

# NanoVIP® CUBEX™

*High end Portable Power Quality analyzer for mono, bi, three phases (balanced and unbalanced), medium and low voltages systems.*



**EN** NANOVIP® CUBEX™ is a modern, powerful, portable Power Quality Analyzer developed for professionals working on the most complex electrical networks.

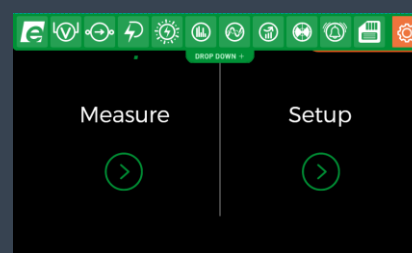
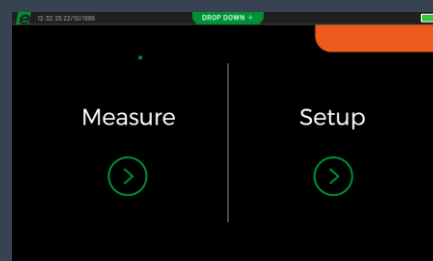
It can be used on single-phase, two-phase, three-phase (balanced and unbalanced, 3 or 4 wires) networks, low and medium voltage.

Measurements **accuracy according to EN61000-4-30** Class-A requirements.

Three external transducers interfaces, allows CUBEX™ to perform **“any energy” assessment** and provide realtime efficiency of machineries (load, pumps, chillers, generators...) or just combine physical measures other than electrical ones into surveys.

## MEASUREMENT PRECISION, POWERFUL ANALYSIS

- ✓ 5 inches 800x480 touch display
- ✓ Can work on networks: single-phase, two-phase, three-phase balanced with or without neutral, three-phase unbalanced with or without neutral
- ✓ Full traditional energy analysis (V, I, P, Q, S, F, PF, THD%, instantaneous values / minimum / maximum / average, energy meters absorbed and generated both three-phase for each phase) according to EN50160.
- ✓ Conformance EN50160 test and report
- ✓ **16bit continuous sampling according to EN61000-4-30**
- ✓ **Unbalance, Harmonics, Interharmonics and flickers according to EN61000-4-7**
- ✓ Dips, Swell, Interruptions from 10mSec
- ✓ Transients from 156 microseconds
- ✓ Up to 3 external transducers inputs to measure thermomechanical data; 0..1V, 0..20mA, 4..20mA and PT transducers can be read
- ✓ 4 tariff bands setting with the related costs display
- ✓ Automatic check of the correct connection of voltage cables and current sensors
- ✓ High capacity rechargeable batteries that guaranties over 10h of work
- ✓ Fast USB communication channel
- ✓ WiFi and/or 4G connectivity (options)
- ✓ Power bank (option) to extend battery autonomy to several days



|                                  |                                                                                                                                                                                                                    |
|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Class</b>                     | Class S – According to EN 61000-4-30                                                                                                                                                                               |
| <b>CASE:</b>                     |                                                                                                                                                                                                                    |
| Dimensions                       | 203x116x53mm                                                                                                                                                                                                       |
| Material                         | ABS with self-extinguishing V0 grade                                                                                                                                                                               |
| Protection class                 | IP30                                                                                                                                                                                                               |
| Weight                           | 850 g                                                                                                                                                                                                              |
| <b>DISPLAY:</b>                  |                                                                                                                                                                                                                    |
| Dimensions                       | 108x65mm                                                                                                                                                                                                           |
| Type                             | 5 inch touch LCD 800x480 pixels double layer graphic                                                                                                                                                               |
| Backlight                        | White LED                                                                                                                                                                                                          |
| Languages                        | English - Spanish - Italian - German - French                                                                                                                                                                      |
| <b>KEYPAD:</b>                   |                                                                                                                                                                                                                    |
| Type                             | Membrane keypad with 10 double-function keys                                                                                                                                                                       |
| <b>POWER SUPPLY:</b>             |                                                                                                                                                                                                                    |
| External power supply            | wall-plug switching; input 100-240VAC $\pm 10\%$ 47-63Hz with interchangeable plug; output 7.5VDC - 12W                                                                                                            |
| Battery pack                     | 4 x AA NiMH 2100mAh                                                                                                                                                                                                |
| Power bank                       | 25000mAh (option)                                                                                                                                                                                                  |
| Duration of the battery charge   | >11h (wireless off)                                                                                                                                                                                                |
| <b>CONNECTING SYSTEMS:</b>       |                                                                                                                                                                                                                    |
| Systems frequencies              | 50Hz – 60Hz                                                                                                                                                                                                        |
| Single phase                     | ✓                                                                                                                                                                                                                  |
| Two phase                        | ✓                                                                                                                                                                                                                  |
| Three-phase, 3-wires, balanced   | ✓                                                                                                                                                                                                                  |
| Three-phase, 3-wires, unbalanced | ✓                                                                                                                                                                                                                  |
| 4-phase, 4-wires, balanced       | ✓                                                                                                                                                                                                                  |
| 4-phase, 4-wires, unbalanced     | ✓                                                                                                                                                                                                                  |
| <b>CONNECTIONS:</b>              |                                                                                                                                                                                                                    |
| Voltages                         | Flexible cables L = 1.5m; 2.5mm <sup>2</sup> - 36A; 1000V CAT III - 600V CAT IV with a 4mm, 90° protected blade plug connector, crocodile clips with a 45mm opening (for sections up to 32mm) and magnetic captors |
| Currents                         | Elcontrol Energy Net interchangeable amperometric sensors                                                                                                                                                          |
| Analog inputs                    | Up to 3 external transducers: 0..1V, 4..20mA or PT                                                                                                                                                                 |
| <b>FUNCTIONS:</b>                |                                                                                                                                                                                                                    |
| Traditional electrical analysis  | V, I, P, Q, S, F, PF, THD(V)%, THD(I)%, $\cos\phi$ , $\phi$ , peaks, minimums, maximums, averages, max. demands, etc.                                                                                              |
| Neutral current                  | Measured                                                                                                                                                                                                           |
| Three phase counters             | kWh, kVAh, kVAh, both absorbed that generated                                                                                                                                                                      |
| Counters for each single phase   | kWh, kVAh, kVAh, both absorbed that generated                                                                                                                                                                      |
| Cogeneration                     | ✓                                                                                                                                                                                                                  |
| Waveforms                        | V & I                                                                                                                                                                                                              |
| Harmonics                        | Values and histograms up to the 50 <sup>th</sup> order                                                                                                                                                             |
| Interharmonics                   | ✓                                                                                                                                                                                                                  |
| Flickers                         | ✓                                                                                                                                                                                                                  |
| Sags                             | Dips, swells & interruptions                                                                                                                                                                                       |
| Transients                       | Overvoltages & overcurrents                                                                                                                                                                                        |
| Unbalance                        | ✓                                                                                                                                                                                                                  |
| Test EN 50160                    | ✓                                                                                                                                                                                                                  |
| Inrush current                   | ✓                                                                                                                                                                                                                  |
| DC measures                      | ✓                                                                                                                                                                                                                  |
| K factor                         | Up to the 25 <sup>th</sup> order                                                                                                                                                                                   |
| Alarms                           | Displayed                                                                                                                                                                                                          |

# NanoVIP® CUBEX™

|                                     |                                                                                                         |
|-------------------------------------|---------------------------------------------------------------------------------------------------------|
| Alarms log                          | 5 at display                                                                                            |
| Tariff bands                        | 4                                                                                                       |
| Energy costs                        | ✓                                                                                                       |
| IEC 61724 network parameters        | ✓                                                                                                       |
| Test EN 82.25                       | -                                                                                                       |
| OSU™ (One Shot UPS)                 | ✓                                                                                                       |
| Measurement campaigns               | unlimited, up to fill the memory card                                                                   |
| <b>MEASUREMENTS:</b>                |                                                                                                         |
| Sampling frequency                  | Adaptive within 40Hz-70Hz range                                                                         |
| Sampling bits                       | 16 bits per sample                                                                                      |
| Sampling method                     | Continuous on 9 channels according to EN61000-4-30 Class A requirements; 69.120 Samples per sec         |
| Data record rate                    | Min 1 sec.                                                                                              |
| Data storage rate                   | User selectable: 1", 5", 10", 30", 1', 5', 10', 15'                                                     |
| Type of connections available       | Three-phase (3 or 4 leads), two-phase (2 leads), and single phase grid                                  |
| Type of grid which can be connected | Low and medium voltage (LV and MV)                                                                      |
| <b>VOLTAGE (TRMS)</b>               |                                                                                                         |
| Channels                            | 4+1: 3 channels with common neutral + 1 independent (auxiliary channel)                                 |
| Input impedance                     | 4 Mohm                                                                                                  |
| Direct measurement                  | Phase-phase: 7-1000VAC 40-70Hz<br>Phase-neutral: 5-600VAC 40-70Hz<br>Aux: 5-1000VAC 40-70Hz, 10-1400VDC |
| Measurement with VT                 | Ratio: 1-60000<br>Maximum value which can be displayed: 20MV                                            |
| Permanent overload                  | Phase-phase: 1200VAC<br>Phase-neutral: 700VAC<br>Aux: 1200VAC, 1700VDC                                  |
| Sensitivity                         | 5VAC Phase-neutral, 7VAC Phase-phase, 10VDC                                                             |
| <b>CURRENT (TRMS)</b>               |                                                                                                         |
| Channels                            | 5 independent channels                                                                                  |
| Input impedance                     | 10KOhm                                                                                                  |
| Measurement with current clamps     | Ratio: 1-60000<br>Maximum value which can be displayed: 500KA                                           |
| Sensitivity                         | 0,2% of F.S.                                                                                            |
| <b>POWERS</b>                       |                                                                                                         |
| Single phase power                  | Values < 999 GW, Gvar, GVA                                                                              |
| Total power                         | Values < 999 GW, Gvar, GVA                                                                              |
| <b>POWER COUNTERS</b>               |                                                                                                         |
| Maximum value before reset          | 99999999 kWh, kvarh, kVAh                                                                               |
| <b>ACCURACY</b>                     |                                                                                                         |
|                                     | 0.1% on voltage channels according to EN61000-4-30                                                      |
| <b>PRECISION</b>                    |                                                                                                         |
| RMS voltages:                       |                                                                                                         |
|                                     | ±0.20% + 0.1% EOS (end of scale)                                                                        |
| RMS currents:                       |                                                                                                         |
| Input channels                      | ±0.20% + 0.1%EOS                                                                                        |
| Power                               | ±0.5% + 0.05%FS <sup>(2)</sup>                                                                          |
| Power Factor (PF)                   | ±0.5°                                                                                                   |
| Frequency                           | ±0.01 Hz (40-70Hz)                                                                                      |
| Active power count (kW)             | Class 0.5                                                                                               |
| Reactive power count (kVar)         | Class 1                                                                                                 |

|                                        |                                                                                                                                                                                                                                                                                                                                        |
|----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| HARMONIC ANALISYS                      | Up to 50 <sup>th</sup> order<br>Up to 7 <sup>th</sup> at 400Hz                                                                                                                                                                                                                                                                         |
| Interharmonics                         | According to EN61000-4-7                                                                                                                                                                                                                                                                                                               |
| Flickers                               | According to EN61000-4-15                                                                                                                                                                                                                                                                                                              |
| ANALYSIS of EN50160 parameters         |                                                                                                                                                                                                                                                                                                                                        |
| Interruptions                          | >10mS                                                                                                                                                                                                                                                                                                                                  |
| Dips                                   | >10mS                                                                                                                                                                                                                                                                                                                                  |
| Swells                                 | >10mS                                                                                                                                                                                                                                                                                                                                  |
| TRANSIENTS                             |                                                                                                                                                                                                                                                                                                                                        |
| Swells and overcurrents                | >156uS                                                                                                                                                                                                                                                                                                                                 |
| Inrush current analysis                | RMS continuous sampling                                                                                                                                                                                                                                                                                                                |
| ANALOGIC (THERMOMECHANICAL)            |                                                                                                                                                                                                                                                                                                                                        |
| Inputs                                 | 3 independent transducer inputs (according to model)                                                                                                                                                                                                                                                                                   |
| <b>COMMUNICATION:</b>                  |                                                                                                                                                                                                                                                                                                                                        |
| Channels                               | Up to 3 independent                                                                                                                                                                                                                                                                                                                    |
| WiFi                                   | ✓ (According to model)                                                                                                                                                                                                                                                                                                                 |
| 4G                                     | ✓ (According to model)                                                                                                                                                                                                                                                                                                                 |
| MRH™                                   | ✓ (According to model)                                                                                                                                                                                                                                                                                                                 |
| Server mode                            | ✓                                                                                                                                                                                                                                                                                                                                      |
| Connectable MRH™ clients               | -                                                                                                                                                                                                                                                                                                                                      |
| Client mode                            | -                                                                                                                                                                                                                                                                                                                                      |
| Maximum distance outdoor               | 600m                                                                                                                                                                                                                                                                                                                                   |
| Maximum distance indoor                | 60m                                                                                                                                                                                                                                                                                                                                    |
| Mesh network                           | ✓                                                                                                                                                                                                                                                                                                                                      |
| Wireless to PC                         | ✓                                                                                                                                                                                                                                                                                                                                      |
| USB                                    | ✓                                                                                                                                                                                                                                                                                                                                      |
| <b>DATA STORAGE:</b>                   |                                                                                                                                                                                                                                                                                                                                        |
| Internal memory                        | 2Mb                                                                                                                                                                                                                                                                                                                                    |
| External memory                        | Micro SD (included in package)                                                                                                                                                                                                                                                                                                         |
| <b>OPERATING CONDITIONS:</b>           |                                                                                                                                                                                                                                                                                                                                        |
| Operating temperature                  | -10 to +55 °C                                                                                                                                                                                                                                                                                                                          |
| Storage temperature                    | -20 to +85 °C                                                                                                                                                                                                                                                                                                                          |
| Relative humidity                      | Max 95%                                                                                                                                                                                                                                                                                                                                |
| Maximum altitude a.s.l. (600V CAT III) | 2000 m                                                                                                                                                                                                                                                                                                                                 |
| <b>REFERENCE STANDARDS:</b>            |                                                                                                                                                                                                                                                                                                                                        |
| Directives                             | 93/68/EEC (Low Voltage Electrical Equipment);<br>89/336/EEC and 2004/108/EC (EMC - Electromagnetic Compatibility);<br>2006/95/EC - 72/23/EEC (LVD - Low Voltage Directive);<br>2002/95/EC (RoHS - Restriction of Hazardous Substances);<br>2002/96/EC and 2003/108/EC (WEEE - Waste Electrical and Electronic Equipment);<br>IEC 61724 |
| Classification                         | EN 61000-4-30 Class S or Class A (according to model)                                                                                                                                                                                                                                                                                  |
| Safety                                 | EN 61010-1                                                                                                                                                                                                                                                                                                                             |
| Electromagnetic Compatibility (EMC)    | EN 61326/A1/A2/A3                                                                                                                                                                                                                                                                                                                      |
| Temperature                            | IEC 60068-2-1 (Operating temperature)<br>IEC 60068-2-2 (Storing temperature)                                                                                                                                                                                                                                                           |
| Vibrations                             | IEC 60068-2-6                                                                                                                                                                                                                                                                                                                          |
| Humidity                               | IEC 60068-2-30 (Humidity)                                                                                                                                                                                                                                                                                                              |
| Overload                               | IEC 60947-1                                                                                                                                                                                                                                                                                                                            |