-20USB Cable, fiber optic 20m	650.000.178
FO-40USB Cable, fiber optic 40m	650.000.182
TR-02A wooden tripod 1-2m with soft carrying bag	655.000.005
TT-01 telescopic mast (120-420 cm) with carrying bag	650.000.005
8053-Display display unit	620.000.057
8053-CA car adapter	650.000.058
8053-CC rigid case	650.000.059

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