STAR3 - Energy & Harmonics Analyser

96 x 96 POWER ANALYSERS

STAR3 is a high quality 96x96 panel energy analyser providing brillant features at a price never reached before. STAR3 is a perfect, professional and low cost solution for electrical panels, sub metering systems and OEM applications.
STAR3 is equipped with an exclusive reverse-LCD display, combining the advantages of LCD displays with the unrivalled visibility of "traditional" LED displays. The harmonic analysis, the wide set of measured parameters including the TDH (available in all the models), the multi-protocol capability of the RS485 port, the switching power supply and the high accuracy class 0.5% allow to consider STAR3 the new state of art of the of the panel analysers market.
The model including harmonic analysis allows a permanent based control of one of the most important aspects of power supply quality. Such important possibility, up to now, was reserved only to high-cost devices. STAR3 breaks this price barrier bringing, for the first time, harmonic analysis into the panel analyser market.

Main Features

- Digital energy and harmonics analyzer 96x96mm.
- True RMS measures.
- Displays 52 measures and 202 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 backlit red number on dark background LCD display. It is visible in any lighting condition 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 SETUP 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 202 measures.
- Switching Power Supply (90V to 230V AC or DC).

66 Measures

Further to all typical information provided by traditional analysers, Star3 monitors various additional parameters as:

The **THD% (Total Harmonic Distortion)** is a clear indication of an otherwise hidden problem: harmonic distortion. Current and voltage harmonics endanger the electrical installation (power transformer(s), neutral lines, circuit breakers and Power Factor Correction equipments) and such sensitive and expensive loads as for example IT loads.

The model including full **Harmonic Analysis**, allows a further, in-depth examination of the harmonic spectrum: voltage and current harmonics up to the 25th order are clearly displayed in numerical format, allowing a first-sight assessment of the causes of distortion.

The **Neutral Current** informs about the condition of the neutral cable, often overcharged as a consequence of unbalanced loads and harmonics.

The **Maximum Demand** of current tells you clearly if the components of the electrical network, cables, breakers, contactors, bus bars etc., are overcharged.

Cogeneration Energy Counters enable energy measurement of both active and reactive energy on 4 quadrants, for installations with Cogeneration Plants.

Available Models:

STAR3 basic model
Measures all parameters listed in the below table. Includes an RS485 port with multiprotocol capability: Modbus RTU (BCD and 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 feature. Even if you are not immediately interested in setting up a network of instruments, this possibility will remain always available for future developments.

STAR3 ALM: As the basic model + 2 relay outputs. The outputs can be set for either alarm signalling or pulses generation or to be remotely controlled via the RS485 port. The "Alarm" function can be associated with several measures including V, A, W, THD. The relay is triggered by a maximum and a minimum threshold; histeresys and the delay time can be set. All the settings can be adjusted by means of the keyboard. If used in "Pulse" mode the relays generate pulses proportional to the associated measure. Also in this case the behaviour is adjustable via the setup menu.
In "remote control" the position of the relays is controlled by an external master device (PLC, PC, etc) via the RS485 line. This is very convenient for load shedding applications.

STAR3 4-20mA: As the basic model + 2 analogue outputs 0/4-20mA. The two analogue outputs are fully configurable by means of the Setup-Menu. The user can choose the measures to be linked with the outputs, configure the output range choosing between the 0-20mA or 4-20mA range and set the full scale value for the chosen measurements.

PARAMETERS	TOT	L1	L2	L3	N
Phase-neutral Voltage [V]	•	•	•	•	
Phase-phase Voltage [V]		L1-L2	L2-L3	L3-L1	
Current [A]	•	•	•	•	•
Power Factor	•	•	•	•	
Frequency [Hz]		•			
Average Current [A]		•	•	•	
Maximum Demand Current [I]	•	•	•	•	
Active Power [kW]	•		•	•	
Reactive Power [kvar]	•	•	•	•	
Apparent Power [kVA]	•	•	•	•	
Average Active Power [kW]	•				
Average Reactive Power [kvar]	•				
Average Apparent Power [kVA]	•				
Maximum Demand Active Power [kW]	•				
Maximum Demand Reactive Power [kvar]	•				
Maximum Demand Apparent Power [kVA]	•				
Positive (Imported) Active Energy [kWh]	•				
COG-negative (Exp.) Active Energy [kWh]	•				
Positive Reactive Energy [kvarh]	•				
COG-negative Reactive Energy [kvarh]	•				
Apparent Energy [kVAh]	•				
Current Tdh%	•	•	•	•	
Voltage Tdh%	•	•	•	•	

STAR3 HARMO:
As Star3 ALM + three phase harmonics spectrum for voltage and current. In addition to the basic measures of the above table, this model displays complete information about the harmonic spectrum.
The instrument display also the harmonics using bar graph pages. For each harmonic order k the following values are available:

HARMONIC ORDER (k=1..25 @ 50Hz - k=1..20 @ 60Hz)	L1	L2	L3
Harmonic Voltage Vk	•	•	•
Harmonic Current Ik	•	•	•

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

General Technical Characteristics

Maximum dimensions (mm): instrumen 96 x 96 x115.4
Cut-out template: 91 x91mm.
Power supply: from 90 to 230 V AC/DC (0÷400Hz) + 15% -20% (5VA)
Display: reverse red LCD with LED backlight
Voltmeter inputs: VL1, VL2, VL3, N up to 350 V ~ phase-neutral, 600 V ~phase-to-phase, 35 ÷ 400Hz.
Voltmeter input impedance: 2 M ohm
Voltage input overload: max 850 V phase-neutral
Current inputs: AL1, AL2, AL3, COM; 5A. Consumption 1 VA. /5A external curr. transf. required.
Measuring range: 0-120% nominal current
Sensitivity: current 20mA; voltage 10V
Overcurrent: withstands 50A for 1 sec.
Number of scales: 1 voltage scale, 2 current scales
Measurements: T.R.M.S. (true effective value) up to 25th harmonic = 1250Hz with fundamental @50 Hz
Sampling frequency: 2,5kHz
Accuracy: error <0.25% for V and I, <0.25% for Power (EN 62053-21)
Connection: Single-phase or three-phase star, three-phase delta, or diphase systems
Weight of the instrument: 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.
Relay output: V 250 max, 120 mA AC max

Standards and Regulations

STAR3 conforms to Directive 73/23/CEE (LVD) and 2004/108/CE (EMC). It has been designed with reference to EN 61010-1, EN 61326 including append. A1/A2/A3, EN 61000-6-2, EN 61000-6-3, EN 61000-3-2, EN 61000-3-3, EN 61000-3-3/A1, EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-5/A1, EN 61000-4-6, EN 61000-4-6/A1, EN 61000-4-8, EN 61000-4-8/A1, EN 61000-4-11, EN 61000-4-11/A1.

Dimensions (mm)