// ZEM-61

Wireless 3-Ph Electricity Monitor

// Introduction

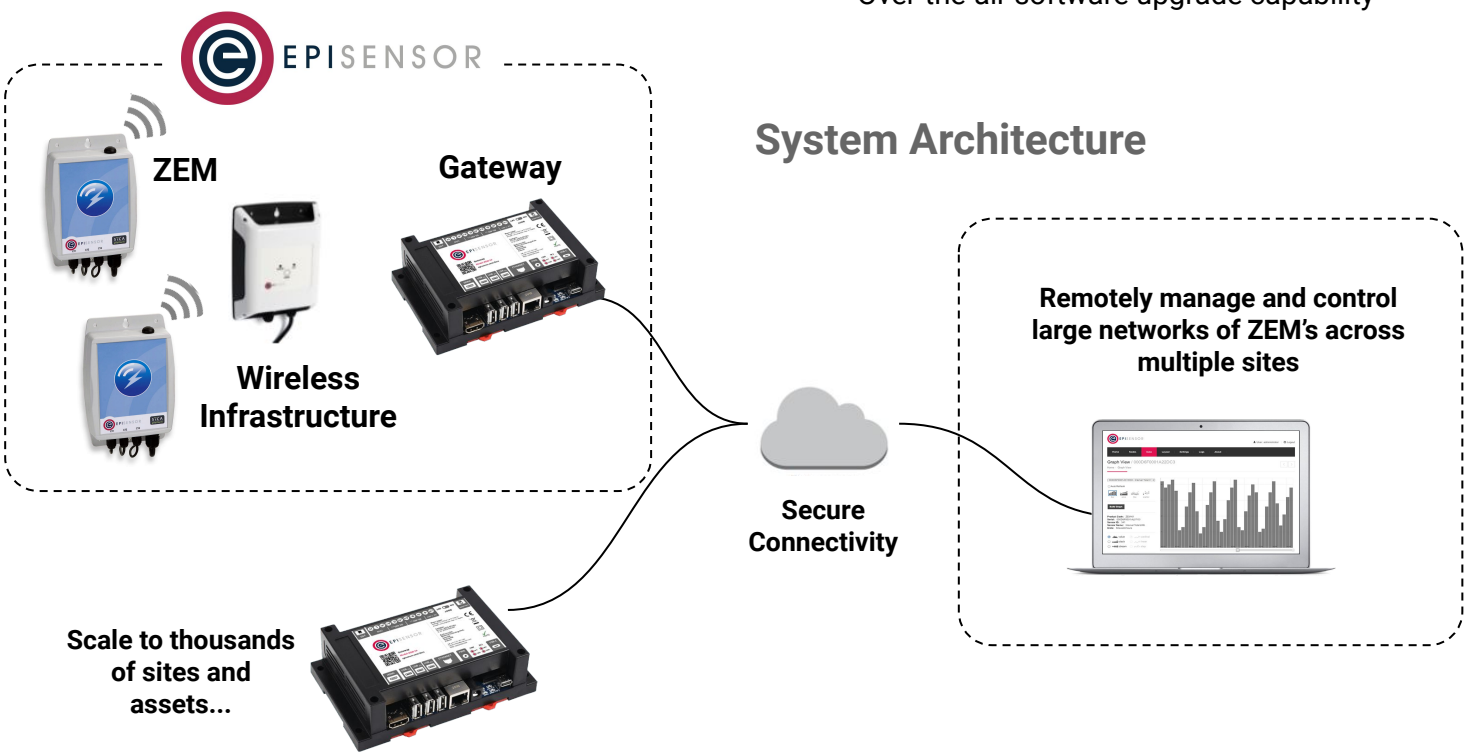
EpiSensor's ZEM is a highly accurate wireless 3-phase electricity monitor. It can monitor energy consumption patterns in equipment and buildings remotely via the EpiSensor Gateway, providing facility and energy managers with targeted energy consumption information essential for increasing efficiency.

// Key Features

- Security from edge to cloud
- Class 1 accuracy 3-phase power meter
- Current Measurement Range: 0.1A to 3kA
- Clip-on CT's are included and pre-calibrated
- Fully wireless communications
- Connect many ZEM's to one Gateway
- Waterproof Polycarbonate Enclosure
- Over-the-air software upgrade capability

For more information, contact:
sales@episensor.com
visit http://episensor.com or call +353 61 512 500

System Architecture



Technical Specification

// Electricity Monitoring

Category	Parameter	Value
3-Phase AC Voltage Inputs	Voltage Measurement Range (L-L)	75 - 470VAC ±10%
	Nominal Frequency (±10%)	50 / 60 Hz
	Overvoltage Category (as per EN 61010-1)	CAT III-600V
	Wiring configurations	3-phase / 4-wire
	Isolation	Digital / 5000V / 1 minute
AC Current Inputs	Supported CT Types	mA / Rogowski (factory paired)
	Nominal Frequency (±10%)	50 / 60 Hz
Auxiliary Voltage Input	Operating Range	85 - 265 V AC
	Burden	Max. 5 watts
	Overvoltage Category (as per EN 61010-1)	CAT III-300V / CAT II-600V
	Frequency	50 / 60 Hz
Measurement Accuracy	Active Energy	±0.5 %
	Reactive Energy	±2 %
	Active Power	±0.5 %
	Apparent Power	±0.5 %
	Current, Phase	±0.5 %
	Voltage, L - N	±0.5 %
	Frequency	±0.05 %

Note: ZEM is powered from its 3-phase voltage reference in the default configuration. Please contact EpiSensor if this is unsuitable.

// Communications

Category	Parameter	Value
Wireless Sensor Network	Radio Technology	ZigBee Pro
	Radio Frequency	2.4 GHz ISM band
	Channels	16 (802.15.4 Channels 11 to 26)
	Max Tx Power	+5dBm
	Rx Sensitivity	-98dBm
	Max Data Rate	256kbit/s
	Wireless Range	up to 50m indoor / 300m outdoor

Technical Specification

// Software Features

Category	Parameter	Value
Real Time Clock & Sync	Real Time Clock Backup	Capacitor
	Hold-up time	up to 72 hours
	Synchronisation	NTP time server via Gateway
	Timestamp Format	ISO-8601
	Timestamp Resolution	1 second
Data Logging	Storage Type	Non-volatile flash
	Capacity	up to 10,000 data points
Security	Sensor Network Encryption	AES 128-bit
	Server Communications	TLS v1.2 / various

// Operating Conditions

Category	Parameter	Value
Operating Conditions	Operating Temperature	−30°C to 55°C (−22°F to 131°F)
	Storage Temperature	−40°C to 70°C (−40°F to 158°F)
	Operating Humidity Range	up to 100%
	Altitude	up to 2000m
Physical	Weight	0.35 - 0.5 kg
	Dimensions (W x H x D)	192 x 128 x 40mm
	IP degree of protection	IP67 (IEC 60529)

// Certifications

Category	Parameter	Value
Certifications	Safety	CE
	Environmental	RoHS, WEEE

EpiSensor products are not suitable or specifically designed, manufactured or licensed for use in military, aviation, powerplant, medical or in other inherently dangerous or safety critical applications.

Technical Specification

// Order Codes

SKU	Description
ZEM-61-120	120A per-phase, 16mm Ø aperture, split-core mA Current Transformers, 2m cable, 600V rated
ZEM-61-300	300A per-phase, 24mm Ø aperture, split-core mA Current Transformers, 2m cable, 600V rated
ZEM-61-r1k	1000A per-phase, flexible Rogowski coil Current Transformers, 80mm Ø aperture, 2m cable, 600V rated
ZEM-61-r3k	3000A per-phase, flexible Rogowski coil Current Transformers, 80mm Ø aperture, 2m cable, 600V rated

Installation & Safety Notes

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- ➔ EpiSensor equipment should be installed, operated, serviced and maintained only by qualified personnel. EpiSensor does not assume any responsibility for any consequences arising out of the use of this equipment.
- ➔ For detailed installation and safety information, consult the Install Sheet.

// Contact

For technical support, please contact **support@episensor.com** or phone +353 61 512 500

Address: EpiSensor Ltd. Georges Quay House, Georges Quay, Limerick, V94 YW9T, Ireland

Manufactured in an ISO 9001 / ISO 14001 certified facility.

Designed and manufactured in Ireland

Frequently Asked Questions

// What Current Transformer types and sizes does the ZEM support?

The ZEM is compatible with milliamp output split core current transformers and flexible Rogowski coils. These CT's are paired with each ZEM during manufacture and calibrate to provide an overall accuracy of Class 1 (+/- 1% or better). The standard mA (split core) range includes 120A/phase CT's with a 16mm aperture, 300A/phase CT's with a 24mm aperture and 1kA/phase or 3kA/phase flexible Rogowski Coils with a 80mm aperture. Larger CT sizes are available on request.

// Are EpiSensor cloud services required?

EpiSensor offer premium support and device management packages providing customers and partners with a defined service level and firmware updates, but no cloud services are required from EpiSensor, and no customer data flows through EpiSensor servers.

// What wireless range can I expect?

The wireless range you can achieve will depend on the fabric of the building and the location where the hardware is installed - but on average, each mains powered node (including the ZEM) will provide coverage for 1000m2 of commercial / industrial floor area. The system uses ZigBee wireless mesh networking technology, so wireless coverage will improve with each node that's added.

// What data is available from the ZEM?

There are up to 36 data feeds available on the ZEM that can be individually configured, like kWh, kVAh, current, voltage, power-factor, wireless signal strength, & many more.

// Who can install the system?

The electricity meters must be installed by qualified electrical workers, and the installation must conform to local electrical standards.

// Can EpiSensor systems be expanded to include multiple meters / sensors?

Yes! The exact number of nodes supported will depend on the number of sensors enabled and their reporting interval (the limit is measured in 'data points per hour') but an approximate limit would be that up to 100 ZEM nodes can be connected to each EpiSensor Gateway.

// What other sensors can be added to the system?

There are many types available, including wireless temperature, humidity, pulse, 4-20mA and also Modbus/RS-485, which can be used to extract live data from existing metering equipment in other locations.

// Where can the ZEM be installed?

ZEM is water and dust-proof to IP67 (NEMA 4) standard and double-insulated. This means it can be mounted inside or outside an electrical panel, indoors or outdoors, in clean or dirty environments. For more detailed product information, please check the technical specification.

// What type of Internet connections are supported?

EpiSensor's Gateway supports Cellular and Ethernet network connections. For Gateway hardware based on the Dell Edge Gateway 3002 Series, Wi-Fi is also supported.

// What security features are supported?

Data is encrypted at every layer in the system. On the ZigBee wireless sensor network, AES 128-bit security is used. Between the Gateway and server, industry standard TLS v1.2 encryption is used to protect customer data.