Edge Electrons Limited
Unit 7A 7TH Floor, New Solid Building
357 Sen. Gil Puyat Ave.
Makati, Philippines

INSTALLATION, COMMISSIONING AND OPERATION MANUAL

EdgeSensor (200 Series)

EE-406

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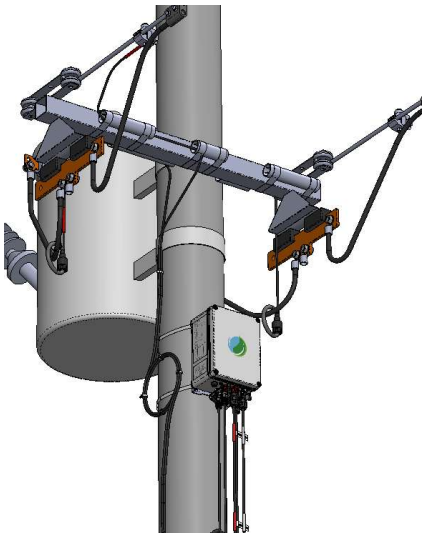
II. PRODUCT DATASHEET

1. Features

Compact Smart Single Phase Power Quality Monitor



- Monitors and Transmits Full Power Quality Data.
- Grid or Transformer Status Monitoring Unit
- For Single Phase or for Single Phase Center Tapped Installations
- Wide Voltage Input - 100-300VAC
- High Temperature Polycarbonate IP67 enclosure
- Monitors and Transmits Full Grid or Transformer Status including Full Power Quality Data.
- Full Alarms including - Power Outages and Recovery, Overloading, Overvoltage, Undervoltage, PF min., Reverse Current.
- Full Alarms including - Overloading, Overvoltage, Undervoltage, PF min., Reverse Current.
- Remote Firmware Upload to add upgrade Custom Options and modify Alarm Limits.
- Intelligent Software Control: Network compatible Unit that is Programmable over Internet.
- Encryption AES128 & SHA256 over private APN.
- Quick install Utility Grade Rogowski Current Transformers.
- Events Logging 10 days – Store and Forward.
- EMI Electrical Noise Suppression Networks.
- Line Surge protected - IEC 61000-4-5 to 6kV / 3kA
- Data Comms – Wi-Fi, Cellular (4G Cat-1)
- Unit Ingress Protection: IP67 / UL Type Rating 4
- IEC 61010-1, 61010-2-030
- Patents Pending.

2. Description

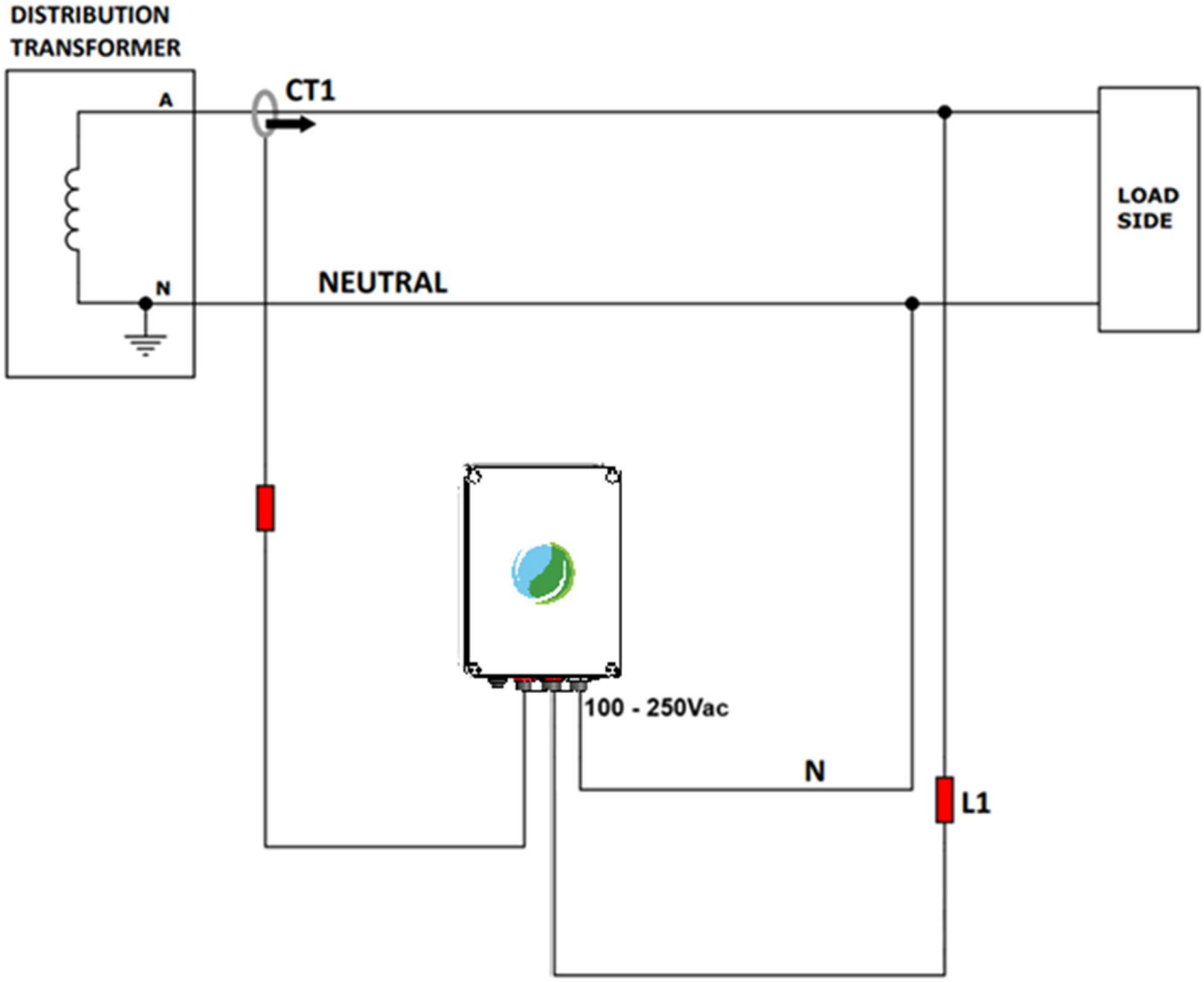
The EdgeSensor (200 Series) is a compact grid Edge Power Quality Monitor that incorporates Edge Electrons Power Quality Grid Edge Technology. It is an intelligent, software-driven, full Power Quality Grid Monitoring Sensor, installed on Pole Transformers that monitors Status and Alarms. The EdgeSensor (200 Series) 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 configuration,* *2 Phase, 3 Wire configuration*
Electrical Frequency	*50/60Hz*
Rated Voltage	*100 - 277 Vac (L1-to-N, Supply Voltage)*
Absolute Maximum Voltage Rating	*300 Vac (L1-to-N)*
Current Full Scale Range	*800 Amps RMS*
Lightning Strike	*Power line surge protected - IEC61000-4-5*
Voltage Accuracy	*± 1%*
Power & Energy Accuracy	*± 0.5% + 0.5% of Current Full Scale*
Power Factor Accuracy	*± 1 degree*
Power Quality Measurements	*Voltage, Current, Power, Energy, vTHD, iTHD, individual harmonics*
Reporting Interval	*5min transmit time*
Back Up Power/" Last Gasp" Hold-up Time	*60 Seconds*
Power Consumption	*3 Watts typical; <6 Watts during startup*
Alarms and Event Logging	
Grid Power Quality Alert	*Voltage Imbalance, Maximum vTHD, Over-voltage, Under-voltage, Voltage Swell, Voltage Sag, Voltage Flicker* *Current Imbalance, Maximum iTHD, Reverse Current Flow, Low Power Factor* *Over-frequency, Under-frequency*
Transformer Asset Management	*Overload, Peak demand Alert, Over-current, Fault Current Reading, No Current Reading* *No Voltage Reading*
Measured Parameters	*V, I, PF, kW, kVA, kVAr, Energy, vTHD, iTHD, up to 21st harmonics*
Connectivity	
Communications Options	*Wi-Fi, Cellular Communications with embedded CAT-1 modem,* *Private APN with AES128 & SHA256 encryption IPSec tunnel.*
Communications Architecture	*Periodic reporting to a central IoT Cloud server*
	On demand reporting to a SCADA system through Edge Cloud
IoT Communications	*Push notification on Alerts*
	CoAP with DTLS security
Mechanical and Environmental	
Dimensions	L200mm[7.874in] x W150mm[5.905in] x H100mm[3.94in]
Weight	1.7kg [3.75lbs]
IP Rating	IP67 / UL Type Rating 4
Power Supply Button	Supported
Operating Temperature and Humidity	-20°C to 60°C[-4°F to 140°F] , 0-95% RH non-condensing
Extended Temperature Rating	-40°C to 60°C [-40°F to 140°F] tested; 70°C [158°F]for 1 hour
Storage Temperature	-40°C to 80°C[-40°F to 176°F]
Operating Altitude	2000m[6561.68ft]

III. WIRING CONNECTION

1. Single Phase (2-Wire) Configuration

CoAP command: transformerconfig 1

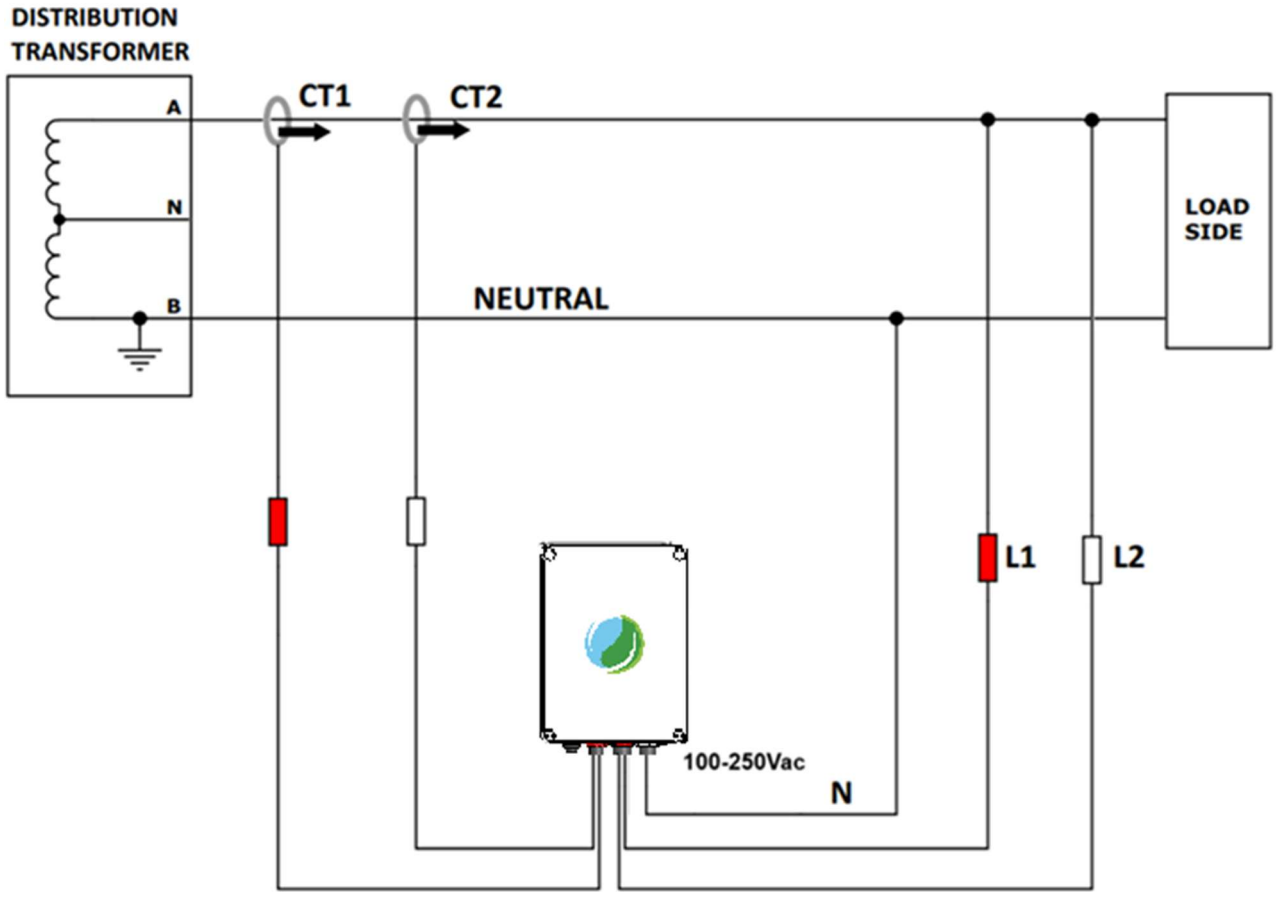


Single Phase (2-Wire)

Fig. 1

2. Single Phase (3-wire) Line-to-Earth Configuration

CoAP command: transformerconfig 2

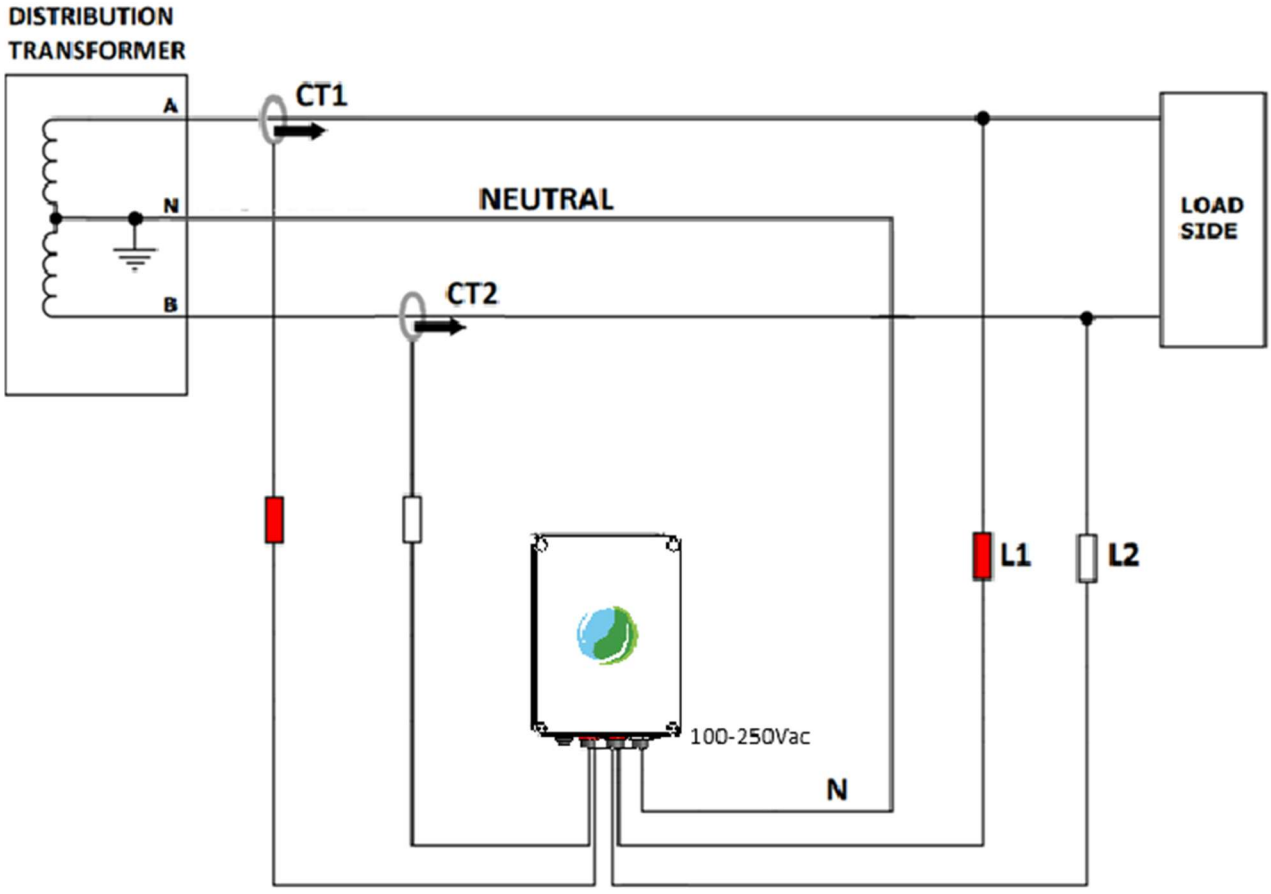


Single Phase (3-wire) Line-to-Earth

Fig. 2

3. Single Phase (3-Wire) Line-to-Line Configuration

CoAP command: transformerconfig 6



Single Phase (3-Wire) Line-to-Line

Fig. 3

IV. BOX CONTENTS

1. **EdgeSensor (200 Series) Unit with Detachable Sensors**
   - EdgeSensor (200 Series) Detachable ..... 1 pc
   - Accessories EdgeSensor (200 Series) Detachable
     - EdgeSensor (200 Series) Accessory: Coreless Current Sensor ..... 2 pcs.
     - EdgeSensor (200 Series) Accessory: Voltage Sensor Wire ..... 1 set
     - EdgeSensor (200 Series) Accessory: Circular Pole mount belt ..... 1 set

EdgeSensor (200 Series) Unit
(Pre-installed Accessories)
Fig. 4

Coreless Current Sensor
Fig. 5

Voltage Sensor Wire
Fig. 6

Circular Pole Mount
Fig. 7

V. CAUTION

IMPORTANT

Installation and wiring termination of the EdgeSensor (200 Series) shall be performed by a qualified personnel, in compliance with local electrical and safety standards.

EdgeSensor (200 Series) comes with Safety Rated Flexible Rogowski Coils for Current Sensing with proper insulation and UV protection.

Always connect the EdgeSensor (200 Series) Neutral sense wire to the transformer's Neutral line cable first before connecting the Live sense wires.

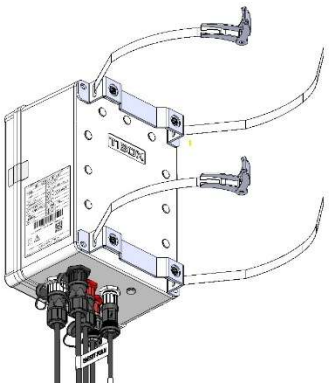
WARNING

Edge Electrons manufacture component parts that can be used in a wide variety of industrial and commercial applications. The selection and application of Edge Electrons products remains the responsibility of the equipment designer or end user. Edge Electrons accepts no responsibility for how its products may be incorporated into final design. Under no circumstance should any Edge Electrons product be incorporated into any product or design as the exclusive or sole safety control, all controls should be designed to dynamically fault detect and fail safely under all circumstances. Any warning provided by Edge Electrons must be passed through to the end user. Edge Electrons offers a warranty only as to the quality of its product to conform to the catalogue specifications. No other warranty is offered. Edge Electrons assumes no liability for any personal injury, property damage, losses or claims arising out of the misapplication and non-performance.

VI. INSTALLATION PROCEDURE

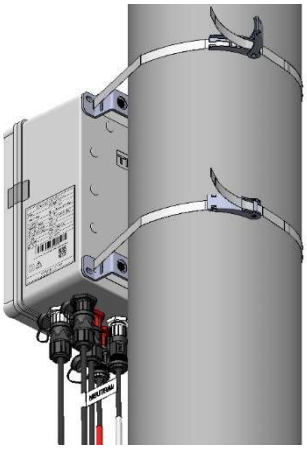
1. Circular Mount Accessory Installation

Step 1



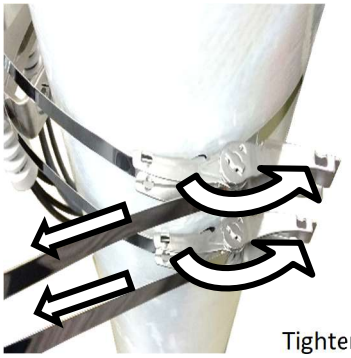
Insert the provided steel belt (PKB-10S) into the slots of the upper and lower brackets as illustrated.

Step 2

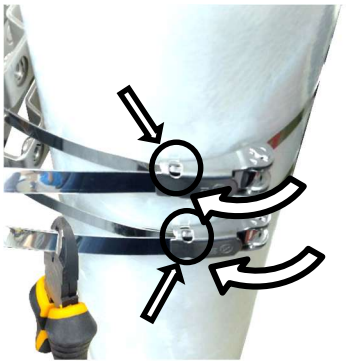


Position the EdgeSensor (200 Series) vertically as illustrated, then wrap the steel belt around the pole.

Step 3

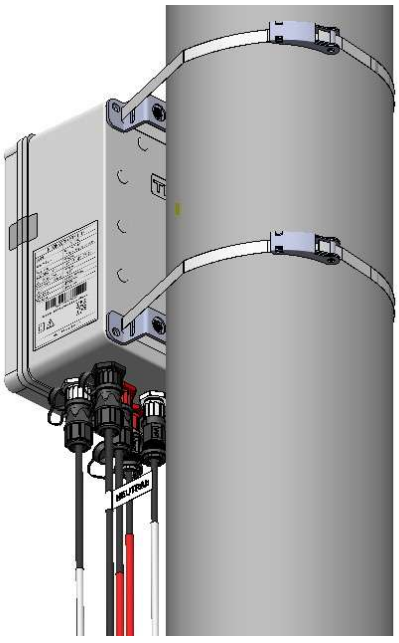


Tighten the steel band by pulling it firmly, then fully engage the ratchet lever by pulling it back, and return it to its original position.



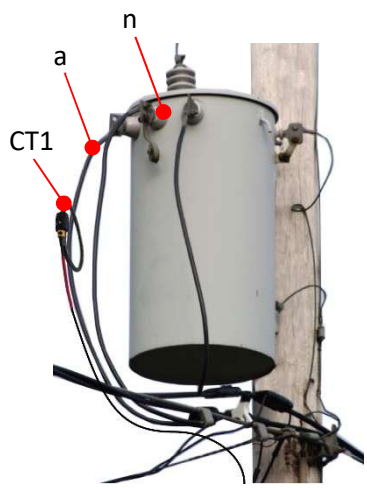
Cut the excess steel band to desired length using cutting tools.

Final Installed EdgeSensor (200 Series) Unit On Circular Pole

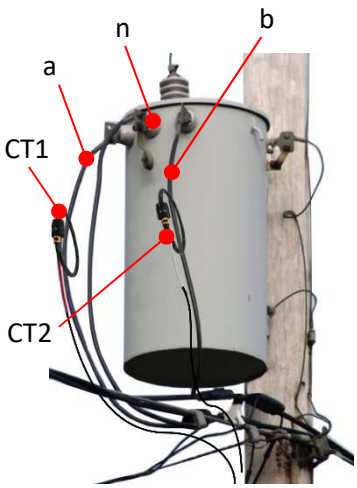


2. Rogowski CT Installation

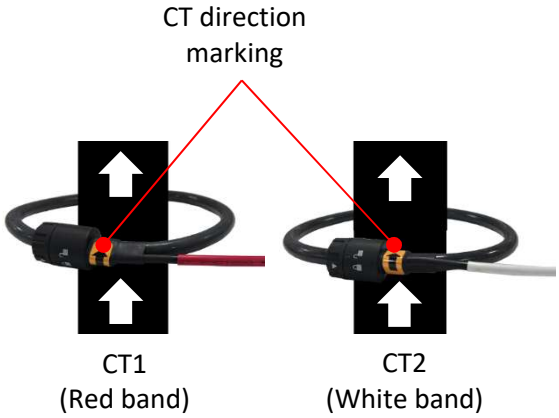
Install the EdgeSensor (200 Series) Rogowski CT's to the transformer's low voltage line and follow the correct CT direction. Refer to the CT's Arrow marking labels for the current direction.
IMPORTANT: Wrong installation for the Rogowski current direction shall result to inaccurate measurement of the EdgeSensor (200 Series).



1 Ph, 2 Wire Configuration
Fig.8



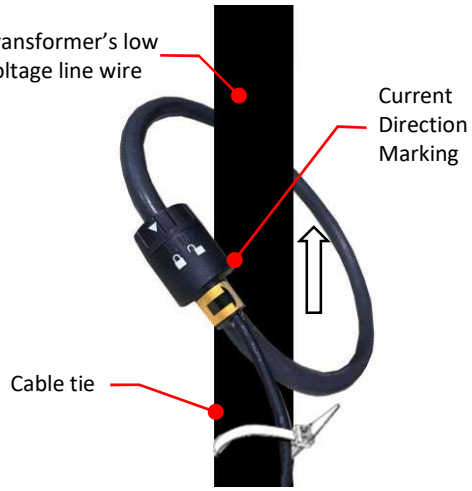
2Ph, 3 Wire Configuration
Fig.9



CAUTION:
For 2Ph, 3Wire Configuration, install the CT1(red band) to L1 and CT2(white band) to L2 of the transformer.

3. Rogowski CT Special Installation

TWIST-LOCKING TYPE
Fully insert the end cap into the mating socket and twist the lock as shown.



4. Voltage Wire Sense Installation

   a. If to be installed in live condition, it is important to first connect the Neutral voltage sense wire before connecting L1 and L2 voltage sense wires. Connecting the EdgeSensor (200 Series) voltage sense wires to the transformer can be done in two ways:

   b. If transformer has terminal block for voltage connections, simply screw the voltage wires of EdgeSensor (200 Series) to transformer's terminal block as shown.

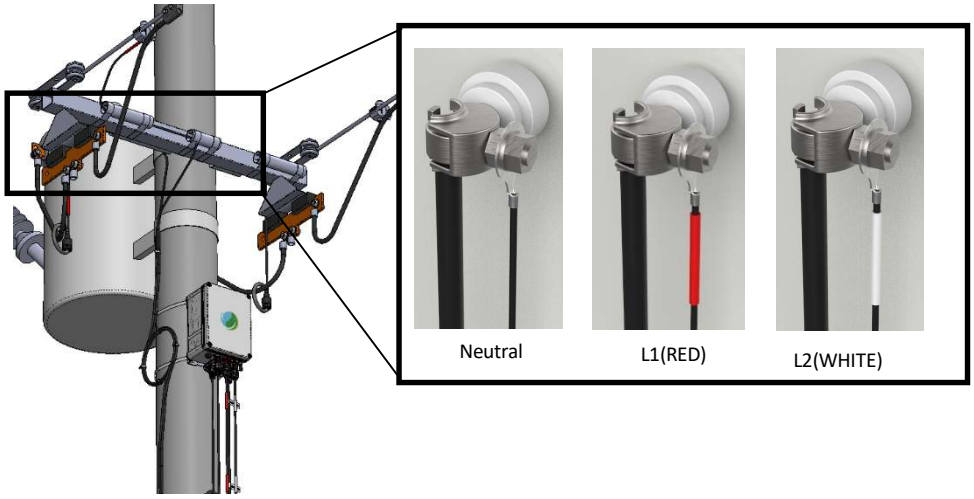
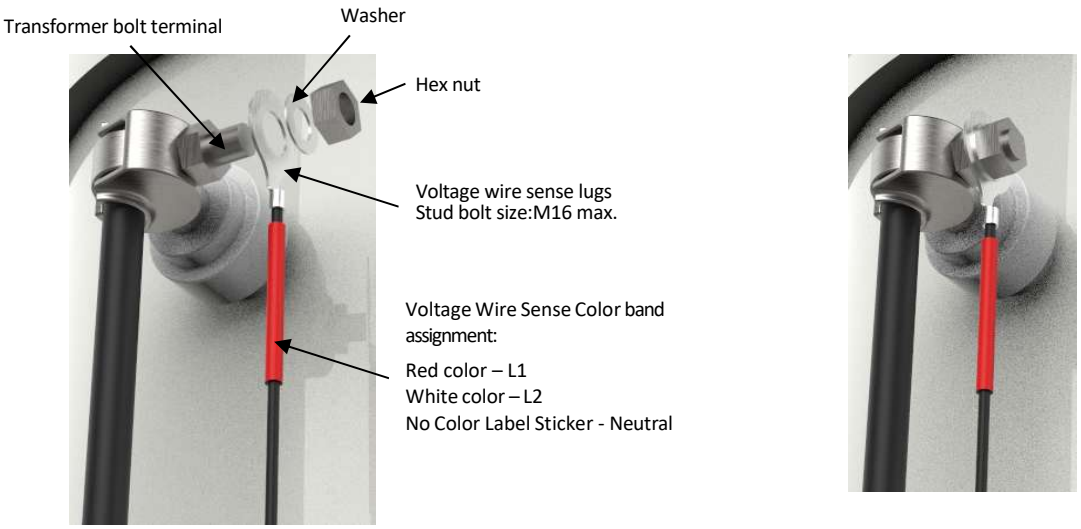


Fig. 10



Voltage Wire Sense Final Assembly

Fig. 11

Identify the L1, L2 & Neutral Bolt Terminal of the Transformer. Install the Voltage Wire Sense Lugs in the Transformer Bolt Terminal using washer and Nut or Locknut as shown above. Check the Voltage Wire Sense if there are color label sticker and its color. Follow the terminal assignment as:
L1 - Red color label
L2 - White color label
Neutral – No color label
Tightening Torque: Max. 248.0 N-m

c. If transformer does not have terminal block for voltage connections, voltage wire of EdgeSensor (200 Series) can be directly connected to the transformer's voltage wires via the IPC accessory.

d. Cut the terminal lug of the EdgeSensor (200 Series) voltage wires as shown.

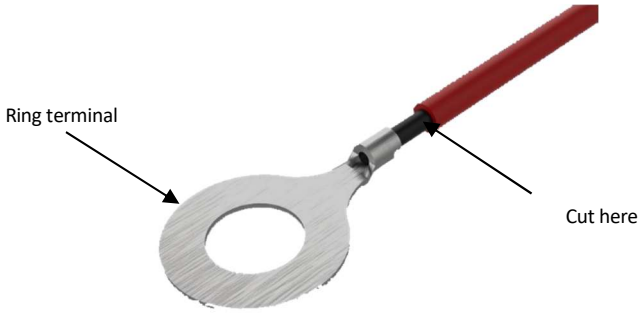
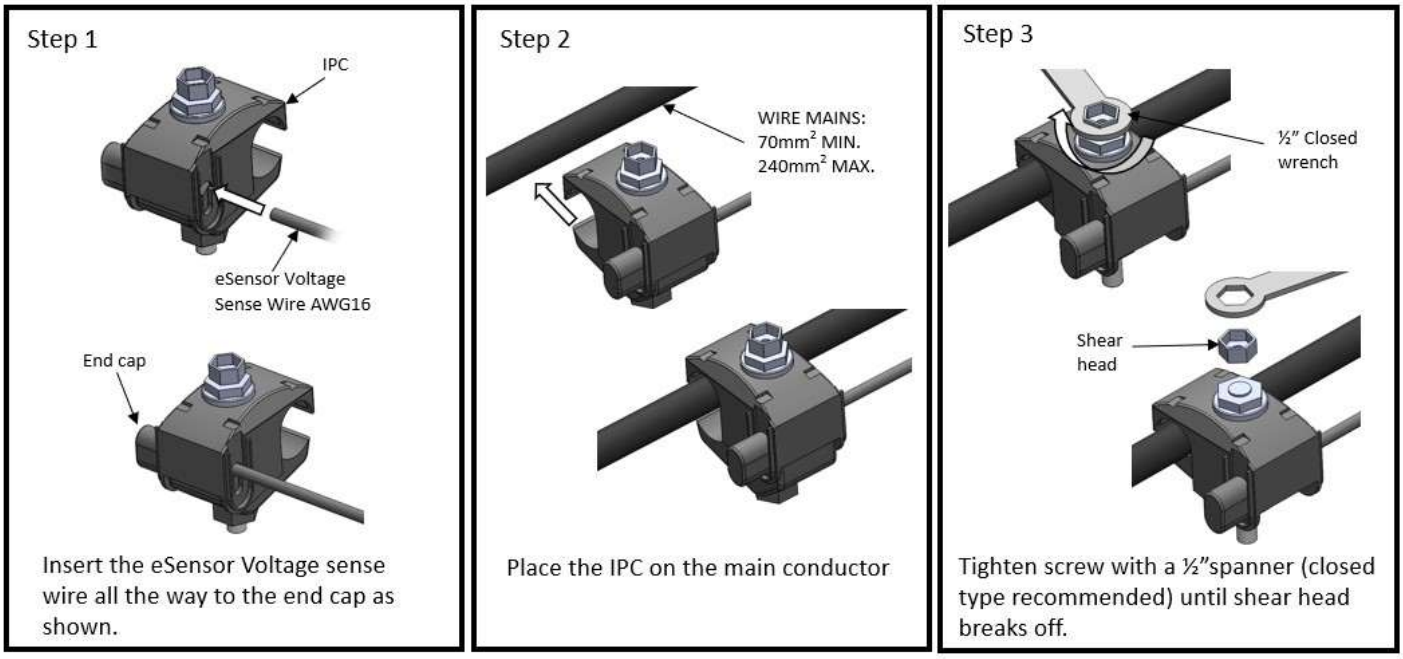


Fig. 12

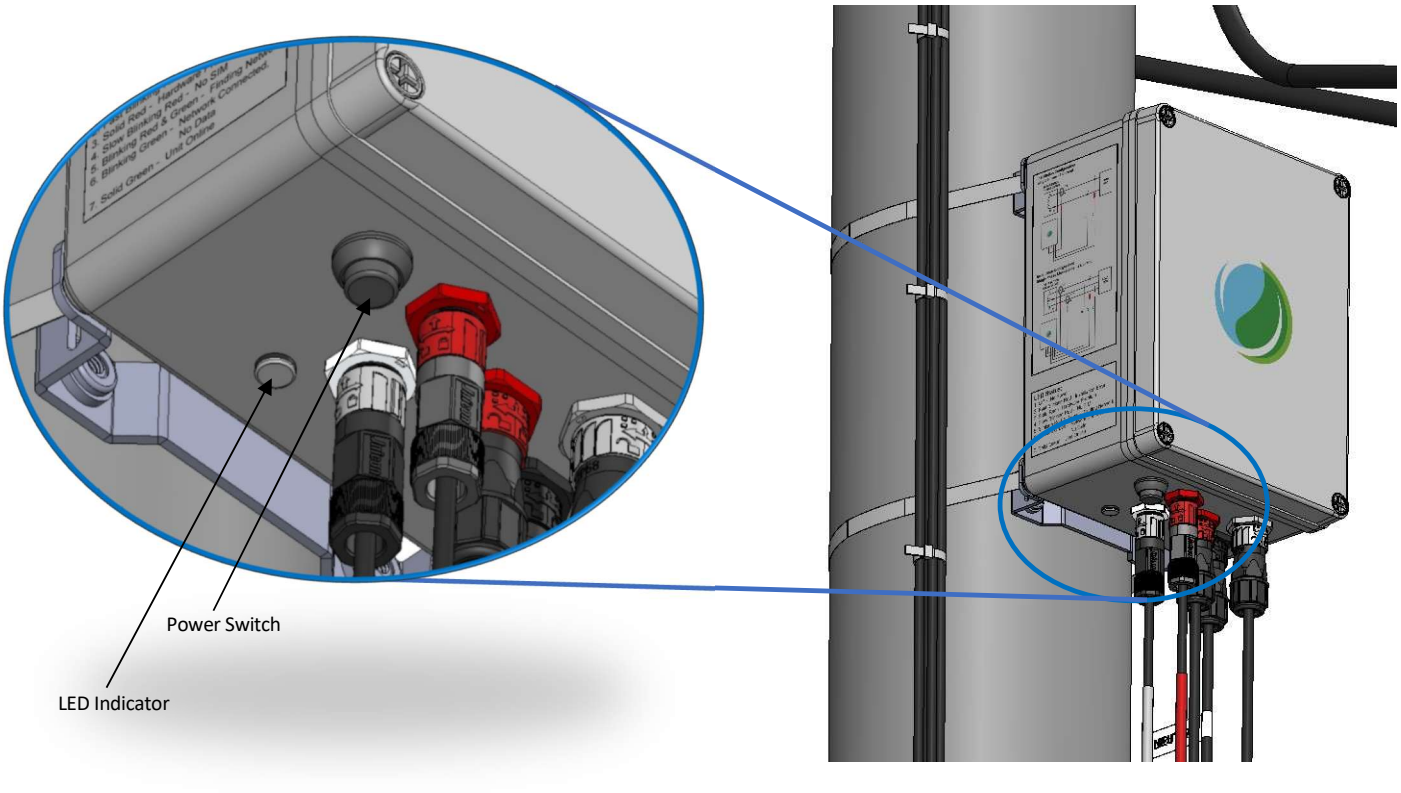
e. Below figure shows how the EdgeSensor (200 Series) Voltage Wire and Transformer Voltage Wire would be clamped together using the IPC accessory.



Insulation Piercing Installation
Fig.13

VII. POWER-ON PROCEDURE

After completing the installation, press the power push button located on the underside of the enclosure to turn the unit ON. When pressed, the LED indicator will illuminate, indicating that the unit is energized and operational.



VIII. COMMISSIONING

Please download the EdgeZero installer app from Google Play or the App Store.

EdgeZero
Edge Electrons Pty Ltd