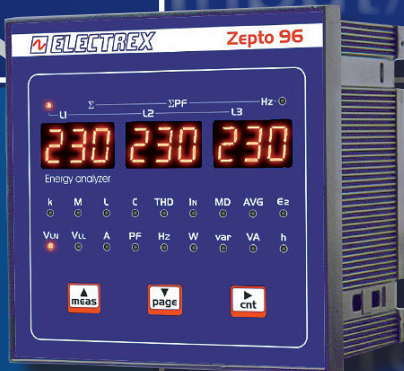




Engineered and manufactured in Italy  
**Made In Italy**  
Pensato, progettato e prodotto in Italia

# FEMTO ATTO ZEPTO

The "new way"  
for energy  
managing and  
measurement



**ELECTREX**

the energy saving technology

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The families of measuring instruments Femto, Atto and Zepto are designed to meet the most sophisticated applications for monitoring and managing electrical parameters of the consumption of electricity in the civil, commercial or industrial sector. All the instruments are characterized by an universal suitability in the electrical systems (mono, two and three-phase, 3 and 4 wire, symmetrical or asymmetrical, balanced or unbalanced, low and medium voltage; 1, 2 or 3 CT). A contemporary and continuous sampling on the three phases and the compensation of the internal offset of amplifiers, ensure maximum accuracy regardless the signal level, the environmental operating conditions and the degradation of components, which vary over time. A specific version of Femto is designed to measure the direct current, for example, in photovoltaic systems.

## ZEPTO



Analyzer, meter and multimeter extremely versatile and designed to meet specific applications and a more sophisticated monitoring of electrical parameters and management of electricity consumption in the civil, commercial or industrial sector.

### Versatility

One tool for all types of auctions, the Zepto is suitable for applications on any type of network: single phase, bi-phase, three-phase 3 and 4 wire, symmetrical or asymmetrical, balanced or unbalanced, low and medium voltage; 1, 2 or 3 CT.

### Simplicity and high visibility

A 3 buttons keyboard allows a simple and rational use of the instrument, while a triad of high brightness red LED display ensures high visibility (up to 7 meters), also in presence of intense environment light. The display of 3 values each, with floating point, allows the simultaneous reading of 3 measures (or 1 measure of 9 values for the energy meters).



### Serial communication

It is equipped with a RS485 serial port with protection against overvoltage for the ModBus networking. Uses the "full compliant" ModBus protocol for communication with PLC and SCADA software. A transmission up to 38.400bps without waiting times ensures an insuperable communication speed.

### Standard version

Zepto is provided in DIN rail 6 modules version and 96x96 panel version.

### Readings: precision and reliability

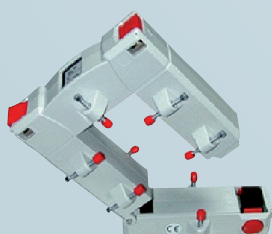
Over 50 readings on 2 quadrants, in true Rms value (up to the 31st harmonic). Maximum precision also in the presence of quickly variable loads (e.g. spot welders), obtained either by continuously sampling waveforms of tensions and current.

Parameter	Type	L1	L2	L3	n	Σ	P	Range
Tension	U <sub>L-N</sub>	●	●	●	●	●	●	20,0V...400 kV
	U <sub>L-L</sub>	●	●	●	●	●	●	
Current	I	●	●	●	●	●	●	10 mA...10,0 kA
	I <sub>THERM</sub> (1)	●	●	●	●	●	●	
Power Factor	PF	●	●	●	●	●	●	0,00ind...1,00...0,00cap
Frequency	Hz	●	●	●	●	●	●	45 ... 65 Hz
Harmonic distortion	THD-U <sub>L-N</sub>	●	●	●	●	●	●	0...199,9%
	THD-U <sub>L-L</sub>	●	●	●	●	●	●	
	THD-I	●	●	●	●	●	●	
Active power	P	●	●	●	●	●	●	± 0,00...1999 MW
	P <sub>m</sub> (1)	●	●	●	●	●	●	
Reactive power	P <sub>MD</sub> (1)	●	●	●	●	●	●	± 0,00...1999 Mvar
	Q <sub>IND</sub>	●	●	●	●	●	●	
	Q <sub>CAP</sub>	●	●	●	●	●	●	
	Q <sub>m IND</sub> (1)	●	●	●	●	●	●	
	Q <sub>m CAP</sub> (1)	●	●	●	●	●	●	
Apparent power	Q <sub>MD IND</sub> (1)	●	●	●	●	●	●	± 0,00...1999 MVA
	Q <sub>MD CAP</sub> (1)	●	●	●	●	●	●	
	S	●	●	●	●	●	●	
	S <sub>m</sub> (1)	●	●	●	●	●	●	
Timelife	S <sub>ed</sub> (1)	●	●	●	●	●	●	0,01...99.999,99 h
	h (1/100 h)	●	●	●	●	●	●	
Active Energy	E <sub>a</sub>	●	●	●	●	●	●	0,1 kWh...99.999,9 MWh
Reactive Energy	E <sub>r IND</sub> (2)	●	●	●	●	●	●	0,1 kvarh...99.999,9 Mvarh
	E <sub>r CAP</sub> (2)	●	●	●	●	●	●	
Apparent Energy	E <sub>s</sub>	●	●	●	●	●	●	0,1kVAh...99.999,9 MVAh

1) value on the time of integration (1.. 60 min. programmable).

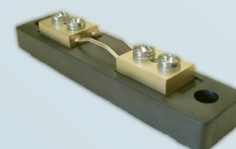
2) the energies are shown in 8 values floating point. The internal counters are stored with minimum definition 0, 1 WH and counting maximum 99,999,999.9999 kWh.

## CURRENT TRANSFORMERS AND SHUNTS



Wide range of openable current transformers, Split Ct series, from 100 to 2500 A with 5A secondary and with 1% precision class obtained thanks to a low loss magnetic material and a patented coupling system, and without screws. Split CT Series reduce the costs of installation on existing plants and are suitable for applications on power bars (by isolated fixing screws) or directly on power cables. Traditional current transformers are also available.

Wide range of Shunts, 0.5%. Voltage drop 60mV. 10A and 25A versions are equipped with a plastic socket, isolating, base. All models are conform to the DIN 43703 Standard.



## FEMTO



Analyzer, counter and multimeter extremely versatile and precise designed to meet the more sophisticated applications of monitoring of the electrical parameters and management of consumption of electricity in the civil, commercial and industrial sector. A specific version of the Femto has been designed for the measure in direct current, for example in applications in the context of photovoltaic systems.

### Versatility

Only one instrument for every kind of insertion. In fact the Femto is suitable for application over all types of electric grid, single, bi phase or tri-phase with 3 or 4 wire, symmetric or asymmetric, balanced or unbalanced, low or medium tension; with 1, 2 or 3 CT.

### Simplicity and high visibility

A 3 buttons keyboard allows a simple and rational use of the instrument, while a graphic dot matrix LCD display with a led backlight and adjustable contrast allows the simultaneous reading of 4 parameters and their symbols with high visibility digits.

### Serial communication

Femto is equipped with a over-voltage protected RS485 serial communication port. The protocol is a full compliant Modbus-RTU suitable for communication with PLC and SCADA software. A transmission up to 38.400bps without waiting times ensures an insuperable communication speed.

### Digital input and outputs / alarms

Femto is equipped by series of 1 input and 2 digital outputs optically insulated. The input is used to count signals of external pulses (e.g. gas counters, water, pieces, etc.), or to detect the state (e.g. ON/OFF in machines, switches, etc.). While the 2 outputs may transmit pulses proportional to the active and reactive energy (e.g. for PLC), internal alarms or can be used as units of output controlled remotely.

### Standard version

Femto is available in DIN rail 4 modules format and 96x96 panel format. For the DIN rail format is available also the 70A version and the DC measurement version (e.g. photovoltaic systems).

### Customized version

Femto is available in other hardware configurations, with different type of inputs and outputs and different insertion kind.

- (1) Average on 10 cycles (eg. 200ms a 50 Hz)
- (2) Average on integration time (1...60 min. programmable)
- (3) Floating average on Import and Export integration time (1..60 min. programmable)
- (4) Import and Export energies are 9 floating point digit displayed. Internal counters are memorized with 0,1 Wh minimum definition and maximum count of 99.999.999,9999 kWh.

### Readings: precision and reliability

Over 60 True-RMS value readings on 2 and 4 quadrant (import/export), up to the 31st harmonics. Maximum precision also in the presence of quickly variable loads (e.g. spot welders).

Parameters	Type	L1	L2	L3	n	Σ	P	Range
Tension	U <sub>L-N</sub>	●	●	●	●	●		20,0V...400 kV
	U <sub>L-L</sub>	●	●	●				
	U <sub>L-N MAX</sub> (1)	●	●	●				
	U <sub>L-L MAX</sub> (1)	●	●	●				
	U <sub>L-N MIN</sub> (1)	●	●	●				
Current	I	●	●	●	●	●		10 mA...10,0 kA
	I <sub>MAX</sub> (1)	●	●	●				
	I <sub>THERM</sub> (2)	●	●	●				
Power Factor	PF	●	●	●		●		0,00ind..1,00..0,00cap
Frequency	Hz	●						45 ... 65 Hz
Harmonics	THD-U <sub>L-N</sub>	●	●	●	●			0...199,9%
	THD-U <sub>L-L</sub>	●	●	●				
	THD-I	●	●	●				
Active Power	P	●	●	●		●		± 0,00...1999 MW
	P <sub>m</sub> (3)					●		
	P <sub>MD</sub> (3)					●		
	P <sub>MAX</sub> (1)	●	●	●				
Reactive Power	Q <sub>IND</sub>	●	●	●		●		± 0,00...1999 Mvar
	Q <sub>CAP</sub>	●	●	●		●		
	Q <sub>m IND</sub> (3)					●		
	Q <sub>m CAP</sub> (3)					●		
	Q <sub>MD IND</sub> (3)					●		
	Q <sub>MD CAP</sub> (3)					●		
Apparent Power	S	●	●	●		●		± 0,00...1999 MVA
	S <sub>m</sub> (3)					●		
	S <sub>MD</sub> (3)					●		
Temperature	T					●		-10...+50 °C
Timelife	h (1/100 h)					●	●	0,01...99.999,99 h
Active Energy	E <sub>a IMP</sub> (4)	●	●	●	●	●		0,1 kWh...99.999,9 MWh
	E <sub>a EXP</sub> (4)					●		
Reactive Energy	E <sub>r IND IMP</sub> (4)	●	●	●	●	●		0,1 kvarh...99.999,9 Mvarh
	E <sub>r CAP IMP</sub> (4)					●		
	E <sub>r IND EXP</sub> (4)					●		
	E <sub>r CAP EXP</sub> (4)					●		
Apparent Energy	E <sub>s IMP</sub> (4)					●	●	0,1kVAh...99.999,9 MVAh
	E <sub>s EXP</sub> (4)					●		
Pulse count	CNT					●	●	

## ATTO



Atto is a microprocessor based Transducer / Energy Analyzer without display designed for on boards applications coupled with a PLC and for low level energy monitoring. It has the same Femto characteristics and is available in two versions: 2 4-20mA analog outputs or 1 digital input and 2 digital outputs. 4 DIN rail modules size. Atto is available in other hardware configurations, with different type of inputs and outputs and different insertion kind.

**X3M Energy Data Manager (Harmonics)**



Digital Energy Data Manager, high-brightness display and memory for analysis and recording of electricity and its quality. Designed for harsh environments and based on firmware upgradeable remotely. Universal suitability (single, bi and three phase, star and delta, BT and MT) and continuous and simultaneous sampling on the three phases. Hundreds of measures. Equipped with perennial, battery powered, clock and 2 Mbytes of nonvolatile memory that can store up to 255 days (programmable) of data, two calendars fare (updated) measurement campaigns (eg, harmonics up to 31A, voltage, current) , events and other information. In addition to the 2 programmable digital outputs, 2 expansion ports for optional modules (RS232, RS485, 2x4-20mA, 2in-2out). Basic version or with analysis of Harmonics. DIN Rail mount size 6 and 9 modules or 96x96. 3 years warranty.



**FLASH (Harmonics)**



Digital Analyzer with high-brightness display. Designed for harsh environments and based on firmware upgradeable remotely. Universal suitability (single, bi and three phase, star and delta, BT and MT) and continuous and simultaneous sampling on the three phases. Hundreds of measures among energy, THD and the peaks on the 4 quadrants, the neutral current, operating time and the single harmonics value up to the 31st. Besides the 2 digital programmable outputs other 2 expansion ports allow the connection of optional modules (RS232, RS485, 2x4-20mA, 2In-2Out). Basic version or with analysis of Harmonics. DIN Rail mount size 6 and 9 modules or 96x96. 3 years warranty.



**FAST (Harmonics)**



Energy transducer / analyzer without display and with the same characteristics of the basic version of Flash. DIN Rail mount size 6 modules. 3 years warranty.

**OPTIONS**



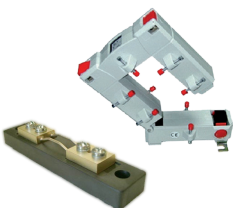
Expansion options RS485, RS232, Output 2x4-20mA, 2 digital inputs and 2 relay outputs for X3M, Flash and Fast in DIN 6 modules or 96x96 version. 3 years warranty.

**NET WEB X3M H BOX**



Portable instrument in a hard plastic carry case can be used also for the management of the quality of the energy. Includes 1 Energy Data Manager X3M D6 H with FFT harmonics readings, 1 Yocto net with Web pages, Energy Brain 4 software. RJ45 and RS232 ports. Voltage and current cables included. 3 years warranty.

**Split CT and Shunt**



Split CT current transformers feature, an innovative fast snap-on system with no screws. Wide range from 100A to 2500A with secondary 5A.

Shunt 0,5 % class. 60mV voltage drop. 10A and 25A version are provided with a plastic socket. All models are conform to the DIN 43703 Standard.

Distributor

**FEMTO**



A family of energy analyzers / counters with LCD display. Universal suitability (single, bi and three phase, star and delta, BT and MT) and continuous and simultaneous sampling on the three phases. Over 60 measures including: max and min, temperature, import/export, phase active energy, THD, RMS up to the 31st harmonics. RS485 port included, 1 digital input and 2 digital outputs, programmable. DIN Rail mount size 6 modules or 96x96. 3 years warranty. Special version for DC measurement.

**ATTO**



Energy Transducer / analyzer without display and the same characteristics of the Femto. RS485 Port included. Two versions: 2 analog outputs 4-20mA or 1 digital input and 2 digital outputs. DIN Rail mount size 4 modules.

**ZEPTO**



Multimeters / counters / analyzers family with a LED display. Universal suitability (single, bi and three phase, star and delta, BT and MT) and continuous and simultaneous sampling on the three phases. Over 50 measures including: total and partial active energy, AVG powers and peaks, THD of voltage and current. RS485 Port included. DIN Rail mount size 6 modules or 96x96.

**YOCTO NET, YOCTO NET LOG END YOCTO GATE**



The Yocto net is a network bridge which can connect one or more Electrex instruments in a Modbus network to a Ethernet port. The network bridge can be interrogated through Energy brain software or by specific HTML pages via Ethernet/ Internet. Features like e-mail alarms and live measures on-line through HTML pages can be activated by PUK entry.

Yocto net log, available in different versions, adds to the previous features the possibility to record the parameters read from the instruments and/or digital or analog interfaces Electrex. With specific PUK updates it is also possible to customize the instrument with features such as measurement survey.

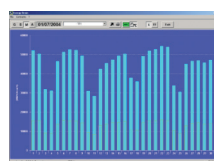
Yocto gate is a gateway GSM with inputs and outputs. It allows to interface via GSM with the Electrex instruments but especially it manages the Modbus alarms and the forward of remote commands. DIN Rail mount size 4 modules.

**ETTO**



Energy counter with pulse output. Etto can be sealed with a tamper proof kit provided with the instrument. Performs the measure of the active energy on a single phase network with direct connection up to 32A. DIN Rail mount size 2 modules

**ENERGY BRAIN**



Energy Brain is Electrex's software developed for data retrieving and managing consumption of electrical energy, gas, water, steam, illumination, compressed air, temperature, calories, etc. The software allows to control energy costs, also divided for cost centers. It is the starting point for a perfect and correct energy saving plan.