

# VIP SYSTEM3 - Digital energy analyzers

Volt  
Amp  
P.F., cosØ  
kW  
kVA  
kvar  
Average power  
Maximum power  
Hz  
Distortion  
kWh  
kvarh



approved



(CESI approved)



## 82 instruments in 1

For unbalanced three-phase systems

- Measurements in AC and DC
- Built-in printer for measurements, alarms and microinterruptions
- Graphic representation of measurements
- 2 relay alarm outputs
- RS232 output
- High accuracy (class 0,5)
- Automatic measurement CAMPAIGNS programmed and stored on MEMORY PACK
- Expandable to other measuring functions using special BLACK BOXES

The VIP-SYSTEM3 is a portable, lightweight analyzer with built-in printer which takes measurements on the three phases and calculates the equivalent three-phase values. The VIP-SYSTEM3 measures and prints voltages, currents, power levels, cosØ and waveform distortion. It measures total and time-band energy consumption. Alongside instantaneous measurement readings it also provides average values and records maximum power and distortion readings. The built-in printer can provide print-out of parameter trends and alarm states in graph form.

The VIP SYSTEM 3, with the addition of a MEMORY PACK, stores all measured data for later use.

The MEMORY PACK can be used to program and carry out automatic measurement surveys, with the option of data transfer to a Host Computer or Remote Printer. A BLACK BOX can be inserted to expand the VIP SYSTEM 3's operating possibilities, including new functions such as monitoring of leakage, temperature, etc. The analyzer is therefore equipped with an input for auxiliary parameters and compartments for the MEMORY PACK and BLACK BOXES. It uses a "SUPER TWISTED" luminous display.

### GENERAL SPECIFICATIONS

- Inputs  
Voltages L1 - L2 - L3 - N: 600 Volt AC between phase and neutral at 20 ± 1000 Hz; or 600 Volt CC.  
Currents L1 - L2 - L3: 1 Volt AC at 20 ± 1000 Hz; or 1 Volt CC  
Auxiliary: AUX 1V/1mA
- Overload of voltage inputs: Max 720 Vrms - Surge voltage 1200 Volt (a cut-out is tripped at 720 Vrms)
- Overload of current inputs: 5 times full scale value (with cut-out tripped at limit values)
- Number of scales: 4 voltage scales 4 current scales
- Automatic scale change
- Scale change response time: 1 sec.
- Relay outputs: 2 - Type A - Contacts for 30 Volt / 0,5A / 10 W
- Instrument dimensions: 240 x 220 x 115 mm.
- Weight 2.250 Kg.
- Ambient temperature range: +5°C +40°C
- Safety reference standards: IEC 348, VDE 411 class 2, for operating voltages -650 VAC rms, IEC 1010-1, EN 61010-1, 600V.
- EMC reference standards: EN 50081-1, EN 50082-1, EN 55022.

### POWER SUPPLY

- Mains: 230 ± 10% at 50 Hz or 60 Hz
- Internal: Rechargeable Ni-Cd battery

## VIP-SYSTEM3 KIT



### VIP-SYSTEM3-KIT

Kit complete with:

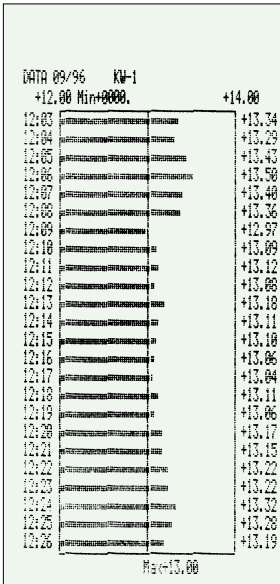
- 1 carrying case SYSTEM3 KIT
- 1 VIP SYSTEM3 ENERGY ANALYZER
- 1 VIP SYSTEM3 SOFTWARE
- 1 PC cable RS232
- 1 power supply cable
- 1 Set of voltage measurement cables
- 3 Clip-on CTs 1000A/1 Vrms AC with cables
- 2 Fuses 5x20 160 mA (spare)
- 1 Ink ribbon
- 2 Rolls of printer paper (spare)
- 1 Carrying strap
- 1 User manual

## SPARE PARTS

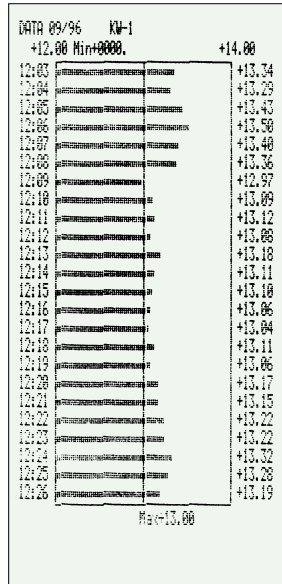
- PINZA-1000A/1V-AC** Clamp meter 1000A/1VAC
- CONF.10-CARTA-X-VIP3** Package of 10 paper rolls
- NASTRO-EPR-ERC-09C** Ink ribbon for printer
- CONF.10-FUS-VIP3-220V** Package of 10 - 5x20 - 80 mA - 250V - delayed fuses
- CONF.10-FUS-VIP3-110V** Package of 10 - 5x20 - 160 mA - 250V - delayed fuses
- VIP3-CAVO-VOLT** Set voltage cables for VIP3
- VIP3-CAVO-RETE** Mains supply cable
- MICROVIP-BRETELLA** 1 carrying strap for MICROVIP and VIP3
- SYS3-VALIGIA-R6-ALL** 1 Case for SYSTEM3 KIT

## PRINTOUTS

**Timed local printout (automatic)**  
up to max. 4 parameters



**Plotter printout** of parameters selected by Printer - Plotter



Performs: **Manual Print-out** of the display, **General Printout** (printout of SET UPs, alarms printout, timed printout in alarm state.)

## SPECIFICATIONS

MEASUREMENTS at low and medium voltage  
Single-phase MEASUREMENTS  
MEASUREMENTS ON 3-wire and 4-wire three-phase systems  
MEASUREMENTS on each phase and corresp. 3-phase measurements.  
MEASUREMENTS on DC systems using special clamp meter provided  
MEASUREMENTS of current value from 30 mA to 999 kA



Manual PRINT-OUT of measurements shown on DISPLAY

Overall manual PRINT-OUT of all the latest measurements available.

Automatic PRINT-OUT of parameters selected by the operator at preset time intervals.

Automatic PRINT-OUT at shorter intervals within preset time bands.

PLOTTER PRINT-OUT in bar-graph form showing trends of two parameters selected by operator.

Immediate PRINT-OUT of measurements when values cross minimum and maximum alarm thresholds preset by operator.

More frequent PRINT-OUT of selected parameters while it remains in alarm state.

PRINT-OUT of micro-interruptions and interruptions in line power.



The working day is divided into TIME BANDS programmed by the operator to provide separate measurements of power consumed at different tariffs. IMMEDIATE PRINT-OUT if average power values for a TIME BAND pass maximum alarm threshold.

## MEASUREMENT ON DISPLAY PAGES

Pag.1	<b>Volt</b>	True line voltage value (average of the three phases)	<table border="1"> <tr> <th colspan="4">FASE Y (3φ)</th> </tr> <tr> <td>V</td> <td> </td> <td>A</td> <td></td> </tr> <tr> <td>cosφ</td> <td> </td> <td>W</td> <td></td> </tr> </table>				FASE Y (3φ)				V		A		cosφ		W														
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	V						A																								
cosφ		W																													
<b>Amp</b>	True equivalent current value for the three-phase system																														
<b>P.F. cosφ</b>	Power factor of the 3-phase system																														
Pag.2, 3, 4	<b>kWatt</b>	Active power of the three-phase system	<table border="1"> <tr> <th colspan="4">FASE L1 (R)</th> </tr> <tr> <td>V</td> <td> </td> <td>A</td> <td></td> </tr> <tr> <td>cosφ</td> <td> </td> <td>W</td> <td></td> </tr> </table>				FASE L1 (R)				V		A		cosφ		W														
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<b>P.F. cosφ</b>	Power factor Phase L1 (pag.2), L2 (pag.3), L3 (pag.4)																														
Pag.5	<b>kWatt</b>	Active Power phase L1 (pag.2), L2 (pag.3), L3 (pag.4)	<table border="1"> <tr> <th>V-12</th> <th>V-23</th> <th>V-31</th> </tr> <tr> <td>A - N</td> <td> </td> <td>Hz</td> </tr> </table>				V-12	V-23	V-31	A - N		Hz																			
	V-12	V-23					V-31																								
	A - N						Hz																								
<b>V-12,V-23,V-31</b>	True value of the voltage between the phases (line voltage)																														
<b>A - N</b>	True neutral current value																														
Pag.6	<b>Hz</b>	Frequency	<table border="1"> <tr> <th>Fase</th> <th>Ist.</th> <th>Med.</th> <th>Max</th> </tr> <tr> <td>L1 (R)</td> <td>W</td> <td>W</td> <td>W</td> </tr> <tr> <td>L2 (S)</td> <td>W</td> <td>W</td> <td>W</td> </tr> <tr> <td>L3 (T)</td> <td>W</td> <td>W</td> <td>W</td> </tr> <tr> <td>Y (3φ)</td> <td>W</td> <td>W</td> <td>W</td> </tr> </table>				Fase	Ist.	Med.	Max	L1 (R)	W	W	W	L2 (S)	W	W	W	L3 (T)	W	W	W	Y (3φ)	W	W	W					
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L1 (R)	W	W	W																												
L2 (S)	W	W	W																												
L3 (T)	W	W	W																												
Y (3φ)	W	W	W																												
<b>Ist. W</b>	Instantaneous, average and maximum active power of each phase and of the three-phase system. (Average values are assessed over an interval of 1 to 99 minutes preset by the operator.)																														
Pag.7	<b>Med. W</b>	Instantaneous, average and maximum active power of each phase and of the three-phase system. (Average values are assessed over an interval of 1 to 99 minutes preset by the operator.)	<table border="1"> <tr> <th>Fase</th> <th>Ist.</th> <th>Med.</th> <th>Max</th> </tr> <tr> <td>L1 (R)</td> <td>VA</td> <td>VA</td> <td>VA</td> </tr> <tr> <td>L2 (S)</td> <td>VA</td> <td>VA</td> <td>VA</td> </tr> <tr> <td>L3 (T)</td> <td>VA</td> <td>VA</td> <td>VA</td> </tr> <tr> <td>Y (3φ)</td> <td>VA</td> <td>VA</td> <td>VA</td> </tr> </table>				Fase	Ist.	Med.	Max	L1 (R)	VA	VA	VA	L2 (S)	VA	VA	VA	L3 (T)	VA	VA	VA	Y (3φ)	VA	VA	VA					
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Pag.8	<b>Ist. VA</b>	Instantaneous, average and maximum active power of each phase and of the three-phase system. (Average values are assessed over an interval of 1 to 99 minutes preset by the operator.)	<table border="1"> <tr> <th>Fase</th> <th>Ist.</th> <th>Med.</th> <th>Max</th> </tr> <tr> <td>L1 (R)</td> <td>var</td> <td>var</td> <td>var</td> </tr> <tr> <td>L2 (S)</td> <td>var</td> <td>var</td> <td>var</td> </tr> <tr> <td>L3 (T)</td> <td>var</td> <td>var</td> <td>var</td> </tr> <tr> <td>Y (3φ)</td> <td>var</td> <td>var</td> <td>var</td> </tr> </table>				Fase	Ist.	Med.	Max	L1 (R)	var	var	var	L2 (S)	var	var	var	L3 (T)	var	var	var	Y (3φ)	var	var	var					
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Y (3φ)	var	var	var																												
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<b>Max VA</b>																															
Pag.9	<b>Ist. var</b>	Instantaneous, average and maximum reactive power of each phase and of the three-phase system. (Average values are assessed over an interval of 1 to 99 minutes preset by the operator.)	<table border="1"> <tr> <th>Fase</th> <th>Ist.</th> <th>Med.</th> <th>Max</th> </tr> <tr> <td>L1 (R)</td> <td>%</td> <td>%</td> <td>%</td> </tr> <tr> <td>L2 (S)</td> <td>%</td> <td>%</td> <td>%</td> </tr> <tr> <td>L3 (T)</td> <td>%</td> <td>%</td> <td>%</td> </tr> <tr> <td>Y (3φ)</td> <td>%</td> <td>%</td> <td>%</td> </tr> </table>				Fase	Ist.	Med.	Max	L1 (R)	%	%	%	L2 (S)	%	%	%	L3 (T)	%	%	%	Y (3φ)	%	%	%					
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Pag.10	<b>kWh</b>	Active power consumption for each phase and for three-phase system.	<table border="1"> <tr> <th>Fase</th> <th>kWh</th> <th>kvarh</th> <th>Cosφ</th> <th>Tgφ</th> </tr> <tr> <td>L1 (R)</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>L2 (S)</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>L3 (T)</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Y (3φ)</td> <td></td> <td></td> <td></td> <td></td> </tr> </table>				Fase	kWh	kvarh	Cosφ	Tgφ	L1 (R)					L2 (S)					L3 (T)					Y (3φ)				
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<b>kvarh</b>	Reactive power consumption for each phase and for three-phase system.																														
<b>Cosφ</b>	Average power factor for each phase and for three-phase system.																														
<b>Tgφ</b>	Correspondent of average power factor, Tgφ = kvarh/kWh																														

4 additional pages are available only if the time bands are programmed (differentiated tariff bands). The data is displayed as on P. 10, with the writing F.T.1, F.T.2, F.T.3, F.T.4, instead of Phase.



TWO OUTPUT RELAYS activated when selected parameters pass a preset maximum or minimum alarm threshold.



PROGRAMMABLE RS232 SERIAL OUTPUT:  
- For connection to remote printer  
- for (on line) connection to HOST COMPUTER for storage and processing of measured data.



For connection (by MODEM) to a tele-phone network for connection to remote Computer or Printer.



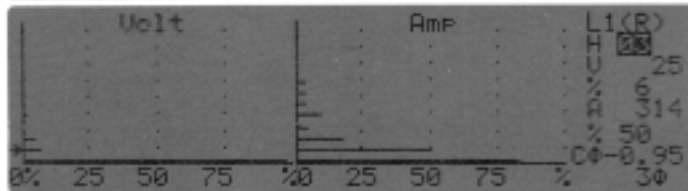
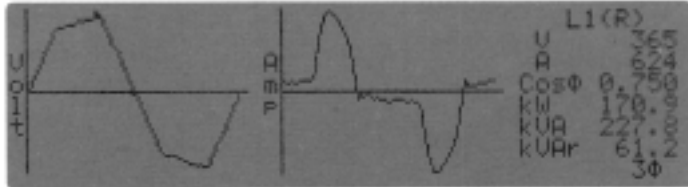
OPTION of MEMORY PACK for automatic measurement surveys, with recording of data for all parameters.  
OPTION of modifying instrument functions using BLACK BOXES.  
OPTION of measurement, print-out and alarm monitoring of auxiliary parameters using BLACK BOXES.



OPTION of connection (by MODEM) to switch-over telephone network for connection to computer.



# BLACK-BOX HARMONICS



## Transforms the VIP SYSTEM3 into a harmonics analyzer

### FUNCTIONS AVAILABLE

- FT harmonics analysis method.
- Harmonics analysis up to 25 harmonics on single-phase. and three-phase systems at low-medium voltage.
- Manual print-out of all numerical data.
- Automatic (programmable) timed printout.
- Display of voltage and current wave forms.
- Bar-graph display of the voltage and current harmonic component.
- Display and printout of voltage and current statistical data.

### TECHNICAL SPECIFICATIONS

#### • Voltage inputs

- Numer of inputs: 4 = L1 - L2 - L3 - N
- Voltage Range: 0 - 600 VAC (more than 600 V with CT)
- Measur. freq. Range: 50 Hz 1500 Hz
- Input impedance:  $\approx$  4 MOhm

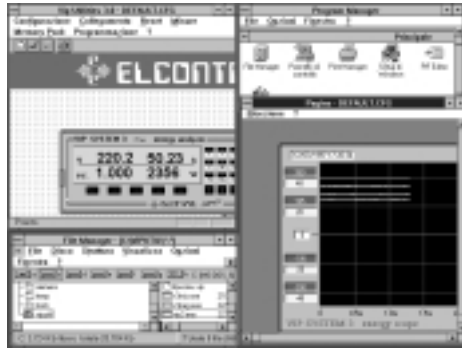
#### • Current inputs

- Numer of inputs: 3 = L1 - L2 - L3
- Current Range: 1 Vrms (1000 A with the clamp meter provided, or more with the CT).
- Measur. freq. range: 50 Hz 1500Hz
- Input impedance:  $\approx$  6 KOhm

#### • Sampling frequency

- Accuracy (from 20% to F.S.): Vrms, Arms \*: 0,4 % Reading + 0,3 % F.S.  
Harmonics \*: 1 % Reading + 0,6 % F.S.  
(See SYSTEM 3)
- Measurement Range: 0,2 % scale max.
- Sensitivity: 0,2 % scale max.

\* **Note:** On current measurement. it is necessary to bear in mind clamp meter error.



## VIP SYSTEM 3 Management Software for Windows 9X/NT/2000

Under the name VIP UTILITIES 3.0 (also VIPU30), ELCONTROL ENERGY has realized a package of Software programmes for continuous, two-directional dialogue between a Personal Computer and the ELCONTROL ENERGY VIP SYSTEM 3 portable three-phase energy analyzer.

In fact, VIP SYS 3 is equipped with an RS232 communication protocol.

An IBM or compatible Personal Computer can have a complete control over the instrument in Windows 3.1 and Windows 95 multi-tasking environments.

This operating possibility is particularly interesting when the VIP SYS 3 is located in a plant at a point which is either inconvenient or even inaccessible.

By transferring all the functions of the VIP SYS 3 to a computer keyboard, the software VIP UTILITIES 3.0 permits many different kinds of work to be performed.

The software VIP UTILITIES 3.0 permits operation between the VIP SYS 3 and the PC in two different conditions: ON-LINE, OFF LINE.

ON LINE: completely operational from IBM or compatible PC with functions via RS232, via MODEM (also on switch-over telephone network) to carry out the following functions:

- ¥ Display of "Energy Analyzer" Measurement pages
- ¥ Measurement graphic trend "Energy Scope" display
- ¥ Printout of Measurement graphic trend "Energy Scope" display
- ¥ Display or printout of all measurements
- ¥ Display or printout of settings
- ¥ On-line automatic Measurement campaign data timed storing into PC files
- ¥ Programming transfer
- ¥ Keyboard Enable/Disable
- ¥ Reset

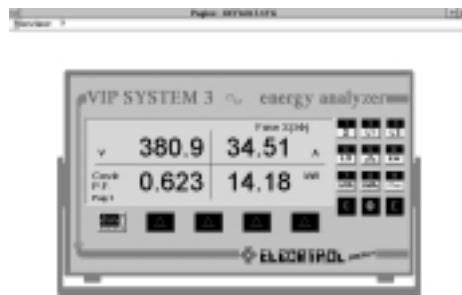
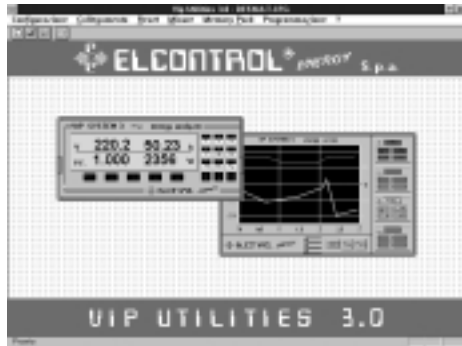
OFF-LINE:

- ¥ MEMORY PACK transfer
- ¥ Instrument programming
- ¥ Memory Pack campaign programming
- ¥ Measurement campaign processing
- ¥ Configuration

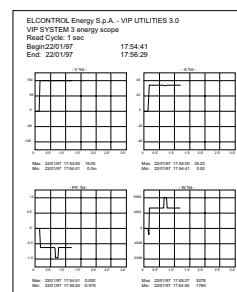
With VIP SYS 3, which includes a Memory Pack, VIP UTILITIES 3.0 can also be used for the programming of Measurement campaigns.

On completion of the campaign, all the resulting data and measurements can be transferred to the computer via RS232 or via Memory Pack Parallel Interface MPPI for visualization and printout and for possible text display with the aid of the appropriate data spread sheet.

In the same way, the computer can be used to programme and command a remote VIP SYS 3 connected via Modem on a telephone line.



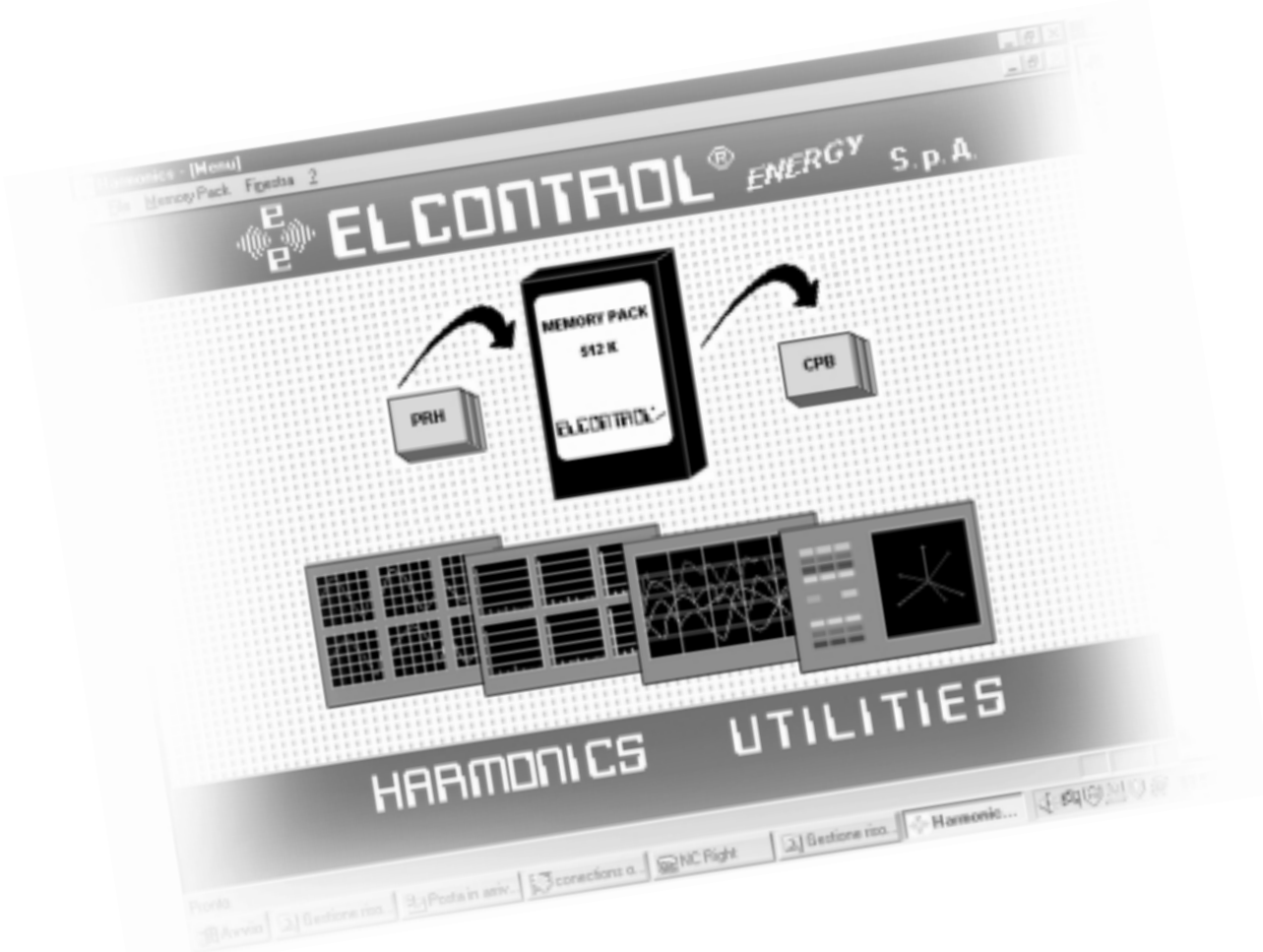
VIP SYSTEM 3		13/03/97		14/03/97		15/03/97		16/03/97		17/03/97	
	LI	L2	L3	SI	LI	L2	L3	SI	LI	L2	L3
1	V	220.2	230.1	249.3	391.1						
2	A	44.3	50.3	3.360	34.41	H 30					
3	PF	0.815	0.765	0.360	0.823						
4	VI	0.126	0.106	0.10000	11.76						
5	Mag IV	2882	3602	0	4823						
6	Max IV	1000	1100	1000	3000						
7	Mag VA	1090	1420	0	1630						
8	Max VA	1000	1420	1000	3430						
9	Mag VA	0.366	0.346	0.00000	17.06						
10	Mag VA	0.240	0.220	0	12.06						
11	Max VA	1000	1100	1000	3000						
12	Mag VA	0.100	0.100	0.00000	0.100						
13	Mag VA	0.100	0.100	0.00000	0.100						
14	Mag VA	0.100	0.100	0.00000	0.100						
15	Mag VA	0.100	0.100	0.00000	0.100						
16	Mag VA	13442.076	79.308024	46547054	240.10054						
17	Mag VA	11.000000	10.000000	00.000000	22.250004						
18	Mag VA	0.366	0.360	1.360	0.360						



ELCONTROL Energy Spa - Vip Utilities 3.0											
VIP SYSTEM 3											
Read Cycle: 1 sec											
Begin: 13/03/1997 17:54:41											
End: 22/03/97 17:56:29											
ReadCycle 00:00:15											
	Hz	V1	V2	V3	VT	V L1-L2	V L2-L3	V L3-L1	A1		
13/03/97	14.03.02	80.0	217.30	217.40	217.50	376.50	376.50	376.60	376.50	26.60	
13/03/97	14.03.17	80.0	215.50	215.90	215.40	373.40	373.90	373.50	373.20	26.470	
13/03/97	14.03.32	80.0	215.50	215.70	215.70	373.50	373.40	373.60	373.40	26.480	
13/03/97	14.03.47	80.0	215.60	216.0	215.60	373.70	373.80	373.80	373.40	26.480	
13/03/97	14.04.02	80.0	216.10	216.10	215.20	373.80	374.30	373.50	373.50	26.520	
13/03/97	14.04.17	80.0	216.0	215.80	215.60	373.80	373.90	373.60	373.80	26.510	
13/03/97	14.04.32	89.90	216.30	216.50	216.20	374.70	374.80	374.70	374.60	26.520	
13/03/97	14.04.47	89.90	215.30	215.40	214.90	372.80	373.0	372.70	372.60	26.470	
13/03/97	14.05.02	80.0	216.0	216.10	215.50	373.90	374.20	373.80	373.70	26.480	
13/03/97	14.05.17	80.0	215.90	215.70	215.50	373.60	373.80	373.40	373.60	26.50	
13/03/97	14.05.32	80.0	215.90	216.10	215.80	374.0	374.10	374.0	373.90	26.520	
13/03/97	14.05.47	89.90	217.60	217.90	217.50	377.0	377.20	377.10	376.80	26.620	
13/03/97	14.06.02	89.90	220.60	221.10	220.90	382.60	382.50	382.80	382.40	26.830	
13/03/97	14.06.17	89.90	220.30	220.30	220.40	381.70	381.60	381.70	381.70	26.830	

# VIP SYSTEM3 SOFTWARE - HARMONICS UTILITIES 3.0

Windows 9X/NT/2000 software for VIP SYSTEM3 - HARMONICS ANALYSER  
included in VIP SYSTEM3 Kit

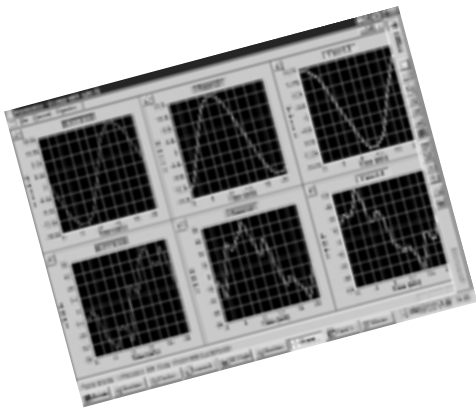


Elcontrol Energy have released an all - new software package for use with the VIP SYSTEM3 configured as a HARMONICS ANALYZER via the BLACK BOX HARMONICS option with either the 128K or 512K memory pack.

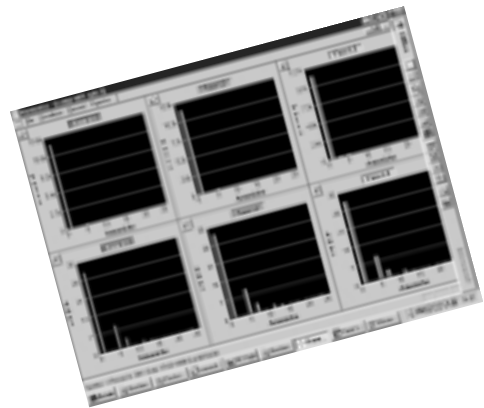
For data download the software is utilised in conjunction with the MPPI parallel interface module which connects to the PC with a standard printer cable.

The new software includes the following features:

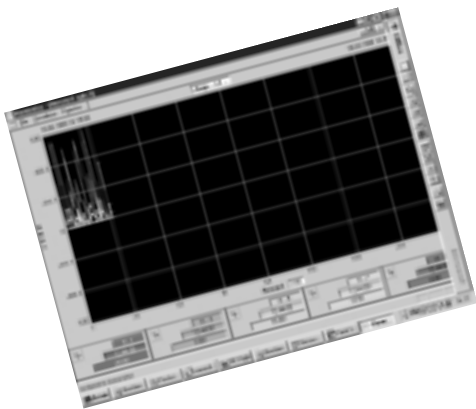
- Download of data and efficient storage to disk.
- Set up of automatic surveys.
- Data export of all parameters for easy spreadsheet analysis including RMS Values, Harmonic to 25<sup>th</sup> multiple, Neutral Current, Peak Current and statistical data.
- On board graphics package for waveforms (V&I), Harmonic Spectrum (V&I) - percentage and absolute values, Harmonic Trend over time, RMS Values Trend, Neutral Current and 3 phase vector diagram.
- Direct printing of RMS values, Harmonic Trend over time (V, I and Cosφ, statistics, Neutral Current and Peak Current).



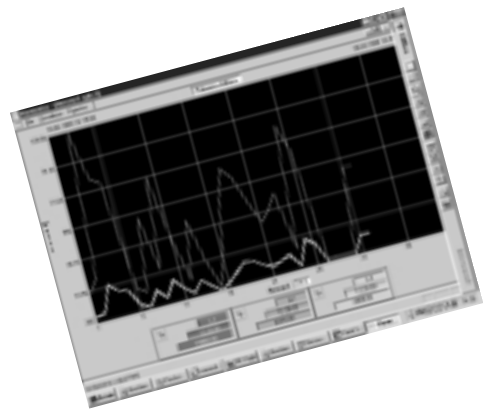
Waveform



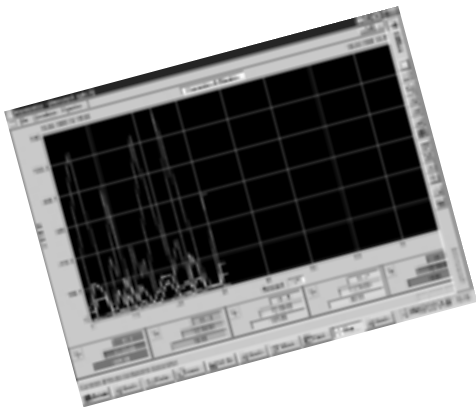
Spectrum of absolute values  
and values per cent of V, I, Cos $\phi$



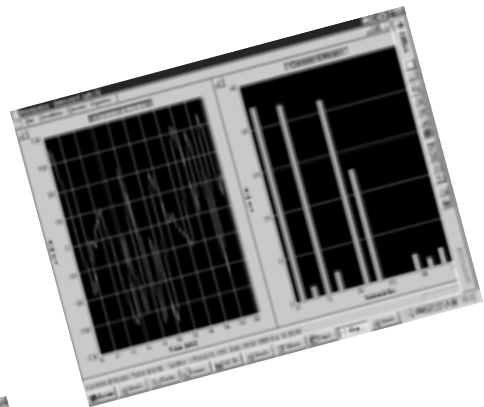
Trend of Harmonics



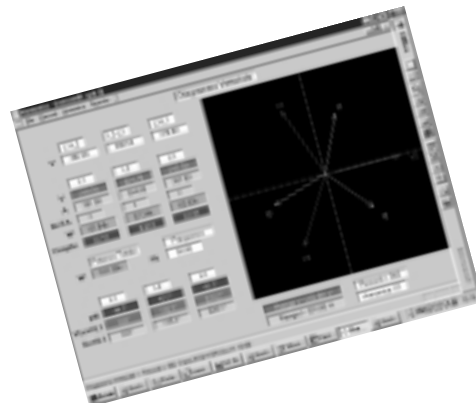
Trend of RMS quantities



Neutral Current



Neutral Current



Three-phase Vector Diagram  
(Vector meter)