

# Grid Edge Power Quality Sensor

eSensor - Compact Grid Edge Monitoring Module

Models: EE-402-Series



## FEATURES

### Compact Grid or Transformer Mounted Metering Module

- Grid or Transformer Status Monitoring Module
- For both Single or Three Phase Installations
- Wide Voltage Input - 100-480VAC
- High Temperature Polycarbonate outdoor enclosure
- Monitors and Transmits Grid Full Power Quality Data.
- Monitors and Transmits Full Pole or Pad Transformer Status including Full Power Quality Data plus Temperatures.
- Full Alarms including - Power Outages, Overloading, Overvoltage, Undervoltage, PF min., Reverse Current, Temperatures, Tampering.
- Firmware Uploading to add Custom Options and set Alarm Limits.
- Intelligent Software control; Network compatible Unit that is Programmable over Internet. Encryption AES128 & SHA256.
- Flexible Utility Grade Rogowski Current Transformers (supplied)
- Unit Ingression Protection – IP66;
- Events Logging 1 Month – Store and Forward.
- Last Gasp Feature – 30 Sec Hold Up for Power Interrupt Data
- Safety Standard AS 61010.1:2003 - Certificate no. ULL-101919
- Overvoltage Category IV
- EMI Electrical Noise Suppression Networks
- Line Surge protected - IEC 61000-4-5 to 10KV / 22KA with fuses in each line phase input
- Complete Install Kits - 1-Ph, 2-Ph, 3-Ph and Base Unit with Detachable accessories
- Flexible Data Comms - 3G, 4G CAT-1, and LTE CAT-M1.
- Supports IoT Centric Cloud Architecture and DNP3 SCADA reporting.
- Transformer life prediction through derived transformer hotspot and top oil temperature
- Patents Pending



**ULL-101919**



Type Accepted

No.: ESD-CPE-1803441

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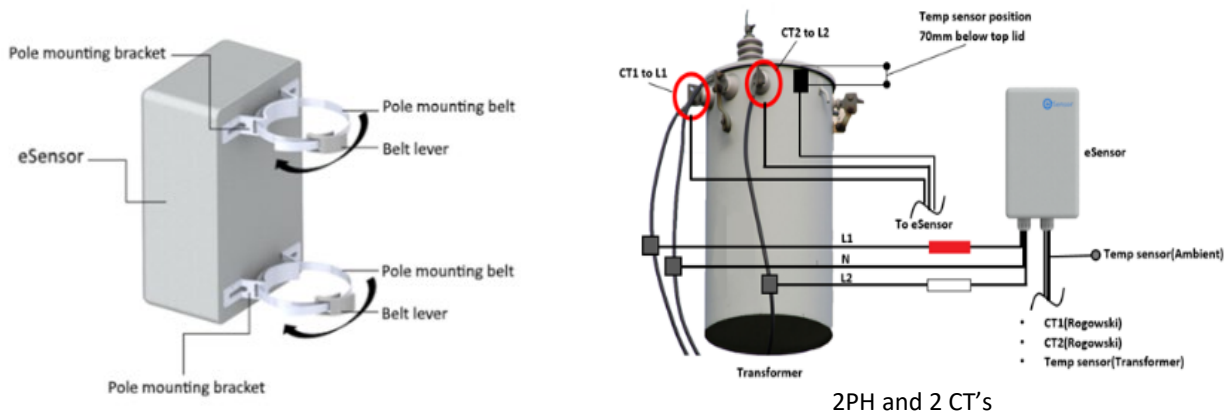
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## DESCRIPTION

The Edge eSensor is a Compact Grid Edge Power Quality Monitor that incorporates Edge Zero Power Quality Grid Edge Technology. It is an intelligent, software-driven, full Power Quality Grid Monitoring Sensor, or installed on Pole or Pad Transformers that monitors Transformer Status and Alarms, including Temperatures. The eSensor is specifically designed to be an Intelligent Network Device that monitors and transmits secure full Power Quality Data with additional Status Alarms for Grid Edge Applications and remote Software updates for additional Custom Features and setting Alarm Limits.



Electrical Specifications		
Available Configurations		1 Phase, 2 Wire configurations. 2 Phase, 3 Wire configurations. 3 Phase, 4 Wire configurations.
Electrical Frequency		50/60Hz
Operating Voltage		100 – 277 VAC Line - Neutral 173 – 480 VAC 4-Wire/3 Phase Network (Line – Line)
Current Full-Scale Range		4000 Amps RMS with auto-range function
Lightning Strike	Fixed Sensors	Power line surge protected to 10KV per IEC61000-4-5
	Detachable eSensor	depends on inline fuse rating either 8KV or 10KV
Voltage Accuracy		± 0.5%
Power & Energy Accuracy	Fixed Sensors	± 1% + 0.1% of Current Full Scale (4kA)
	Detachable eSensor	± 2.5% + 0.3% of Current Full Scale (4kA)
Power Factor Accuracy		± 1 degree
Power Quality Measurements		Voltage, Current, Power, Energy, vTHD, iTHD, individual harmonics up to 21 <sup>st</sup> order
Reporting Interval		1min transmit time, 4GB memory for 1min to 5min (default: 1min)
Temperature Measurement Accuracy		± 1 degree Celsius
'Last Gasp' Hold-up Time		30 seconds

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<b>Alarms and Event Logging</b>	
Power Quality Alert	Power Outage, Power Restore Current Imbalance, Maximum iTHD, Reverse Current Flow, Low Power Factor Voltage Imbalance, Maximum vTHD, Over-voltage, Under-voltage, Voltage Swell, Voltage Sag, Voltage Flicker Over-frequency, Under-frequency,
Transformer Asset Management	Overload (Power), Peak demand Alert, Over-current, Fault Current Reading, No Current Reading No Voltage Reading Transformer Over Heating Temperature Alert (Hotspot & Top-oil), Transformer Over Heating Temperature Limit (Hotspot & Top-oil), End-of-Life Warning Device Tampering, Communication Fault, Watchdog Alarm
Measured Parameters	V, I, PF, kW, kVA, kVAr, Energy, vTHD, iTHD, V/I Harmonics (up to 21 <sup>st</sup> ), T unit internal, T transformer top oil, T transformer hotspot
<b>Connectivity</b>	
Communications Options	Cellular Communications with embedded 3G / 4G CAT-1 / LTE CAT-M1 modem, Private APN with AES128 & SHA256 encryption IPsec tunnel
	Periodic reporting to a central IoT Cloud server
	On demand reporting to a SCADA system (upon request)
IoT Communications	Push notification on Alerts
	CoAP with DTLS security DNP3 with TLS security
SCADA Communications	Fully configurable measurement interval, 4GB memory allocated to data logging
<b>Mechanical and Environmental</b>	
Dimensions	L250 x W150 x H100
Weight	5.0kg
IP Rating	IP66
Operating Temperature and Humidity	-10°C to 50°C, 0-95% RH non-condensing
Storage Temperature	-30°C to 80°C
Operating Altitude	2000m
<b>Compliance</b>	
Safety Test Compliance	- AS 61010-1:2003 - EC 61010-2-30:2010
	- IEC 60529 (Edition 2.2)
Other Approval	- NTC Approval - RCM Mark Approval

# Grid Edge Power Quality Sensor

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## eSensor with Fixed Sensors



## eSensor Parts List Options for Fixed Sensors

eSensor Parts/Accessories	Options
• <b>Current Ranges</b>	4kA
• <b>CTs (Rogowski) per Phase Configuration</b>	3-Phase 3 CTs 2-Phase 2 CTs 1-Phase 1 CT
○ <b>Current Sense Internal Diameter (mm/in)</b>	Ø106mm/4.17" Ø178mm/7.01"
• <b>Voltage Cables</b>	Ring terminal Ring terminal with in-line fuse
• <b>Cable Lengths for Current, Voltage, and Thermal Sensor</b>	1.5m 2.5m 3m
○ <b>Communications</b>	3G 4G CAT-1 LTE CAT-M1
• <b>Mounting</b>	Magnetic Circular Pole Stobie Wooden Pole Universal Mounting

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## eSensor with detachable accessories



Voltage Line Sensor



Current Rogowski Sensor



Magnetic Temperature Sensor

## eSensor Parts List Options for Detachable Sensors

eSensor Parts/Accessories	Options		
<ul style="list-style-type: none"> <li>• <b>CTs (Rogowski) per Phase Configuration</b></li> </ul>	3-Phase 3 CTs	2-Phase 2 CTs	1-Phase 1 CT
<ul style="list-style-type: none"> <li>○ Current Sense Internal Diameter (mm/in)</li> </ul>	$\varnothing 106\text{mm}/4.17''$ $\varnothing 178\text{mm}/7.01''$		
<ul style="list-style-type: none"> <li>• Cable Lengths for Current, Voltage, and Thermal Sensor</li> </ul>	2.5m		
<ul style="list-style-type: none"> <li>• <b>Voltage Cables</b></li> </ul>	3-Phase 4 Cables (3 lines +N)	2-Phase 3 Cables (2 lines +N)	1-Phase 2 Cables (1 line +N)
<ul style="list-style-type: none"> <li>○ Termination for Voltage Cables</li> </ul>	Ring terminal (16mm bolt diameter) with in-line fuse		
<ul style="list-style-type: none"> <li>• <b>Magnetic Thermal Sensor</b></li> </ul>	Magnetic Thermal Sensor available in 2.5m		
<ul style="list-style-type: none"> <li>• <b>Mounting</b></li> </ul>	Magnetic Circular Pole Stobie Wooden Pole Universal Mounting		

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## Standard eSensor Part Numbers

### EE-402-0016 (for Three-Phase Pole Transformers)

2kA eSensor with 4G Comms, 3-phase 8cm  $\varnothing$ , 3.1m length Current Sense, and 3.1m Ring Terminal with In-Line Fuse type Voltage Lead Connection

### EE-402-0018 (for Three-Phase Pad Transformers)

4kA eSensor with 4G Comms, 3-phase 17cm  $\varnothing$ , 3.1m length Current Sense, and 3.1m Ring Terminal with In-Line Fuse type Voltage Lead Connection

### EE-402-0019 (for Single-Phase Pad Transformers)

2kA eSensor with 4G Comms, 1-phase 8cm  $\varnothing$ , 3.1m length Current Sense, and 3.1m Ring Terminal with In-Line Fuse type Voltage Lead Connection

### EE-402-0009 (for Two-phase or Single-Phase Center Tapped Transformers)

2kA eSensor with 4G Comms, 2-phase 8cm  $\varnothing$ , 2.6m length Current Sense, and 2.6m Ring Terminal type Voltage Lead Connection

### EE-402-1004 (eSensor Detachable Base Unit for Utilities with Cat-1 Cellular Communication)

2kA eSensor Base Unit with 4G Cat-1 Communication and Detachable Sensors (Network Type)

### EE-402-0030 (eSensor Detachable Base Unit for Utilities with Cat-M1 Cellular Communication)

2kA eSensor Base Unit with LTE Cat-M1 Communication and Detachable Sensors (Network Type)

## Accessories Part Numbers for Detachable eSensor variant

1. Current Transformer
  - a. EE-510-2500 Coreless Current Sensor 1 SET (3 PCS) 10cm Window Size 2.5m cable length
  - b. EE-510-2600 Coreless Current Sensor 1 SET (3 PCS) 17cm Window Size 2.5m cable length
2. Voltage Wire
  - a. EE-900-0009-AA 3phase Voltage Sensor Wire (Network Disconnect) 1 Set (4pcs) with AWG16(1.3mm<sup>2</sup>) and 2.5m UV Resistant cable length for IP68 Fuse Holder with Color Shrinkable Tube
3. Magnetic Thermal Sensor
  - a. EE-507-0007 Magnetic Thermal Sensor with 2.5m UV Resistant cable length
4. Mounting Bracket
  - a. EE-509-0001 eSensor Pad Mount Magnetic Accessory Bracket Set
  - b. EE-509-0002 eSensor Circular Pole Mount Belted and Bracket Set
  - c. EE-503-0003 eSensor Stobie Pole Mount Belted and Bracket Set
  - d. EE-509-0010 eSensor Universal Mounting Accessory Bracket Set
  - e. EE-509-0012 eSensor Wooden Pole Mounting
  - f. EE-509-0002 Circular Pole mount belted (1.5m length) and bracket set.

**Contact :**

EDGEZERO PTY LTD

<https://edgezero.co/>