

# Enerscope - 3S

## Basic Power Quality and Energy Analyzer

The ideal tool for both Power Quality troubleshooting and discovering Energy Savings



- Three-phase measuring and logging instrument
- Include Power Factor Correction and Harmonics measurements
- Economic
- Easy and ready to use
- Portable
- Autonomy of over 24 hours with rechargeable batteries

# Description

Enerscope-3S is a leading device for measuring and monitoring power consumption and for advanced energy and power quality analysis. This device can measure, display, process and transmit all the parameters of a system.

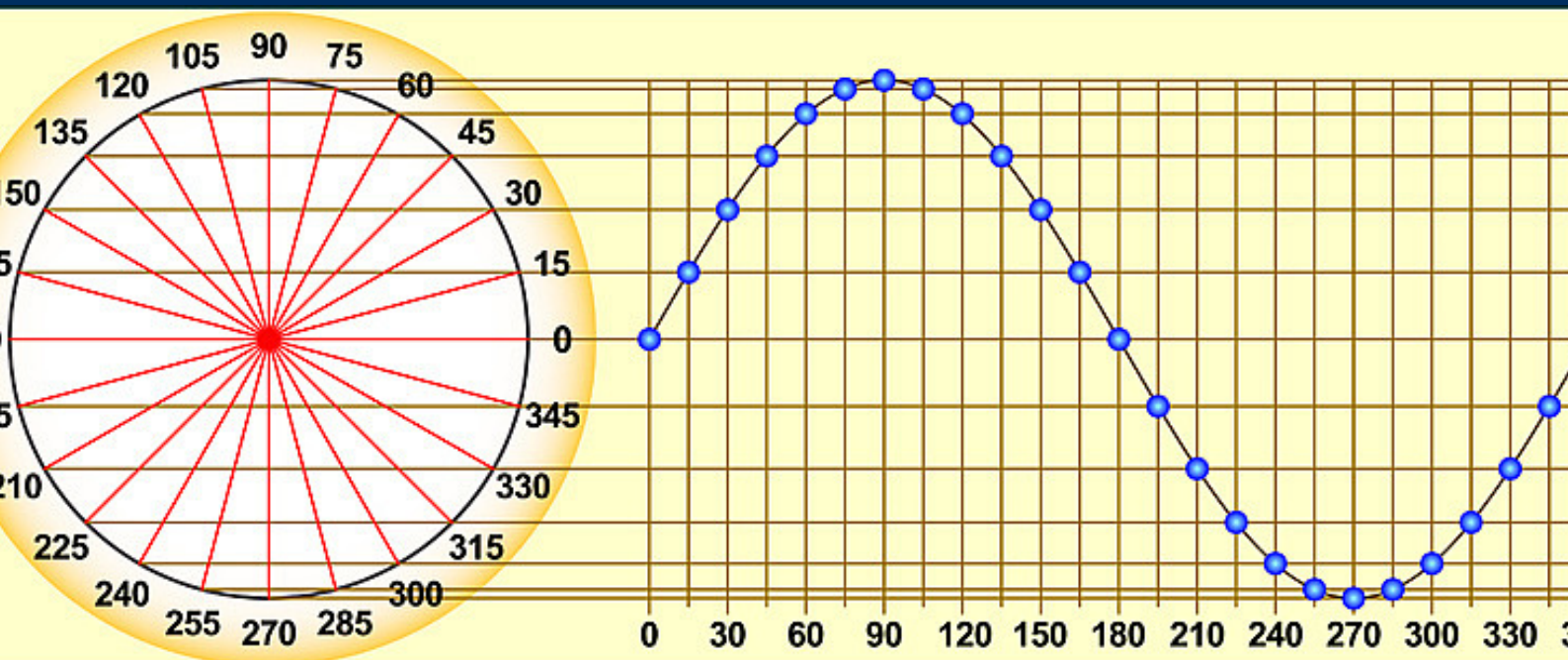
Main features:

- Handheld product and therefore, light and easy-to-use.
- 4 voltage measuring channels: 3 with common neutral + 1 auxiliary independent.
- 5 current inputs: 3 independent + 1 for neutral current + 1 auxiliary.
- Equipped with flexible current clamps up to 3000A.
- High performance battery pack with more than 24 hours of battery life, so that extended measurement campaigns can also be performed without using main power supply.
- Powerful but compact external power supply, compatible with all types of sockets (USA/JP, EU, UK, AU).
- Multilingual menus (English, Italian, German, Spanish, French).
- Automatic connection test to check if electrical connections are correct.
- Micro SD memory card for extended measurement campaigns.
- Special PC software, allowing for advanced analysis of data stored on uSD card.

## Functionalities

Calculation engine based on 16-bit microprocessor, allowing for the measurement of all standard quantities (V I P Q A F PF THD% etc.) in true root mean square (TRMS) value, as well as:

- Measurement of minimum, average and maximum instant values on 4 quadrants (absorbed and generated).
- Absorbed and produced power counters (kWh kVA kVAR), which can be password-protected.
- Current and voltage harmonics (all 7 input channels) up to the 50th order.
- Network interruptions & micro-interruptions.
- Dips (brownouts).
- Swells (overvoltages).
- EN50160 test (reference standard for power quality).
- Event log (last 5 alarms, 5 dips, 5 swells, 5 interruptions).
- Power measurement during 4 time periods (tariffs), which can be set.
- For three-phase and each single phase.
- 6 different electrical systems which can be analysed: single-phase; two-phase; 3-lead three-phase (unbalanced); 4-lead three-phase (unbalanced); 3-lead three-phase (balanced); 4-lead three-phase (balanced).
- Medium voltage connection available



# Technical data

**CASE:** Dimensions 203x116x53mm - Material ABS with self-extinguishing V0 grade - Protection class IP30 - Weight 580 g

**DISPLAY:** Dimensions 68x68mm - Type 128x128 FSTN Negative dot matrix graphic LCD - Backlight White LED

**KEYPAD:** Type Membrane keypad with 10 double-function keys

**POWER SUPPLY:** 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 - Duration of the battery charge >24h.

**CONNECTIONS:** 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, and a crocodile clip with a 45mm opening (for sections up to 32mm) - Currents interchangeable amperometric sensors.

**CONNECTING SYSTEMS:** Single phase - Two phase - Three-phase, 3- wires, balance - Three-phase, 3-wires, unbalanced - 4-phase, 4-wires, balance - 4-phase, 4-wires, unbalanced

**MEASUREMENTS:** Display refresh rate 1 sec. - 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)

**VOLTAGE (TRMS):** 3 channels with common neutral + 1 independent, auxiliary channel

Direct measurement: Phase-phase: 7-1000VAC 40-70Hz; Phase-neutral: 5- 600VAC 40-70Hz; Aux: 5-1000VAC 40-70Hz 10-1400VDC

Measurement with VT Ratio: 1-60000 Maximum value which can be displayed: 20MV

Permanent overload: Phase-phase: 1200VAC; Phase-neutral: 700VAC; Aux: 1200VAC 1700VDC

Sensitivity 5VAC Phase-neutral, 7VAC Phase-phase 10VDC

**CURRENT (TRMS)** Channels 5 independent channels. Measurement with current clamps Ratio: 1-60000 Sensitivity 2% of F.S. POWERS

Maximum value wich can be displayed 500 kA

**POWER COUNTERS:** Maximum value before reset 99999999 kWh, kvarh, kVAh

**ACCURACY**

RMS voltages:  $\pm 0.25\% + 0.1\%FS @ RMS V < 350VAC$   
 $\pm 0.25\% + 0.05\%FS @ RMS V > 350VAC$

RMS currents:  $\pm 0.25\% + 0.1\%FS @ RMS I < 5\% IN \text{ clamp}$   
 $\pm 0.25\% + 0.05\%FS @ 5\% < RMS I < 20\% IN \text{ clamp}$   
 $\pm 0.25\% + 0.05\%FS @ 20\% < RMS I < 50\% IN \text{ clamp}$   
 $\pm 0.25\% + 0.05\%FS @ > 50\% RMS IN \text{ clamp}$

Power  $\pm 0.5\% + 0.05\%FS$

Power Factor (PF)  $\pm 0.5^\circ$ ; Frequency  $\pm 0.01 \text{ Hz}$  (40-70Hz); Active power count (kW) Class 0.5; Reactive power count (kVar) Class 1

**HARMONIC ANALISYS** Up to 50th order

**ANALYSIS of EN50160 parameters:** Interruptions >500mS; Dips >500mS; Swells >500mS

**TRANSIENT ANALYSIS:** Swells and overcurrents >150uS - Inrush current analysis

RMS continuous sampling every 2 periods – Duration 1, 2, 5, 10 sec.

**COMMUNICATION:** USB to PC

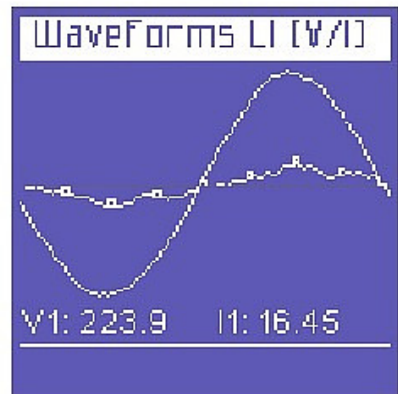
**DATA STORAGE:** Internal memory 64kB. External memory Micro SD (2GB included)

**OPERATING CONDITIONS:**

Operating temp -10 to +55 °C; Storage temp -20 to +85 °C; Relative humidity Max 95%; Maximum altitude a.s.l. (600V CAT III) 2000 m

**EC COMPLIANCE:** Directives 93/68/EEC (Low Voltage Electrical Equipment); 2004/108/EC (EMC - Electromagnetic Compatibility); 2006/95/EC (LVD - Low Voltage Directive); 2011/65/EU (RoHS - Restriction of Hazardous Substances); 2002/96/EC and 2003/108/EC (WEEE - Waste Electrical and Electronic Equipment).

**REFERENCE STANDARDS:** Safety EN 61010-1 Electromagnetic Compatibility (EMC) EN 61326 EN 61326/A1 EN 61326/A2 EN 61326/A3 Temperature IEC 60068-2-1 (Operating temp) IEC 60068-2-2 (Storing temp) Vibrations IEC 60068-2-6 Humidity IEC 60068-2-30 (Humidity) Overload IEC 60947-1



## Power menu

Active [W]	PF	Reactive [var]	PF	Apparent [VA]	PF	Power Factor	Load
L1 3.637k	0.94	L1 1.224k	0.94	L1 3.788k	0.94	L1 0.947	Cap
L2 5.538k	0.96	L2 1.525k	0.96	L2 5.700k	0.96	L2 0.968	Ind
L3 6.818k	0.93	L3 2.516k	0.93	L3 6.801k	0.94	L3 0.975	Ind
3PH 15.99k		3PH 5.266k		3PH 16.28k		3PH 0.993	Ind
Ehdv L2: 1.646		Ehdv L2: 1.630		Ehdv L2: 2.085		Ehdv L2: 1.941	
Avg. P-Q-S-PF [AUX]		Min. P-Q-S-PF [AUX]		Max. P-Q-S-PF [AUX]		Max.O. P-Q-S-PF [AUX]	
P 3.565k W		P 0.000 W		P 128.5k W		P 6.849k W	
Q 1.247k var		Q -2.999k var		Q 33.86k var		Q 1.663k var	
S 3.816k VA		S 0.000 VA		S 132.9k VA		S 7.085k VA	
PF 0.934 Ind		PF 0.000 Ind		PF 0.995 Ind		PF 0.969 Ind	
Vrms 3f: 394.6		Ehdv L2: 1.244		Ehdv L2: 2.085		Vrms 3f: 393.9	





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