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

INSTALLATION, COMMISSIONING AND OPERATION MANUAL

EdgeSensor (610 Series)

Reference to E-IM-EE-405-B4 Installation Manual

EE-411-Series

DOCUMENT INFORMATION

Document ID	E-IM-EE-411	Version	A1
Prepared by	Leonard Torio/Joseph Cruz	Date of Issue	11/25/2025

APPROVED BY

Engineering Manager	Jian Carlo Zapata	Date:

REVISION HISTORY

Revision no.	Date of Revision	Revision no.	Date of Revision
1.0	Aug 28, 2025		
1.1	Nov 24, 2025		
A1	Nov 25, 2025		

CHANGE RECORD

Revision no.	Prepared by	Description on Changes
1.0	Leonard Torio/Joseph Cruz	First Release
1.1	R. Bautista / J. Cruz	Change from Delta with Line C earthed to Delta clockwise Add Delta counterclockwise
A1	P. D. Peralta / J. Cruz	Official Release

I. TABLE OF CONTENTS

II. PRODUCT DATASHEET

1. Features

Compact Smart EdgeSensor (610 Series)

- Active components all US brand – Microchip Technology, Atmel, Telit, Analog Devices, and SanDisk
- Monitors and Transmits Grid Full Power Quality Data. Grid or Transformer Status Monitoring Unit
- 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.
- Remote Firmware Upload to add upgrade Custom Options and modify Alarm Limits.
- Intelligent Software Control: Network compatible Unit that is Programmable over Internet.
- CoAP with DTLS security (AES128 encryption + SHA256 hashing) with option for private APN.
- Quick install Utility Grade Rogowski Current Transformers.
- Events Logging 90 days (4GB) – Store and Forward.
- EMI Electrical Noise Suppression Networks.
- Line Surge protected - IEC 61000-4-5 to 6KV / 3KA
- Data Comms – Cellular (4G Cat-1), W*ired LAN (Ethernet standard – IEEE 802.3)* and LoRa Mesh for redundancy.
- Unit Ingress Protection: IP67 / UL Type Rating 4
- IEC 61010-1, 61010-2-030
- Patents Pending

2. Description

The EdgeSensor (610 Series) is a Compact Grid Edge Power Quality Monitor that incorporates Edge Zero Power Quality Grid Edge Technology and using all American brand active chipset - Microchip Technology, Atmel, Telit, Analog Devices, and SanDisk. It is an intelligent, software-driven, full Power Quality Grid Monitoring Sensor, installed on Pole or Pad Transformers that monitor Status and Alarms. The EdgeSensor (210 & 610 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 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*
Rated Voltage	*100 – 277 Vac (L1-to-N, Supply Voltage)* *170 - 480 Vac 4-Wire/3 Phase Network (Line-to-Line) Plus Neutral for power quality data*
Absolute Maximum Voltage Rating	*300 Vac (L1-to-N)* *520 Vac (Line-to-Line)*
Current Full-Scale Range	*4000 Amps RMS*
Overvoltage Category Rating	*CAT-IV*
Insulation Rating & Type	*Measurement category Cat-IV (IEC61010)*
Lightning Strike	*Power line surge protected - IEC61000-4-5*
Voltage Accuracy	*± 0.5% with Manufacturing Sensor Calibration*
Power & Energy Accuracy	*± 0.5% + 0.2% of Current Full Scale with Manufacturing Sensor Calibration*
Power Factor Accuracy	*± 1 degree*
Power Quality Measurements	*Voltage, Current, Power, Energy, vTHD, iTHD, individual harmonics*
Reporting Interval	*1min transmit time*
Alarms and Event Logging	
Grid 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*
Measured Parameters	*V, I, PF, kW, kVA, kVAr, Energy, vTHD, iTHD, up to 21st harmonics*
Connectivity	
Communications Options	*Cellular Communications with embedded CAT-1 modem, Option for Private APN* *Wired LAN Ethernet standard – IEEE 802.3* *LoRa Mesh for data communication redundancy.*
Communications Architecture	*Periodic reporting to a central IoT Cloud server* *On demand reporting to a SCADA system*
IoT Communications	*Push notification on Alerts* *CoAP with DTLS security (AES128 encryption + SHA256 hashing)*
Mechanical and Environmental	
Dimensions	*L250 x W200 x D100 mm*
Weight	*4.1 kg*
IP Rating	*IP67 / UL Type Rating 4*
Power Supply Button	*Phase 1 Power Supply Button to initialize the unit*
Operating Humidity	*0-95% RH non-condensing*
Operating Temperature	*-20°C to 60°C*
Short Time Maximum Temperature	*70°C for 1 hour*
Operating Temperature Tested by Design	*-40°C to 60°C*
Storage Temperature	*-40°C to 80°C*
Operating Altitude	*2000m*

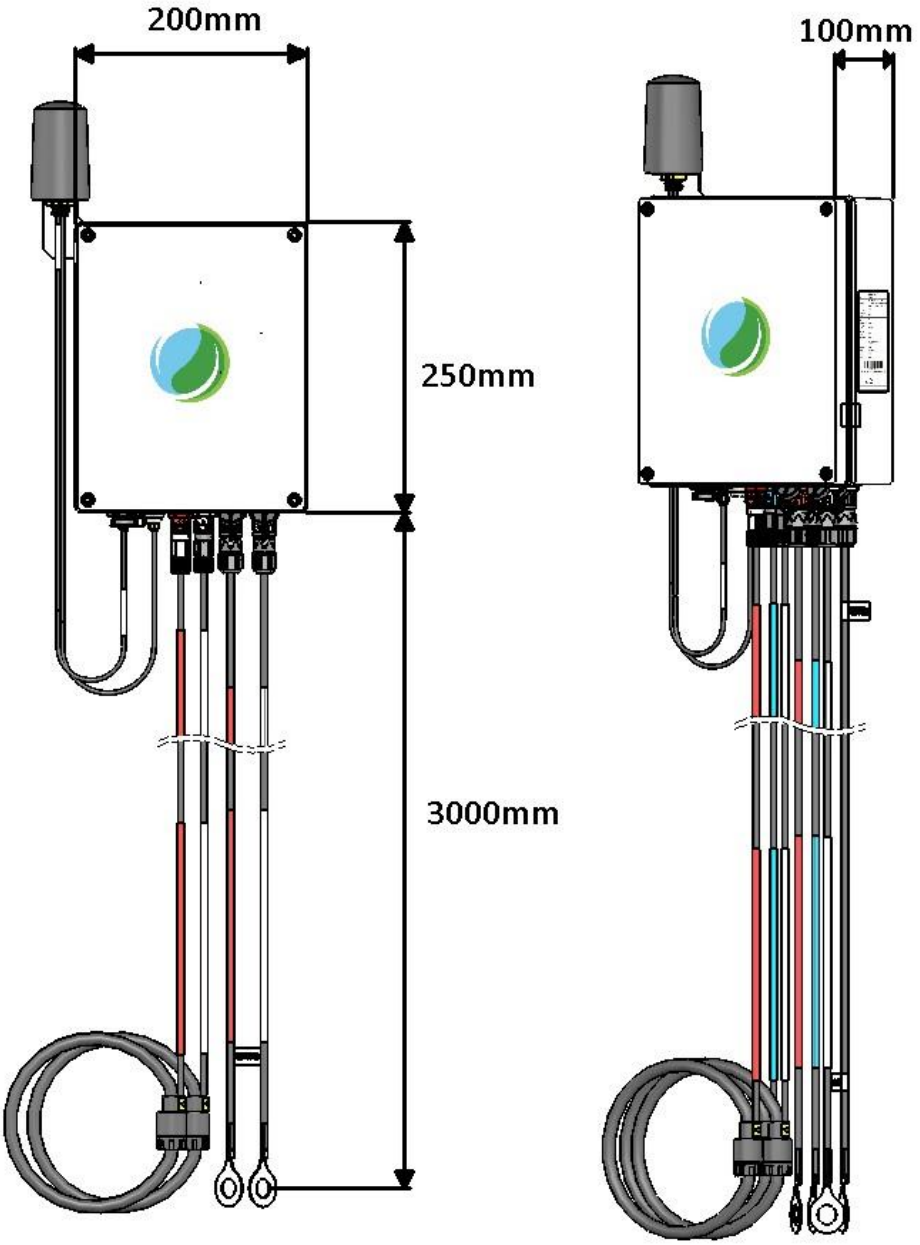
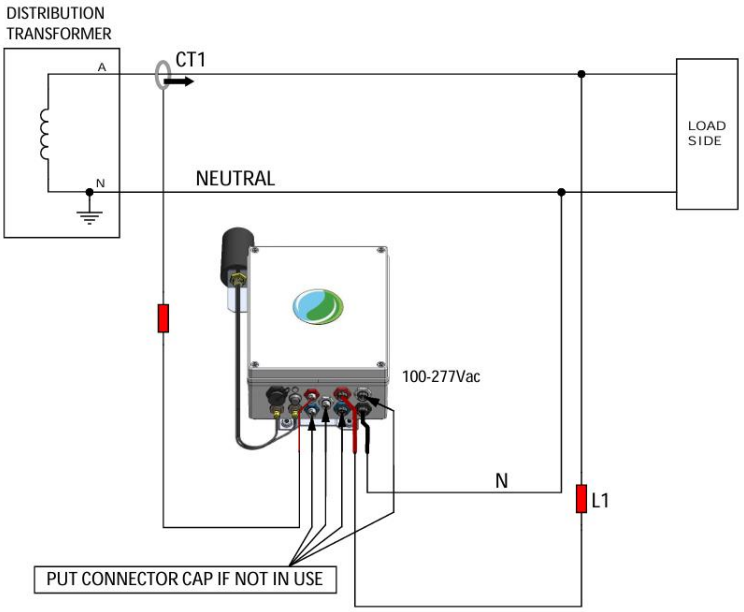


Fig. A

III. WIRING CONNECTION

1. Single Phase (2-Wire) Configuration

CoAP command: transformerconfig 1

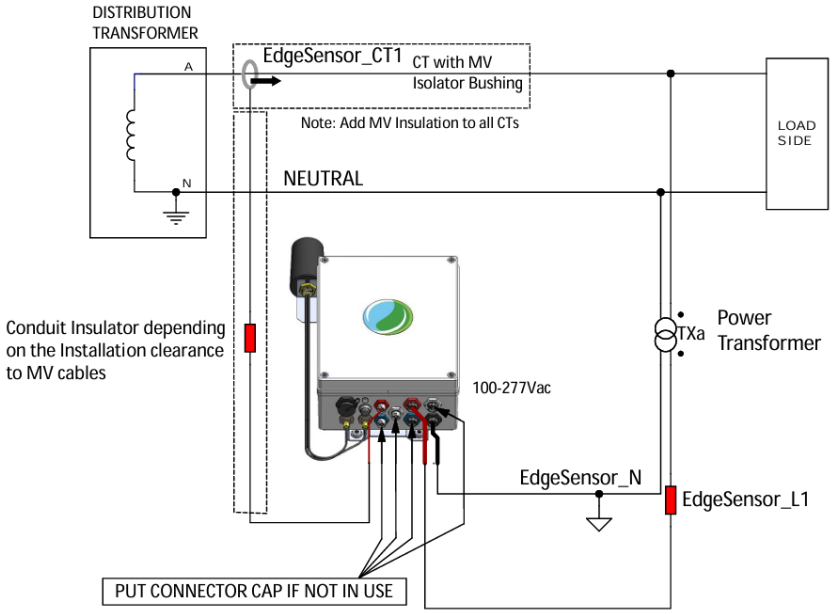


Single Phase (2-Wire)

Fig. 1

1.a. Single Phase (2-wire, 1PT) – Medium Voltage Configuration

CoAP command: transformerconfig 1



Single Phase (2-Wire, 1PT) – Medium Voltage

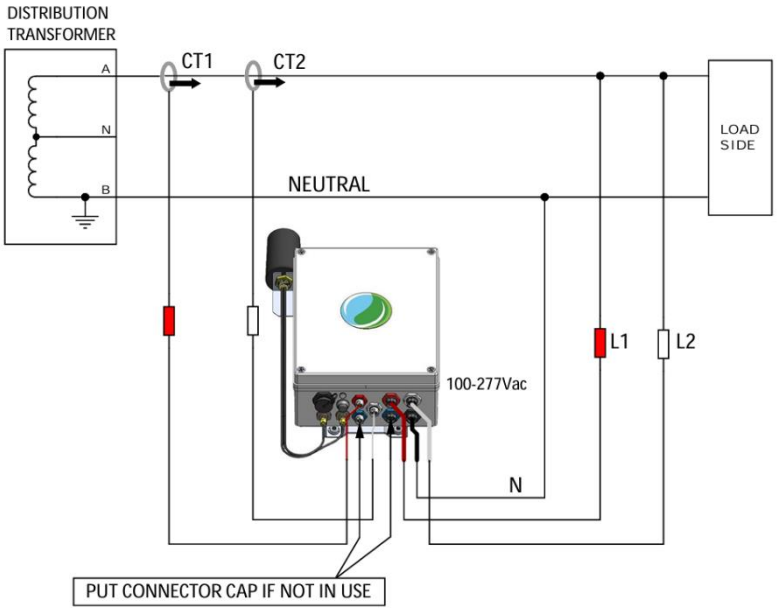
Fig. 1A

Note:

1. Refer to 8. Medium Voltage Current Transformer Isolator Bushing Installation under VI. Installation Procedure for installation of isolator bushing

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

CoAP command: transformerconfig 2

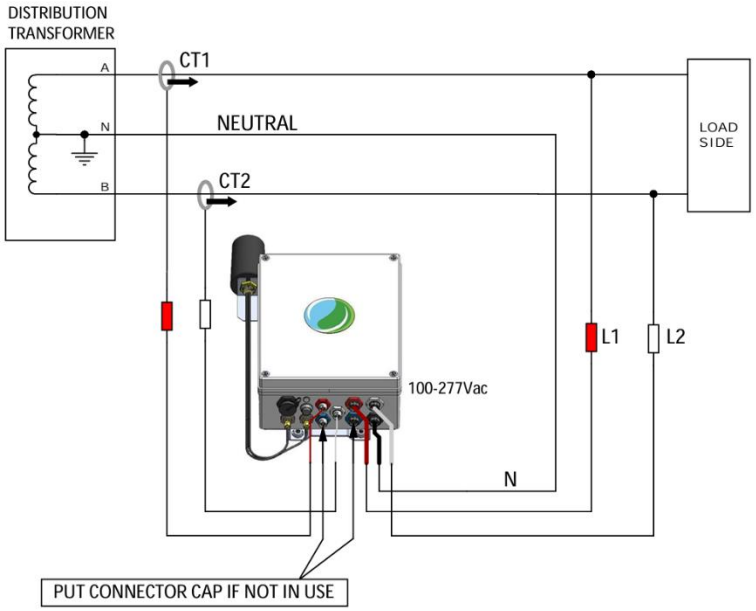


Single Phase (3-wire) Line-to-Earth

Fig. 2

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

CoAP command: transformerconfig 6

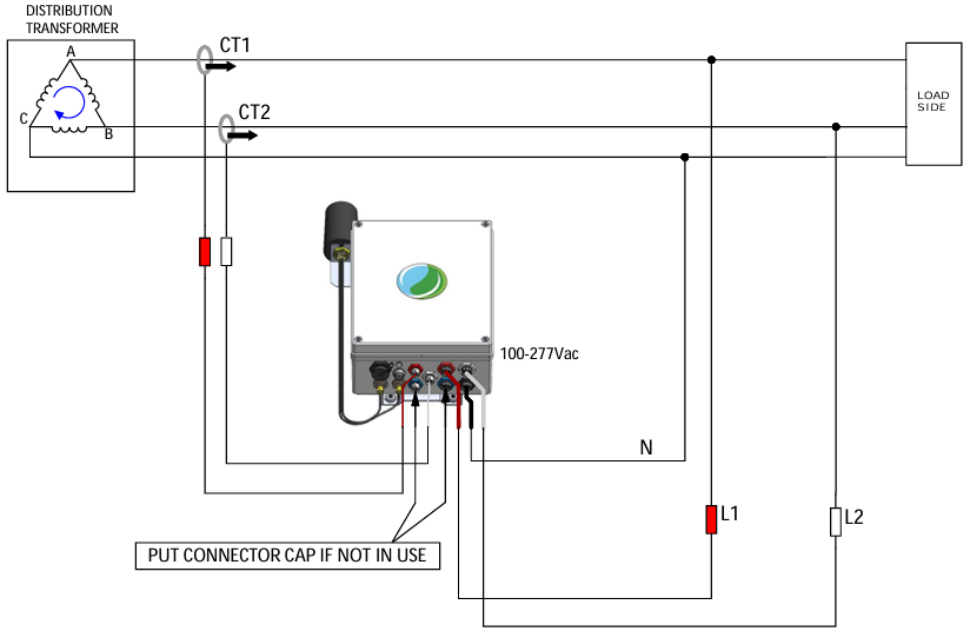


Single Phase (3-Wire) Line-to-Line

Fig. 3

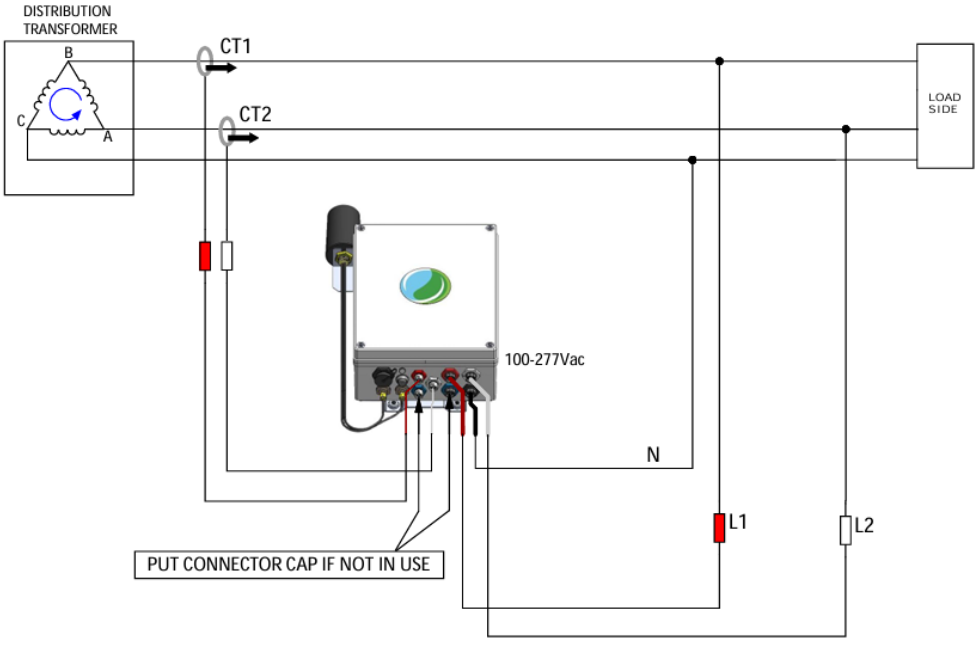
4. Three Phase (3-Wire) Delta clockwise and Delta counterclockwise Configuration

CoAP command: transformerconfig 4



Three Phase (3-Wire) Delta clockwise

Fig. 4.1



Three Phase (3-Wire) Delta counterclockwise

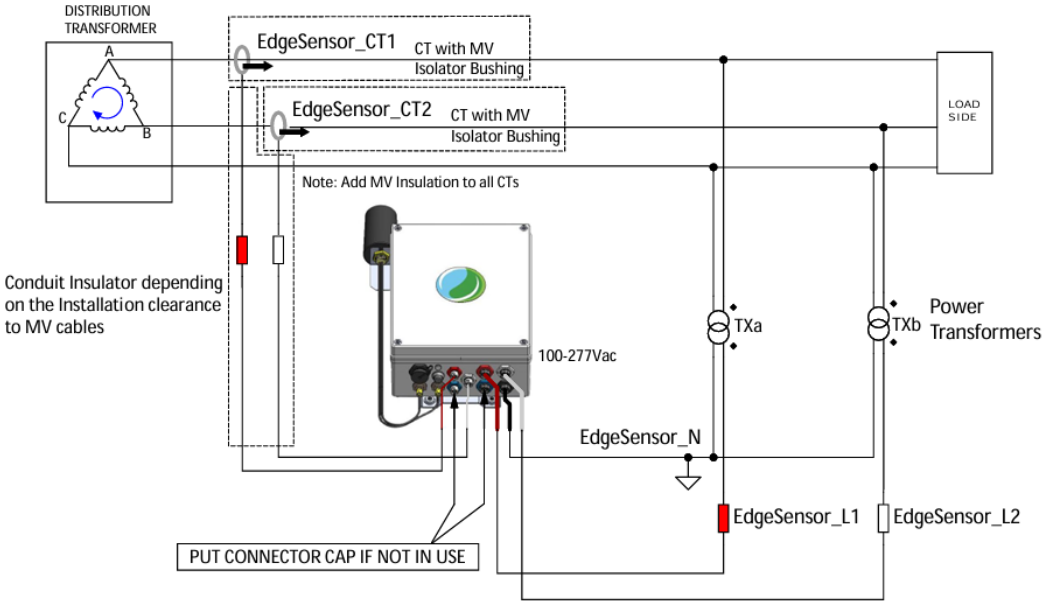
Fig. 4.2

Note:

1. One of the "Line" terminals of the Transformer is Earthed.
2. Input rating of EdgeSensor (610 Series) Line-to-Neutral is 277Vac maximum. Please use Power Transformer if Voltage Line-to-Line of Distribution Transformer exceeds EdgeSensor (610 Series) input rating.

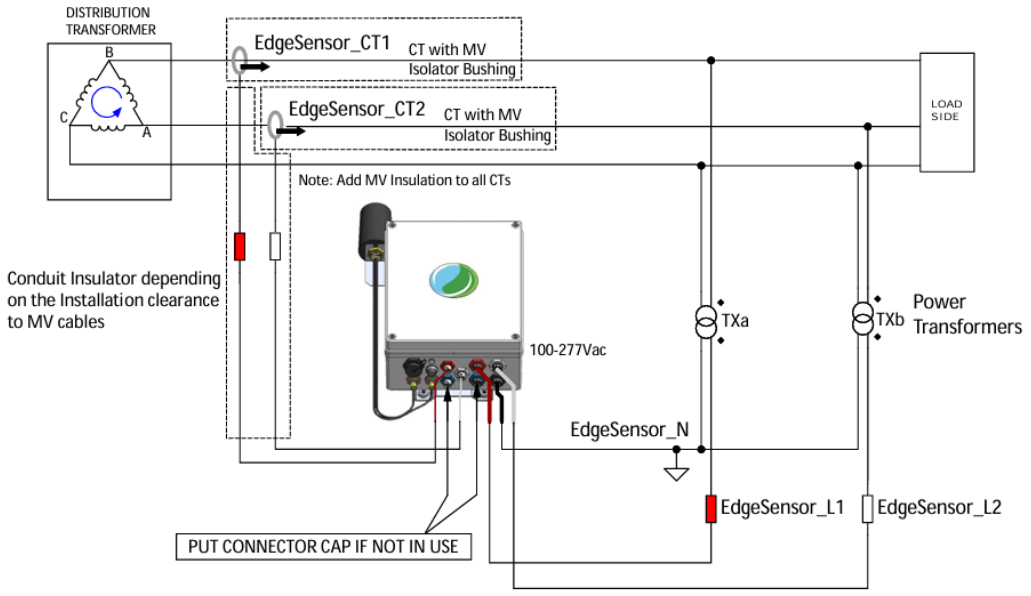
4.A. Three Phase (3-wire, 2PT) Delta clockwise and Delta counterclockwise – Medium Voltage Configuration

CoAP command: transformerconfig 4



Three Phase (3-wire, 2PT) Delta clockwise – Medium Voltage

Fig. 4A.1



Three Phase (3-wire, 2PT) Delta clockwise – Medium Voltage

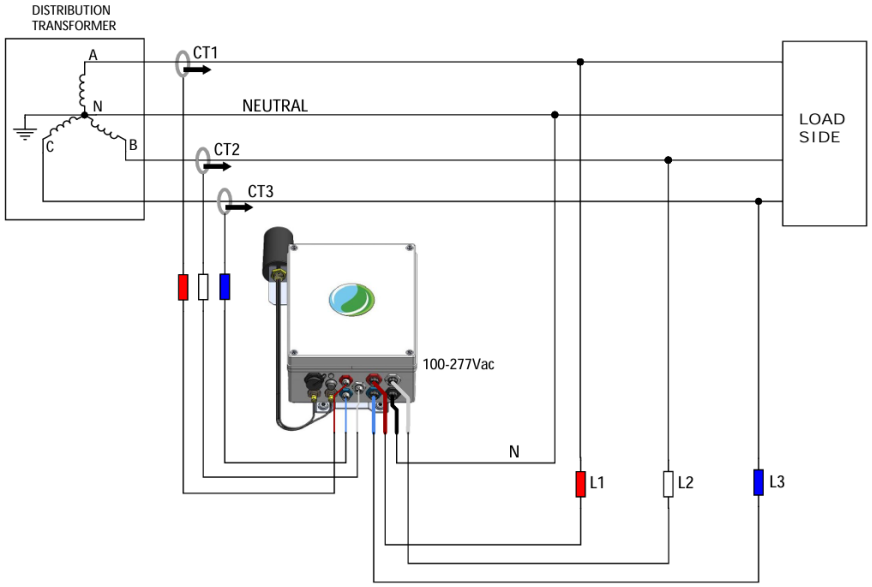
Fig. 4A.2

Note:

1. One of the "Line" terminals of the Transformer is Earthed.
2. Refer to 8. Medium Voltage Current Transformer Isolator Bushing Installation under VI. Installation Procedure for installation of isolator bushing.

6. Three Phase (4-wire) Wye Line-to-Neutral

CoAP command: transformerconfig 3

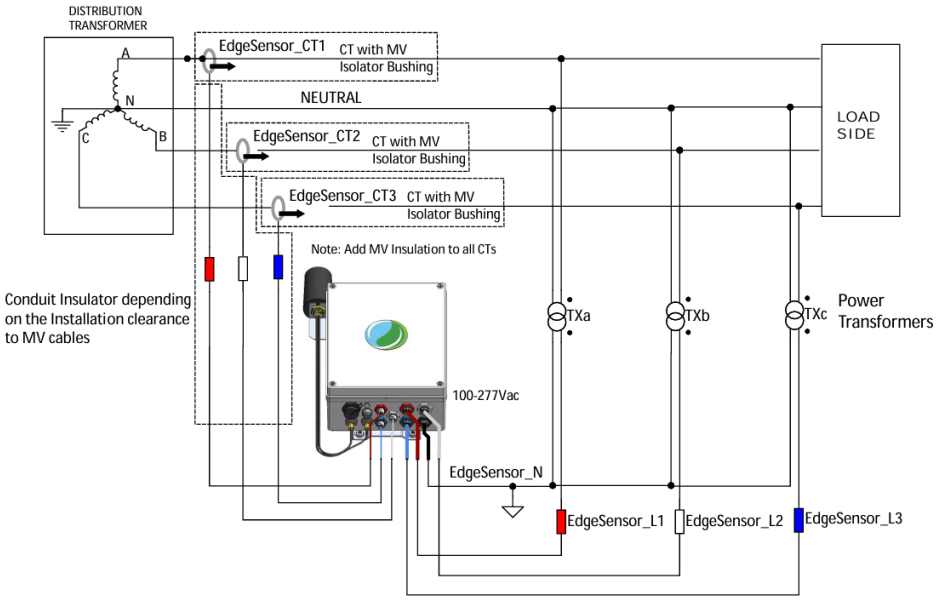


Three Phase (4-wire) Wye Line-to-Neutral

Fig. 6

6.A. Three Phase (4-wire, 3PT) Wye Line-to-Neutral – Medium Voltage Configuration

CoAP command: transformerconfig 3



Three Phase (4-wire, 3PT) Wye Line-to-Neutral – Medium Voltage

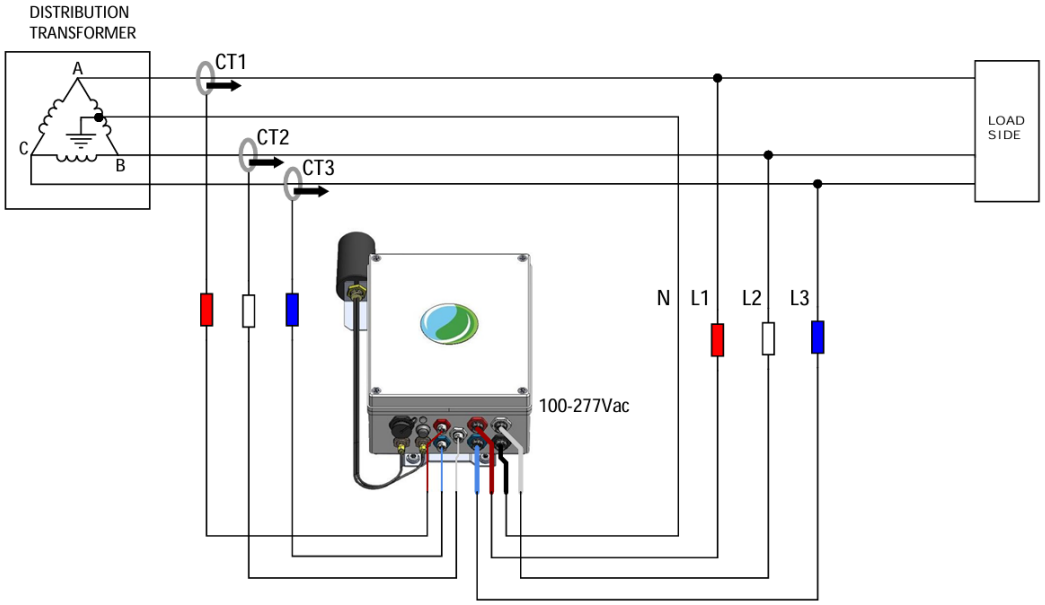
Fig. 6A

Note:

1. Refer to 8. Medium Voltage Current Transformer Isolator Bushing Installation under VI. Installation Procedure for installation of isolator bushing

7. Three Phase (3-Wire) Delta with Mid Tap Connection on A-B Configuration

CoAP command: transformerconfig 7



Note:

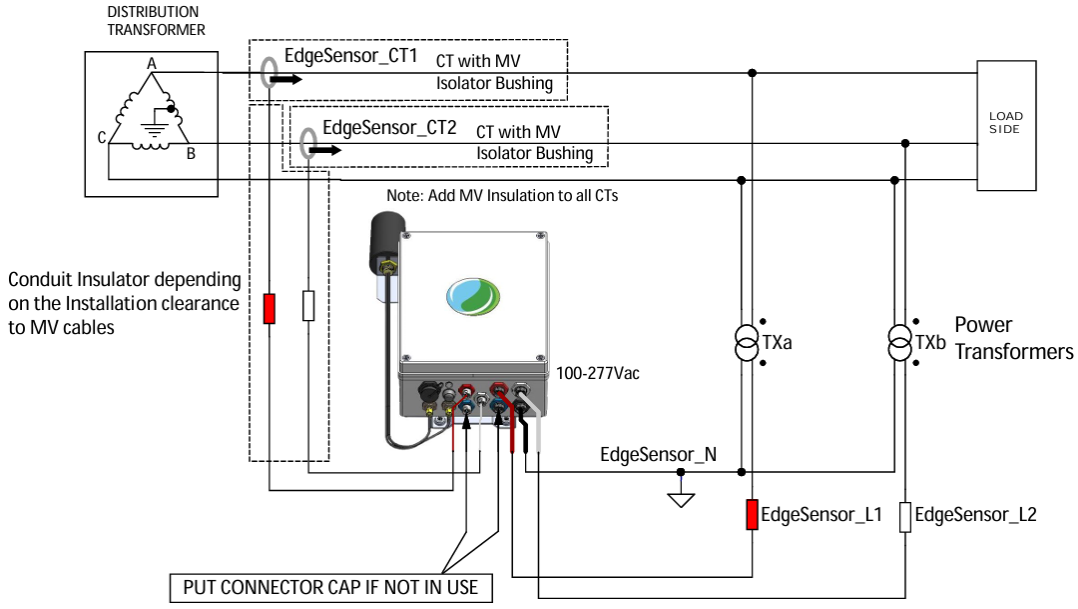
1. Input rating of EdgeSensor (610 Series) Line-to-Neutral is 277Vac maximum. Please use Power Transformer if Voltage Line-to-Line of Distribution Transformer exceeds EdgeSensor (610 Series) input rating.

Three Phase (3-Wire) Delta with Mid Tap Connection on A-B

Fig. 7

7.A. Three Phase (3-Wire, 2PT) Delta with Mid Tap Connection on A-B – Medium Voltage Configuration

CoAP command: transformerconfig 4



Three Phase (3-Wire, 2PT) Delta with Mid Tap Connection on A-B – Medium Voltage

Fig. 7A

Note:

1. Refer to 8. Medium Voltage Current Transformer Isolator Bushing Installation under VI. Installation Procedure for installation of isolator bushing

IV. BOX CONTENTS

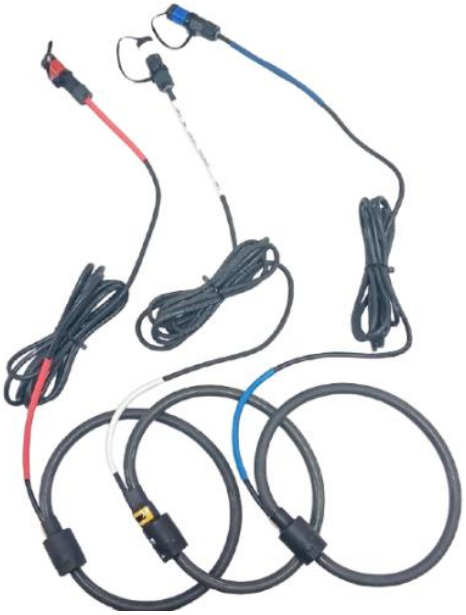
1. **EdgeSensor (610 Series) Unit with Detachable Sensors**
   - EdgeSensor (610 Series) Detachable ..... 1 pc.
   - Accessories EdgeSensor (610 Series) Detachable:
     - EdgeSensor (610 Series) Accessory: Coreless Current Sensor ..... 1 set
     - EdgeSensor (610 Series) Accessory: Voltage Sensor Wire ..... 1 set
     - EdgeSensor (610 Series) Accessory: Universal mount and L189mm bracket set ..... 1 set
     - Antenna Accessories ..... 1 set

EdgeSensor(610 Series)
Voltage Sensor Wire
Unit (Preinstalled Accesories
Fig. 10

Universal Mount and
L189mm Bracket set
Fig. 11

Antenna & Bracket
Fig. 12

Voltage Sensor Wire
Fig. 13



Coreless Current Sensor
Fig. 14

V. CAUTION

IMPORTANT

Installation and wiring termination of the EdgeSensor (610 Series) shall be performed by qualified personnel, in compliance with local electrical and safety standards.

EdgeSensor (610 Series) comes with Safety Rated Flexible Rogowski Coils for Current Sensing with proper insulation and UV protection.
Always connect the EdgeSensor (610 Series) Neutral sense wire to the transformer's Neutral line cable first before connecting the Live sense wires.

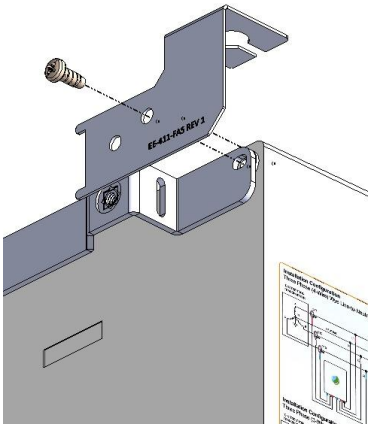
WARNING

Edge Zero manufacture component parts that can be used in a wide variety of industrial and commercial applications. The selection and application of Edge Zero products remains the responsibility of the equipment designer or end user. Edge Zero accepts no responsibility for how its products may be incorporated into final design. Under no circumstance should any Edge Zero 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 Zero must be passed through to the end user. Edge Zero offers a warranty only as to the quality of its product to conform to the catalogue specifications. No other warranty is offered. Edge Zero assumes no liability for any personal injury, property damage, losses or claims arising out of the misapplication and non-performance.

VI. INSTALLATION PROCEDURE

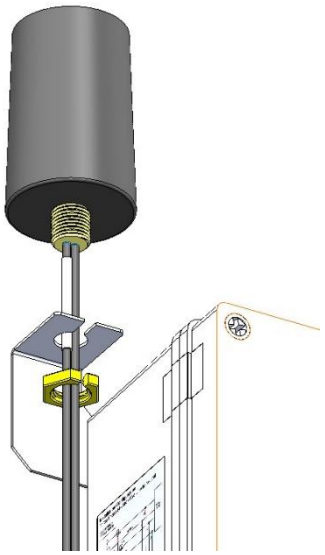
1. Antenna Installation

Step 1



Install the Antenna Bracket Mount (EE-405-FA20) at the back of the unit and fix using the metal screw as shown.

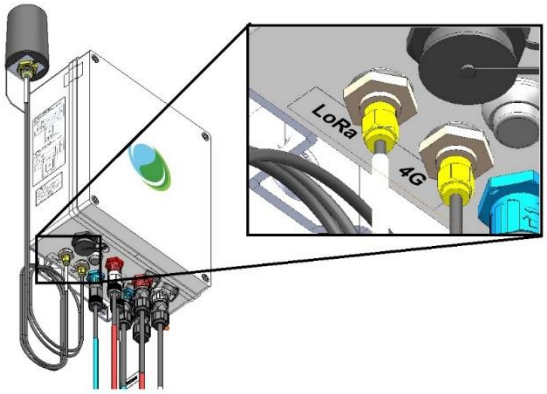
Step 2



Step 2

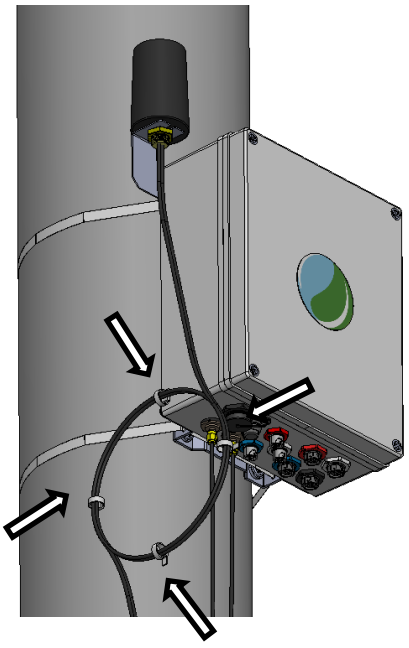
Mount the antenna into the metal bracket slot and tighten the nut of the antenna ensuring it is fixed.

Step 3



- Connect the SMA connector of the white-sleeved wire to the corresponding SMA panel connector labeled LoRa.
- Connect the other SMA connector to the second SMA panel connector labeled 4G.
- Securely tighten both connectors until they are firmly fixed in place.
- Neatly route the cable in a loop and fasten it with cable ties to keep it tidy and secured.

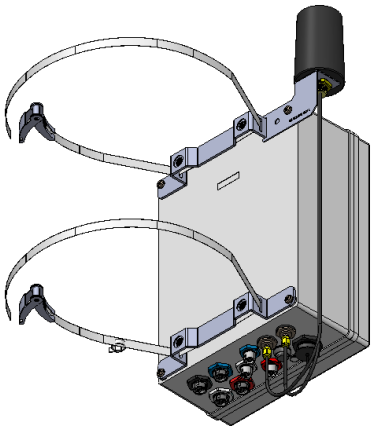
Step 4
Fully assembled antenna



Secure the cable loop and any excess slack with cable ties and belts as shown.

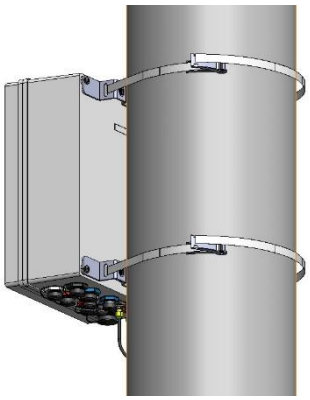
2. Circular Mount Accessory Installation

Step 1



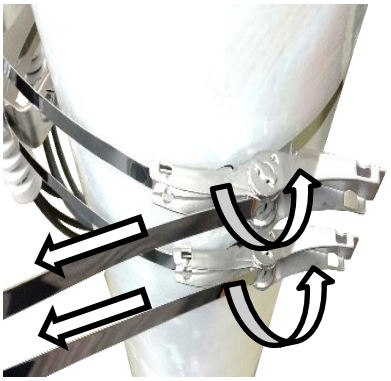
Insert the provided steel belt (PKB-10S) into the slots of the upper and lower brackets as illustrated

Step 2



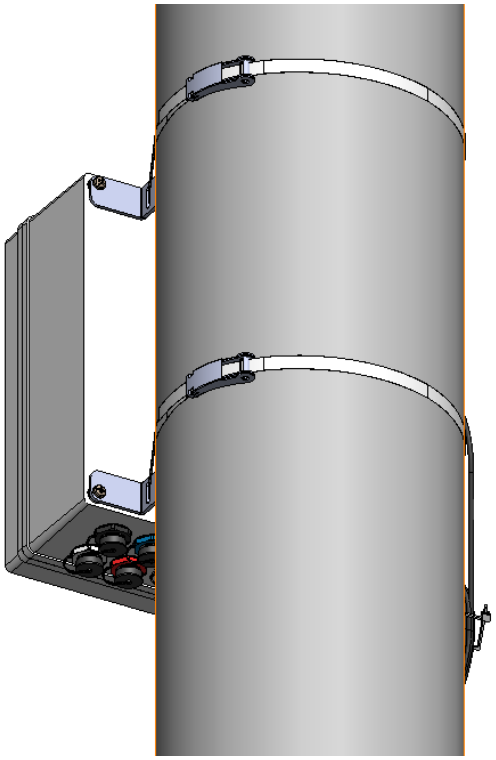
Position the EdgeSensor (610 Series) vertically as shown and wrap the steel belt around the pole.

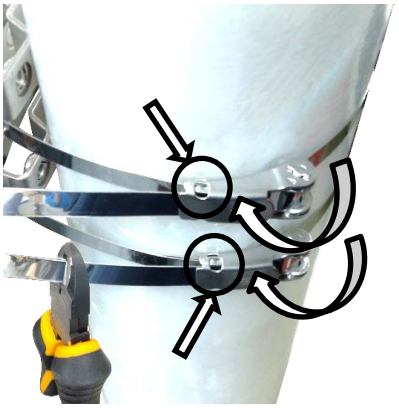
Step 3



Pull the steel band with tension and cock the ratchet lever all the way back then return the lever to the original position.

Fully Installed EdgeSensor (610 Series) Unit on Circular Pole

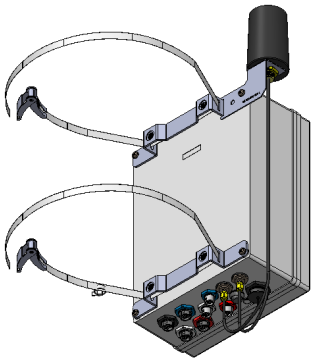




Cut the excess steel band to desired length using cutting tools.

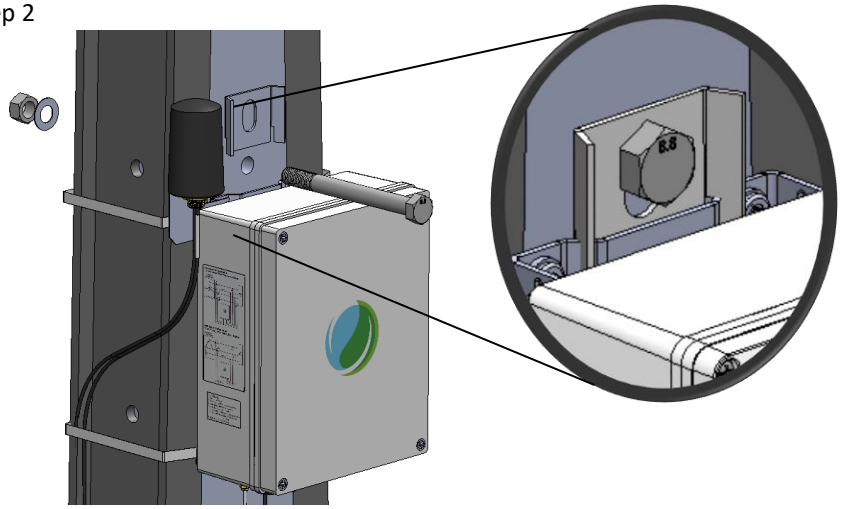
3. Stobie Mount Accessory Installation

Step 1



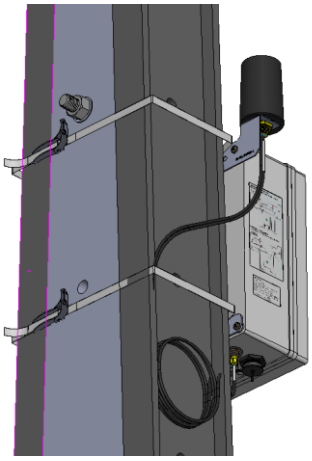
Insert the supplied steel belt (PKB-10S) into the slots of the upper and lower brackets as shown.

Step 2



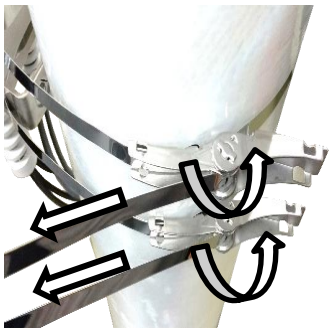
Position and install the Top Hanger Plate (EE-509-0009) and fix using the supplied bolt and nut. Align the EdgeSensor (610 Series) metal bracket metal bracket underneath the Top hanger slot. Tighten the nut after completing Step 4.

Step 3

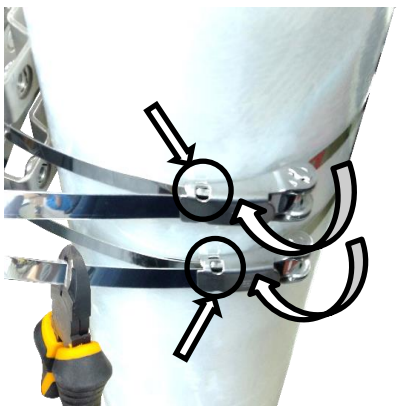


Wrap the steel belt around the Stobie pole as shown.

Step 4

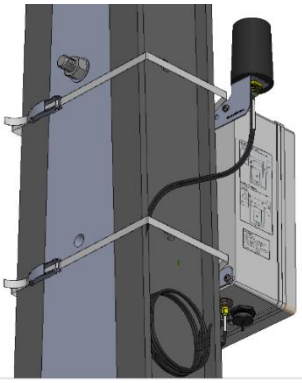


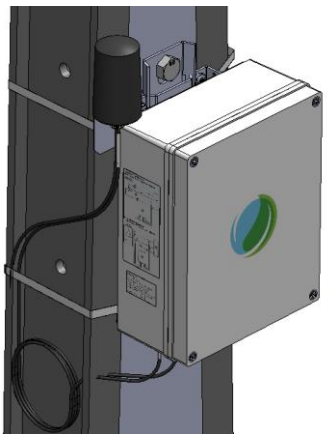
Pull the steel band with tension and cock the ratchet lever all the way back then return the lever to the original position.



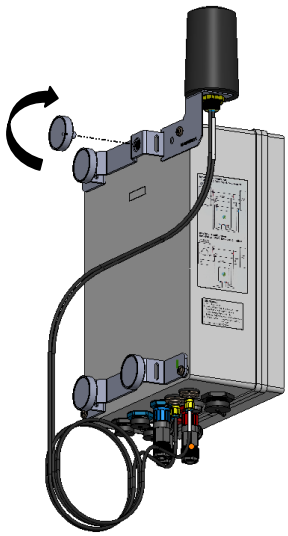
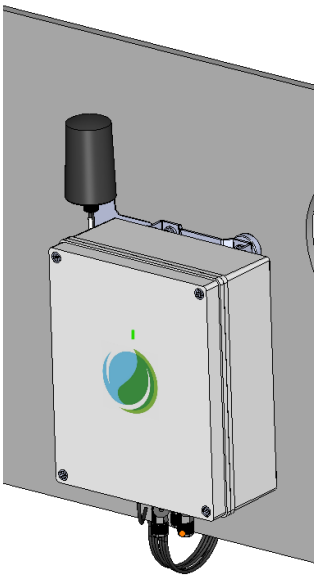
Cut the excess steel band to desired length using cutting tools.

Step 3
Fully Installed EdgeSensor (610 Series) Unit On Stobie Pole





4. Pad Mount Accessory Installation

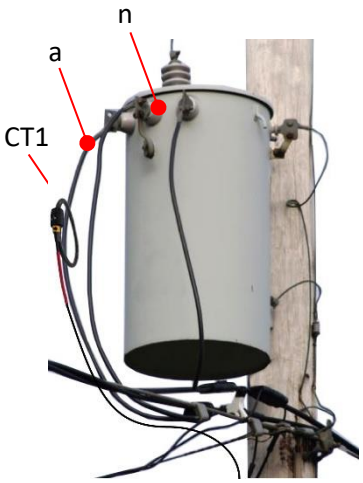
Step 1	Step 2	Step 3	Final Installed Unit on Pad (Metal Cabinets)
 Install the supplied 4 pcs magnets (EE-508-0006) on the bracket as shown. Screw the magnets clockwise and tightened by hand.	 Attached the EdgeSensor (610 Series) unit into the metal surface starting at the bottom magnet as shown.	 Tilt the top of the EdgeSensor (610 Series) unit carefully into position.	

HANDLE WITH CAUTION

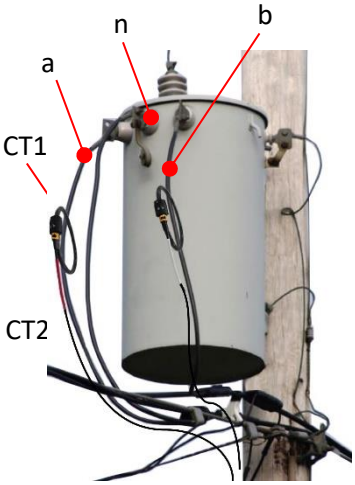
- Always wear gloves when handling magnets to prevent pinching. These are rated at 4kg-force.
- Magnets can be harmful to pacemaker wearers and other with medical implants.
- Keep tools and other metal objects away.
- When dismantling the EdgeSensor with magnet mounting, perform the reverse of the installation with caution.

5. Rogowski CT Installation

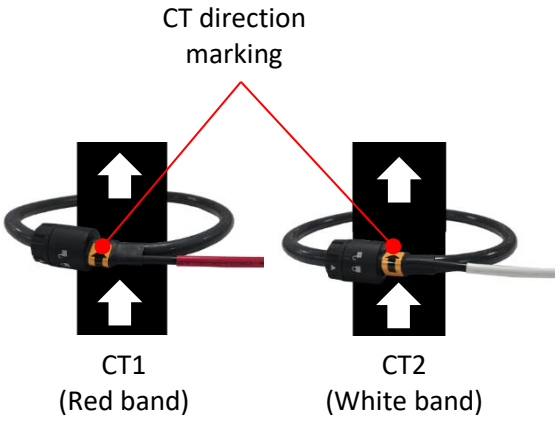
Install the EdgeSensor (610 Series) Rogowski CT's to the transformer's low voltage line and follow the correct CT direction. Refer to the CT's Arrow marking labels for the current direction.
IMPORTANT: Wrong installation for the Rogowski current direction shall result to inaccurate measurement of the EdgeSensor (610 Series).

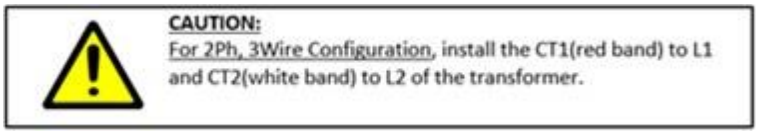


1 Ph, 2 Wire Configuration
Fig. 15

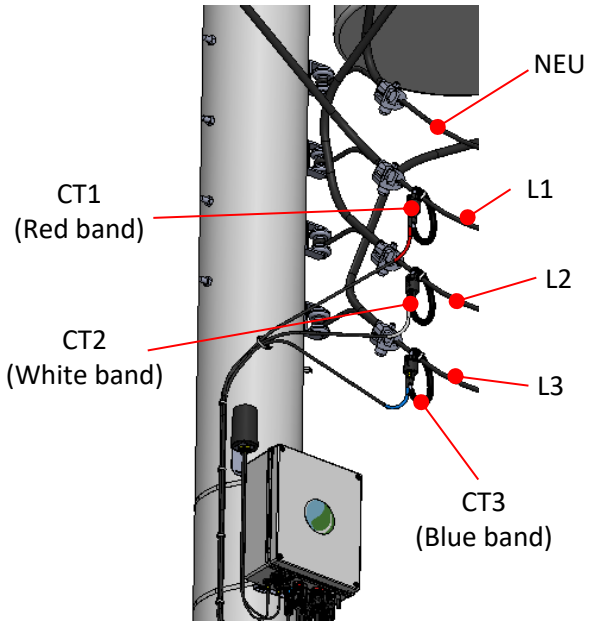


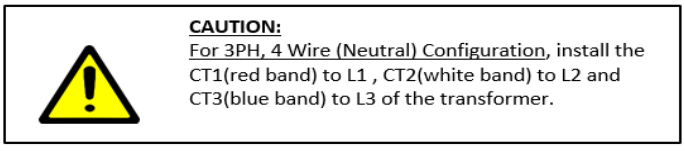
2Ph, 3 Wire Configuration
Fig. 16





For 3 Phase, 4 Wire Configuration
Fig. 17





6. Rogowski CT Special Installation

TWIST-LOCKING TYPE

Fully insert the end cap into the mating socket and twist the lock as shown.

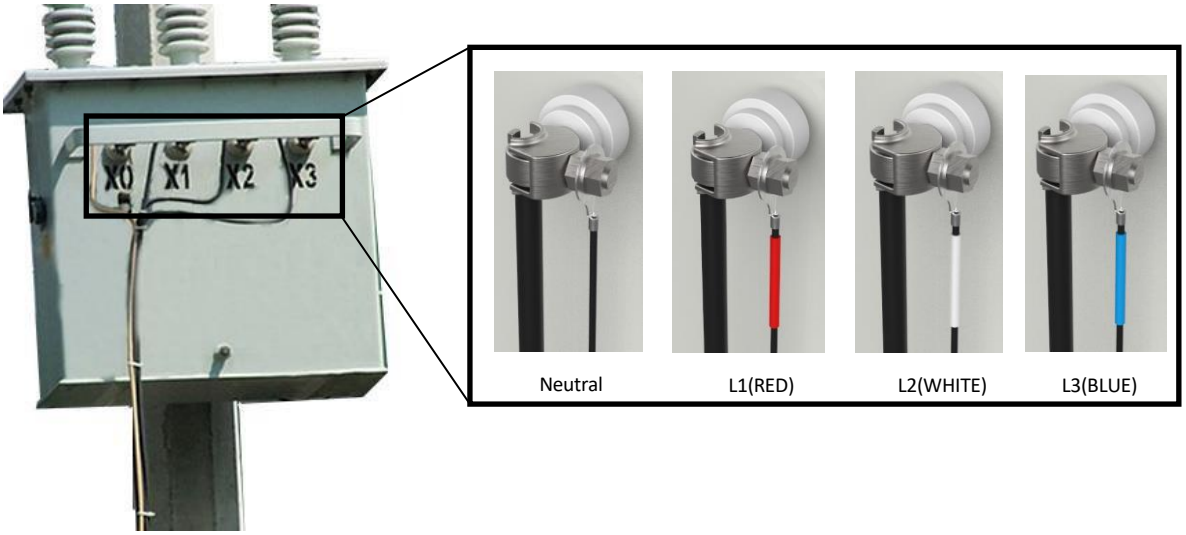
Fig. 18

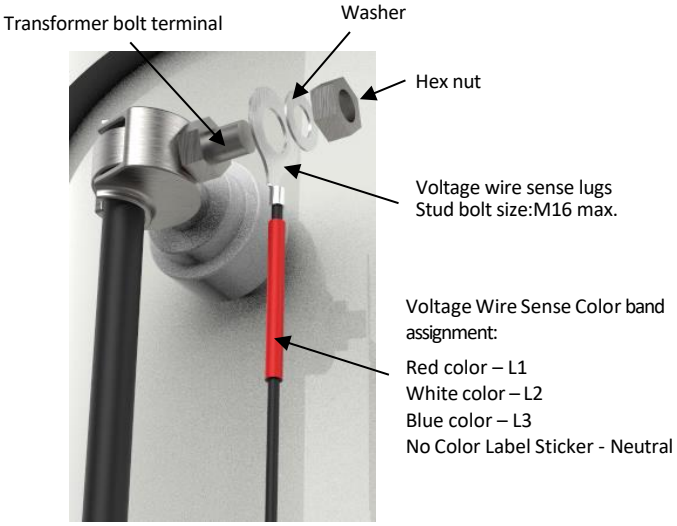
7. Voltage Wire Sense Installation

7.1 If to be installed in live condition, it is important to first connect the Neutral voltage sense wire before connecting L1, L2, and L3 voltage sense wires. Connecting the EdgeSensor (610 Series) voltage sense wires to the transformer can be done in two ways:

7.2 If transformer has terminal block for voltage connections, simply screw the voltage wires of EdgeSensor (610 Series) to transformer's terminal block as shown in Fig. 19 and Fig. 20.

3-PH TRANSFORMER
Fig. 19





Voltage Wire Sense Final Assembly
Fig. 20

Identify the L1, L2, L3 & 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 is color label sticker and its color. Follow the terminal assignment as:
L1 - Red color label
L2 - White color label
L3 - Blue color label
Neutral – No color label
Tightening Torque: Max. 248.0 N-m

7.3 If transformer does not have terminal block for voltage connections, voltage wire of EdgeSensor (610 Series) can be directly connected to the transformer's voltage wires via the IPC accessory provided.

7.4 Cut the terminal lug of the EdgeSensor (610 Series) voltage wires as shown in Fig. 21.

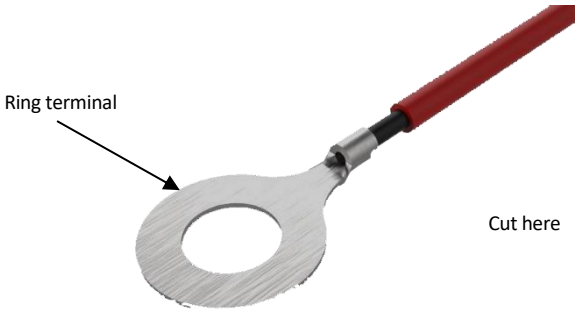
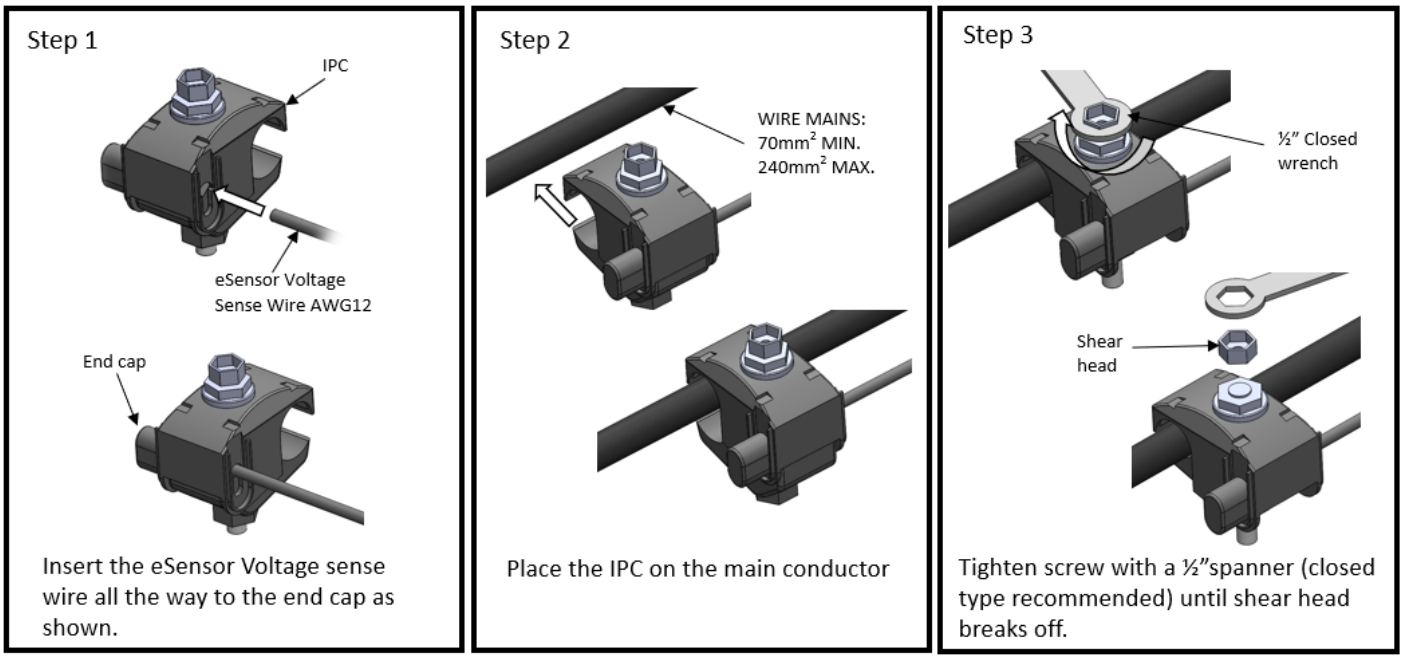


Fig. 21

7.5 Fig. 22 shows how the EdgeSensor (610 Series) Voltage Wire and Transformer Voltage Wire would be clamped together using the IPC accessory.



Insulation Piercing Installation
Fig. 22

7.6 Fig. 23 shows typical installation of EdgeSensor (610 Series) Voltage Wires using IPC.

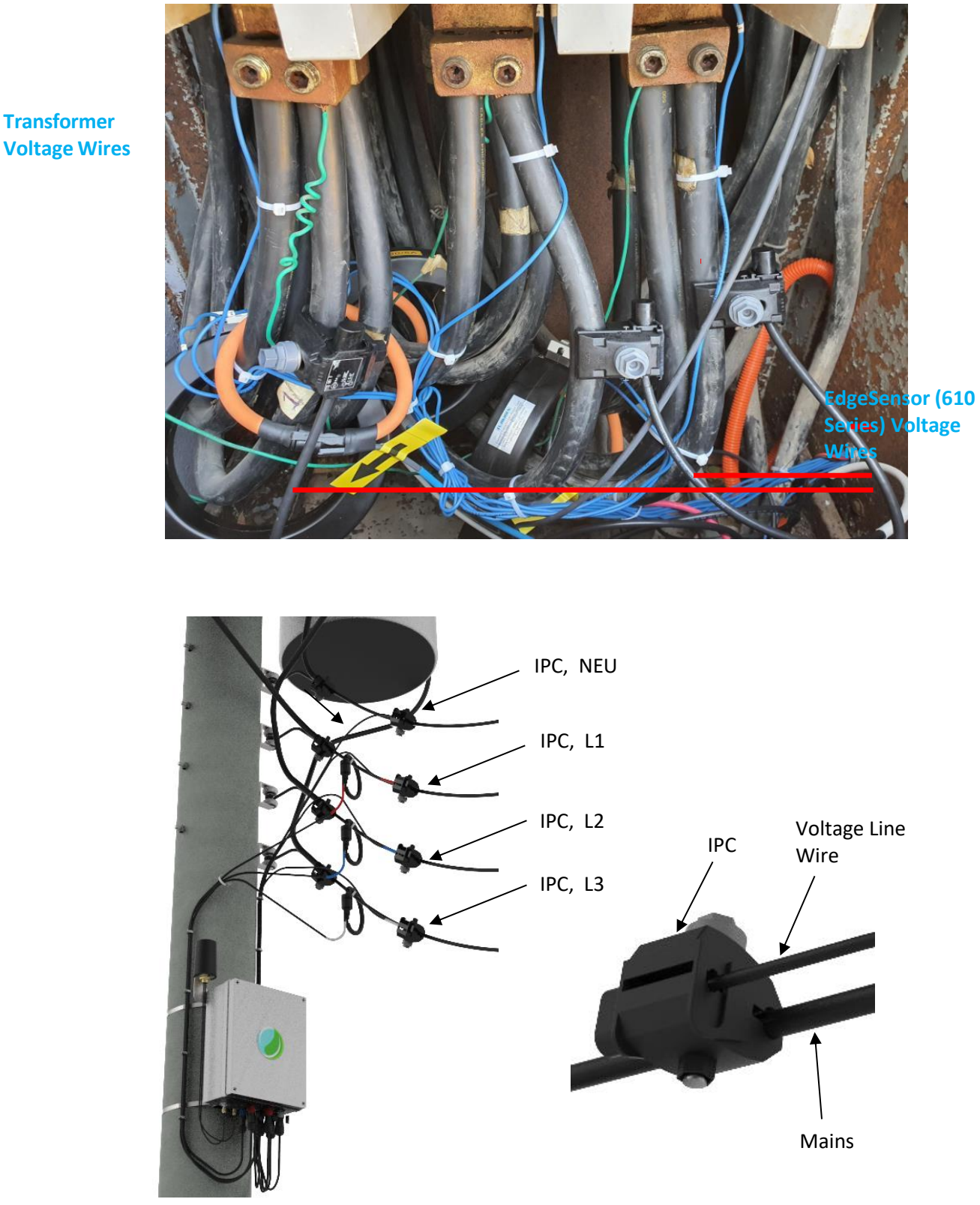


Fig. 23

8. Medium Voltage Current Transformer Isolator Bushing Installation **for MV applications**

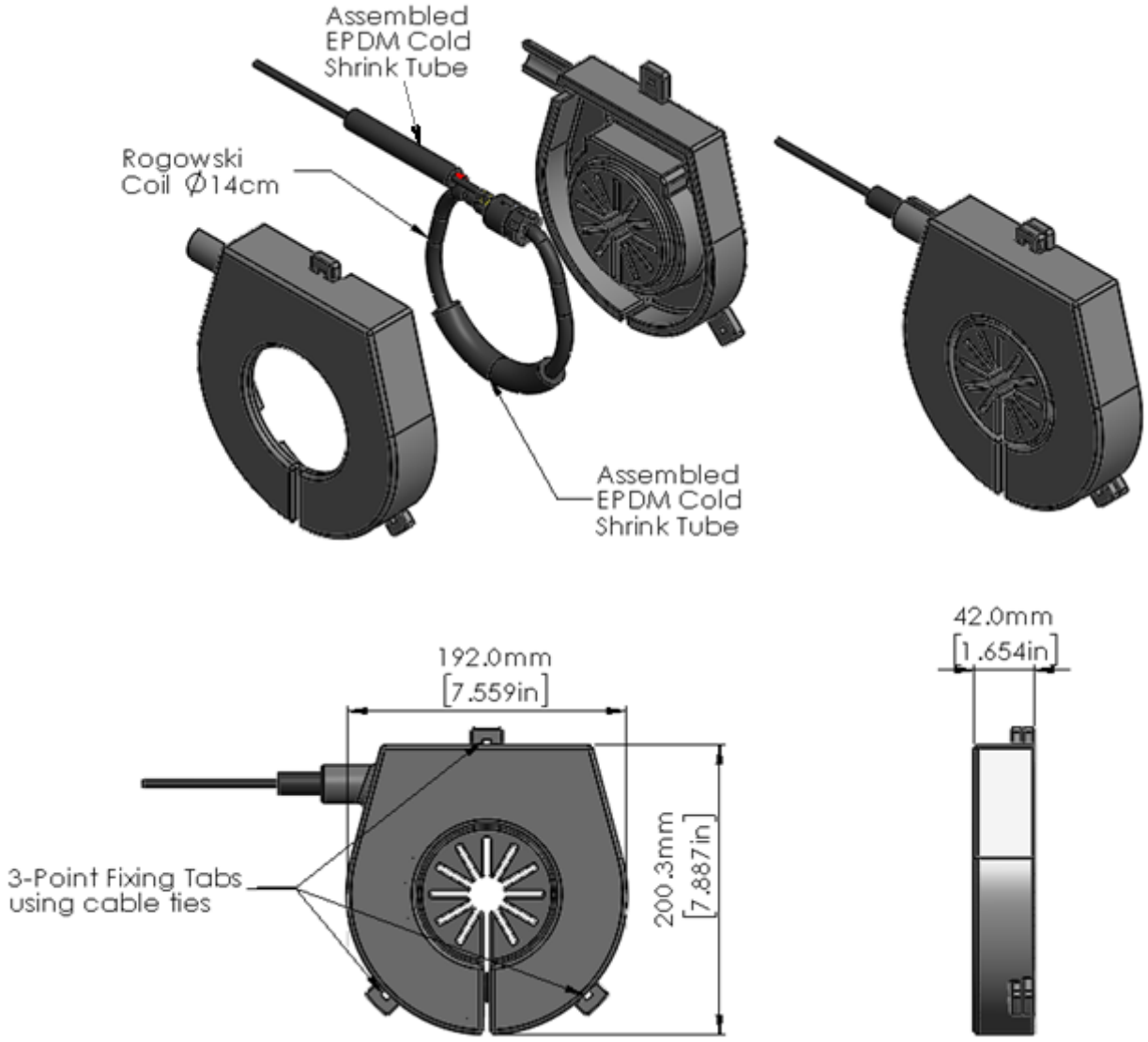
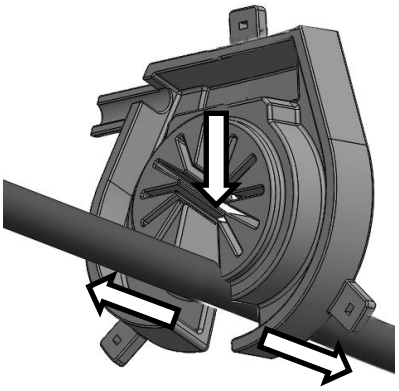
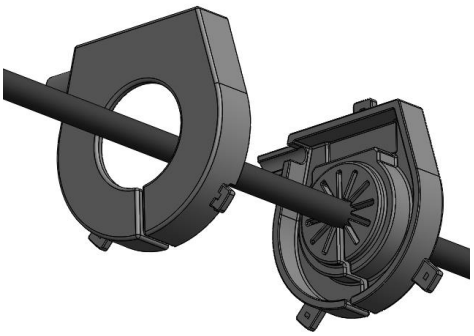
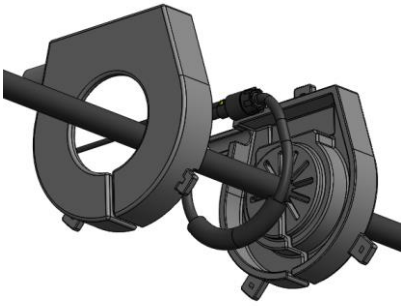
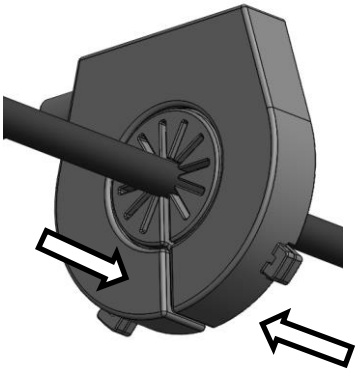
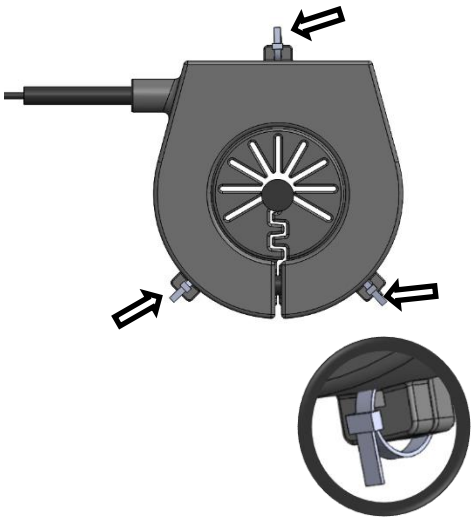


Figure: Outline Dimension with Rogowski Coil

INSTALLATION

Step 1 Install the cold shrink tube in the middle section of the Rogowski coil as shown.  Cold shrink tube	**Step 2** Stretch the slit sideways to install the bushing base on the wire. 	**Step 3** Perform the same procedure for the bushing cover. 
Step 4 Install the Rogowski in between the two bushings as shown. 	**Step 5** Close both the bushing together to enclose the Rogowski as shown. 	**Step 6** Secure the bushing with the supplied cable ties. 

IMPORTANT

Installation and wiring termination of the EdgeSensor (610 Series) shall be performed by qualified personnel, in compliance with local electrical and safety standards.

EdgeSensor (610 Series) comes with Safety Rated Flexible Rogowski Coils for Current Sensing with proper insulation and UV protection.
Always connect the EdgeSensor (610 Series) Neutral sense wire to the transformer's Neutral line cable first before connecting the Live sense wires.

WARNING

Edge Zero manufacture component parts that can be used in a wide variety of industrial and commercial applications. The selection and application of Edge Zero products remains the responsibility of the equipment designer or end user. Edge Zero accepts no responsibility for how its products may be incorporated into final design. Under no circumstance should any Edge Zero 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 Zero must be passed through to the end user. Edge Zero offers a warranty only as to the quality of its product to conform to the catalogue specifications. No other warranty is offered. Edge Zero assumes no liability for any personal injury, property damage, losses or claims arising out of the misapplication and non-performance.