elcontrol®
energy net S.p.A.

ENERGY EXPLORER

Energy Explorer is a portable three-phase Power Analyzer, designed for the user to obtain all the necessary data to administer efficiently the Power management.
The knowledge of the electrical parameters of his system and of the time profile of its power consumption gives certain advantages:

- The possibility to find the most advantageous purchase contract by his own supplier or in the free market.
- The planning of interventions to energy economization, as for example the use of a Power factor correction instrument.
- The calculation of the cost of the electric power per production line or product unit.
- The planning of maintenance interventions, to maintain the systems efficiency and to minimize the risks to stop the production.

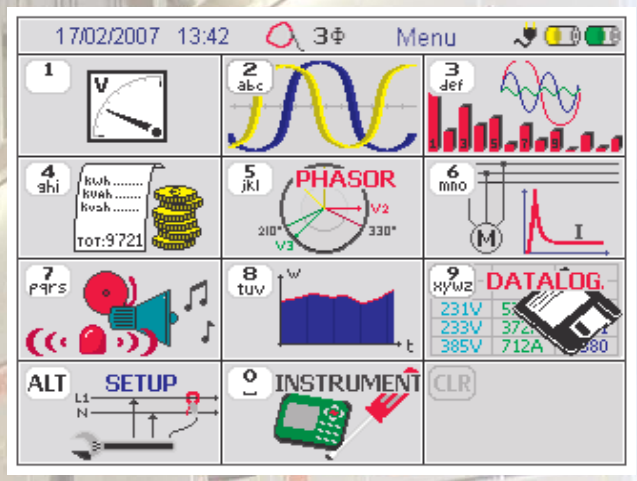
These data are usually request to the Responsible for the Maintenance, to the Designer or to the trusty installation firm; these professional persons have to make measurements with very precise instruments, with an easy installation and with an intuitive use. All these characteristics are the basis of Energy Explorer project, and it permits a payback of the purchase investment in short time that is soon checkable on the electricity bills.

Energy Explorer is realized with Linux firmware and the most recent EN61000-4-30 standard. It allows the measurement of all the traditional electric standards and it is also able to analyze the system consumption, to notice the micro interruptions and the alarm situations, to analyze the inrush currents while it is examining the start up of electrical engines. It is possible to make particularly precise campaigns of measurement and to store them on a Compact Flash Card. After that the stored data can be analyzed on a personal computer with the PE-Studio analyzer software.

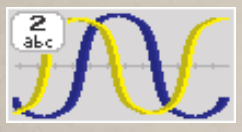
PROFESSIONAL POWER ANALYSER & DATALOGGER

GENERAL INFORMATION

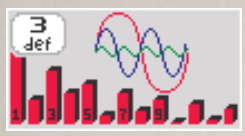
Energy Explorer is provided with a colored Display for graphic functions that make the use of the instrument immediateand intuitive.
On the display are given all the necessary information to the navigation in the system, and are also displayed the measurements made.
The buttons of the Menu page reflect the position of the keyboard and show the button to push to start up each corresponding function of the instrument.



RMS METER: 3-phase TRMS measurements of all electrical parameters characterizing the load's supply and power consumption, such as: Voltages, Currents, Powers, Energies, Frequency, Power Factor, CosPhi, Crest Factor, THD-V, THD-I, Harmonics, Micro interruptions, Voltage Unbalance, etc. The analysis of such phenomena is nowadays an indispensable troubleshooting tool, helping to minimize downtimes and malfunctions of increasingly complex electrical systems.
The RMS Measures can be displayed as instantaneous, Min/Max or Average values with configurable integration time and mode:
-***Fixed:*** fixed integration time-frame; the Average and MD values are updated at the end of each fixed time-frame.
-***Sliding:*** sliding integration time-frame; the Average and MD values are constantly updated on the basis of a sliding time-frame.



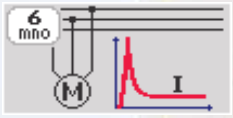
SCOPE: it permits to display in Real-Time the measured voltages' and currents' waveforms, contemporarily the RMS values on the summary board. Through the zoom function it is possible to modify the signals display.



HARMONICS: Harmonics are one of the most well-known power quality phenomena and are the result of the distortion of the sinusoidal signal of the voltage and/or current. The presence of harmonics is originated by the "non-linear" characteristics typical of several devices like inverters, static energy converters, rectifiers, etc. The complete measurement of tension harmonics is calculated up to 32nd order in compliance to EN 61000-4-7. The values of the harmonics are displayed in the form of a histogram in which every bar represents a harmonic order (showing if the harmonic is absorbed or generated by the system), as well as for the phase angle between the tension and the current.

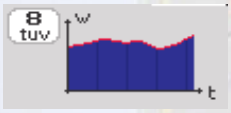
TARIF-BAND MANAGEMENT: the analysis of the consumptions during the different time bands and the finding of the most convenient tariff plan are very important to optimize all the costs of the Electric Power Invoice. Energy Explorer allows to set up various personalized tariff plans. They can have maximum 4 time bands disposed on the 24 hours with a definition of 30 minutes, (each with the related kWh and kVAh costs and those absorbed).

PHASOR: A three-phase system is made by three phases that supply contemporary the load factor and they are indicated by the 1, 2, 3 numbers. The three phases are alternating sinusoidal voltages having the same frequency and, usually, the same amplitude, but with phase-angle displaced by 120 degrees from each other. The same frequency and therefore rotation speed of the vectors ensures the constant phase displacement. The "PHASOR" page provides a vector graph representation of the three-phase system by plotting the vectors representing the fundamental-frequency components of the line voltages and the respective currents.

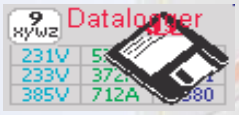


INRUSH CURRENT: The display of the transient current events with pre-triggering function. This function gives an accurate analysis of the insertion of the load factors (the start up of motors, the connection of capacitor banks, etc.), it represents the current and tension trend with a high definition (10ms) and it gives a medium and maximum value during the period of the insertion.
The determination of the current length and the peak of the inrush current are very important to establish the stress of the electrical and electronic devices and also to ascertain the presumed "life time".

ALARM: Energy Explorer provides the possibility to set configurable alarm thresholds on the following electrical values: Tension (V), Current (I), Active Power P [kW]), Reactive Power (Q [kvar]), Apparent Power (S [kva]), Power Factor, Tension Harmonic Distortion; Current Harmonic Distortion. The alarms are immediately displayed and logged in an all events file. Each alarm can be also linked to one of the two Relay Outputs.



TREND: The Trend function permits to view the time trend of the main electrical values. The activity of each value is automatically registered without the manual starting up of the process. The Trend function has the auto-scale option which allows an optimal view of the curves that represent the time trend of Tensions, Currents, Active Powers, Reactive Powers, Apparent Powers, and Power Factor.



DATALOGGER: Energy Explorer has an extremely flexible system of memorization of the measures based on an extractable memory Compact Flash Card that can store long and detailed campaigns of measurement. The reading of the measurement campaigns is made by the PE-Studio Software that is given with the kit.
The measurement campaigns can be started or stopped by hand in every moment or set up to start and to stop automatically.
The measurements campaigns can be of two types:
RMS: campaigns storing the RMS values of all measured parameters with a settable frequency.
WAVEFORM: campaigns storing the actual digital samples of voltages and currents with a settable frequency.

KIT ENERGY EXPLORER

Current and Voltage measurement: Energy Explorer Kit includes a set of 3 flexible current probes with 5A – 1000A measuring range and 41cm of length. Thanks to a particular input circuit, Energy Explorer avoids the necessity of the usual external amplifier/integrator box for the flexible current captors. The elimination of the external circuit-box highly improves the accuracy and eliminates the short autonomy caused by the amplifier's battery supply, as well as enhancing the natural ease-of-use of the flexible clamps.
For voltage measurement the Energy Explorer kit includes a set of 6 measuring cables, color-coded and with extractable crocodile clips.
In option on the auxiliary channel of the instrument can be connected a clamp for the measurement of the weak currents, such as the leak currents and neutral currents.

Memory: Energy Explorer is delivered with a 512 Mb Compact Flash memory to store all the data; in option it is possible to measure memories up to 8 GByte.

Portable Printer: Optional Portable Graphic Printer.

PC Software: PE-Studio is powerful and easy-to-use PC Software, specially designed to the complete analysis and reporting of all data recorded by Energy Explorer on its Compact Flash. The Software is included with Energy Explorer Kit

Power Supply: Energy Explorer kit comes with a portable power supply (for the instrument supply and for the batteries recharge) and a set of 10 rechargeable NiMh batteries (AA type, overall capacity of 2300mAh).

GENERAL TECHINICAL CHARACTERISTICS:

Instrument Dimensions:
Self-Extinguishing ABS case with rubber-coated grips.
Alphanumerical rubber keyboard.
Dimensions (mm): 290x210x55

Display:
Screen LCD 320x240, colours, for graphic functions, (mm.115, 2x89, and 3)

Power Supply:
Mains: Desktop Power Supply
Battery: 2 independent battery compartments, in all there are 10 rechargeable AA NiMh batteries, 2300mAh

Voltage Inputs:
N.3 Voltage Inputs: double scale 500/1000V; accuracy 0, 2%+- 0, 05%f.s.
Voltage Inputs rating:600V CAT III

Current Inputs:
N.3 Current Inputs for exchangeable flexible **current** transducers without external amplifiers (1000Arms) or CT Clamps(1000A/1Vac o 3000A/1Vac); accuracy: +- 0,2%+- 0,05%f.s.(+-clamp error). 1 Auxiliary/Neutral Input Channel for CT Clamps with 0-1Vac; accuracy: +-0,2%+-0,05%f.s.(+- clamp error)

Fundamental Frequency Range:
The Frequency Range is measurable from 40 to 80 Hz. The measurement of Harmonics is up to 31st order.

Internal Software:
LINUX Operative System Embedded.
The Software is up-datable/up-gradable by the user via internet.

Memory:
Removable Compact Flash of 512Mb (supports up to 8 Gb and more according to available sizes.)

Languages:
Italian, English, French, German, Spanish

STANDARDS AND REGULATIONS:

SAFETY:	EN 61010-1 Safety for electrical equipment for measurement.
EMC:	EN 61326; EN 61326/A1/A2/A3Electromagnetic compatibility for electrical equipment for measurement.
MEASUREMENT:	EN 61004-30 Measurement methods.
	EN 61002-8Measurement of losses of voltage and interruptions.
	EN 61004-7 Measurement of Harmonics and Interharmonics.
	EN 50160 Power quality.