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VIP ENERGY

VIP ONE

VIP ENERGY and VIP ONE

VIP 39 din

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VIP396

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VIPVIEW - PANEL UTILITIES - VIPLINK - VIPLOAD

Software for DATA ACQUISITION

MICROVIP3 PLUS

MICROVIP3

MICROWIN

VIP SYSTEM3

BLACK-BOX HARMONICS

VIP UTILITIES

HARMONICS UTILITIES 3.0

NANOVIP PLUS - NANOVIP PLUS MEM

NANOVIP

NANOWIN

MICROVIP MK 1.1/1.2

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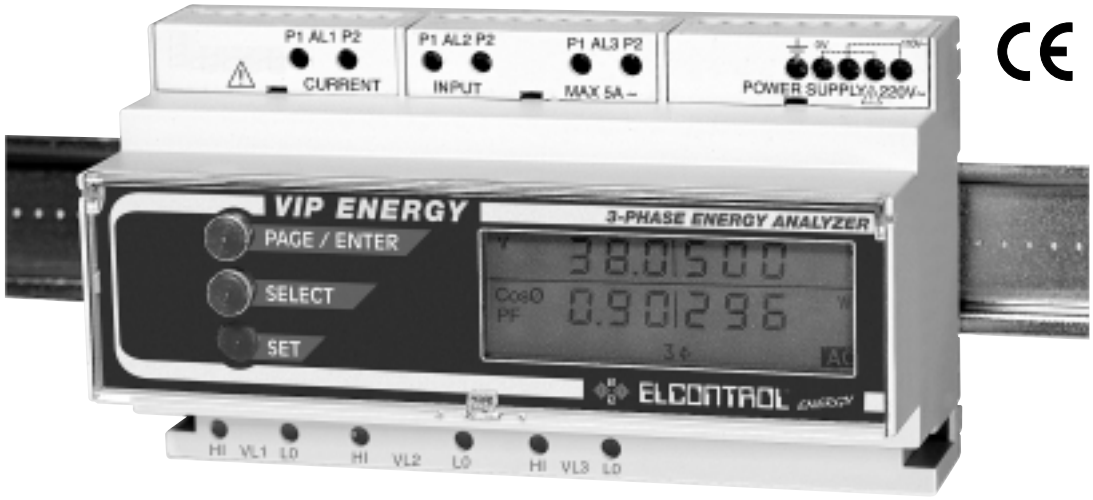
VIP ENERGY - Three-phase energy analyzers

Volt
Amp — True RMS
P.F., cosØ
kW
kVA
kvar
Hz
Peak kVA
Peak kW
kWh — Single-phase and Three-phase Energy Meters
kvarh
kVAh — (ALM model)
±kWh — Import/export COG4 option
±kvarh
Average KW
Average kVA
Average kvar
C.F. (1/THDF)
Date
Time



43 instruments in 1

Versions with outputs for kWh, kvarh, kVAh, data transmission, alarms, demand control (load shedding), DIN rail mounting

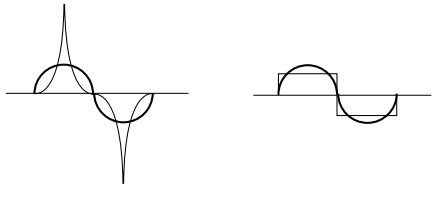
TOP PERFORMANCE IN A SMALL PLACE

- 43 Measuring functions in 157,5 mm of DIN rail (9 DIN modules):
  - Volts single-phase and three-phase (rms), Amp single-phase and three-phase (rms), P.F. cosØ single-phase and three-phase, W single-phase and three-phase, var single-phase and three-phase, VA single-phase and three-phase, Hz.
  - kWh, kvarh, energy meters; import/export kWh, kvarh (kWh, kVAh selecting STD2).
  - Storage of average, apparent and active power peaks average active, apparent, reactive powers.
  - True Rms measurements from 200 mW (7,5V 23mA) up to 999 GW (999999 V, 999999 A).
  - Unbalanced and distorted three-phase system measurements.
- Backlit display.
- Simple and easy to install and use.
- Fully programmable in the field by means of the keyboard.
- Signal outputs: available in a number of versions and with various configurations for expansion of VIP ENERGY functions up to industrial control level.

C.VIPENERGY
Frame for panel mount of VIP ENERGY

POWER MEASUREMENT WHERE AND HOW YOU WANT THEM

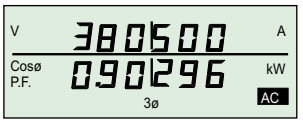
- WHERE: Installation in modular panel.
- HOW: The measurements give a full view of electrical consumption including storage of power peaks and consumption (Maximum demand of Active Power).
- High accuracy (class 1 IEC1036).
- Voltage input: Max. direct 550V or from 2 or 3 voltage transformers: primary value programmable from 1V to 999999V; secondary value selection from 57.7, 63.5, 100, 115, 120, 173, 190, 200, 220 Volt configuration.
- Current input: Direct 5A or through secondary of CT/5 or CT/2.5, CT/2, CT/1. Primary value of CT selectable from 1 to 999999 A). Accepts alternatively either 2 or 3 CTs.
- All the models are available with 30A current input.
- Automatic scale change.
- Average KVA: integration times of 1', 2', 5', 10', 15', 20', 30', 60'.
- Average KW: integration times of 1', 2', 5', 10', 15', 20', 30', 60'.
- Ampere Crest Factor (1/THDF = Transformer Harmonic Derating Factor):
  >1 or <1 for DISTORTED signals
  =1 for SINUSOIDAL wave forms



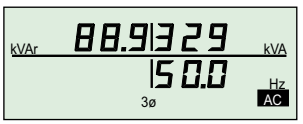
COGENERATION PLANTS
All models can be used with option COG4, visualizing the absorption and the production of energy on the 4 displays.

MEASUREMENT ON DISPLAY PAGES

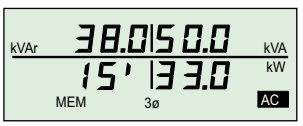
Volt	Phase-to-phase rms voltage (average of the 3 phases)
Amp	Equivalent current rms of the three-phase system
P.F. cosØ	Power factor of the three-phase system
kWatt	Active power of the three-phase system



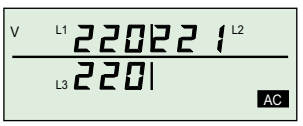
kvar	Instantaneous reactive power of the three-phase system
kVA	Instantaneous apparent power of the three-phase system
Hz	Phase L1 voltage frequency



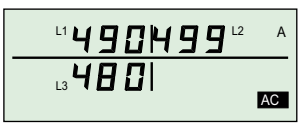
kVAr	Average three-phase reactive power on 1, 2, 5, 10, 15, 20, 30, 60 min.
kVA	Average three-phase apparent power on 1, 2, 5, 10, 15, 20, 30, 60 min.
kW	Average three-phase active power on 1, 2, 5, 10, 15, 20, 30, 60 min.



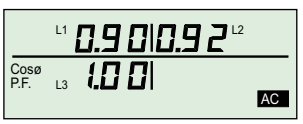
Volt L1	Rms voltage between phase L1 and neutral (STAR) or L1-L3 (DELTA)
Volt L2	Rms voltage between phase L2 and neutral (STAR) or L2-L3 (DELTA)
Volt L3	Rms voltage between phase L3 and neutral (STAR) or L1-L2 (DELTA)



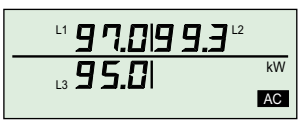
Amp L1	Phase L1 rms current
Amp L2	Phase L2 rms current
Amp L3	Phase L3 rms current



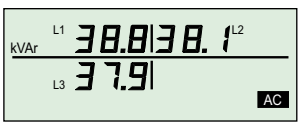
P.F. cosØ L1	Phase L1 Power Factor
P.F. cosØ L2	Phase L2 Power Factor
P.F. cosØ L3	Phase L3 Power Factor



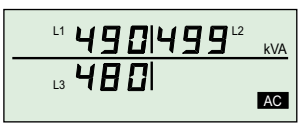
kW L1	Phase L1 active power
kW L2	Phase L2 active power
kW L3	Phase L3 active power



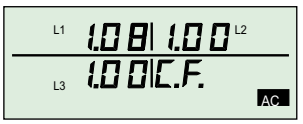
kVAr L1	Phase L1 instantaneous reactive power
kVAr L2	Phase L2 instantaneous reactive power
kVAr L3	Phase L3 instantaneous reactive power



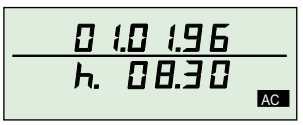
kVA L1	Phase L1 instantaneous apparent power
kVA L2	Phase L2 instantaneous apparent power
kVA L3	Phase L3 instantaneous apparent power



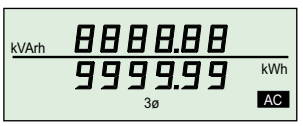
C.F. L1	L1 Current Crest Factor (1/THDF L1)
C.F. L2	L2 Current Crest Factor (1/THDF L2)
C.F. L3	L3 Current Crest Factor (1/THDF L3)



DATE	DD MM YY
TIME	HH MM

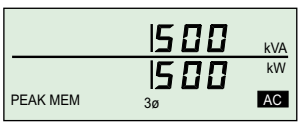


kvarh kVAh	Consumption in kVArh of the three-phase system (or kVAh in VIP ENERGY ALM)
kWh	Consumption in kWh of the three-phase system (and of L1, L2, L3 phases)

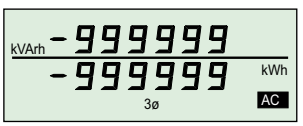


kVA	Average apparent power peak of the three-phase system
kW	Average active power peak of the three-phase system

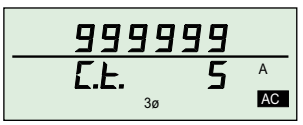
N.B. The VIP ENERGY displays and stores the peak values 15 minutes after it is activated and are up-dated every 3 minutes. Integration times other than 15 minutes can be programmed (10, 15, 20, 30 minutes).



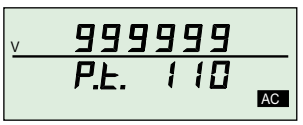
-kVArh	Reactive energy export (COG4 option)
-kWh	Active energy export (COG4 option)



kA	The VIP ENERGY has a page for selecting the CT.



kV	The VIP ENERGY has a page for selecting the VT.



STAR	4 wires L1, L2, L3, N (star)
DELTA	3 wires L1, L2, L3 (delta)

RELAY STATUS	Only RPQS, ALM

VIP ENERGY - Models available

Choice of the models

BASIC MODELS

VIP ENERGY
standard model

VIP ENERGY RPQS
In addition to the measuring function, it is equipped with a relay or pulse output

VIP ENERGY ALM
it has all the functions of the RPQS model plus the possibility of alarms output

OPTIONS

24VDC
24 VDC feeding

PASS
SET-UP pages and reset of the energy contactors and of the power peaks protected through password

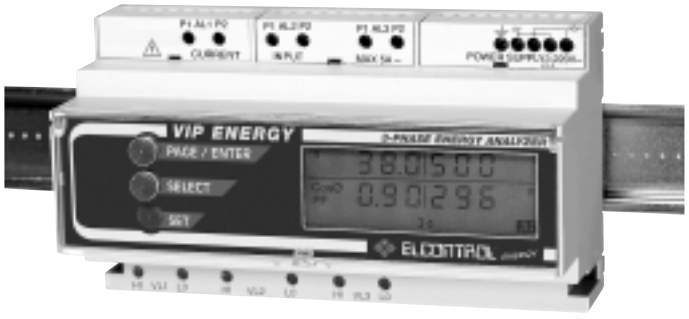
485
RS485 output with standard or ONE WAY transmission

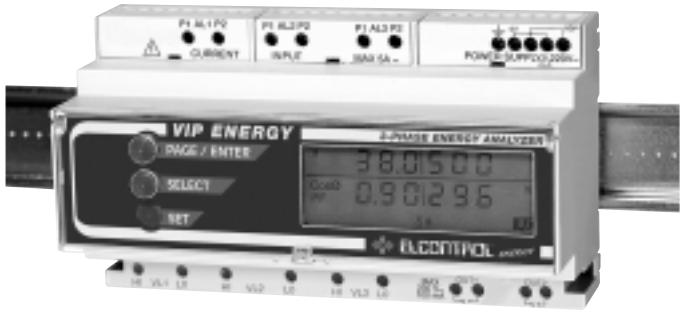
FURTHER OPTIONS

24VDC
24 VDC feeding

PASS OF
all the functions of the PASS option plus automatic transmission of the ONE WAY measures for OF format

All the models are available with 30A current input





VIP ENERGY, VIP ENERGY 485

Standard model for UNBALANCED THREE-PHASE systems

Measurements on STAR (4 wires) or DELTA (3 wires).
For direct measurements up to 5A, 550V, or with external CT, PT up to 999999 A, 999999 V max.
All the models are available with 30A current input.
Measures and displays Volts, Amps, W, P.F. cosø, VAr, VA, Hz, kwh, kvarh, VA Peak, W Peak, Average kW, Average kVA, Average kvar, Crest Factor (1/THDF), Date, Time, replacing 43 instruments and using the space and connections of just one.
LV, MV, HV measurements. Star and Delta connections.
4-quadrant energy counters kWh, kvarh Import/Export.
Free selection of transformers.
Possibility of automatic transmission type "ONE WAY" (RS422) each second.
Possibility of display of just the single phase measures.
The 485 version is equipped with a RS485 serial output.

VIP ENERGY RPQS, VIP ENERGY RPQS 485

In addition to the measuring function, they are equipped with pulse output for industrial monitoring

2 SOLID STATE RELAY OUTPUTS with pulse frequency proportional to 2 out of the P (P+ or P- with COG4 option), Q (Q+ inductive or Q- capacitive), S (active, reactive, apparent) powers selection by keyboard.
In addition to the measuring function it is equipped with 2 solid state relay outputs, volt-free contacts (280VAC rms max. 100mA max.). They supply pulses with frequency proportional to the power measured.
A simple display menu and SELECT, SET push-buttons allow selecting 2 out of powers: active (P, P+ or P- with COG4 option selected), reactive (positive Q+ inductive, negative Q- capacitive), apparent (S) and different output frequencies according to requirements:
Min. 1 pulse= 1 MWh (Mvarh) (MVAh)
Max. 999 pulses= 1 Wh (varh) (VAh)

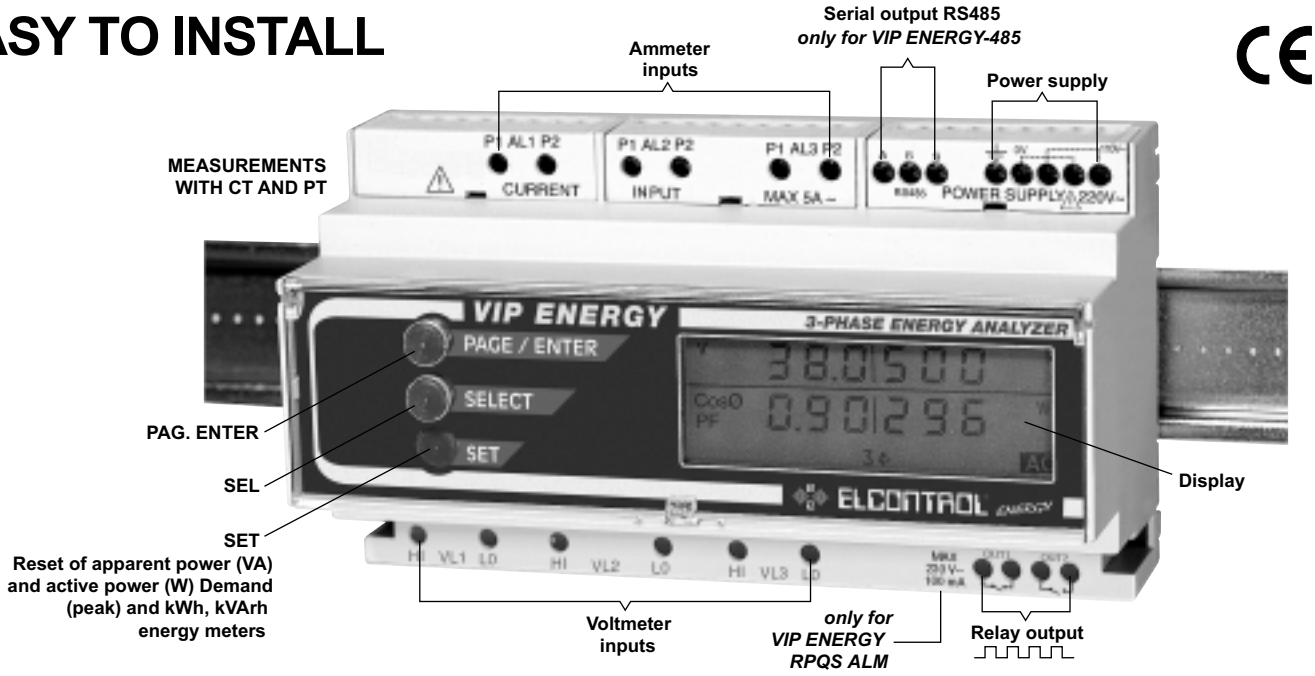
- RPQ (P+ or P- with COG4 option, Q+ or Q-) selection: supplies pulses proportional to the active energy (P=W) and reactive (Q=var) for measurements of active energy (kWh) and reactive (kvarh).
- RPS (P+ or P-) selection: supplies pulses proportional to the active energy (P=W) and apparent (S=VA) for measurements of active energy (kWh) and apparent (kVAh).
- RSQ (Q+ or Q-) selection: supplies pulses proportional to the apparent energy (S=VA) and reactive (Q=var) for measurements of apparent energy (kVah) and reactive (kvarh).
- The functionning of the relay can also be set with static procedure, with opening and closing checked through keyboard or RS485.
- **In the RPQS-485 version it is possible a remote control (by PC) of 2 loads.**

VIP ENERGY ALM, VIP ENERGY ALM 485

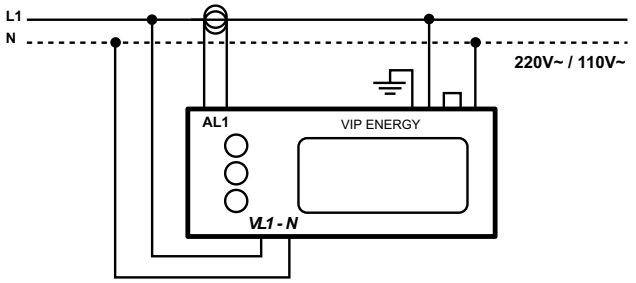
In addition to the RPQS functions, they are are equipped with RELAY OUTPUT for alarm and load control

MINIMUM and MAXIMUM alarms on any 2 measurements chosen by the user from 27 of those displayed, with selection of the ON and OFF delay time (from 0 to 999 seconds) and of the MINIMUM and MAXIMUM threshold hysteresis (from 0 to 17.5% in steps of 2.5%) for each of the two relays which can be connected to the alarms.
The VIP ENERGY ALM-485 also has all the functions of the VIP ENERGY RPQS-485.

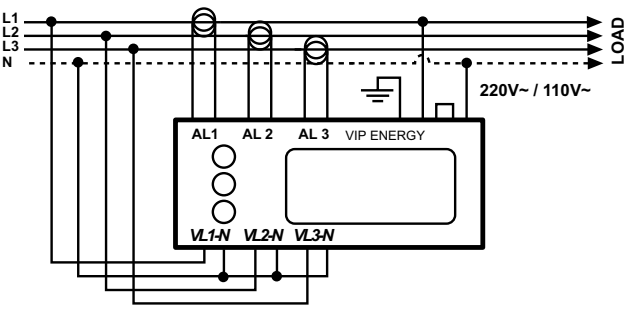
EASY TO INSTALL



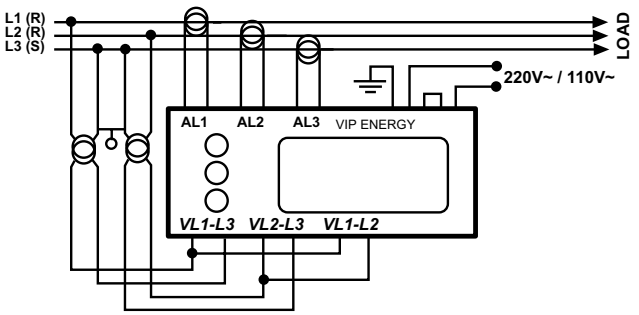
SINGLE-PHASE CONNECTION: 1 phase - 2 wires

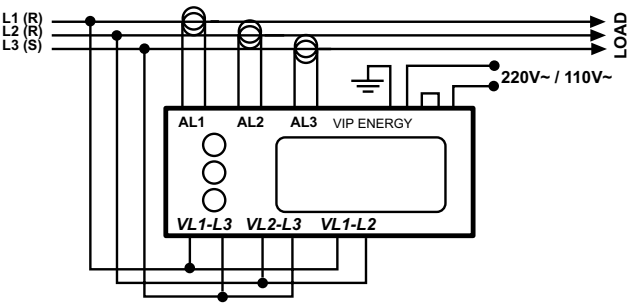


STAR CONNECTION (STAR): 3 phases - 4 wires



DELTA CONNECTION (DELTA): 3 phases - 3 wires

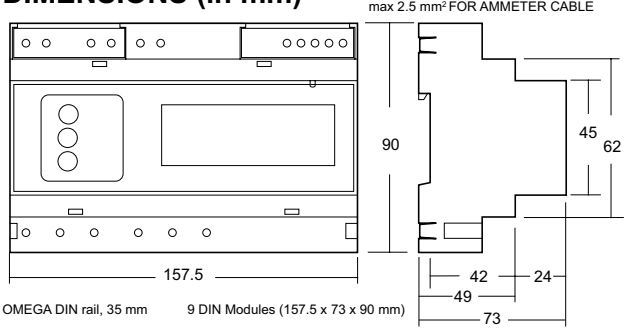




DISPLAYED VALUES

	Volt	Ampère	Watt	VA	Var	cosØ, PF	C. F. (A)	Max demand (peak) KW	Max demand (peak) KVA	Average KW	Average KVA	Average Kvar	Hz	KWh	KVAh	Kvarh	KWh Import/export	Kvarh Import/export	Date	Time
L1	•	•	•	•	•	•	•						•	•					•	•
L2	•	•	•	•	•	•	•							•						
L3	•	•	•	•	•	•	•							•						
3Ø	•	•	•	•	•	•		•	•	•	•	•		•	•	•	•	•		

DIMENSIONS (in mm)



GENERAL SPECIFICATIONS

- **Inputs:**
  Voltmeter: L1-N, L2-N, L3-N max 550 Vrms (STAR)
  L1-L3, L2-L3, L1-L2 max 550 Vrms (DELTA)
  from 20 to 600 Hz.
  Ammeter: 5A or 30A from 20 to 600 Hz.
- **Voltmeter input overload:** peak voltage 2000 Vrms (60 sec.).
- **Ammeter input overload:** 20 times Full Scale value / 1 sec. (with overload cut-out tripped at limit values).
- **Number of scales:** 2 voltage scales; 3 current scales.
- **Automatic scale change:** response time at scale change: 1.2 sec; passage to scale above occurs at 105% of scale activated; passage to scale below occurs at 20% of scale activated.
- **Dimensions:** length= 157.5 mm (9 DIN modules); height= 90 mm; Depth= 73 mm
- **Lithium battery:** 3 V; 280 mAh
- **Weight:** 1 kg.
- **Degree of protection:** instrument IP20; front panel IP40.
- Data back-up is guaranteed by means of the internal EEPROM (1.000.000 write cycles min.) 40 years.

SERVICE AND TESTING CONDITIONS

- Ambient service conditions:
  ambient temperature range: from -10°C to +60°C.
  relative humidity (R.H.) range: from 20% to 80%.
- Storage temperature: from -20°C to +70°C.
- Condensation: not permitted.
- Insulation to VDE 0110 group C for operating voltage - 500 VAC rms.
- Insulation resistance ³ 500 Mý between input terminals and outer casing.
- Insulation voltage between input connectors: testing at 2000 Vrms at 50 Hz for 60 sec.
  Between each connector and the container: testing at 3000 Vrms for 60 sec.
- Safety reference standards: IEC 348, VDE 411, class 1 for operating voltage - 650 VAC rms; IEC 1010-1, EN 61010-1, 550V.
- EMC reference standards: EN 50081-1, EN 50082-2, EN 55011, EN 55022.

POWER SUPPLY

- Mains: 110/220V~ ±10%, 50/60 Hz. Available also at 24VDC under request.
- Instrument consumption: 8 VA
- Immunity to voltage microints: 0.1 sec.

MEASUREMENT OF PRIMARY PARAMETERS

- Measuring method: fixed sampling and analog/digital conversion
- Sampling frequency: 1.25 KHz.
- Number of samples per phase: 125 (100 msec.).
- Measuring interval: 1.2 sec.
- Zero self-correction: every 1.2 sec.

MEASUREMENT ACCURACY FOR PRIMARY PARAMETERS

- Measuring error in ambient from 18°C to 25°C (after 30' warm-up) - see the tables
- Measuring error outside this temperature range: ± 0.02% F.S. for each °C out of range.
- Sensitivity and accuracy in voltage measurements:
  direct input with max. voltage = 550 Vrms at Full Scale;
  Input voltage crest factor ³1.6;
  0.03 VA for each phase.

Alternating voltage sensitivity, Full scale and accuracy			
Nominal Range	Sensitivity	Full Scales	ε from 20% F.S. to 100%F.S. VIP ENERGY
140 Vrms	111 mV	140 V	0,3% F.S. + 0,3% L.t.
550 Vrms	480 mV	550 V	0,3% F.S. + 0,3% L.t.

- Sensitivity and accuracy in current measurements.
  Direct input with max. 5A at Full Scale. 0.07Ω burden for each current transformer.
  Input current crest factor ³ 1.6.

Alternating voltage sensitivity, Full scale and accuracy			
Nominal Range	Sensitivity	Full Scales	ε from 20% F.S. to 100%F.S. VIP ENERGY
0,30 A	0,2 mA	0,30 A	0,5% F.S. + 0,5% L.t.
1,50 A	1 mA	1,50 A	0,3% F.S. + 0,3% L.t.
5,00 A	3,2 mA	5,00 A	0,3% F.S. + 0,3% L.t.

- • Accuracy in voltage and current measurements in relation to frequency: for signal frequencies in the range 20÷90 Hz no error in addition to those indicated in the tables above.
- Precision in measurement of secondary parameters: measurements (single-phase or three-phase) of power, CosØ, active energy: Class 1 IEC 1036.
- Frequency measurement accuracy: 20÷99 Hz ±0.1 Hz;100÷600 Hz ±1 Hz +0.5% Rdg.
- Measurements of other secondary parameters: the error is expressed by the formula which defines the parameter, in relation to V, I W.

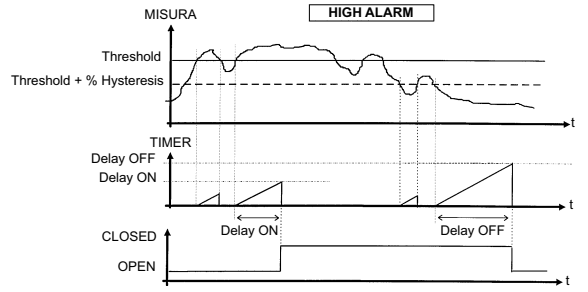
Formulae used for single-phase and three-phase measurements

Instantan. rms voltage	$V_{1N}=\sqrt{\frac{1}{n}\sum_{1}^{n}(V_{1N})_i^2}$	Three-ph. Voltage	$V_{\hat{y}}=\frac{VL1+VL2+VL3}{\sqrt{3}}$ STAR $V_{\hat{y}}=\frac{V_{12}+V_{23}+V_{31}}{3}$ DELTA
Instantan. active power	$W_1=\frac{1}{n}\sum_{1}^{n}(V_{1N})_i\cdot(A_1)_i$	Three-phase reactive power	$VAr_{\hat{y}}=VAr_1+VAr_2+VAr_3$
Instantan. power factor	$\cos\emptyset_1=\frac{W_1}{VA_1}$	Three-phase current	$A_{\hat{y}}=\frac{VA_{\hat{y}}}{\sqrt{3}\cdot V_{\hat{y}}}$
Instantan. rms current	$A_1=\sqrt{\frac{1}{n}\sum_{1}^{n}(A_1)_i^2}$	Three-phase active power	$W_{\hat{y}}=W_1+W_2+W_3$
Instantan. apparent power	$VA_1=V_{1N}\cdot A_1$	Three-phase apparent power	$VA_{\hat{y}}=\sqrt{W_{\hat{y}}^2+VAr_{\hat{y}}^2}$
Instantan. reactive power	$VAr_1=\sqrt{(VA_1)^2-(W_1)^2}$	Three-phase power factor	$\cos\emptyset_{\hat{y}}=\frac{W_{\hat{y}}}{VA_{\hat{y}}}$
Crest Factor (1/Transformer Harmonic Derating Factor)	$C.F.1=\frac{I_{peak}}{\sqrt{2}\ I_{RMS}}=1/THDF1$		

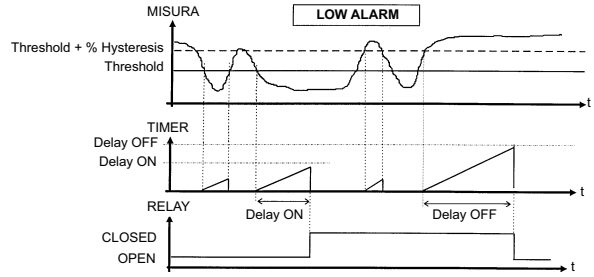
SIGNAL OUTPUT

- **RS-485** - Isolated serial output for shielded twisted pair cable up to 1.2 Km, 9600/1200 baud, 7 data, 1 o 2 stop bit, parity, NO/E/O parity bit, JBUS/MODBUS ASCII protocol, up to 247 slave instrument.
- **Pulses** - 2 terminal outputs 280 VAC Rms 100 mA insulated (insulation 1500 Vrms), selectable frequency from 1 imp./1KWh to 999 imp./Wh.
- **Optic fibre** - By means of external converter PC 485 OF-LINK, VIP485 OF-LINK and 2 optic fibres (HFBR or VERSATILE LINK HP type connector) plastic fibre up to 70 m (plastic fibre), glass fibre up to 500 m.
- **Alarms**

VIP ENERGY ALM ALARM DIAGRAMS



Threshold: occurrence threshold set on VIP ENERGY. For alarms of the “high” type, as soon as the measurements is higher than the threshold, relay closing timer starts counting.
Delay ON: the relay will close only if the measurements is steadily over the threshold for the set Delay ON time.
Hystheresis: the opening mechanism will start only if the measurements goes under the Threshold-%Hystheresis value.
Delay OFF: the relay will open only if the measurements is steadily under the Threshold -%Hystheresis value for the set Delay OFF time.



Threshold: occurrence threshold set on VIP ENERGY. For alarms of the “low” type, as soon as the measurements is lower than the threshold, relay closing timer starts counting.
Delay ON: the relay will close only if the measurements is steadily under the threshold for the set Delay ON time.
Hystheresis: the opening mechanism will start only if the measurements goes over the Threshold+%Hystheresis value.
Delay OFF: the relay will open only if the measurements is steadily over the Threshold+%Hystheresis value for the set Delay OFF time.

17 instruments in 1

Volt | True RMS value
Amp
P.F., cosØ
W
var
VA
Hz
kWh
kvarh
kWh
kvarh

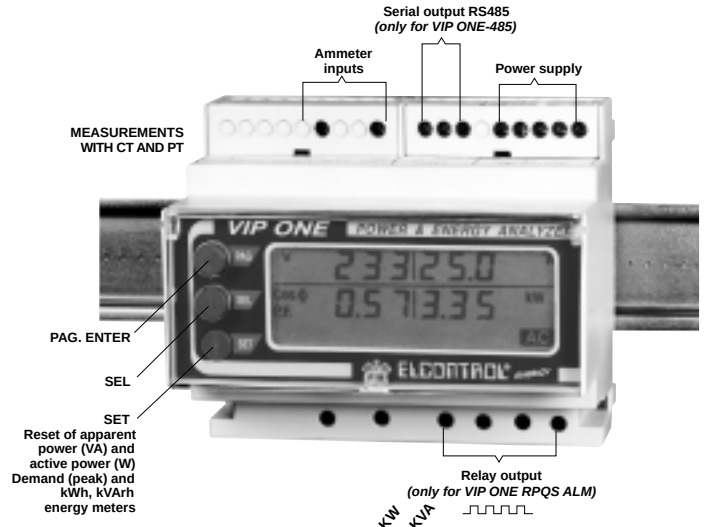
TOP PERFORMANCE IN A SMALL PLACE

- **17 Measuring functions in 105 mm of DIN rail (6 DIN modules):**
  - **Volts** Single-phase and Three-phase (rms), **Amps** Single-phase and Three-phase (rms), **P.F. cosø** Single-phase and Three-phase, **W** Single-phase and Three-phase, **var** Single-phase and Three-phase, **Va** Single-phase and Three-phase, **Hz**.
  - Energy counters **kWh**, **kvarh**, or import/export **kWh**, **kvarh** (kWh, KVAh selecting STD2).
  - Storage of average, apparent and active **power peaks**.
  - True Rms measurements from 200 mW(7,5V 23mA) to 999 GW (999999 V, 999999 A).
  - Unbalanced three-phase systems.
- LCD Display
- Simple and easy to install and use.
- **Fully programmable in the field by means of the keyboard.**
- Signal outputs: available in a number of versions and with various configurations for expansion of VIP ONE functions up to industrial control level.

POWER MEASUREMENTS WHERE AND HOW YOU WANT THEM

- **WHERE**: Installation in any modular panel
- **HOW**: The measurements give a full view of electrical consumption including storage of power peaks and consumption (Maximum demand of Active Power).
- High accuracy (class 1 IEC1036)
- Measures with external VT (single value programmable by keyboard up to 999999 V) single-phase or balanced three-phase configuration.
- VIP ONE allows the use of a voltmetric transformer with secondary 57.5, 63.5, 100, 115, 120, 173, 190, 200, 220V.
- Measures with external CT (primary value programmable by keyboard up to 999999 V) or directly through internal TA up to 5A max. All the models are available with 30A current input.
- VIP ONE allows the use of amperometric transformers with secondary 1, 2, 2.5, 5 A.
- Average KVA: integration times of 1', 2', 5', 10', 15', 20', 30', 60'.
- Average KW: integration times of 1', 2', 5', 10', 15', 20', 30', 60'.

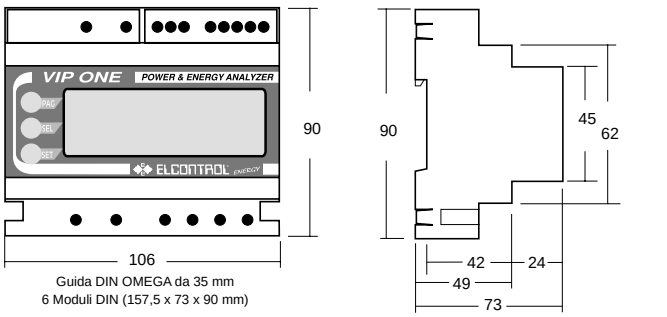
EASY TO INSTALL

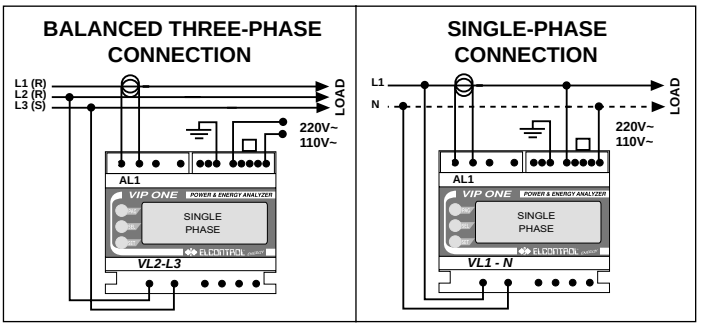


	Volt	Ampère	Watt	VA	Var	cosØ, PF	Max demand (Peak) KW	Max demand (Peak) KVA	Average KW	Average KVA	Average Kvar	Hz	KWh	KVAh	Kvarh	KWh import/export	Kvarh import/export
L1 signle-phase	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
3Ø balanced three-phase	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		

DIMENSIONS (in mm)

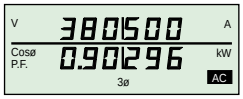
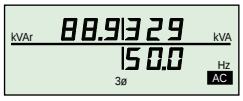
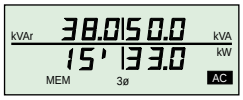
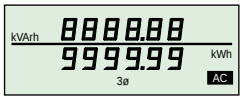
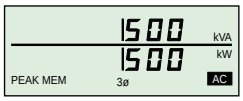
max 2.5 mm² FOR AMMETER CABLE



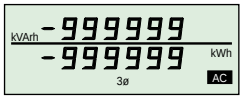
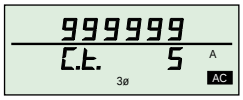
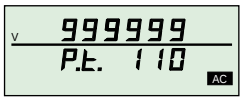
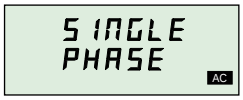


C.VIPONE
Frame for panel mount of VIP ONE

MEASUREMENTS ON DISPLAY PAGES

Volt	Phase-to-phase rms voltage (av. of the 3-ph.)	
Amp	Equivalent current rms of the 3-ph. system	
P.F. cosØ	Power factor of the three-phase system	
kWatt	Active power of the three-phase system	
kvar	Instantaneous reactive power of the three-phase system	
kVA	Instantaneous apparent power of the three-phase system	
Hz	Phase L1 voltage frequency	
kVAr	Average reactive power 1, 2, 5, 10, 15, 20, 30, 60 minutes	
kVA	Average apparent power 1, 2, 5, 10, 15, 20, 30, 60 minutes	
kW	Average active power 1, 2, 5, 10, 15, 20, 30, 60 minutes	
kvarh kVAh	Consumption in kVArh of the three-phase system	
kWh	Consumption in kWh of the three-phase or single-phase system	
kVA	Average apparent power peak of the three-phase system	
kW	Average active power peak of the three-phase system	

N.B. The VIP displays and stores the peak values 15 minutes after it is activated and it update them every 3 minutes.
Integration times other than 15 minutes can be programmed through keyboard (10, 15, 20, 30 minutes).

-kVArh	Reactive energy export (COG4 option)	
-kWh	Active energy export (COG4 option)	
kA	The VIP ONE has a page for selecting the CT.	
kV	The VIP ONE has a page for selecting the VT.	
SINGLE	4 wires L1, L2, L3, N (star)	
THREE	3 wires L1, L2, L3, (delta)	
RELAY STATUS	Only RPQS, ALM	

GENERAL SPECIFICATIONS

- **Inputs:** Voltmeter: L1-N max 550 Vrms (single-phase)
  L2-L3 max 550 Vrms (three-phase)
  balanced from 20 to 600 Hz.
  Ammeter: 5A or 30A from 20 to 600 Hz.
- **Voltmeter input overload:** Peak voltage 2000 Vrms (60 seconds)
- **Ammeter input overload:** 20 times Full Scale value - 1 sec. (with an overload cut-out triggered at the limit values).
- **Number of scales:** 2 voltage scales; 3 current scales.
- **Automatic scale change:** response time at scale change: 1,2 sec; The passage to the upper scale takes place at 105% of the inserted scale; The passage to the lower scale takes place at 20% of the inserted scale.
- **Dimensions:** Length= 106 mm (9 DIN modules); Height= 90 mm; Depth= 73 mm
- **Weight:** 550 gr.
- **Protection degree:** instrument IP20; front panel IP40.
- The measures stored are saved on EEPROM (1.000.000 write min.) which garantees the preservation of the data for 40 years.

SERVICE AND TESTING CONDITIONS

- Ambient service conditions:
  ambient temperature range: from -10°C to + 60°C.
  relative humidity range (U.R.): from 20% to 80%.
- Storage temperature: from -20°C to + 70°C.
- Condensation: not permitted.
- Isolation according to VDE 0110 groupe C for service voltage -550 VAC rms.
- Isolation resistance ³ 500 MÝ between input connectors and external case.
- Isolation voltage between the input connectors: trial at 2000 Vrms at 50 Hz for 60 sec.
  Between each connector and the case: trial at 3000 Vrms for 60 sec.
- Security reference rules: IEC 348, VDE 411 class 1 for service voltage over than 650 VAC rms, IEC 1010-1, EN 61010-1, 550V.
- EMC reference rules: EN 50081-1, EN 50082-2, EN 55011, EN 55022.

POWER SUPPLY

- Mains: 110/220V ~ ±10%, 50/60Hz. Available also at 24 VDC under request.
- Instrument consumption: 3 VA
- Immunity to microinterruption: 0.1 sec.

MEASUREMENT OF PRIMARY PARAMETERS

- Measuring method: Fixed sampling and analog/digital conversion
- Sampling frequency: 1.25 KHz
- Number of samples per phase: 125 (100 msec).
- Measuring interval: 0.5 sec.
- Zero self-correction: every 0.5 sec.

MEASUREMENT ACCURACY FOR PRIMARY PARAMETERS

- Measuring error in ambient from 18°C to 25°C (after 30' warm-up) - see the tabels
- Measuring error outside this temperature range: ± 0.02% F.S. for each °C out of range.
- Sensitivity and accuracy in voltage measuments: direct input wit max. voltage = 550 Vrms at Full Scale;
  Input VoltageCrest Factor ³1.6
  0.03 VA for each phase.

Alternating voltage sensitivity, Full scale and accuracy			
Nominal Range	Sensitivity	Full Scales	ε from 20% F.S. to 100% F.S. VIP ONE
140 Vrms	111 mV	140 V	0,3%F.S. + 0,3% L.t.
550 Vrms	480 mV	550 V	0,3%F.S. + 0,3% L.t.

- Sensitivity and accuracy in current measurements.
  Direct input with max. 5A at Full Scale. 0.07Ω Burden for each current transformer.
  Input current crest factor ³ 1.6.

Alternating voltage sensitivity, Full scale and accuracy			
Nominal Range	Sensitivity	Full Scales	ε from 20% F.S. to 100% F.S. VIP ONE
0,30 A	0,2 mA	0,30 A	0,5%F.S. + 0,5% L.t.
1,50 A	1 mA	1,50 A	0,3%F.S. + 0,3% L.t.
5,00 A	3,2 mA	5,00 A	0,3%F.S. + 0,3% L.t.

- Accuracy in voltage and current measurements in relation to frequency: for signal frequencies in the range 20÷90 Hz no error in addition to those indicated in the tables above.
- Precision in measurement of secondary parameters: measurements (single-phase or three-phase) of power, CosØ, active energy: Class 1 IEC 1036.
- Frequency measurement accuracy: 20 ÷ 99 Hz ± 0.1 Hz - 100 ÷ 600 Hz ± 1 Hz + 0.5% Rdg.
- Measurements of other secondary parameters: the error is expressed by the formula which defines the parameter, in relation to V, I W.

FORMULAE USED FOR SINGLE-PHASE MEASUREMENTS

Instantan. rms voltage	$V_{1N}=\sqrt{\frac{1}{n}\sum_{1}^{n}(V_{1N})_i^2}$
Instantan. active power	$A_1=\sqrt{\frac{1}{n}\sum_{1}^{n}(A_1)_i^2}$
Instantan. power factor	$W_1=\frac{1}{n}\sum_{1}^{n}(V_{1N})_i\cdot(A_1)_i$
Instantan. rms current	$VA_1=V_{1N}\cdot A_1$
Instantan. apparent power	$\cos\emptyset_1=\frac{W_1}{VA_1}$
Instantan. reactive power	$VAr_1=\sqrt{(VA_1)^2-(W_1)^2}$

FORMULAE USED FOR THREE-PHASE MEASUREMENTS

Equiv. three-ph. voltage	$V_{23}=\sqrt{\frac{1}{n}\sum_{1}^{n}(V_{23})_i^2}$
Three-ph. reactive power	$A_1=\sqrt{\frac{1}{n}\sum_{1}^{n}(A_1)_i^2}$
Equiv. three-ph. current	$VAr_\Sigma=\sqrt{3}\cdot\frac{1}{n}\sum_{1}^{n}(V_{23})_i\bullet(A_1)_i$
Three-phase active power	$VA_\Sigma=\sqrt{3}\,V_{23}\bullet A_1$
Three-ph. apparent power	$W_\Sigma=\sqrt{VA_\Sigma^2-VAr_\Sigma^2}$
Equiv. three-ph. power factor	$\cos\emptyset_\Sigma=\frac{W_\Sigma}{VA_\Sigma}$

SIGNAL OUTPUT

- **RS-485** - Isolated serial output for shielded twisted pair cable up to 1.2 Km, 9600/1200 baud, 7 data, 1 o 2 stop bit, parity, NO/E/O parity bit, JBUS/MODBUS ASCII protocol, up to 247 slave instrument.
- **Pulses** - 2 terminal outputs 280 VAC Rms 100 mA insulated (insulation 1500 Vrms), selectable frequency from 1 imp./1KWh to 999 imp./Wh.
- **Optic fibre** - By means of external converter PC 485 OF-LINK, VIP485 OF-LINK and 2 optic fibres (HFBR or VERSATILE LINK HP type connector) plastic fibre up to 70 m (plastic fibre), glass fibre up to 500 m.

VIP ONE - Models available

Choice of the models

BASIC MODELS

VIP ONE
standard model

VIP ONE RPQS
In addition to the measuring functions, it is equipped with a relay or pulse output

VIP ONE ALM
it has all the functions of the RPQS model plus the possibility of alarms

OPTIONS

24VDC
24VDC feeding

485
RS485 serial output

485 24VDC
power supply 24VDC with standard or ONE WAY transmission

All models are available also with 30A current input

VIP ONE, VIP ONE 485

Standard model for SINGLE-PHASE or BALANCED THREE-PHASE systems

For direct measurements up to 5A, 550V, or with external CT, PT up to 999999 A, 999999 V max.
All the models are available with 30A current input.
Measures and displays Volts, Amps, W, P.F. cosø, var, VA, Hz, ±kwh, ±kvarh, kVAh, VA Peak, W Peak, Average kW, Average kVA, Average kvar, replacing 17 instruments and using the space and connections of just one.
LV, MV, HV measurements with single-phase or balanced three-phase insertion.
4-quadrant energy counters kWh, kvarh Import/Export.
Free selection of transformers.
Protection password of SET-UP pages and reset of energy counters of power peaks.
The 485 version is equipped with a RS485 serial output.
Possibility of automatic transmission type "ONE WAY" every second.
Protocol compatible with the one of VIP-OF (SHORT RS422) model.

VIP ONE RPQS, VIP ONE RPQS 485

In addition to the measuring function, they are equipped with pulse output for INDUSTRIAL MONITORING

2 SOLID STATE RELAY OUTPUTS with pulse frequency proportional to 2 out of the P (P+ or P- with COG4 option), Q (Q+ inductive or Q- capacitive), S (active, reactive, apparent) powers selection by keyboard.
In addition to the measuring function it is equipped with 2 solid state relay outputs, volt-free contacts (280VAC rms max. 100mA max.). They supply pulses with frequency proportional to the power measured.
A simple display menu and SELECT, SET push-buttons allow selecting 2 out of powers: active (P, P+ or P- with COG4 option selected), reactive (positive Q+ inductive, negative Q- capacitive), apparent (S) and different output frequencies according to requirements:
Min. 1 pulse= 1 MWh (Mvarh) (MVAh)
Max. 999 pulses= 1 Wh (varh) (VAh)

- RPQ (P+ or P- with COG4 option, Q+ or Q-) selection: supplies pulses proportional to the active energy (P=W) and reactive (Q=var) for measurements of active energy (kWh) and reactive (kvarh).
- RPS (P+ or P-) selection: supplies pulses proportional to the active energy (P=W) and apparent (S=VA) for measurements of active energy (kWh) and apparent (kVAh).
- RSQ (Q+ or Q-) selection: supplies pulses proportional to the apparent energy (S=VA) and reactive (Q=var) for measurements of apparent energy (kVah) and reactive (kvarh).

In the RPQS-485 version it is possible a remote control (by PC) of 2 loads.

VIP ONE ALM, VIP ONE ALM 485

In addition to the RPQS functions, they are are equipped with relay output for ALARMS

MINIMUM and MAXIMUM alarms on any 2 measurements chosen by the user from 27 of those displayed, with selection of the ON and OFF delay time (from 0 to 999 seconds) and of the MINIMUM and MAXIMUM threshold hysteresis (from 0 to 17.5% in steps of 2.5%) for each of the two relays which can be connected to the alarms.
The VIP ONE ALM-485 also has all the functions of the VIP ONE RPQS-485.

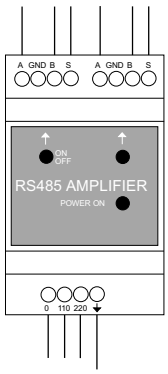
VIP ENERGY and VIP ONE - with RS485 option

The VIP ENERGY-485 and the VIP ONE 485 enlarge an already wide range of portable and panel mounting instruments. Elcontrol Energy can therefore solve the problem of a reliable ad economical connection of its own instrumentation with the VIPNET-485 monitoring network, a complete system for measurement and monitoring of energy, composed by instruments VIP ENERGY-485 and VIP ONE 485 connected to a Personal Computer where a software VIP or VIPVIEW is installed. This network is based on the electrical standard RS485, whereas the communication protocol has been realized according to the standard JBUS/MODBUS, extended addressable, via signal repeaters, up to 247 VIP ENERGY-485 or VIP ONE 485.
Elcontrol Energy has opto-isolated the communication ports of VIP ENERGY-485 and VIP ONE 485 and galvanically isolated the voltage and current inputs of the electrical interfaces, so as to allow its VIPNET-485 networks to operate in highly aggressive environments where electrical noise and overvoltage conditions arise.
The maximum value of the tollerable pulse overvoltage reaches 2500 VAC per 1 minute.

Every VIP ENERGY-485 and VIP ONE 485 are individualised by its own address which can be configured in the field by means of the keyboard.
The VIP ENERGY-485 and VIP ONE 485 connection to the network is via a shielded single pair cable connected to the terminals located in the options area of the instrument.

"REPEATER-485" SIGNAL REPEATER

Power supplied at 220VAC ±10% or at 110VAC ±10%, the REPEATER-485, signal repeater, is a bi-directional amplifier connected to the VIPNET-485 network according to the following diagram:



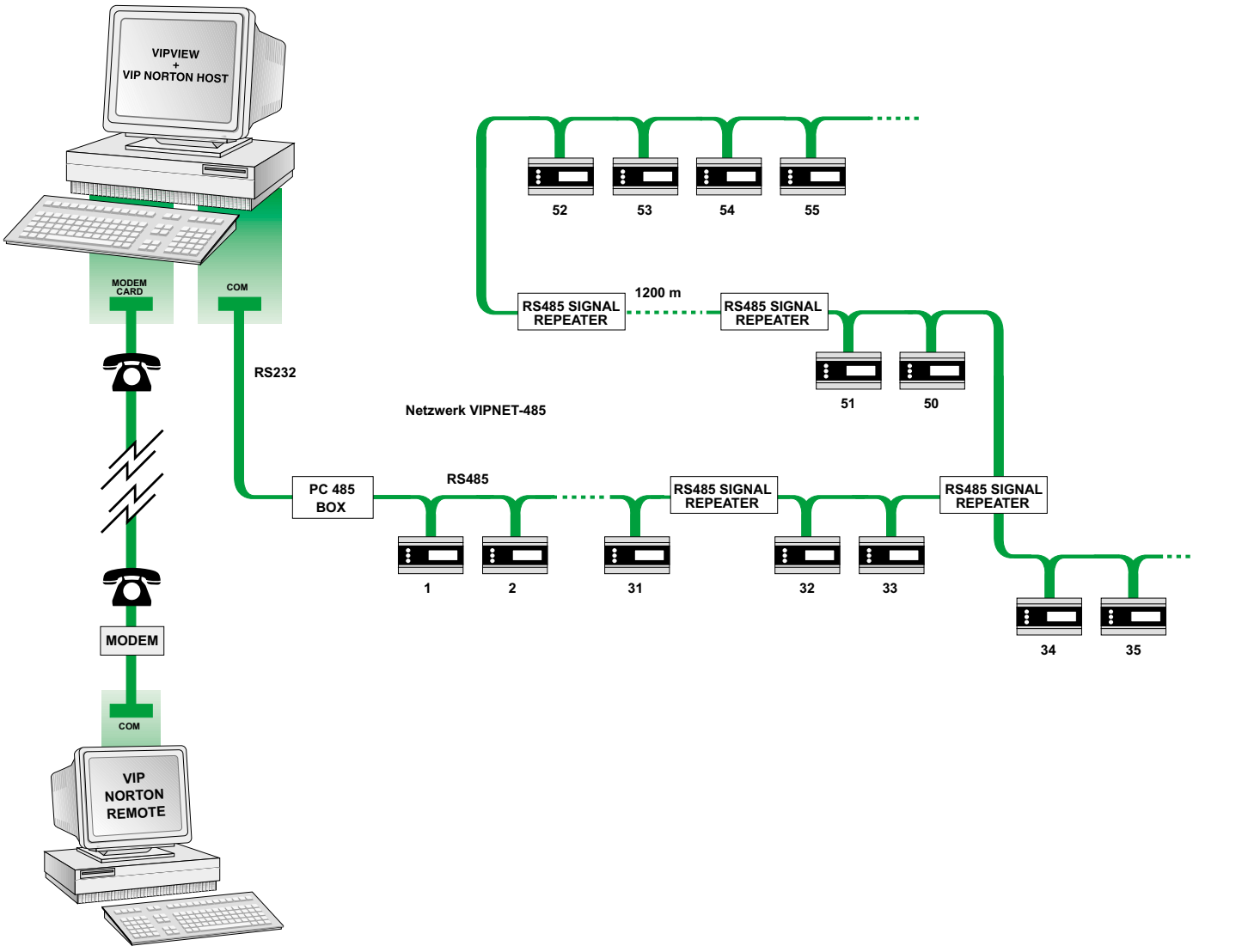
Depending on the type of system, the REPEATER-485s can be utilised in various network configurations, both the "linear" type (Linear Bus Tipology) or the "tree" type (Tree Tipology).

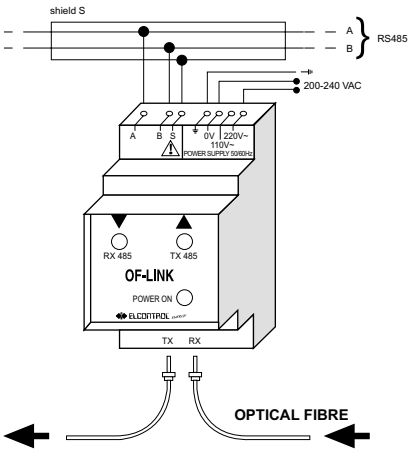
EXTERNAL CONNECTIONS AND SET-UP OF THE RS485 OPTION

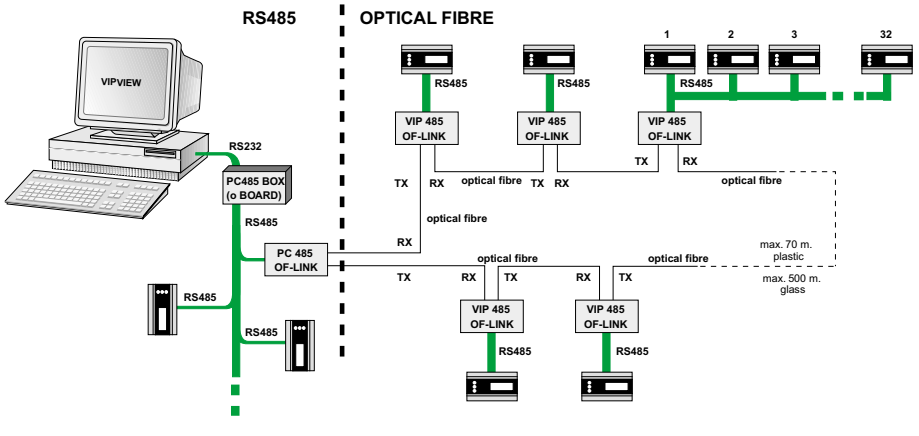
The VIP ENERGY-485 and VIP ONE 485 can be connected to a PC via a single pair shielded cable with maximum length of 1200 mt. Other instruments or devices can be connected to the same line (VIP ENERGY-485, VIP ONE 485 or REPEATER-485 signal repeaters) for up to 31 units. Additional groups of 32 units can be added by means of the REPEATER-485 signal repeaters for a maximum of up to 247 VIP ENERGY-485 and VIP ONE 485.

SPECIFICATIONS OF THE VIP ENERGY-485 SOFTWARE PROTOCOL

The software communication protocol is compatible with the JBUS/MODBUS standard with data rate of 9600 and 1200 baud (7 data bit, 1 or 2 stop bit, parity bit NONE, ODD, EVEN programmable by means of the keyboard) with a master represented by the PC-485-BOARD (Personal Computer board) or by the PC-485-BOX (external converter).







"PC 485 OF LINK" and "VIP 485 OF LINK" CONVERTERS

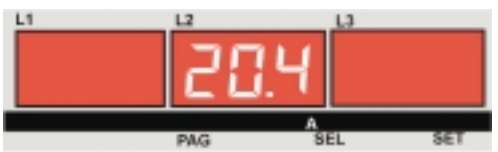
Power supplied at 220VAC ±10% or at 110VAC ±10%, VIP 485 OF-LINK and PC 485 OF-LINK interfaces RS485 twisted pair cable and 2 (TX and RX) optic fibres. It is therefore possible to replace portions of RS 485 network with 70 meters of plastic fibre (or 500 meters of glass fibre) in EMI high polluted environments; the VIP 485 OF-LINK is designed for connection to the RS485 leading out from a VIP ONE 485 or from a VIP ENERGY 485. The PC 485 OF-LINK is intended for connection to the RS485 - PC side. Up to 32 VIP ONE 485 or VIP ENERGY 485 instruments can be connected to the RS 485 side of a single VIP 485 OF-LINK converter. Any number of VIP 485 OF-LINK can be connected to the OF side: the only constraint is that of 247 instruments max with RS485.

DMM3

warranty 3 years

Pg. M1: VL1, VL2, VL3

Pg. M2: AL1, AL2, AL3

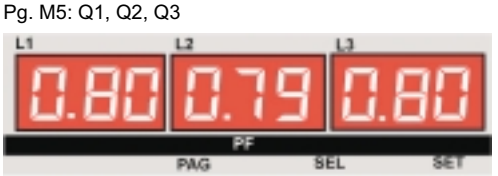


Pg. M2n: A neutral

Pg. M3: P1, P2, P3

Pg. M4: S1, S2, S3

Pg. M5: Q1, Q2, Q3



Pg. M6: P.F.1, P.F.2, P.F.3

Pg. M7: V, A, Hz

Pg. M8: P, P.F., S

DMM3 - Multi Panel Meter

DMM3 is a 9 DIN module multi-functional instrument ideal for the measurement and display of electrical parameters.

The large clear led displays showing the parameters and values are easily read under all lighting conditions.

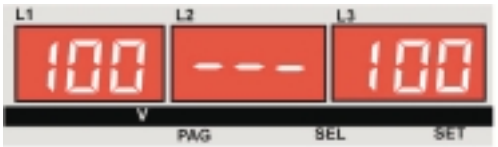
The instrument displays up to 28 parameters (see table), and is suitable for installation in single phase, two phase and three phase systems. Connection is via sturdy 2.5 mm^2 terminals and 5A secondary CTs for current measurement.

Operation is via simple pushbuttons located on the front panel : PAG, SEL, SET.

- ¤ Replaces traditional analogue instruments with one digital package.
- ¤ Improved accuracy and reliability.
- ¤ Simplified installation reducing costs.
- ¤ Competitive pricing.
- ¤ Superior performance on distorted waveforms

MODELS AVAILABLE

- ¤ DMM3 : Standard
- ¤ DMM3 - 4-20 mA : 2 analogue outputs 4-20 mA or 0-20 mA
- ¤ DMM3 - 485 : RS485 output. MODBUS ASCII or BCD or IEEE
- ¤ DMM3 - ALM : alarm-pulsed-relays outputs
- ¤ DMM3 - 485 - ALM : RS485 port and alarm-pulsed-relays outputs
- ¤ DMM3 - LON FTT10 : LonWorks interface FTT10
- ¤ DMM3 - LON RS485 : LonWorks interface RS485



Pg. S1: PT/TV SET UP

Pg. S2: CT/TA SET UP

Pg. S3a: 3 wire

Pg. S3b: 4 wire

Pg. S3c: 2 phase

Pg. S3d: 1 Phase

TECHNICAL CHARACTERISTICS

Maximum size (mm): instrument: 158.5 X 73 X 90. (9 DIN module)
Power supply: from network 230 V ~ or 115 V ~ ± 10% @ 50/60 Hz (4 VA)
Display: Seven-segment 13 mm red LED's , 3 digit on 1 line
Voltmeter inputs: VL1, VL2, VL3, N up to 430 V ~ phase-neutral, 750 V ~ phase-to-phase, 35 ÷ 400 Hz. Voltmeter input impedance: 2 M ohm
Voltage input overload: max 850 V phase-neutral
Amperometric inputs: AL1, AL2, AL3. Consumption 1 VA.
Three /5A external curr.transf. required 3 PH And n, 3 PH
Amper. input overload: max 7 A ~
Number of scales: 1 voltage scale, 2 current scales
Measurements: T.R.M.S. (true effective value) up to 24th harmonic (50 Hz), 20th (60 Hz)
Precision: 1% reading per V and I; 2% for power
Suitable for connection to: Single phase or three phase star, three phase delta, or two phase systems
Weight of instrument: 0.6 Kg
Protection level: IP40
Ambient temperature range: -10°C ÷ + 60°C
Relative humidity range (R.H.): from 20% to 80%. Condensation: non condensing.

FUNCTIONING

At power on, the VIP39din displays the last page selected before power off. Use the PAG key to scroll through the different measurement pages. To access SETUP mode, press at the same time the PAG and the SEL keys. The parameters are programmed with the SEL and SET keys. Use the PAG key to scroll through the various SETUP pages and return to the Measurement page.
The type of connection is configured in SETUP:
3 PH and N (Three phases with neutral, i.e. Star or 4 wires);
3 PH (Three phases without neutral, i.e. Delta or 3 wires);
2 PH = Two - phase.
1 PH = Single - Phase

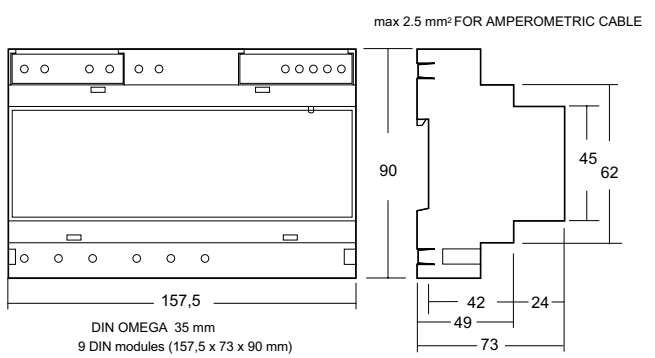
STANDARDS and REGULATIONS

The DMM3 family of products conforms to Directive 89/336/EEC (EMC) and to Directives 73/23/EEC - 93/68/EEC (LVD). It is in compliance with standards IEC 1010-1 430 V for Cat. III and protection level 2 according to IEC 664-664 A (Safety), EN500081-1, EN50082-2 and EN55022 (EMC).

28 FUNCTIONS

	V	kA	W	VAR	VA	P.F.	Hz	A neutral	kWh	kVArh	kVAh
L1	•	•	•	•	•	•	•				
L2	•	•	•	•	•	•					
L3	•	•	•	•	•	•					
3ϕ	•	•	•		•	•		•	•	•	•

DIMENSIONS (mm)



DM3 DEM3 DMD3 DET3 - Three-phase energy analyzers

DM3
12 INSTRUMENTS IN 1

DM3 Digital meter for single-phase or unbalanced three-phase systems

Single or three-phase system Voltage (V)
Phase L1, L2, L3 Voltage (V)
Single or three-phase system Current (A)
Phase L1,L2,L3 Current (A)
Single phase or three-phase Active Power (kW)
Single or three-phase inst. Power Factor, P.F.
Voltage frequency (Hz)
Single or three-phase inst. Reactive Power (kvar)

DEM3
10 INSTRUMENTS IN 1

DEM3 Digital counter and meter for single-phase or unbalanced three-phase systems

Voltage of single/three-phase systems (V)
Current of single/three-phase systems (A)
Single/Three-phase Active Power (kW)
Single/three-phase Power Factor, P.F.
Voltage frequency (Hz)
Single/Three-phase Reactive Power (kvar)
Max single/three-phase average active power (kW)
Max single/three-phase average reactive power (kvar)
Single/three-phase Active Energy (kWh)
Single/three-phase Reactive Energy (kvarh)

DMD3
8 INSTRUMENTS IN 1

DMD3 and DMD3-485 Impulse digital counter for single-phase or unbalanced three-phase systems

Inst. single/three-phase Active Power (kW)
Inst. single/three-phase Reactive Power (kvar)
Max single/three-phase average Reactive Power (kvar)
Single/three-phase Active Energy (kWh)
Single/three-phase Reactive Energy (kvarh)
Single/three-phase Active Energy impulse output (kWh) (DMD3); 485 output (DMD3 485)
Single/three-phase Reactive Energy impulse output (kvarh) (DMD3); 485 output (DMD3 485)

DET3
12 INSTRUMENTS IN 1 VIA RS485

DET3 Transducer without display with 485 output for single-phase or unbalanced three-phase systems

Voltage of single/three-phase system (V)
Current of single/three-phase system (A)
Single/three-phase Active Power (kW)
Single/three-phase Power factor, P.F.
Voltage frequency (Hz)
Single/three-phase Reactive Power (kvar)
Single/three-phase average Active Power (kW)
Single/three-phase average Reactive Power (kvar)
Max. single/three-phase average Active Power (kW)
Max. single/three-phase average Reactive Power (kvar)
Single/three-phase Active Energy (kWh)
Single/three-phase Reactive Energy (kvarh)

MODBUS communication protocol also used by VIP ENERGY, VIP ONE and VIP96

Volt single-phase/three-phase; **Amp** single-phase/three-phase; **P.F.**; **Hz**; **kWh**; **kvarh**; inst. **kW**; average **kW**; max. **kW**; inst. **kvar**; average **kvar**; max. **kvar**; **kWh kvarh impulsive output**; **RS485 serial outputs**

TOP PERFORMANCE IN A COMPACT PACKAGE

- **Max 12 measuring functions in 105 mm of DIN rail (6 DIN modules)**
- **Volt** single-phase and three-phase (rms), **Amp** single-phase and three-phase (rms), **P.F.** three-phase, **W** three-phase , **var** three-phase, **Hz** Frequency, Energy counters **kWh** and **kvarh**
- Measures on single and three-phase balanced and unbalanced systems
- Backlit display
- LCD display (2 lines)
- Models available with 3 x 230/400VAC power supply or 3 x 127/220VAC

POWER MEASUREMENT WHERE AND HOW YOU WANT IT

- **WHERE** : Easy installation in modular DIN housing
- **HOW** : The measurements give a full view of electrical consumption
- High accuracy :
  Active energy class 2 IEC 1036
  Reactive energy class 3 IEC 1268
- Isolated CT inputs
- Measurements with external CT, 5A secondary (primary value of CT selectable from 5A to 99999 A)
- 3 or 4 wire connection

GENERAL SPECIFICATIONS

POWER SUPPLY

- Measurement Voltage 3 x 230/400 or 3 x 127/220 VAC (-20% +15%)
- Power supply Voltage supplied from voltmeter connection VL3 VL2
- Consumption instrument 4VA

INPUTS

- CT input : 5A 0,1 VA.
- Isolated CT inputs
- CT primary programmable by keyboard from 5/5 and 99999/5
- Max current : 6A
- Frequency : from 45 to 65 Hz
- Measurement storage : on EEprom (min. 10 millions writings)
- Dimensions : 6 modules DIN, 105 mm. x 90 mm. x 73 mm.
- Weight : 450 gr.
- Installation : DIN rail, Omega 35 mm.

MEASUREMENT OF PRIMARY PARAMETERS

- Measuring method : sampling and analog/digital conversion
- Sampling frequency : 2,4 kHz
- Connection: 3/4 wire single or three-phase
- Display : backlit display LCD 2 lines

OUTPUTS

- Volt-free contact (2): 1 kWh/imp and 1 kvarh/imp (DMD3 only)
- RS485 output for the connection to personal computer (DET3 only)

SERVICE AND TESTING CONDITIONS

- Ambient service conditions :
  operating temperature from -10°C to + 55°C
  relative humidity (R.H.) : from 20% to 80%
- Storage temperature from -20°C to +70°C
- Condensation : not permitted
- Protection degree : instrument IP20; front panel IP40
- Safety reference standards: IEC1010 440 V CAT III
- EMC reference standards: EN 50082-1 EN 50082-2 EN 55011 EN 55022
- Active energy accuracy : class 2 according to IEC 1036
- Reactive energy accuracy : class 3 according to IEC 1268

MEASUREMENTS ON DISPLAY PAGES

DM3

Volt	Phase-to-phase rms voltage (average of the three phases) in three-phase system or phase-neutral voltage in single-phase system
kW	Active power of single or three-phase system
Amp	Current rms in single or three-phase system
P.F.	Power factor of the single or three-phase system
kvar	Instantaneous reactive power of single or three-phase system
Hz	Voltage frequency
Volt L1	Rms voltage between phase L1 and neutral or L1-L2
Volt L2	Rms voltage between phase L2 and neutral or L2-L3
Volt L3	Rms voltage between phase L3 and neutral or L3-L1
Amp L1	Phase L1 rms current
Amp L2	Phase L2 rms current
Amp L3	Phase L3 rms current
	Protection password of the configuration parameters

DEM3

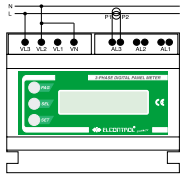
Volt	Phase to phase average Voltage (average of the three phases) in three-phase system or phase-neutral Voltage in single-phase system
kW	Active power of single or three-phase system
Amp	Current rms in single or three-phase system
P.F.	Power factor of single or three-phase system
kvar	Instantaneous reactive power of single or three-phase system
Hz	Voltage frequency
kW	Average active power 1-5-10-15-20-30-60 minutes in single or three-phase system
kVAr	Average reactive power 1-5-10-15-20-30-60 minutes in single or three-phase system
kWh	Consumption in kWh of single or three-phase system
kvarh	Consumption in kvarh of single or three-phase system
	Protection password of the configuration parameters

DMD3

kW	Instantaneous active power of single or three-phase system
kvar	Instantaneous reactive power of single or three-phase system
kW	Average active power 1-5-10-15-20-30-60 minutes in single or three-phase system
kvar	Average reactive power 1-5-10-15-20-30-60 minutes in single or three-phase system
kWh	Consumption in kWh of single or three-phase system
kvarh	Consumption in kVArh of single or three-phase system
	Protection password of the configuration parameters

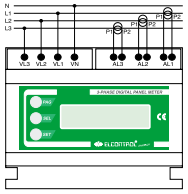
EASY TO INSTALL

Single-phase connection



Single-phase connection 220V
(model 3 x 127/220V)

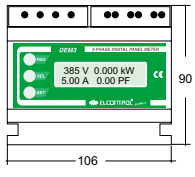
4 wires connection. Valid for all the models of serial DM3, DEM3, DMD3, DET3

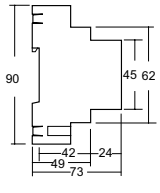


Three-phase connection
(model 3 x 230/400V)

DIMENSIONS (in mm.)

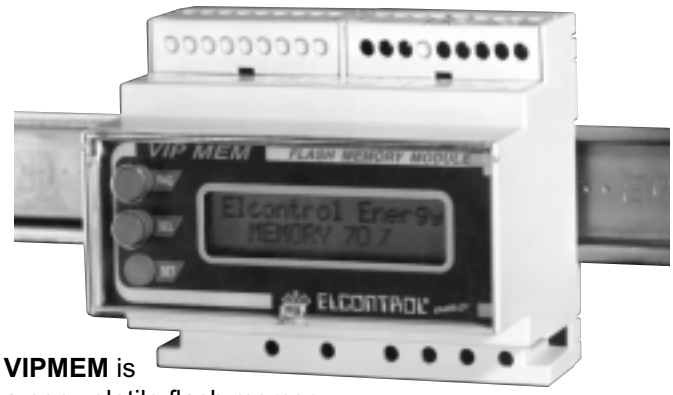
Frame C.VIPONE for panel mount available





VIP MEM - Flash Memory Module

Models with display:
VIP MEM D, VIP MEM DM



Models without display:
VIP MEM , VIP MEM M

VIPMEM is a non volatile flash memory module in a 6 modules DIN case. It is equipped with a 230 / 115 VAC power supply and it is able to store data from a VIPNET 485 monitoring network connected to a serial port RS485. In a second time, it can download stored data to a PC having VIP MEM configuration and downloading software installed and connected either to its serial port RS232 or internal modem.
Five digital optical coupled inputs enable the counting and the storing of state of maximum five external relay contacts / npn open collector pulsed outputs.

VIP MEM General specifications

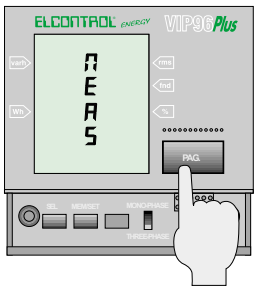
Case:	self-estinguish plastic material
Dimensions:	6 modules standards DIN 43 880 (106 mm. X 90 mm. X 73mm.)
Installation:	OMEGA DIN rail (DIN 46277 EN 50022)
Display (in models D and DM only):	2 lines, 16 columns, backlit LCD display (as DEM3 / DM3 / DMD3).
Pushbuttons (in models D and DM only):	PAG, SEL, SET
Power supply:	230 Vrms/115 Vrms 10% @ 50/60 Hz (5VA).
Communication port:	1 RS232 serial port with 3 wires terminal block (GND, RX, TX) 1 RS485 optoinsulated serial port with 2 wires terminal block (A, B); 1 Modem port (if equipped, shared with RS232 serial output) with two wires terminal block (RING, TIP).
Internal memory:	from 2 Megabytes up to 8 Megabyte, parallel bus, storing also VIP MEM setup data. Saving all the measures, 2 Megabytes memory enables to save data with: 1 instrument read any 10' ---> 3 months 3 instruments read any 10' ---> 1 month 30 instruments read any 10' ---> 3 days Saving only kWh, kvarh, kW: 1 instrument read any 10' ---> 20 months 3 instruments read any 10' ---> 7 months 30 instruments read any 10' ---> 20 days Saving only kWh: 1 instrument read any 10' ---> 30 months 3 instruments read any 10' ---> 10 month 30 instruments read any 10' ---> 1 month
Max. no. of devices connectable to RS485:	max 32 instruments Vip Energy 485, Vip One 485, Vip96 Plus 485, DET3, DMD3 485.
Internal modem (in models M and DM):	with baud rate fixed at 2400 baud.
Built-in Calendar-Clock:	you can select (via PC with a setup program) the automatic data record in the internal memory at regular intervals selectable from 2 seconds up to 24 hours by VIP MEM configuration and downloading PC software.
Digital inputs:	5 optical coupled digital inputs max 24 VDC + 10%, 60 mA, for external relay contacts or npn open collector outputs.
CE Conformity declaration:	the VIP MEM family of products conforms to Directive 89/336/EEC (EMC) and 73/23/EEC - 93/68/EEC (LVD).
Standards:	in compliance with standards IEC1010-1 250V Class III, protection degree 2, according to IEC 664-664A (Safety) EN500081-1, EN500082-2 and EN500022 (EMC Electromagnetic Compatibility)
Operating temperature:	from 0°C to 50°C
Relative Humidity Range (R.H.):	from 20% to 80%
Condensation:	non condensing
Weight:	0,6 Kg.
Protection Level:	instrument IP20, front panel IP40
PC Software:	VIP MEM Windows 9x / NT 4.0. configuration and downloading of stored data software.

MODELS AVAILABLE

VIP MEM 2	2 megabyte flash memory, no lcd Display, no Modem
VIP MEM 8	8 megabyte flash memory, no lcd Display, no Modem
VIP MEM D2	2 megabyte flash memory, with lcd Display, no Modem
VIP MEM D8	8 megabyte flash memory, with lcd Display, no Modem
VIP MEM M2	2 megabyte flash memory, with Modem, no lcd Display
VIP MEM M8	8 megabyte flash memory, with Modem, no lcd Display
VIP MEM DM2	2 megabyte flash memory, with lcd Display and with Modem
VIP MEM DM8	8 megabyte flash memory, with lcd Display and with Modem

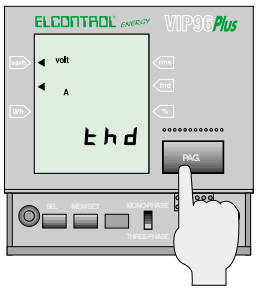
More than 100 measures in single and three-phase balanced systems

Volt | True RMS
Amp | True RMS
P.F.
cosØ
kW
kVA
kvar
Peak kW | import/export COG4 option
Peak kVA | import/export COG4 option
kVAr
Hz
± kWh
± kvarh
Thd
Harm 1÷24
C.F.



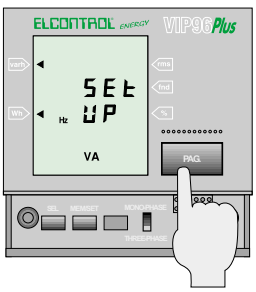
INSTANTANEOUS MEASUREMENTS

Volt, Amps, W, P.F., kvar, kVA, Hz, ± kWh (import/export), ± kvarh (inductive/capacitive), kW, kVA, kvar average and peak values.
Accuracy is 1% (IEC1036).



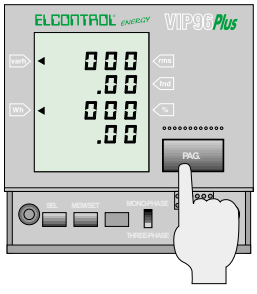
HARMONICS MEASUREMENTS

- Measurement of harmonic values of V & I (1st to 24th) expressed as absolute and percentage values, plus their displacement values.
- Total Harmonic Distortion (THD) of V & I as a percentage of the fundamental and total RMS value.
- Crest factor for V & I expressed as absolute and percentage values.



SET-UP OPTIONS

- Fully programmable for any CT and PT.
- Standard or co-generation energy metering.
- 50/60Hz fundamental selection for harmonics analysis.
- Integration time selection: 1', 2', 5', 10', 15', 20', 30', 60' (for average and peak power values
- RS485 parameter set-up for multipoint serial communication to PC (up to 247 units): 19200 / 9600 / 4800 / 2400 / 1200 baud, 7/8 data, 1/2 stop bit, no / even / odd.
- Pulse and analogic output versions available (programmable dual parameters output).



RESET OPTIONS

- Reset of energy meters.
- Reset of Peak kW and Peak kVA.
- Reset of average kW, kVA, kvar.

VIP96 PLUS - Power and harmonic analyzer

PC SOFTWARE

The VIP96 PLUS is fully compatible with both **VIPLINK/VIPLOAD** and **VIPVIEW** networking software. These packages allow up to 247 instruments to be connected to a central PC via a single cable for automatic data acquisition and realtime viewing of measured values.

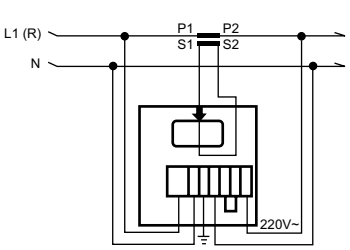
Note: VIPLINK/VIPLOAD and VIPVIEW do not support the harmonic measurement capability of the VIP96 PLUS.

For realtime data transmission from a single instrument to a local PC **VIP96 LINK** is a DOS utility providing:

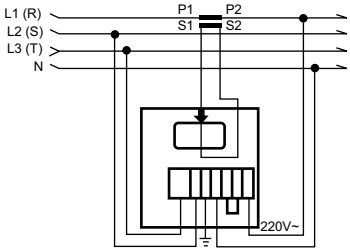
- Display of all measurements and instrument status (RMS, Harmonics and THD).
- Automatic data collection with fully programmable sampling rate.
- Automatic storage to standard TXT file.
- Runs in background in Windows™ if desired.

CONNECTION DIAGRAMS

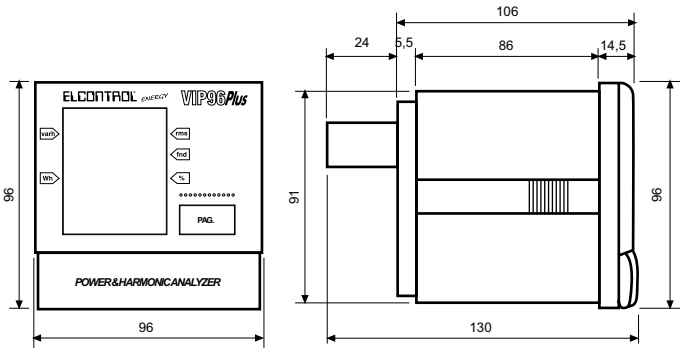
On a single-phase system



On a three-phase system



DIMENSIONS (in mm)



VIP96 Power meter

9 MEASUREMENT FUNCTIONS IN 1

- **Volt** (rms), **Amp** (rms), **P.F. cosØ, kW, kvar, kVA, Hz.**
- Storage of average Active and Apparent Power Peaks.
- Single-phase and three-phase (balanced loads) measurements.
- Measurements from 200 mW (7.5V 23 mA) to 3.9 MW (7.50 V 3 KA).
- Measurements as true RMS value.
- Automatic voltage and current scale change.
- Measurements with external CT (selectable from 5/5 to 3000/5A) or directly with intenal CT up to 5 A max (VIP96).
- Direct measurement up to 30 A (VIP96 - 30A).
- High accuracy (Class 1 IEC1036).
- Very user-friendly.
- Backlit display.
- Signal outputs: available in a number of versions and with various configurations for expansion of VIP96 functions even up to industrial control level.

GENERAL TECHNICAL DATA

- **Inputs:** Voltmeter: (L1-N) max 600 Vrms up to 600 Hz.
  Ammeter: 5 Arms up to 600 Hz.
- **Number of scales:** 3 voltage scales; 3 current scales.
- **Automatic scale change:**
  Scale change response time: 1 sec. max
  Passage to the scale above takes place at 105% of the scale in use. Passage to the scale below takes place at 20% of the scale in use.

Instrument dimensions: 96x96x130 mm.
Instrument weight: 1 Kg.
Protection degree: instrument: IP20; front panel: IP30.

SERVICE AND TESTING CONDITIONS

- **Ambient operating conditions:**
  Ambient temperature range: from -10°C to +50°C.
  Relative humidity range (R.H.): from 20% to 80%.
- **Storage temperature:** from -20°C to +60°C.
- **Condensation:** not permitted.
- **Reference standards:** IEC 348, VDE 411 class 2, for operating voltages - 600 VAC rms, IEC 1010 600 V CAT III, EMC: EN50081-1, EN 50082-2, EN55022

POWER SUPPLY

- **Mains:** 220V~ ±10% / 110V~ ±10%, 50/60 Hz.
- **Instrument consumption:** 4 VA.

MEASUREMENT OF THE PRIMARY PARAMETERS

- **Measuring method:**
  with fixed sampling and analogic/digital conversion
- **Sampling frequency:** 2.5 kHz.
- **Number of samples per phase:** 250 (100 msec)
- **Measuring frequency:** ~0,5 sec.
- **Zero self-correction:** every minute.

MEASURING ACCURACY FOR PRIMARY PARAMETERS

- **Measuring error in ambient from 18°C to 25°C (after 10' warm-up):** (see table)
- **Measuring error outside this temperature range:**
  ± 0,02% F.S for every °C outside the range.
- **Voltage measurement accuracy and sensitivity**
  Direct input with max voltage = 600 Vrms at Full Scale.
  Input voltage crest factor ³ 1,6
  Input impedance ³ 4Mý.
- **Voltage and current measurement accuracy in relation to frequency:** for signal frequencies in the range 20-90 Hz no error apart from those indicated in the tables.
- **Measuring precision of secondary parameters:**
  Measurements of active power, cosø,
  active energy: IEC 1036 class 1.
- **Measurements of the other secondary parameters:**
  the error is expressed by the formula which defines the parameter, in relation to V and I.

Alternating current sensitivity, Full Scale and accuracy			
Nominal Range	Sensitivity	Full Scale	ε from 20% F.S. to 100% F.S.
			VIP96
37 Vrms 174 Vrms 750 Vrms	24 mV 111 mV 480 mV	37,0 V 174 V 750 V	0,5% F.S. + 0,5% L.t. 0,3% F.S. + 0,3% L.t. 0,3% F.S. + 0,3% L.t.

Sensitivity and precision in current measurements:
Direct input with max. 5 Arms at Full Scale.
Crest Factor of input current ³1.6.

Alternating current sensitivity, Full Scale and accuracy			
Nominal Range	Sensitivity	Full Scale	ε from 20% F.S. to 100% F.S.
			VIP96
0,25 A 1,16 A 5A	0,16 mA 0,7 mA 3,2 mA	0,25 A 1,16 A 5,00 A	0,5% F.S. + 0,5% L.t. 0,3% F.S. + 0,3% L.t. 0,3% F.S. + 0,3% L.t.

SIGNAL OUTPUT

- **Pulses:** 2 terminal outputs 280 VAC 100 mA insulated (insulation 1500 Vrms). Selectable frequency 1 imp./Wh or 20 imp./Wh (referred to the CT secondary).
- **Analog:** 2 terminal outputs 0-1 VDC (10 mA max). Accuracy ±1% F.S., linearity ±0.5% F.S. at 25 °C. Voltage range selection 750 V / 250 V.
- **RS232:** Isolated serial output, 9 poles male connector, only TX every 0.5 sec., 2400 baud, 8 data bits, 1 stop bit, no parity.
- **OF:** HFBR type HP connector, up to 70 m (plastic optic fibre), glass optic fibre up to 500 m, only TX every 0.5 sec., 2400 baud, 8 data bits, 1 stop bit, no parity.
- **RS485:** Isolated serial output for shielded twisted pair cable up to 1.2 Km, JBUS/MODBUS ASCII protocol. Up to max 247 slave instruments.
  19200 / 9600 / 4800 / 2400 / 1200 baud, 7/8 data bit, 1/2 stop bit / no / even / odd / parity.

CHOICE OF THE MODELS

- **VIP96:** standard version - 9 measurements.
- **VIP96 - RS232C:** RS232C serial output for PC connection.
- **VIP96 - OF:** fibre optic output for remote processing of data with the PC.
- **VIP96 - APQ:** 2 analog outputs proportional to Active (P) and Reactive (Q) Power.
- **VIP96 - APS:** 2 analog outputs proportional to Active (P) and Apparent (S) Power.
- **VIP96 - ASQ:** 2 analog outputs proportional to Apparent (S) and Reactive (Q) Power.
- **VIP96 - RPQ:** 2 pulse outputs proportional to Active (P) and Reactive (Q) Power.
- **VIP96 - RPS:** 2 pulse outputs proportional to Active (P) and Apparent (S) Power.
- **VIP96 - RSQ:** 2 pulse outputs proportional to Apparent (S) and Reactive (Q) Power.
- **VIP96 - RPT:** RPT-VIP96 output, LED repeater 7 segments.
- **VIP96 PLUS:** standard version - More than 100 measurements.
- **VIP96 PLUS 485:** RS485 serial output for energy monitoring networks.
- **VIP96 PLUS APQS:** 2 analog outputs proportional to 2 of 3 Active (P), Reactive (Q), Apparent (S) Powers. Keyboard selection.
- **VIP96 PLUS RPQS:** 2 pulse outputs proportional to 2 of 3 Active (P), Reactive (Q), Apparent (S) Powers. Keyboard selection.
- **VIP96 PLUS RPT:** RPT-VIP96 output, LED repeater 7 segments.

Note: 30 Amp models available.

VIP 396

Pg. M1: VL1, VL2, VL3

warranty 3 years

Pg. M2: AL1, AL2, AL3

Pg. M6: V, A, Hz

Pg. M2n: A neutral

Pg. M7: P, P.F., S

Pg. M3: P1, P2, P3

Pg. M8: kWh

Pg. M4: S1, S2, S3

Pg. M9: kVArh

Pg. M5: P.F.1, P.F.2, P.F.3

Pg. M10: kVAh

CE

VIP 396 - Multi Panel Meter

now provided with 3 Energy Counters

Vip 396 is a 96 DIN panel mount multi-functional instrument ideal for the mesaurement and display of electrical parameters.

The large clear led displays showing the parameters and values are easily read under all lighting conditions.

The instrument displays up to 25 parameters (see table), and is suitable for intallation in single phase, two phase and three phase systems. Connection is via sturdy 2.5 mm^2 terminals and 5A secondary CTs for current measurement.

Operation is via a simple pushbutton located on the front panel, with set up keys hidden behind a hinged cover.

¤ Replaces traditional analogue instruments with one digital package.

¤ Improved accuracy and reliability.

¤ Simplified installation reducing costs.

¤ Competitive pricing.

¤ Superior performance on distorted waveforms

MODELS AVAILABLE

¤ VIP396 : Standard

¤ VIP396 485 : RS485 port with Modbus ASCII, BCD, IEEE

¤ VIP396 485-4/20 mA : port and analogic outputs 0/4-20mA

¤ VIP396 485-ALM-485 : port and alarm-pulsed-realys outputs

¤ VIP396-LON/FTT10A : LONWORKS interface FTT10

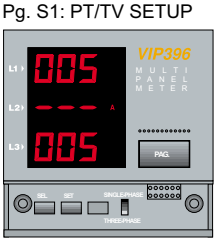
¤ VIP396-LON/FTT10A/ALM : LONWORKS interface FTT10
Two outputs for pulse / alarm / remote control

TECHNICAL CHARACTERISTICS

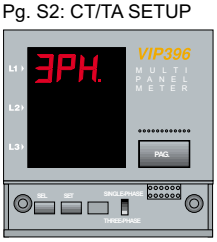
Maximum size (mm): instrument: 96 X 96 X 115.4. Cut-out template: 91 X 91
Power supply: from network 230 V ~ or 115 V ~ ± 10% @ 50/60 Hz (4 VA)
Display: Seven-segment 13 mm red LED's , 3 digit on 3 lines
Voltmeter inputs: VL1, VL2, VL3, N up to 430 V ~ phase-neutral, 750 V ~ phase-to-phase, 35400 Hz. Voltmeter input impedance: 2 M ohm
Voltage input overload: max 850 V phase-neutral
Amperometric inputs: AL1, AL2, AL3, COM. Consumption 1 VA.
Three /5A external curr.transf. required 3 PH And n, 3 PH
Amper. input overload: max 7 A
Number of scales: 1 voltage scale, 2 current scales
Measurements: T.R.M.S. up to 24th harmonic (50 Hz), 20th (60 Hz)
Precision: 1% reading per V and I; 2% for power
Suitable for connection to: Single phase or three phase star, three phase delta, or diphase systems
Weight of instrument: 0.6 Kg
Protection level: instrument IP20, front panel IP30
Ambient temperature range: -10°C + 60°C
Relative humidity range (R.H.): from 20% to 80%. Condensation: non condensing.

FUNCTIONING

Pg. S1: PT/TV SETUP

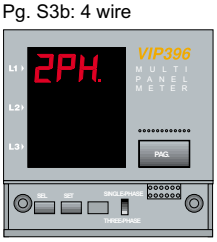


Pg. S2: CT/TA SETUP



Pg. S3a: 3 wire

Pg. S3b: 4 wire



Pg. S3c: 2 Phase

At power on, the VIP396 displays the last page selected before power off. Using the selector switch, select the type of system connected: Single phase system (SINGLE-PHASE) or three phase or diphase system (THREE-PHASE).
Use the PAG key to scroll through the different measurement pages. To access SETUP mode, press at the same time the PAG and the SEL keys.
The parameters are programmed with the SEL and SET keys.
Use the PAG key to scroll through the various SETUP pages and return to the Measurement page.
The type of connection is configured in SETUP:
3 PH and N (Three phases with neutral, i.e. Star or 4 wires);
3 PH (Three phases without neutral, i.e. Delta or 3 wires);
2 PH = Diphase - Two phases
SETUP protection can be used to prevent unauthorised settings and resetting of counters

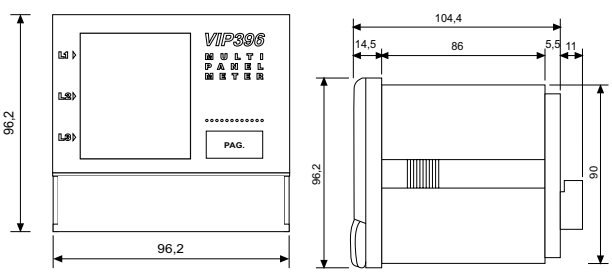
STANDARD and REGULATIONS - CE Conformity declaration

The VIP396 family of products conforms to Directive 89/336/EEC (EMC) and to Directives 73/23/EEC - 93/68/EEC (LVD).
This instrument has been manufactured and tested in compliance with standards IEC 1010-1 430 V for Cat. III and protection level 2 according to IEC 664-664 A (Safety), EN500081-1, EN50082-2 and EN55022 (EMC).

25 FUNCTIONS

	V	kA	W	VAR	VA	P.F.	Hz	A neutral	kWh	kVArh	kVAh
L1	•	•	•	•	•	•	•				
L2	•	•	•	•	•	•					
L3	•	•	•	•	•	•					
3ϕ	•	•	•		•	•		•	•	•	•

DIMENSIONS (mm)



elcontrol energy net

STAR3

High accuracy panel energy analysers

STAR 3

The latest instrument available from Elcontrol Energy Net.
This high quality 96*96 panel energy analyser provides brilliant features at a price never reached before.
The new bright red LCD display, the harmonic analysis, the wide set of measured parameters including the THD available in all the models, the multi-protocol capability of the RS485 port and the high accuracy **class 0.5%**, the 3 years-warranty period, allow to consider the **STAR 3** the new state of art of the panel analysers market.
It is a perfect, professional and low cost solution for the electrical panels, sub-metering systems, OEM applications, supervisory systems, Building and Factory automation systems.
The high flexibility of the instrument makes it adaptable to totally different applications. The model with harmonics allows a permanent based control of one of the most important aspect of the power supply quality. Such important possibility, up to now, was reserved only to high-cost device.
The **STAR 3** breaks this price barrier bringing, for the first time, the harmonic analysis into the market of the panel analysers.

MAIN FEATURES

- Digital Energy and Harmonics Analyzer 96*96.
- True RMS measures.
- Displays 52 measures and 352 measures for model with harmonics.
- Unbalanced three phase systems delta or star, bi-phase, single phase.
- High accuracy: Voltage, Current and Power error <0.5%.
- Bright back-lighted red numbers on dark background LCD display. It is visible in any lighting conditions also from long distance
- Cogeneration Counters.
- Total harmonic distortion factor per phase.
- Alarm, pulses and analogue outputs.
- RS485 communication port included in all models.
- Multi-protocol instrument.
- Easy and extremely flexible Set up menu including CT and VT ratios selection.
- Password protection for setup and resets.
- Model with three phase Harmonic Analysis up to the 25th order and 352 measures.
- 3 years warranty period.

52 MEASURES

The **STAR3** displays 52 main measures.
The model with harmonics shows the harmonics spectrum, adding others 300 parameters

	3ph TOT	L_1	L_2	L_3	Neutral
Voltage	•	V_{L1-L2}	V_{L2-L3}	V_{L3-L1}	
Phase-phase voltage		V_{L1-N}	V_{L2-N}	V_{L3-N}	
Current	•	•	•	•	•
Power factor	•	•	•	•	
Frequency		•			
Current Avg		•	•	•	
Current maximum demand		•	•	•	
KW	•	•	•	•	
KVAr	•	•	•	•	
KVA	•	•	•	•	
kW Avg	•				
KVAr Avg	•				
kVA Avg	•				
kW maximum demand	•				
kVA maximum demand	•				
kWh imported +	•				
kWh exported -	•				
kVArh leading +	•				
kVArh lagging -	•				
THD Current	•	•	•	•	
THD Voltage	•	•	•	•	

In addition to the commonly known measures, the **STAR 3** introduces several advanced measures whose are normally available only in high-cost instruments.
The **THD** provides a clear indication of an hidden problem: the harmonics.
You can save money not replacing switch breakers.
The **Neutral current** informs about the condition of the neutral cable, often overcharged as a consequence of unbalanced loads and harmonics.
The neutral current is an RMS value obtained with an intelligent method which ensure an accuracy higher than the one obtainable with a direct measures through a 4th CT.
The **maximum demand of current** tells you clearly if the components of the electrical network, cables, breakers, contactors, bus bars etc., are overcharged.
The model with **harmonics spectrum** shows comprehensive details to identify clearly the harmonics running in the system.

STAR3

High accuracy panel energy analysers

HIGH ACCURACY

Voltage and current : error lower than **0.5%** for Power Voltage and Current. The accuracy remain the same with fundamental different than 50 or 60 Hz and power factor low. These conditions drive the majority of the instrumentations out of accuracy
Calibration certificate delivered with each instrument.

MODELS

STAR3 Basic model
It shows all the measures listed in the above table. Includes an **RS485** output with multi-protocol capability: Modbus RTU, Modbus IEEE and Modbus ASCII . The importance of the communication and the lower cost of the components allow today the inclusion of the RS485 port as a default features. Even if you are not interested in making a network of instruments, this possibility will remains always available for future developments.

STAR3 ALM:
as the basic model+ two relay outputs. The outputs can be set be for either alarms signalling or pulses or remote relay control .
The function "alarm" can be associated with several measures including V,A,W,THD and harmonics. Each relay has a maximum and a minimum threshold, the histeresys and the delay time. All the settings can be adjusted.
If used in "pulse" mode the relays generate pulses proportional to the associated measures. Also in this case the behaviour is adjustable with the setup menu.
In "remote control" the position of the relay is decided by an external master device (PLC, PC, etc) through the RS485 line . This is very convenient for load shedding application.

STAR3 4-20mA:
as the basic model + two analogue outputs 4-20 mA or 0-20 mA.

STAR3 HARMO:
as Star3 ALM+ three phase harmonics spectrum for voltage and current.
In addition to the basic measures of the above table, the harmonics model displays complete information about the spectrum.
For each harmonic order k the following values are available:

Harmonic order k	L_1	L_2	L_3
$Vrms_k$	•	•	•
$Irms_k$	•	•	•

The accuracy of the harmonic measures is totally independent from the frequency of the fundamental.
The instrument measures harmonics up to the frequency 1250Hz which is the 25th in case of fundamental at 50Hz. In case of higher frequency value of the fundamental, the numbers of available orders decreases automatically.

OUTPUTS

1) **RS485**: serial communication output included in all models. It is now a standard feature
The STAR3 has an unique feature:
allows the selection of three protocols:
Modbus BCD (RTU)
Modbus IEEE
Modbus ASCII (only Vip Energy frame for compatibility with existing softwares)
The full control of the instrument is available only with the BCD and the IEEE format.
The ASCII format is limited to the same data frame of the VIP ENERGY; this allow the connection with all the existing softwares VIPLOAD, VIPVIEW, VIPVISION and the memory module VIPMEM
2) **ALM:** two digital outputs for alarms, pulses and remote control . the alarms setup includes the association of the measures, thresholds, hysteresys % and delay time.
The pulses setup includes association of the measures, number of pulses per unit , pulse width 100 msec or 20 msec
3) **4-20mA:** two analogue outputs programmable in two different ranges: 4-20 or 0-20 mA.
The setup includes the association of the measures and the full scale value.

STANDARDS and REGULATIONS CE

The STAR3 conforms to directive IEC 1010-1 430 V for Cat. III and protection level 2 according to IEC 664-664 A. regarding the safety of the operators
It conforms to EN55011; EN61000-3-2; EN61000-3-3; EN61000-4-2; EN61000-4-3; EN61000-4-4 extension 4kV; EN61000-4-5; EN61000-4-6; EN61000-4-8; EN61000-4-11 (EMC)

3-YEARS-WARRANTY

The high quality of all our new products makes possible to provide a warranty period of 3 YEARS .
This remain valid also for the STAR3.

THECNICAL CHARATERISTICS

Maximum dimensions (mm):
instrument: 96 X 96 X 115.4. Cut-out template: 91 X 91
Power supply:
from network 230 V or 115 V +15%-20% @ 35÷400 Hz (4 VA).
Display: reverse red LCD with LED backlight
Voltmeter inputs:
VL1, VL2, VL3, N up to 430 V phase-neutral,
750 V phase-to-phase, 35÷400 Hz
Voltmeter input impedance: 2 Mohm
Voltage input overload: max 850 V phase-neutral
Current inputs: AL1, AL2, AL3, COM., consumption 1 VA. Three or two 5A external curr.transf. required
Measuring range: 0-120% In
Sensitivity: current 20 mA ; voltage 10 mV
Overcurrent: withstand 50 amps for 1 min.
Number of scales: 1 voltage scale, 2 current scales
Measurements: True R.M.S. up to25th harmonic = 1250Hz with fundamental @50 Hz
Sampling frequency: 2.5 kHz.
Accuracy: <0.5% for Voltage and current and Power
Connection: Single phase or three phase star, three phase delta, or diphase systems
Weight: 0.6 Kg
Protection level: instrument IP20, front panel IP40
Temperature range: -10°C ÷ + 50°C
Relative humidity range: (R.H.): from 20% to 90%.
Condensation: non condensing.

elcontrol® energy net

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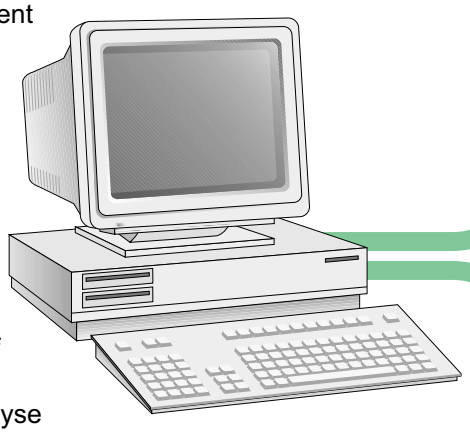
Networks of instruments for the measurement, monitoring and optimization of a company's electricity consumption

The installation of a metering network is central to establishing effective cost control and optimum use of energy resources.

Identifying the cost per unit of electricity is necessary if the true cost of production or provision of a service is to be established.
Energy consumption (kWh, kvarh) Maximum Demand (kW, kVA) are directly linked to this cost, and Voltage, Current, Power Factor and Harmonic Distortion are all important contributory factors.
In fact, all these parameters are a function of supply quality which in turn has a direct relationship to product quality in a manufacturing environment.

The application of a metering network complete with suitable data acquisition and management software allows the cost and quality aspects of the electricity consumption to be accurately measured and assessed.
The metering network will:



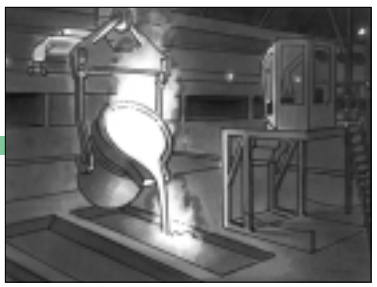
- provide bill validation / capability
- allow cost centre allocation of energy use
- automatically collect and analyse consumption data
- assist in the production of energy usage targets
- provide ongoing data for the achievement and maintenance of target performance.

Initial assessment is often carried out using portable instrumentation prior to the installation of a monitoring network.
This ensures the most cost effective approach is adopted in terms of instrument siting and software analysis capability. This can be biased towards management accounting and cost control, provide information of a more technical nature such as voltage stability, overloads and power factor levels, or a combination of both. With today's multifunction microprocessor instruments combined with the availability of low cost high performance PCs and the simplicity of RS485 or optical fibre networking, highly detailed plant and building monitoring is no longer a complex and expensive operation.

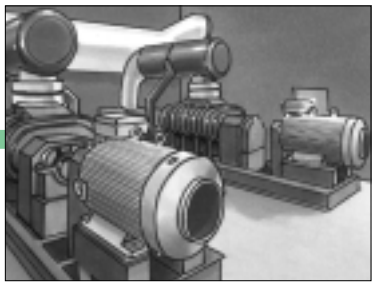
OFFICES

DATA PROCESSING CENTER

FOUNDRY



PLANT ROOM



WAREHOUSE

SWITCH ROOM

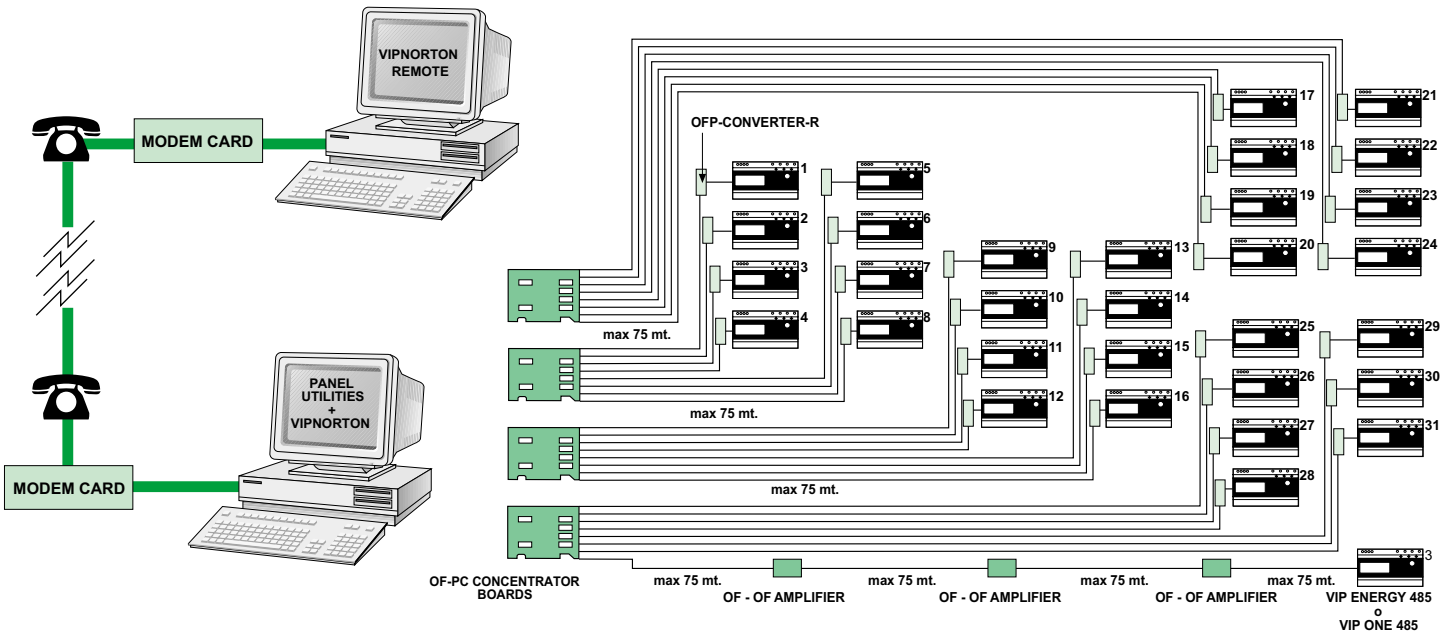
Metering Systems (Energy Monitoring Network)

ELCONTROL ENERGY offers the choice of two metering systems, VIPNET-OF and VIPNET 485 which allow: Storage of data on Personal Computer - Location and elimination of energy wastage - Cost effective tariff management - Choice of the best contract - Cost processing.

VIPNET-OF

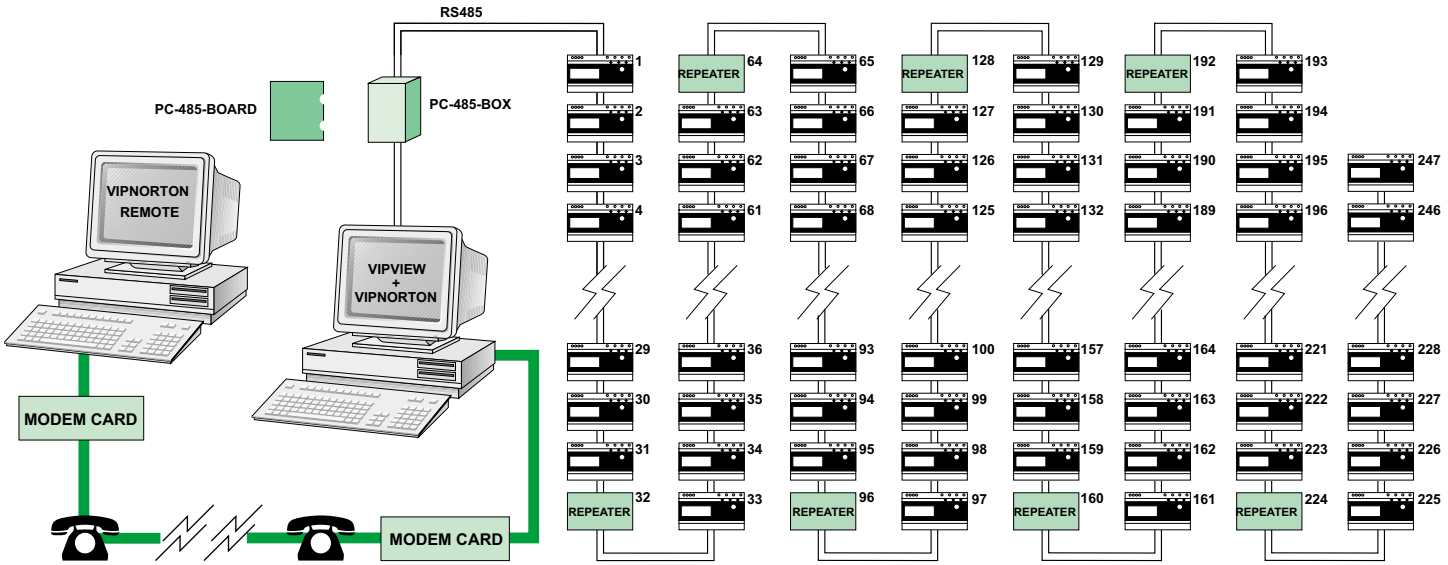
Up to 32 instruments of your choice between VIP ENERGY 485 + OFP-485-CONVERTER-R (unbalanced three-phase systems), VIP ONE 485 + OFP-485-CONVERTER -R and VIP96-OF (single-phase or balanced three-phase systems) can be connected in any order.The software for management on P.C. is the **PANEL UTILITES 2.1**.The connection between the instruments and the computer is in plastic fibre (up to 75 m.)* or glass fibre (up to 2 Km.)* easy to use and not subject to electrical interference in industrial environments with particularly high disturbance levels.

* For greater distances are available: OF-OF-AMPLIFIER, repeater for further 75 m. plastic optical fibre, OFV-OFV AMPLIFIER, repeater for further 2 Km. of glass optical fibre; OFP-485T (or R) CONVERTER to convert the signal from glass fibre to twisted pair cable (T) or viceversa (R), to cover a maximum distance of 1200 m; OF-OFV CONVERTER and OFV-OF CONVERTER to convert the signal from plastic optical fibre to glass optical fibre, and viceversa.



VIPNET-485

Low cost energy monitoring network based on RS485 serial protocol for a maximum number of 247 measuring points connected by a twisted pair cable. The instruments are subdivided into groups of up to 31 units: each group can cover a maximum distance of 1200 m. and are connected to the network by means of signal repeaters. The software management on P.C. is the "VIPVIEW", with MODBUS protocol; data rate: 9600 or 1200 baud, 7 data bit, 1 stop bit, no parity.



MICROVIP 3 PLUS - Portable energy and harmonics analyzers

Volt

Amp

P.F., cosØ

kW

kVA

kvar

Hz

kWh

kvarh

Peak kVA

Peak kW

189 instruments in 1

Portable energy and harmonics analyser for unbalanced 1- and 3-phase systems.

A new compact portable Energy & Power Quality Analyser for both single phase and 3 phase systems, supplied complete with 3 off 1000A clip-on CTs.

Crisp high-contrast backlit LCD displays true RMS values for up to 33 parameters.

Massive 1MB on-board memory for data storage over extended survey periods including waveform capture for current and voltage.

Programmable 42 column on-board graphics printer provides additional

156 parameters of data including V&I harmonics to 24th multiple with both DC component and displacement factor, and waveform/harmonic bar chart printout.

Supplied complete with CTs, voltage leads and all accessories in strong carry case.

Fast download to PC via high-speed serial link.

Fully programmable for all CT/VT ratios, star/delta/single phase connection and power integration period.

Class 1 accuracy (IEC 1036)

Suitable for DC measurement (via optional DC clamp).

Dual voltage power supply 230/110VAC with internal rechargeable back-up battery.

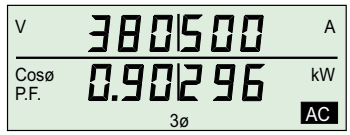
On-board clock/calendar.

156 additional measurements of the printer

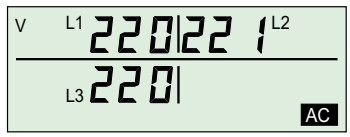
	VH0, AH0	VH1, AH1	VH2, AH2	VH3, AH3	VH4, AH4	VH5, AH5	VH6, AH6	VH7, AH7	VH8, AH8	VH9, AH9	VH10, AH10	VH11, AH11	VH12, AH12	VH13, AH13	VH14, AH14	VH15, AH15	VH16, AH16	VH17, AH17	VH18, AH18	VH19, AH19	VH20, AH20	VH21, AH21	VH22, AH22	VH23, AH23	VH24, AH24	Cosφ f nd.
L1	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
L2	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
L3	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

33 measurements showing the true value displayed on a back-lit LCD.

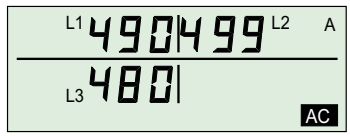
Volt	Rms phase-to-phase voltage (average of the three phases)
Amp	Equivalent rms current of the three-phase system
P.F. cosØ	Power factor of the three-phase system
kWatt	Active power of the three-phase system



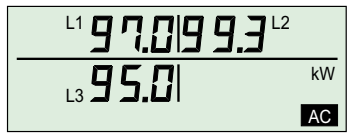
Volt L1	Rms voltage between phase L1 and neutral
Volt L2	Rms voltage between phase L2 and neutral
Volt L3	Rms voltage between phase L3 and neutral



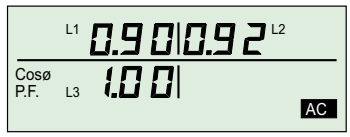
Amp L1	Rms current of phase L1
Amp L2	Rms current of phase L2
Amp L3	Rms current of phase L3



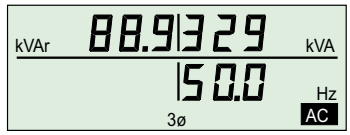
kW L1	Phase L1 active power
kW L2	Phase L2 active power
kW L3	Phase L3 active power



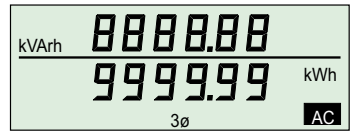
P.F. cosØ L1	Phase L1 Power Factor
P.F. cosØ L2	Phase L2 Power Factor
P.F. cosØ L3	Phase L3 Power Factor



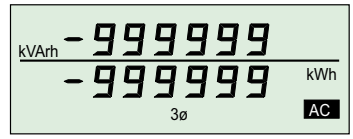
kvar	Reactive power of the three-phase system
kVA	Apparent power of the three-phase system
Hz	Voltage frequency



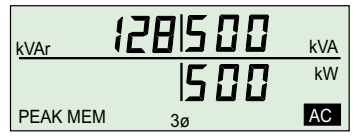
kvarh (kVAh)	Reactive energy consumption for the three-phase system (Apparent Energy with STD2 option)
kWh	Active energy consumption for the three phase system



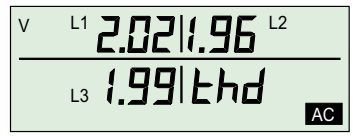
-kVArh	Reactive energy export (COG4 option)
-kWh	Active energy export (COG4 option)



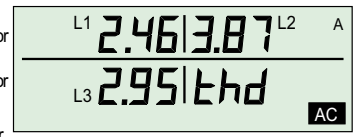
kVAr	Average reactive power peak of the three-phase system
kVA	Average apparent power peak of the three-phase system
kW	Average active power peak of the three-phase system



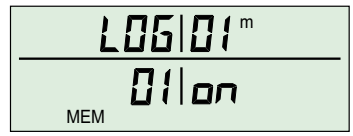
THDF VL1	Total Harmonic Distortion Factor of the Voltage of Phase 1 referenced to the RMS value for 50 / 60 Hz systems.
THDF VL2	Total Harmonic Distortion Factor of the Voltage of Phase 2 referenced to the RMS value for 50 / 60 Hz systems.
THDF VL3	Total Harmonic Distortion Factor of the Voltage of Phase 3 referenced to the RMS value for 50 / 60 Hz systems.



THDF AL1	Total Harmonic Distortion Factor of the Current of Phase 1 referenced to the RMS value for 50 / 60 Hz systems.
THDF AL2	Total Harmonic Distortion Factor of the Current of Phase 2 referenced to the RMS value for 50 / 60 Hz systems.
THDF AL3	Total Harmonic Distortion Factor of the Current of Phase 3 referenced to the RMS value for 50 / 60 Hz systems.



LOG on (off)	To activate (or de-activate) storage (Changed using the SET key)
01÷99 m (minutes)	Data recording rate
00÷100 (%) MEM	% of memory used



MICROVIP3 - Digital energy analyzers

Volt
Amp
P.F., cosØ
kW
kVA
kvar
Hz
kWh
kvarh
Peak kVA
Peak kW

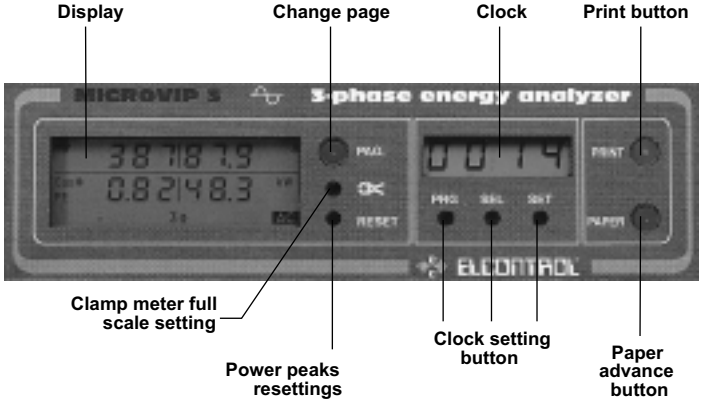
CE (CESI approved)

20 instruments in 1

For THREE-PHASE unbalanced system
Fibre optic output for RS232 connection to computer

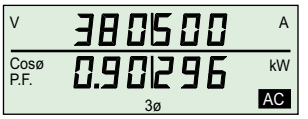
TOP PERFORMANCE IN A SMALL SPACE

- **20 Measurement functions**
  -Volt (rms), **Amp**(rms), **P.F. cosØ, kW, kvar, kVA, kvarh, kWh, Power peak kVA, kW.**
- Three-phase measurements on unbalanced systems.
- Single-phase measurements.
- Measurements in true rms
- Automatic scale change for voltage and current
- AC and DC measurements with optional clamp meter
- Display and print out of each phase and three-phase value
- Timed printout of all measurements with date and time
- Quartz clock with display
- Back-lit measurement display
- Fibre optic output for connection to computer (optional fibre optic interface INTERFACE-OF -RS232 ref.4AAFH)
- Kit includes accessories.

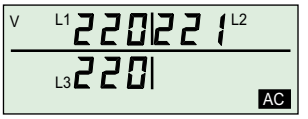


MEASUREMENT ON DISPLAY PAGES

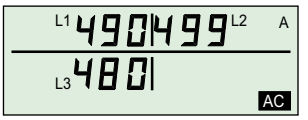
Volt	Rms phase-to-phase voltage (average of the three phases)
Amp	Equivalent rms current of the three-phase system
P.F. cosØ	Power factor of the three-phase system
kWatt	Active power of the three-phase system



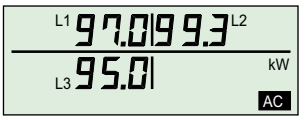
Volt L1	Rms voltage between phase L1 and neutral
Volt L2	Rms voltage between phase L2 and neutral
Volt L3	Rms voltage between phase L3 and neutral



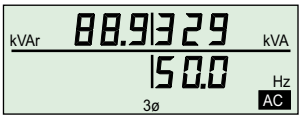
Amp L1	Rms current of phase L1
Amp L2	Rms current of phase L2
Amp L3	Rms current of phase L3



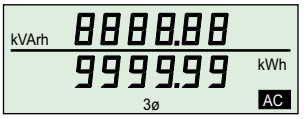
kW L1	Phase L1 active power
kW L2	Phase L2 active power
kW L3	Phase L3 active power



kvar	Reactive power of the three-phase system
kVA	Apparent power of the three-phase system
Hz	Voltage frequency

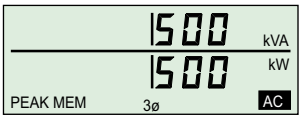


kvarh	Reactive energy consumption for the three-phase system
kWh	Active energy consumption for the three phase system

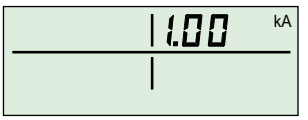


kVA	Average apparent power peak of the three-phase system
kW	Average active power peak of the three-phase system

N.B. The peak values are displayed on MICROVIP3 15 minutes after the instrument has been turned on and are updated every 3 minutes. Integration times different than 15 min. may only be programmed at the factory.



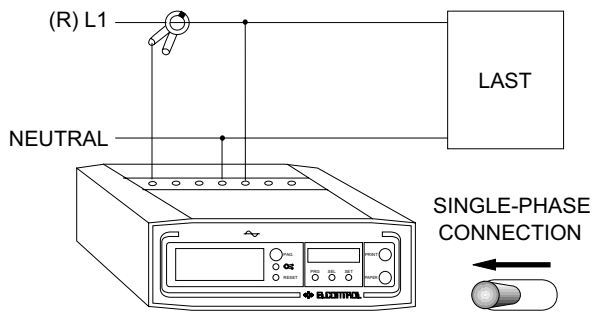
kA	The instrument provides a page for selection of the CT to be used (For clamp meters with 0-1 Volt output)



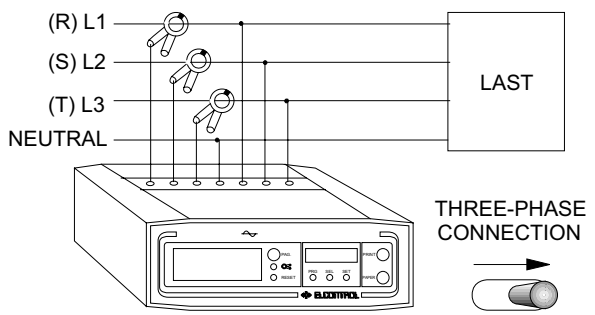
N.B. - For any clamp meter or CT with 0 - 1 Amp output, interface INTA/1 is required (ref.4AABB)
- For any CT with 0-5 Amp output, it must be interfaced with a INTA/5 (ref.4AABD), in any case the KA is set equal to the primary values of the clamp meters or CT used.

CONNECTION DIAGRAMS

For SINGLE-PHASE measurements



For THREE-PHASE measurements



PRINTOUT EXAMPLE

For SINGLE-PHASE measurements

```
microVIP 3 01/06/00      11:44:48  Manual
 V 226     A 22.7    P.F. .69   KW 3.52
KVA 5.12  KVAr 3.73   Hz  50.0
Kwh 0002.07           KVArh 0001.90
PEAK MEM  KVA 6.27    KW  4.90
```

For THREE-PHASE measurements

```
microVIP 3 01/06/00      10:40:04  Manual
 V 380     A 84.7    P.F. .86   KW 48.1
KVA 55.8  KVAr 28.2   Hz  50.0
Kwh 0021.75           KVArh 0014.65
PEAK MEM  KVA 58.1    KW  48.7
Phase     L1      L2      L3
 V        219     219     220
 A        66.5    132     64.5
KW        10.1    27.9    10.1
```

KIT PER MICROVIP3

MICROVIP3-KIT

Complete with:
- 1 Carrying case for MICROVIP kit
- 1 MICROVIP 3
- 1 Power supply cable
- 1 Set of voltage measurement cables
- 3 Clip-on CT's 1000A/1Vrms AC with cables
- 2 Fuses 5x20 160 mA (spare)
- 1 Ink ribbon (spare)
- 1 Roll of printer paper (spare)
- 1 Carrying strap
- 1 User manual
- 1 Guarantee certificate
- 1 Calibration certificate

SPARE PARTS

PINZA-1000A/1V-AC	Clamp meter 1000A/1 VAC
CONF.10-CARTA-X-VIP3	Package of 10 paper rolls for MICROVIP3
NASTRO-EPR-ERC-09C	Ink ribbon for printer
CONF.10-FUS-VIP3-220V	Package of 10 - 5x20 - 80 mA - 250V - delayed fuses
VIP3-CAVO-VOLT	Set voltage cables for MICROVIP3
VIP3-CAVO-RETE	Mains supply cables for VIP3
MICROVIP-BRETELLA	1 carrying case for MICROVIP3
MICROVIP3-VALIGIA	1 carrying case for MICROVIP3

GENERAL SPECIFICATIONS

- Inputs:
  Voltmeter: (L1-N, L2-N, L3-N) max 600 Vrms fr. 20 to 600 Hz.
  Ammeter: 1 Volt from 20 to 600 Hz.
- Number of scales: 3 voltage scales; 3 current scales.
- Automatic scale change
- Scale change response time: 500msec.
- Ambient temperature Range: from -10°C to +50°C
- Safety reference standards: IEC 348, VDE 411 class 1, for operating voltages -650 VAC rms, IEC 1010-1, EN 61010-1, 600V.
- EMC reference standards: EN 50081-1, EN 50082-1, EN 55022.
- Instrument dimensions: 251 x 239 x 104 mm.
- Instrument weight: 2,9 Kg.
- Kit weight: 6,3 kg.

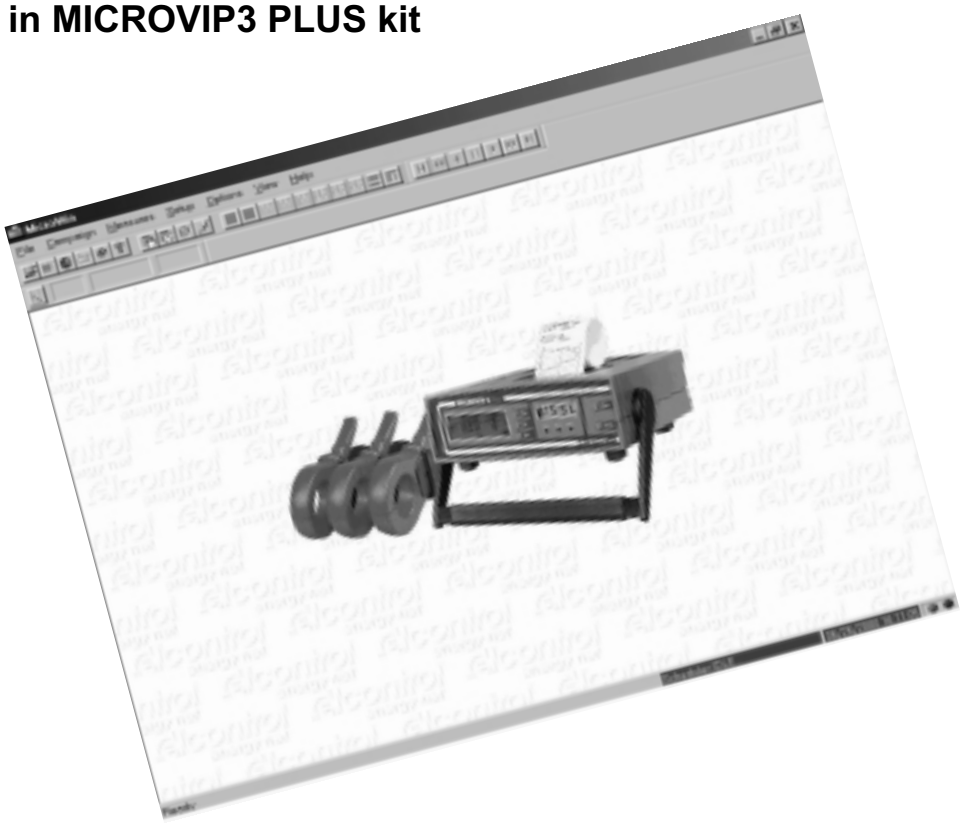
POWER SUPPLY

- Mains: 100 ÷ 120V~ / 200 ÷ 240V~ ± 10%
- Internal battery
- Instrument consumption: 4VA

MICROWIN - Software for MICROVIP3 PLUS

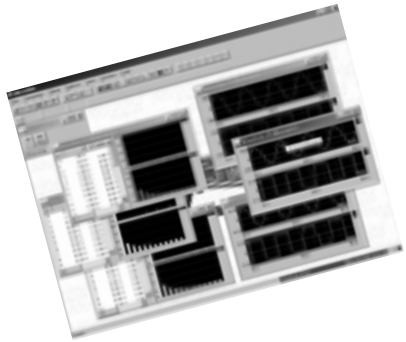
Data management software for Windows 9x/NT/2000 developed for MICROVIP 3 Plus harmonics and power portable analyzers

Included in MICROVIP3 PLUS kit



MicroWin allow reading all instrument measures and creating measuring campaigns in two models: Manual or Automatic. With this program you can display the measuring trend over time, the waveform and the harmonics spectrum of voltage and current, etc.

MicroWin allows downloading, classifying and archiving any measuring campaigns stored in the instrument internal memory. These campaigns are processed in the same way as the numeric or waveform campaigns run on a PC by MicroWin in Remote mode.



Moreover, you can create waveform campaigns displaying the three-phase voltages and currents in Graphic mode. In the Harmonics spectrum display, all Voltage, Current and Cos measures for all the harmonics available on the instrument (0-24) appear both in numeric and in percentage values calculated on the basis of the first harmonic.

During the campaign it is possible to display the measuring trend in real time, up to a maximum of four measures.

MicroWin allows selecting in real time the number of tracks to be displayed and the type of measure of each channel.

The user can freely modify the colours of any graph in the program.

The Print preview shows a preview of the print output for each window.

For a detailed analysis of the measuring campaign in off-line mode all campaign records appear included in a grid similar to an EXCEL spreadsheet.

Inside the spreadsheet, historical data can be graphed up to a maximum of four measures. Besides, the user can freely select the measures and records to be displayed.

Configuring campaigns is a very intuitive procedure. MicroWin simply provides one Configuration window, where all the basic parameters (such as date and time of campaign start and end, the frequency time, the instrument setup and a descriptive label for each measuring campaign) are set.

It is possible to have access to the scheduler at any time, so as to add, modify or delete measuring campaigns.

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 / 0,5 A / 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
- 1 Guarantee certificate
- 1 VIP UTILITIES 2.0 software
- 1 Calibration certificate

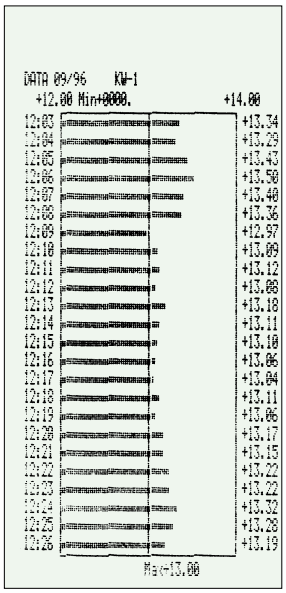
SPARE PARTS

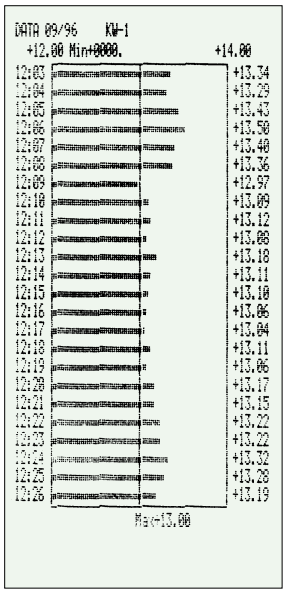
PINZA-1000A/1V-AC	Clamp meter 1000/A1VAC
CONF.10-CARTA-X-VIP3	Package of 10 paper rolls
NASTRO-EPR-ERC-09C	Ink ribbon for printer
CONF.10-FUS-VIP3-220V	Package of 10 - 5x20 - 80 mA - 250V - delayed fuses
CONF.10-FUS-VIP3-110V	Package of 10 - 5x20- 160 mA - 250V - delayed fuses
VIP3-CAVO-VOLT	Set voltage cables for VIP3
VIP3-CAVO-RETE	Mains supply cable
MICROVIP-BRETELLA	1 carryng 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.)

MEASUREMENT ON DISPLAY PAGES

Pag.1	**Volt**	True line voltage value (average of the three phases)	FASE Ý (3ø): V | A; cosø | W
	Amp	True equivalent current value for the three-phase system	
	P.F. cosØ	Power factor of the 3-phase system	
	kWatt	Active power of the three-phase system	
Pag.2, 3, 4	**Volt**	True voltage value of phase L1 (pag.2),L2 (pag.3), L3 (pag.4)	FASE L1 (R): V | A; cosø | W
	Amp	True current value of the phase L1 (pag.2), L2 (pag.3), L3 (pag.4)	
	P.F. cosØ	Power factor Phase L1 (pag.2), L2 (pag.3), L3 (pag.4)	
	kWatt	Active Power phase L1 (pag.2), L2 (pag.3),L3 (pag.4)	
Pag.5	**V-12,V-23,V-31**	True value of the voltage betwen the phases (line voltage)	V-12 V-23 V-31; A - N | Hz
	A - N	True neutral current vaue	
	Hz	Frequency	

Pag.6	**Ist. W**	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.)	Fase	Ist.	Med.	Max
	Med. W		L1 (R)	W	W	W
	Max W		L2 (S)	W	W	W
			L3 (T)	W	W	W
			Ý (3ø)	W	W	W
Pag.7	**Ist. VA**	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)	Fase	Ist.	Med.	Max
	Med. VA		L1 (R)	VA	VA	VA
	Max VA		L2 (S)	VA	VA	VA
			L3 (T)	VA	VA	VA
			Ý (3ø)	VA	VA	VA
Pag.8	**Ist. var**	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)	Fase	Ist.	Med.	Max
	Med. var		L1 (R)	var	var	var
	Max var		L2 (S)	var	var	var
			L3 (T)	var	var	var
			Ý (3ø)	var	var	var
Pag.9	**Ist. %**	Instantaneous, average and maximum distortion 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)	Fase	Ist.	Med.	Max
	Med. %		L1 (R)	%	%	%
	Max %		L2 (S)	%	%	%
			L3 (T)	%	%	%
			Ý (3ø)	%	%	%

Pag.10	**kWh**	Active power consumption for each phase and for three-phase system.	Fase	kWh	kvarh	Cosø	Tgø
	kvarh	Reactive power consumption for each phase and for three-phase system.	L1 (R)				
	CosØ	Average power factor for each phase and for thre-phase system.	L2 (S)				
	TgØ	Correspondent of average power factor, TgØ = kvarh/kWh	L3 (T)				
			Ý (3ø)				

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.

SPECIFICATIONS

MEASUREMENTS at low and medium voltage
Single-phase MEASUREMENTS
MEASUREMENTS ON 3-wire and 4-wire three-phase systems
MEASUREMTS on each phase and corresp. 3-phase measuremts.
MEASUREMTS 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.

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

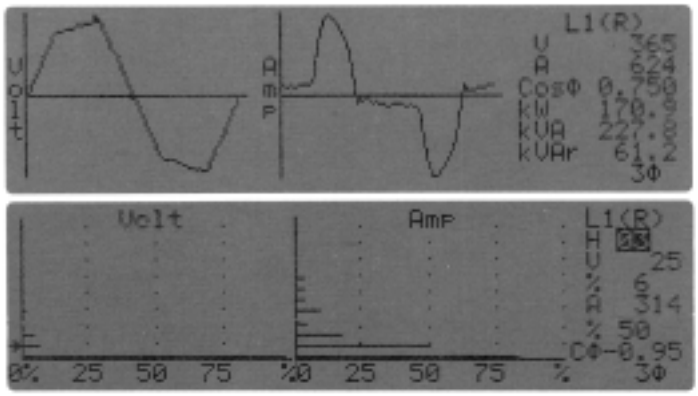
PROGRAMMABLE RS232 SERIAL OUTPUT:
- For connection to remote printer
- for (on line) connection to HOST COMPUTER for storage and processing of measured data.

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)
- Measurem. freq. Range:	50 Hz 1500 Hz
- Input impedance:	³ 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).
- Measuremt. freq. range:	50 Hz 1500Hz
- Input impedance:	³ 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.
- Measurement Range:	(See SYSTEM 3)
- Sensitivity:	0,2 % scale max.

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

HARMONICS-UTILITIES

SOFTWARE FOR MANAGEMENT OF THE VIP SYSTEM3 FROM PC, FOR HARMONICS ANALYSIS FUNCTIONS. The HARMONICS UTILITIES are contained in 4 3"1/2 diskettes. The supply kit includes both sets diskettes and the instruction manual. Harmonics Utilities is copyright protected.
The proper assessment of the harmonics present in a plant requires a long-term analysis of all the phenomena which may occur as a result of the various types of processes carried out or the different machines which produce harmonics distortions. It is therefore very important to check a complete working cycle. That's why ELCONTROL ENERGY, as well as developing the harmonics analyzer as an expansion of the VIP SYSTEM3 with the use of the HARMONICS BLACK BOX, has developed the possibility of carryng out measurement surveys which can be transferred by means of Memory Packs and MPPI (Memory Pack Parallel Interface) to a Personal Computer (PC) for subsequent processing. **To RECORD the data, the HARMONICS BLACK BOX and the MEMORY PACK must be inserted in the VIP-SYSTEM3. For DATA PROCESSING TRANSFER to a PC it is necessary to insert the MEMORY PACK in the parallel interface (MP-PI-1) and connect it to the PC.**
For the VIP-SISTEM3, with the Memory Pack, Harmonics Utilities also programms automatic measuring campaigns. The user is offered a choice of 5 different languages. The Menu display the various functions which can be carried out.

MENU
F1 Memory Pack transfer
F2 Trasfer Programming
F3 Survey Programming
F4 Survey analysis
F5 Survey print-out
F6 Conversion to DIF file
F7 Graphs (wave forms, zoom of a wave spectrum, value spectrum, harmonics trend, RMS values trend)

VIP UTILITIES 2.0

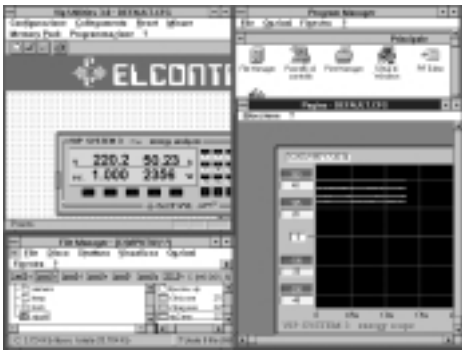
VIP-SISTEM3 MANAGEMENT SOFTWARE FOR PERSONAL COMPUTER
The VIP UTILITIES-2.0 are contained in three 3 1/2" diskettes. The supply kit includes both sets of diskettes and the instruction manual. VIP UTILITIES is copyright protected. The menu succinctly describes its many functions.

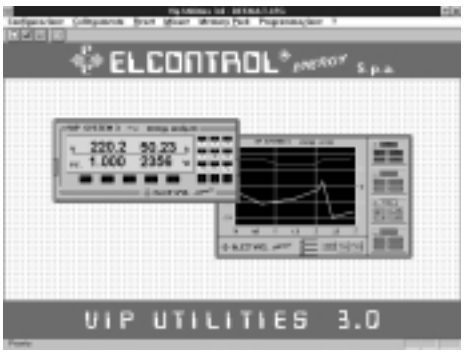
MENU
F1 Display of measurement pages
F2 Display or printout of all measurements
F3 Display or printout of settings
F4 Programming transfer
F5 Keyboard Enable/ Disenable
F6 Reset
F7 MEMORY PACK transfer
F8 Instrument programming
F9 Campaign programming
F10 Campaign processing Shift F1 Configuration
Shift F2 End

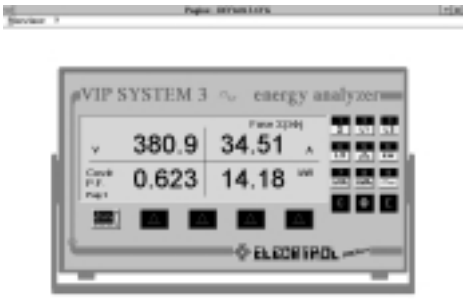
The software permits operation between the VIP-SYSTEM3 and the computer in three different conditions: **ON LINE** (from F1 to F6): completely operational from IBM or compatible PC with functions via RS232, via MODEM (also on switch-over telephone network) to carry out functions F1 to F6. This operating possibility is particularly interesting when the VIP SYSTEM3 is located in a plant at a point which is either inconvenient or even inaccessible. By transferring all of the functions of the VIP3 to a computer keyboard, VIP utilities permits many different kinds of work to be performed. **BATCH** (F7): Enables instructing the computer for the programming of cyclical measurement campaigns via MODEM of several instruments connected at different points. The computer cyclically transmits the following commands to several VIPs for the following programmed activities: Campaign execution; Transfer to computer of the measurement carried out; Data archiving.
OFF-LINE (from F8 to shift F1): this is for converting the measurement campaign files into files which can be used with various text and graphics programs.

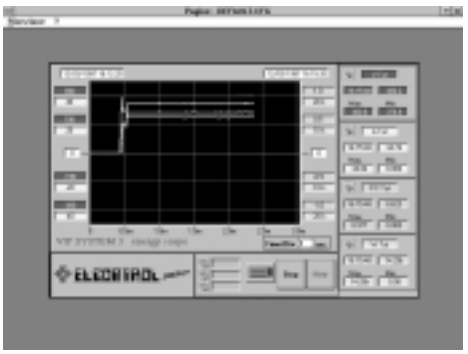
GRAPHIC-VIP-UTIL-2.0

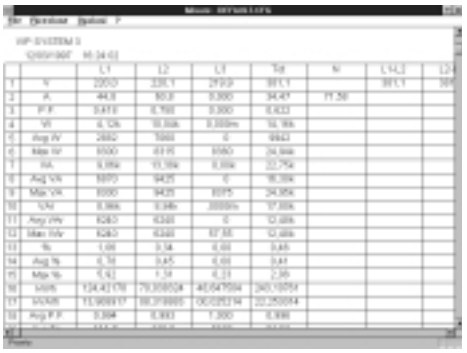
SOFTWARE DI GESTIONE DEI DATI PRESENTI IN UN FILE CMP (CAMPAGNE MISURA) TRASFERITO DAL MEMORY PACK PER CONSENTIRE LA CREAZIONE DI GRAFICI
La procedura è inserita nella funzione ELABORAZIONE CAMPAGNE richiamabile dal menu principale delle VIP UTILITIES 2.0 col tasto F10. L'impiego di questo software risulta molto interessante perché permette una immediata visione grafica dei valori registrati mediante una campagna col VIP SYSTEM3 e quindi una più facile diagnosi dell'impianto su cui si sta indagando.
È possibile stampare le forma d'onda con ampia possibilità di scelta del tipo di stampante.











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

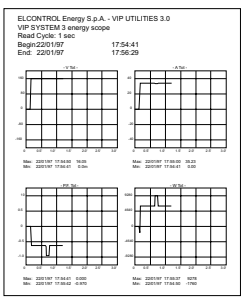
OFF-LINE:

¥ 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.



ELCONTROL Energy Spa - Vip Utilities 3.0
VIP SYSTEM 3
Begin - 13/03/1997 14:03:02
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	50,0	217,30	217,40	217,50	376,50	376,50	376,60	376,50	26,60
13/03/97	14.03.17	50,0	215,50	215,90	215,40	373,40	373,60	373,50	373,20	26,470
13/03/97	14.03.32	50,0	215,50	215,70	215,70	373,50	373,40	373,60	373,40	26,480
13/03/97	14.03.47	50,0	215,60	216,0	215,60	373,70	373,80	373,80	373,40	26,480
13/03/97	14.04.02	50,0	216,10	216,10	215,20	373,80	374,30	373,50	373,50	26,520
13/03/97	14.04.17	50,0	216,0	215,80	215,60	373,80	373,90	373,60	373,80	26,510
13/03/97	14.04.32	49,90	216,30	216,50	216,20	374,70	374,80	374,70	374,60	26,520
13/03/97	14.04.47	49,90	215,30	215,40	214,90	372,80	373,0	372,70	372,60	26,470
13/03/97	14.05.02	50,0	216,0	216,10	215,50	373,90	374,20	373,80	373,70	26,480
13/03/97	14.05.17	50,0	215,90	215,70	215,50	373,60	373,80	373,40	373,60	26,50
13/03/97	14.05.32	50,0	215,90	216,10	215,80	374,0	374,10	374,0	373,90	26,520
13/03/97	14.05.47	49,90	217,60	217,90	217,50	377,0	377,20	377,10	376,80	26,620
13/03/97	14.06.02	49,90	220,60	221,10	220,90	382,60	382,50	382,80	382,40	26,830
13/03/97	14.06.17	49,90	220,30	220,30	220,40	381,70	381,60	381,70	381,70	26,830

VIP SYSTEM3 SOFTARE - HARMONICS UTILITIES 3.0

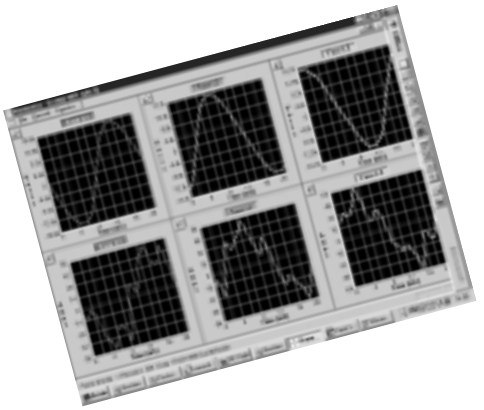
Windows 9X/NT/2000 software for VIP SYSTEM3 - HARMONICS ANALYSER included in VIP SYSTEM3 Kit

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.

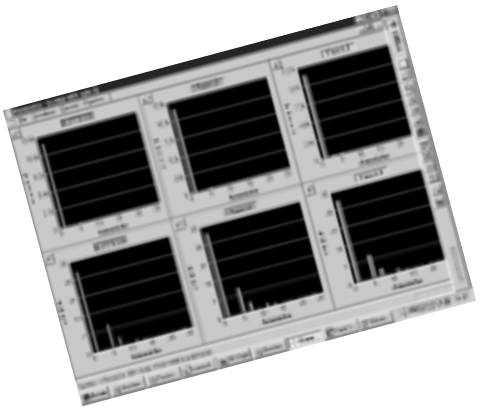
For data download the software is utilised in conjunction with the MPPI parallel interface module which connects to the PC with a standard printer cable.

The new software includes the following features:

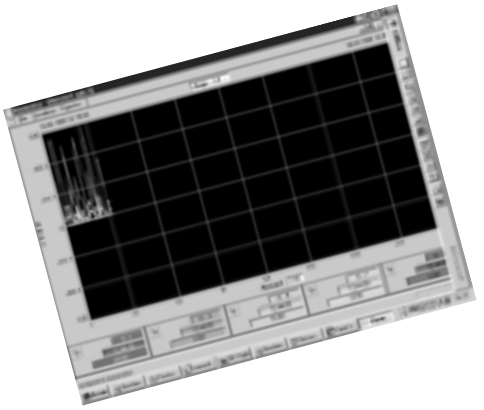
- Download of data and efficient storage to disk.
- Set up of automatic surveys.
- Data export of all parameters for easy spreadsheet analysis including RMS Values, Harmonic to 25th multiple, Neutral Current, Peak Current and statistical data.
- On board graphics package for waveforms (V&I), Harmonic 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 Cosf, statistics, Neutral Current and Peak Current).



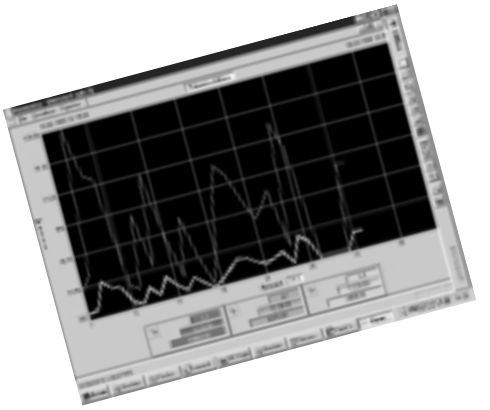
Waveform



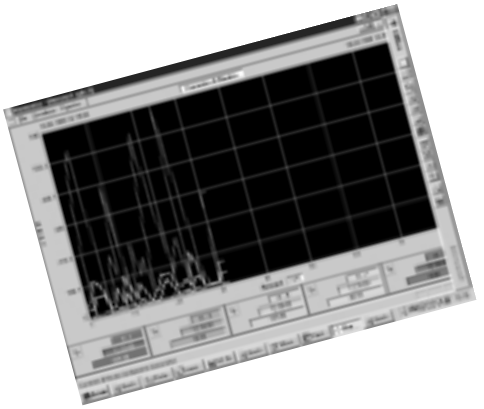
Spectrum of absolute values
and values per cent of V, I, Cosf



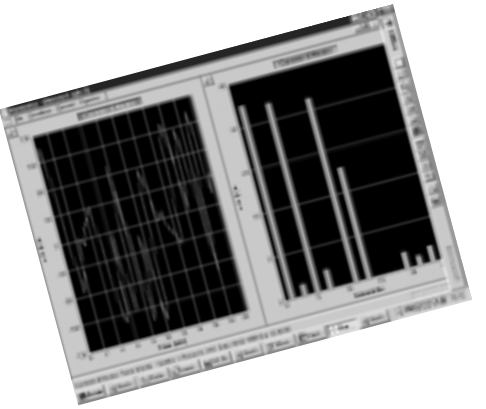
Trend of Harmonics



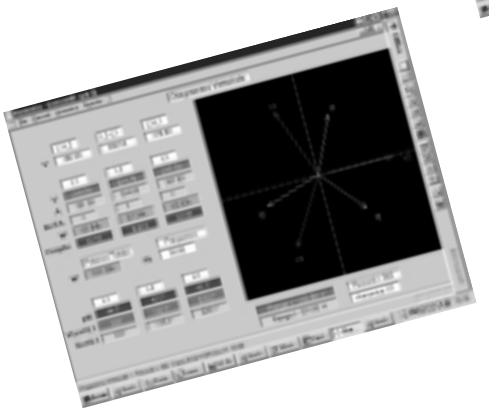
Trend of RMS quantities



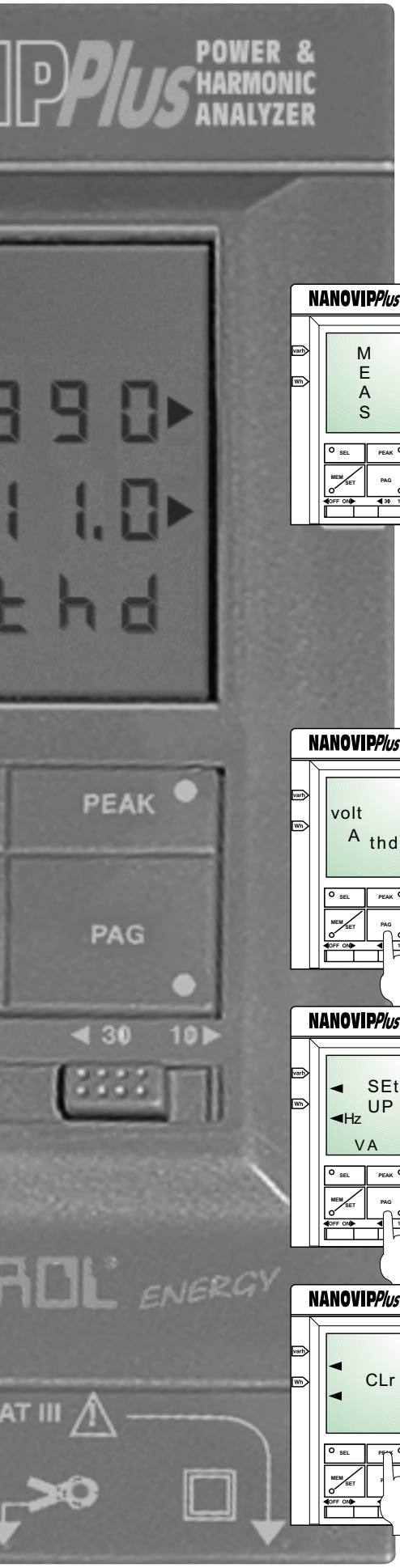
Neutral Current



Neutral Current



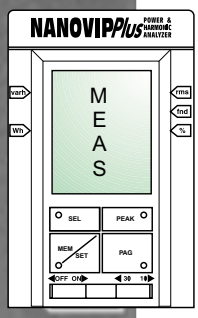
Three-phase Vector Diagram
(Vector meter)



SUPERB PERFORMANCE IN A COMPACT PACKAGE

For single-phase and balanced three-phase systems

The NANOVIP PLUS is a hand-held portable instrument capable of measuring over 100 fundamental parameters for display via a large high-contrast LCD. The product of many years R & D by the ELCONTROL ENERGY laboratories, it makes serious power quality analysis more affordable than ever before.



INSTANTANEOUS MEASUREMENTS

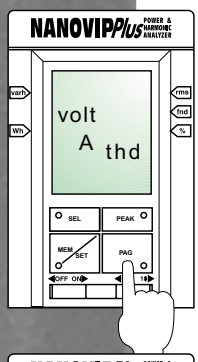
Volt, Amps, Watts, VAr, VA,W, Hz pos/neg kWh (import/export), pos/neg kvarh (inductive/capacitive)

All measurements are true RMS. Accuracy is 1% or better including clamp error between 7 W and 150 kW (200A clamp) or 35 W to 750 kW (1000A clamp).

DC measurement capability (requires Hall effect clamp for current.

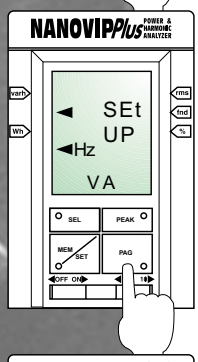
Automatic recognition of clamp type in use (200A or 1000A) - removes the need for additional set-up by the user.

- PEAK feature captures max current/power values or min voltage value (user selectable).
- MEM function provides data hold and allows realtime comparison of new readings against stored values.



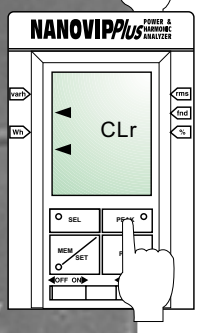
HARMONICS MEASUREMENTS

- Measurement of harmonic values of V & I (1 st to 24th) expressed as absolute and percentage values, plus their DC component and displacement values
- Total Harmonic Distortion (THD) of V & I with reference to the fundamental or total RMS value
- Crest factor for V & I expressed as absolute and percentage values
- DC ripple component for V & I as RMS percentage values
- V & I ripple as RMS value



SET-UP

- Auto set-up for standard current clamps
- Manual override facility for non-standard ratios - fully programmable for any CT
- Standard or co-generation energy metering
- 50/60Hz fundamental selection for harmonics analysis
- DC selection
- RS232 parameter set-up for serial communication to PC



RESET

- Reset of energy meters

NANOWIN

NANOWIN software for Windows 9X/NT/2000 included in the kit of NANOVIP PLUS and NANOVIP PLUS MEM (see page 45)

NANOVIP PLUS MEM

CE

All the performance of the Nanovip Plus and

- Automatic data storage to 1MB internal memory (4032 records)
- Internal clock/calendar
- Backlit LCD with auto/manual control
- KW (active power for each harmonic frequency)
- Fast data download to PC via 38.4K baud serial port.
- "One touch" set-up for default values CT set-up, VT set-up, fundamental frequency, comms set-up etc)
- Realtime link to PC in addition to memory download

- NANOWIN software included in the kit

* Optional power supply, part no 4AAQI.

NANOVIP Power analyzer

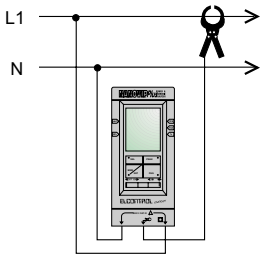
CE

7 MEASUREMENT FUNCTIONS IN THE PALM OF YOUR HAND

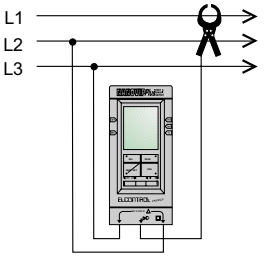
- **Volt** (rms), **Amp** (rms), **P.F. Cosf, W, var, VA, Hz**
- **PEAK** function for storing the measurements in correspondence to the V, A, W peaks (selectable)
- **MEM** functions for measurements of deviations of V, A, W, Cosf with respect to the recorded values
- Measurements from 7W to 150kW (750kW with 1000A clamp meter)
- Measurements as true RMS value
- Automatic voltage and current scale change
- AC and DC measurements (with DC clamp meters)
- High accuracy
- Very user-friendly

CONNECTION DIAGRAMS

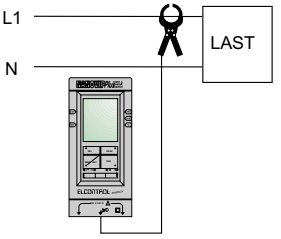
On a single-phase system



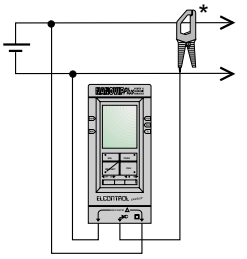
On a three-phase system



Used as a clamp meter



For DC measurements



*** N.B. The clamp meter is not included. The Elcontrol Energy Hall Effect clamp meter must be used (Cod.4AABW)**

GENERAL TECHNICAL DATA

- **Inputs:**
  Voltmeter: (L1-N) max 600 Vrms up to 600 Hz.
  Ammeter: 1 Volt up to 600 Hz.
- **Number of scales:**
  3 voltage scales; 3 current scales.
- **Automatic scale change:**
  Scale change response time: 1 sec. max
  Passage to the scale above takes place at 105% of the scale in use.
  Passage to the scale below takes place at 20% of the scale in use.

Instrument dimensions: 80x175x32,5 mm (without cover).
Instrument weight: 500 g.
Kit weight: 1,1Kg. (without instrument).

SERVICE AND TESTING CONDITIONS

- **Ambient operating conditions:**
  Ambient temperature range: from -10°C to +50°C.
  Relative humidity range (R.H.): from 20% to 80%.
- **Storage temperature:** from -20°C to +60°C.
- **Condensation:** not permitted.
- **Reference standards:** IEC 348, VDE 411 class 2, for operating voltages - 600 VAC rms, IEC 1010 600 V CAT III, EMC: EN50081-1, EN 50082-2, EN55022

POWER SUPPLY

4 15V batteries (size AA).

MEASUREMENT OF THE PRIMARY PARAMETERS

- **Measuring method:**
  with fixed sampling and analogic/digital conversion
- **Sampling frequency:** 1,25kHz.
- **Number of samples per phase:** 250 (200msec)
- **Measuring frequency:** 1 sec., 0,4 sec. Peak.
- **Zero self-correction:** every minute.

MEASURING ACCURACY FOR PRIMARY PARAMETERS

- **Measuring error in ambient from 18°C to 25°C (after 10' warm-up):** (see table)
- **Measuring error outside this temperature range:** ± 0,02% F.S for every °C outside the range.
- **Voltage measurement accuracy and sensitivity**
  Direct input with max voltage = 600 Vrms at Full Scale.
  Input voltage crest factor ³ 1,6
  Input impedance ³ 4Mý.
- **The accuracy does not consider the clamp meter error.**
- **Voltage and current measurement accuracy in relation to frequency:** for signal frequencies in the range 30-90 Hz no error apart from those indicated in the previous tables.
- **Measuring precision of secondary parameters:**
  Measurements of active power, Cosf, active energy: IEC 1036 class 1.
- **Measurements of the other secondary parameters:** the error is expressed by the formula which defines the parameter, in relation to V and I.

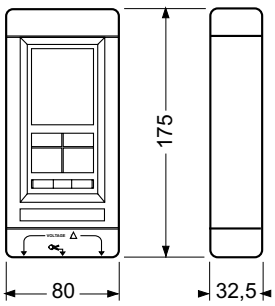
Alternating current sensitivity, Full Scale and accuracy			
Nominal Range	Sensitivity	Full Scale (*)	ε from 20% F.S. a 100%F.S. NANOVIP
37 Vrms	24 mV	37,0 V	0,5%F.S. + 0,5% L.t.
174 Vrms	111 mV	174 V	0,3%F.S. + 0,3% L.t.
750 Vrms	480 mV	750 V	0,3%F.S. + 0,3% L.t.

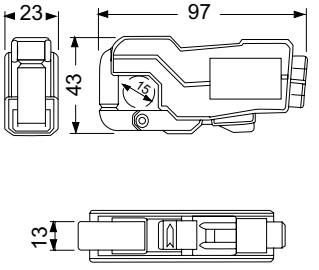
Sensitivity and precision in current measurements:
Direct input with max. voltage -1 Vrms at Full Scale
Crets Factor of input current ³3

Alternating current sensitivity, Full Scale and accuracy			
Nominal Range	Sensitivity	Full Scale (*)	ε from 20% F.S. a 100%F.S. NANOVIP
50 mV	32µV	50 mV	0,5%F.S. + 0,5% L.t.
232 mV	140µV	232 mV	0,3%F.S. + 0,3% L.t.
1 V	640µV	1 V	0,3%F.S. + 0,3% L.t.

(*) Corresponding Full Scales at 10-46,4 -200 Amps., with standard 200A/1V 50 - 232 - 1000 Amp., with optional 1000A/1V clamp meter
(Error= Sum of the errors of the Nanovip and the clamp meter)

DIMENSIONS (in mm)





NANOVIP KIT

Complete with:
1 NANOVIP kit case
1 NANOVIP PLUS/NANOVIP
1 Set voltmeter cables
1 Clamp meter 200A/1 Vrms AC with wires
1 Instruction booklet
1 Guarantee certificate
1 NANOWIN Software (only for NANOVIP PLUS and NANOVIP PLUS MEM)
1 Calibration certificate

SPARE PARTS

PINZA-200A/1V-AC	Clamp meter 200A/1VAC
NANOVIP-CAVO-VOLT	1 Set voltage cables for NANOVIP
NANOVIP-VALIGIA	1 NANOVIP KIT case

Data management software for Windows 9x/NT/2000 for hand-held analysers NANOVIP Plus and NANOVIP Plus MEM

NanoWin is designed for the Windows 9x/NT4.0 platforms. It is compatible with the NANOVIP *Plus* and the NANOVIP *Plus* MEM and provides full control of the instrument and display of data (including waveform and harmonic spectrum) via the PC.

Instrument set up is easily done via a simple configuration window, which allows all the main parameters to be set with a few clicks of the mouse. Options include start/finish time and date, storage rate, instrument set up and survey description.

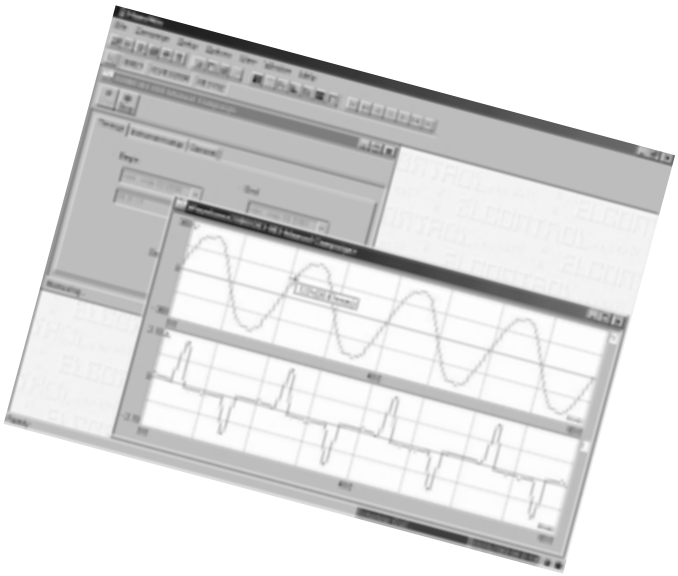
Instrument set-up Window.

Drop down windows for RMS values, Peak Memory Sweep, THD/Crest Factor/Ripple and Harmonic Spectrum can be viewed together or independently.

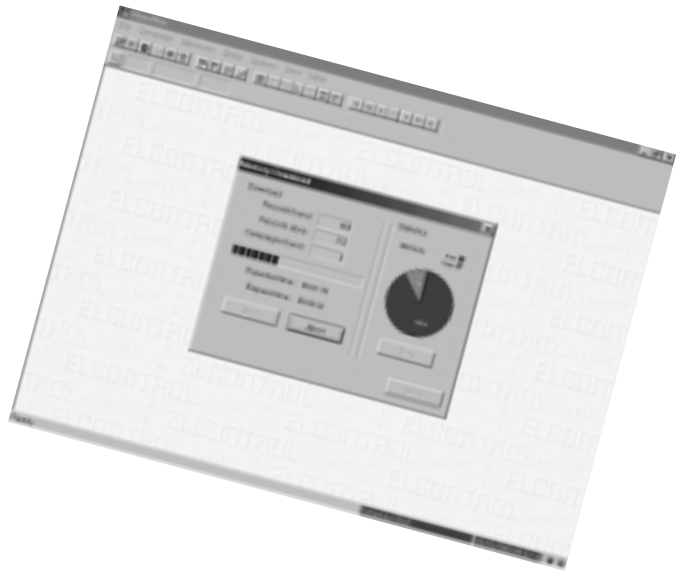
Data management software for Windows 9x and NT 4.0 for hand-held analysers NANOVIP Plus and NANOVIP Plus MEM

Harmonic Spectrum (to 24th) for Voltage Current and phase angle is displayed as actual values or as a percentage of the fundamental.

Realtime display of up to four trend measurements.



Graphic mode displays voltage and current waveforms in full colour (user definable).



Full download and data management capability for data stored by the NANOVIP *Plus* MEM. All the data display and graphic options available in realtime can also be applied to downloaded data.