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

INSTALLATION, COMMISSIONING AND OPERATION MANUAL

eSensor

EE-402-SERIES

I. DOCUMENT INFORMATION

Document ID	E-IM-EE-402	Version	A8
Prepared by	Excel Kit Palmes	Date of Issue	November 13, 2024

II. APPROVED BY

Engineering Manager	Jian Carlo Zapata	Date:
General Manager, Business Development	Nathan Oxley	Date:

III. REVISION HISTORY

Revision no.	Date of Revision	Revision no.	Date of Revision
01	11/09/2018	A6	09/11/2024
A1	09/25/2019	A7	10/09/2024
A2	09/14/2020	A8	11/13/2024
A3	05/04/2023		
A4	06/13/2023		
A5	08/27/2024		

IV. CHANGE RECORD

Revision no.	Prepared by	Description on Changes
01	Joseph Cruz / Leo Torio	Initial Release
A1	Jon Rick Lo Chiong	Official Release
A2	Jon Rick Lo Chiong	Included details on eSensor connection using IPC
A3	Joseph Cruz / Leo Torio	1. Add eSensor Detachable Accessories 2. Magnet mount safety handling Add install drawings for Circular pole, Magnet Mount, Universal Mounting 3. Add Antennae Installation
A4	Leo Torio	1.Add wooden mount accessory and installation diagram. 2.Add twist-lock CT installation diagram.
A5	Excel Kit Palmes	Updated VII. Wiring Connection. Transformer Configurations
A6	Joseph Cruz	1) Add Overvoltage Category Rating 2) Add Insulation Rating & Type 3) Update Power Quality Measurements 4) Update Back Up Power/" Last Gasp" Hold-up Time 5) Update Communications Options 6) Add box dimension and weight
A7	Excel Kit Palmes	1) Updated VII. Wiring Connection. with MV Isolator Bushing and Conduit Insulation to Transformer Configuration Diagrams

		2) Added Medium Voltage Current Transformer Isolator Bushing Installation under X. Installation Procedure
A8	Excel Kit Palmes	1) Under VII. Wiring Connection. Swapped Line-to-Line and Line-to-Earth diagrams. 2) Updated Line-to-Earth and Mid-tap A-B diagrams. 3) Changed CoAP command of Mid-tap A-B Medium Voltage from transformerconfig 7 to 4.

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

INSTALLATION, COMMISSIONING AND OPERATION MANUAL

eSensor

EE-402-series

ULL-100892

V. TABLE OF CONTENS

VI. PRODUCT DATASHEET

Features

Compact Grid or Transformer Mounted Metering Module

- Grid or Transformer Status Monitoring Module
- For both Single or Three Phase Installations
- Wide Voltage Input - 100-520VAC
- High Temperature Polycarbonate IP66 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)
- Ingression Protection – IP66
- Events Logging 1 Month – Store and Forward.
- Last Gasp Feature – 30 Sec Hold Up for Power Interrupt Data
- 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
- Data Comms - 3G, 4G CAT-1, LTE CAT-M1, and LoRaWan. Options for 3G+GPS and NB-IoT are in development.
- Supports IoT Centric Cloud Architecture and DNP3 (in development) SCADA reporting.
- Transformer life prediction through derived transformer hotspot and top oil temperature
- Patents Pending

Description

The Edge eSensor 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, 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*
Rated Voltage		*100 – 277VAC Line - Neutral* *173 - 480VAC 4-Wire/3 Phase Network (Line – 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 with auto-range function*
Overvoltage Category Rating		*CAT-IV*
Insulation Rating & Type		*Measurement category CAT-IV (IEC61010)*
Lightning Strike	*Fixed Sensors*	*Power line surge protected to 10KV per IEC61000-4-5*
	Detachable eSensor	*depends on inline fuse rating use 8KV or 10kV*
Voltage Accuracy		*± 0.5%*
Power & Energy Accuracy	*Fixed Sensors*	*± 1% + 0.1% of Current Full Scale*
	Detachable eSensor	*± 3% + 0.5% of Current Full Scale*
Power Factor Accuracy		*± 1 degree*
Power Quality Measurements		*Voltage, Current, Power, Energy, vTHD, iTHD, individual harmonics* *Dedicated energy meter IC that supports IEC 62053-21, IEC 62053-22, IEC 62053-23, EN 50470-1, EN 50470-3, ANSI C12.20, and IEEE1459 standards Supports IEC 61000-4-7 Class I and Class II accuracy specification*
Reporting Interval		*1min transmit time, 4GB memory allocated for 1min data logging*
Temperature Measurement Accuracy		*± 1 degree*
'Last Gasp' Hold-up Time		*30 seconds* *Event Tag 167 - Power Outage Alert (1sec)* *Event Tag 166 - Power Outage Fault (30sec)*
Alarms and Event Logging		
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* *In development - 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 21st), T unit internal, T transformer top oil (in development), T transformer hotspot (in development)*
Connectivity		

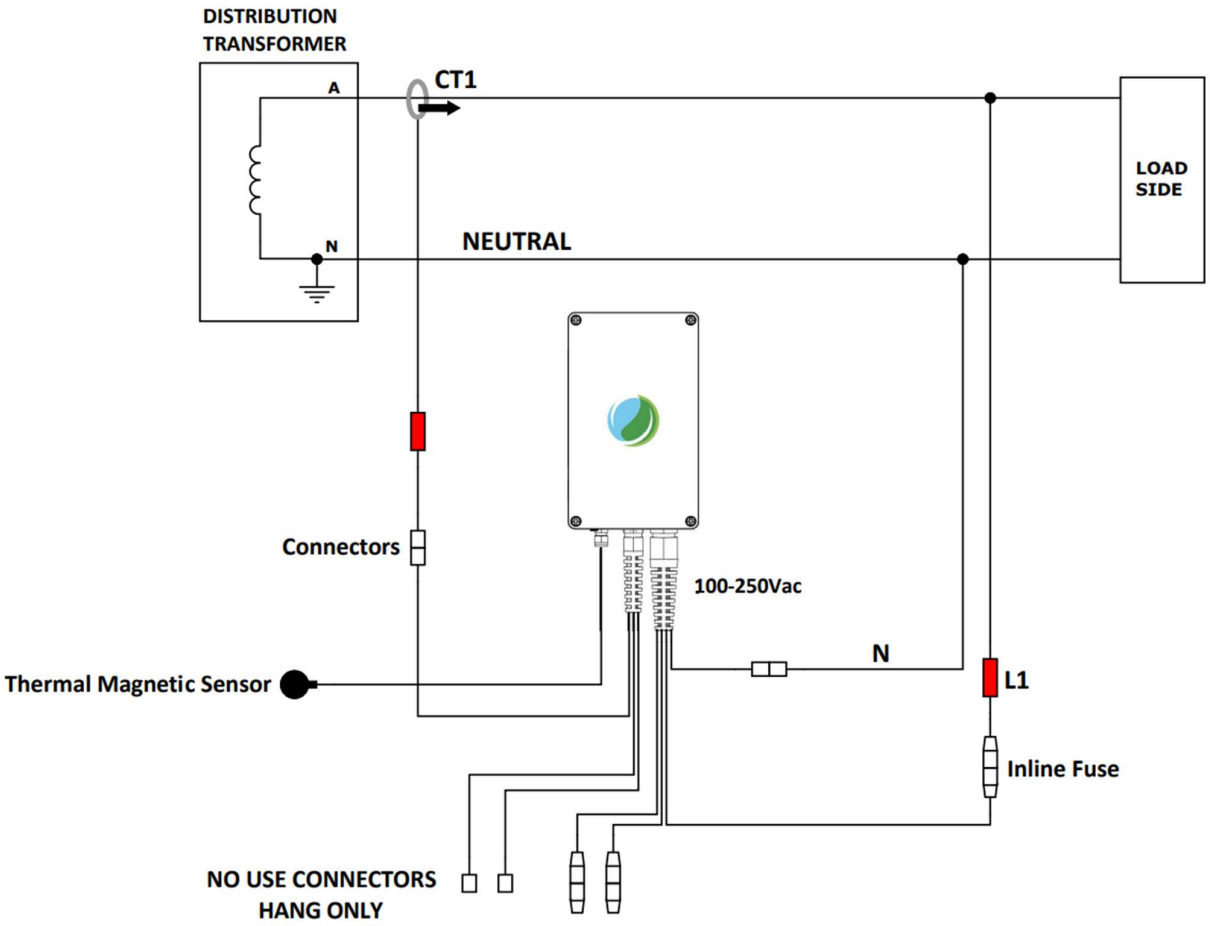
Communications Options	*Cellular Communications with embedded 3G / 4G CAT-1 / LTE CAT-M1 modem, Private APN with AES128 & SHA256 encryption IPSec tunnel* 3G - *Frequency Bands: B1, B5, B8* 4G Cat-1 - *Frequency Bands: B3, B5, B8, B28* LTE CAT-M1 - *Frequency Bands: B1, B2, B3, B4, B5, B8, B9, B10, B12, B13, B14, B17, B18, B19, B20, B25, B26, B27, B28, B65, B66*
	Versions available to support SilverSpringNetworks and Landis + Gyr Mesh Wireless (in development)
	Other Communication options by request (eg. LoRA, NB-IoT, SigFox)
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
SCADA Communications	*DNP3 with TLS security*
Systems Logs	*Fully configurable measurement interval, 4GB memory allocated to data logging*

Mechanical and Environmental	
Dimensions	*Unit: L250 x W150 x H100* *Box: L600 X W250 X H260 mm*
Weight	*Unit: 3.9kg estimated weight* *Box: 5.9kg estimated weight*
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*

VII. WIRING CONNECTION

1. Single Phase (2-Wire) Configuration

CoAP command: transformerconfig 1

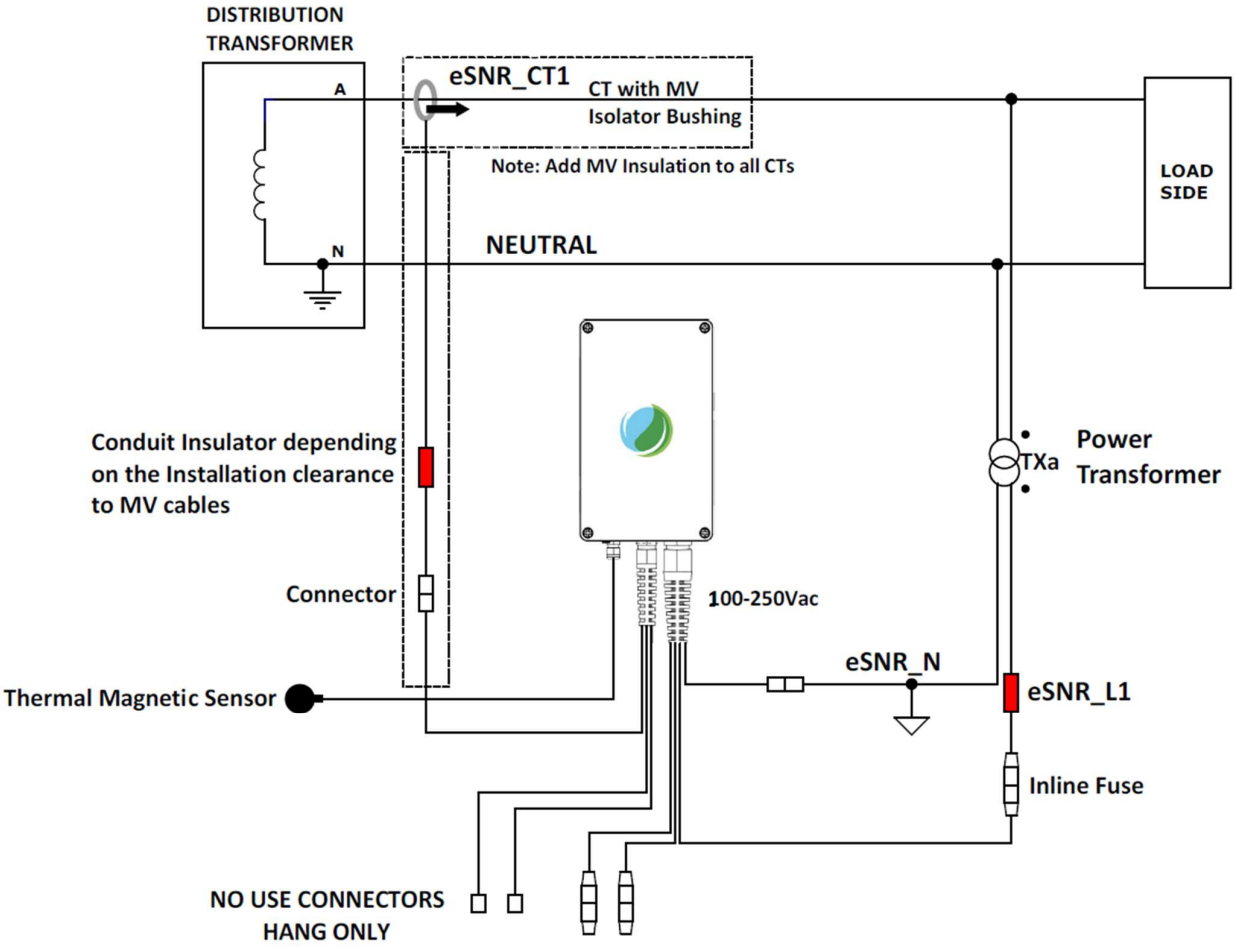


Single Phase (2-Wire)

Fig. 1

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

CoAP command: transformerconfig 1



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

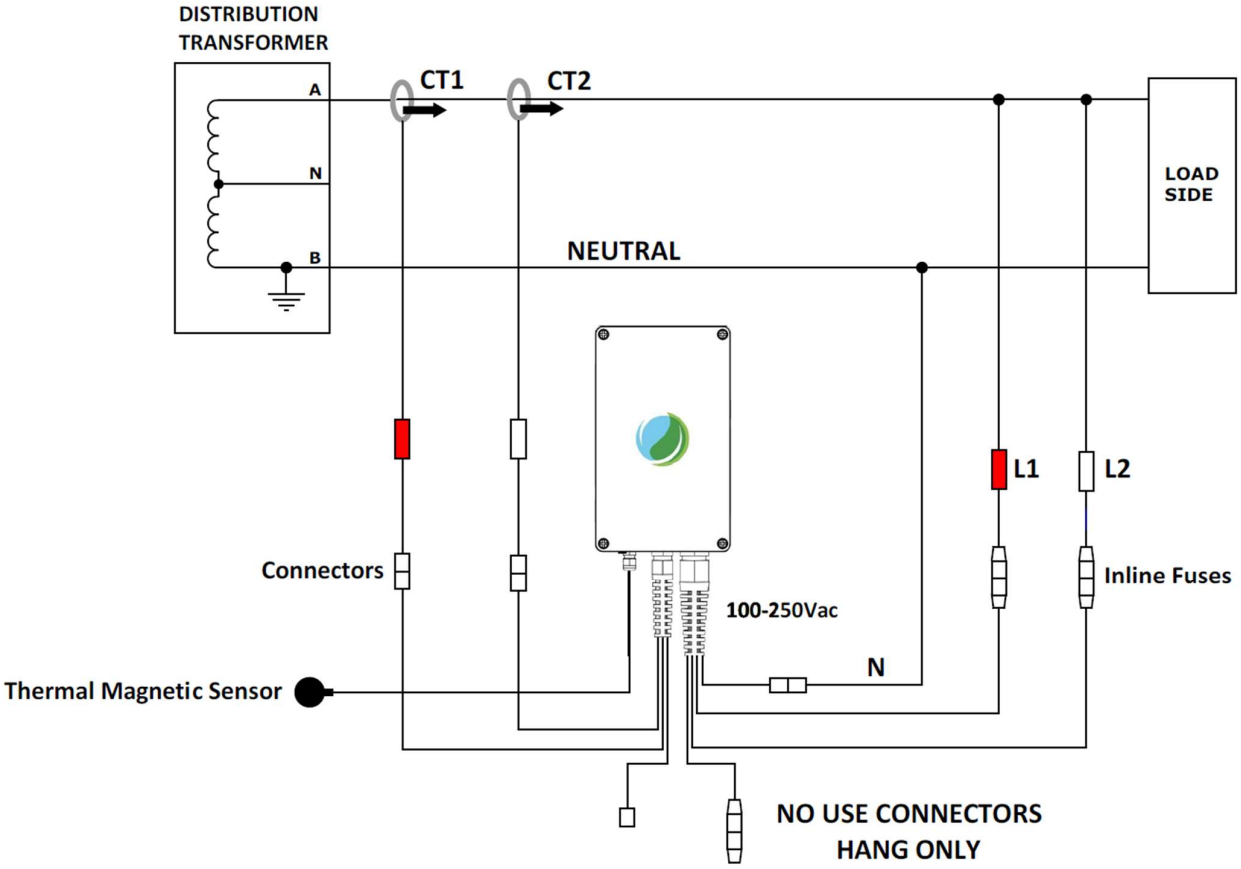
Fig. 1A

Note:

1. Refer to 3. Voltage Current Transformer Isolator Bushing Installation under X. Installation Procedure for installation instructions for isolator bushing.

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

CoAP command: transformerconfig 2

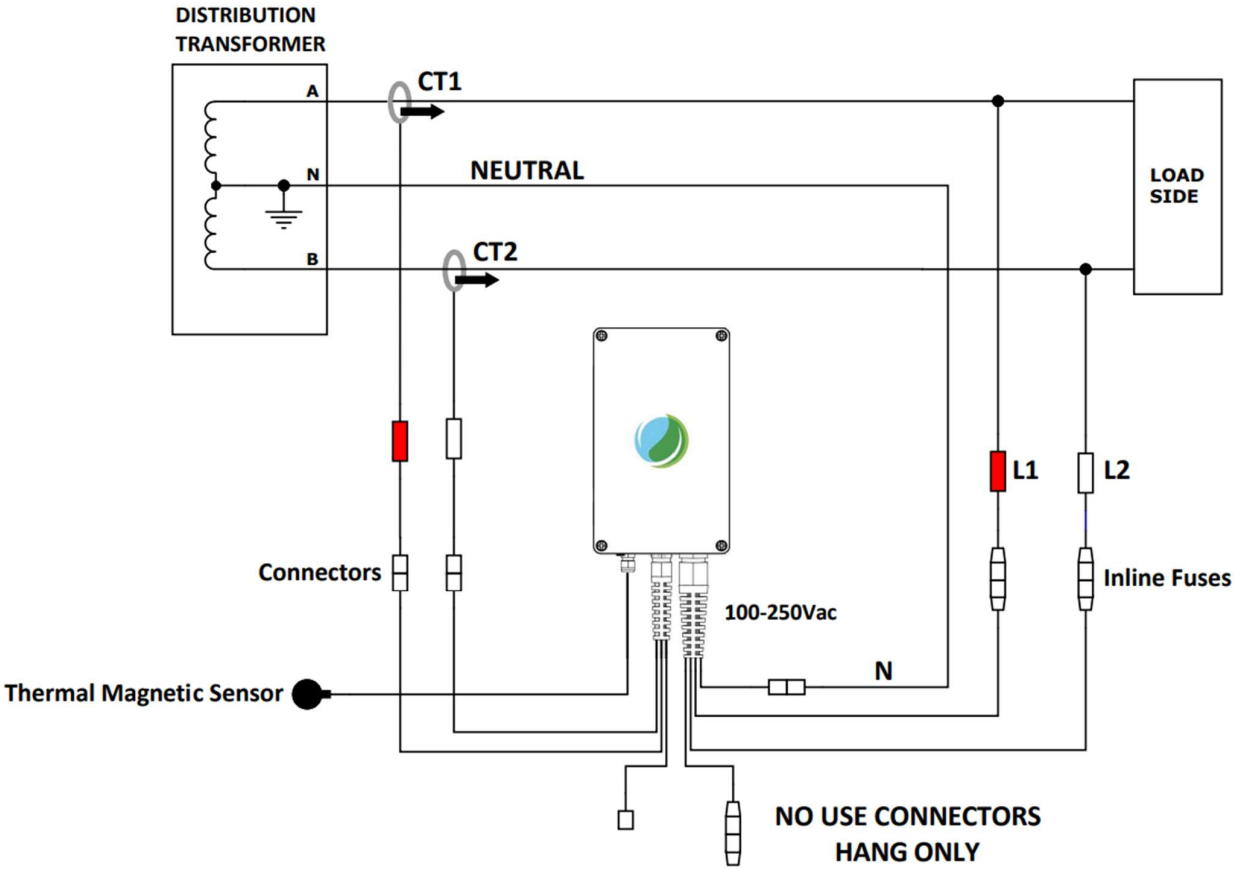


Single Phase (3-wire) Line-to-Earth

Fig. 2

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

CoAP command: transformerconfig 6

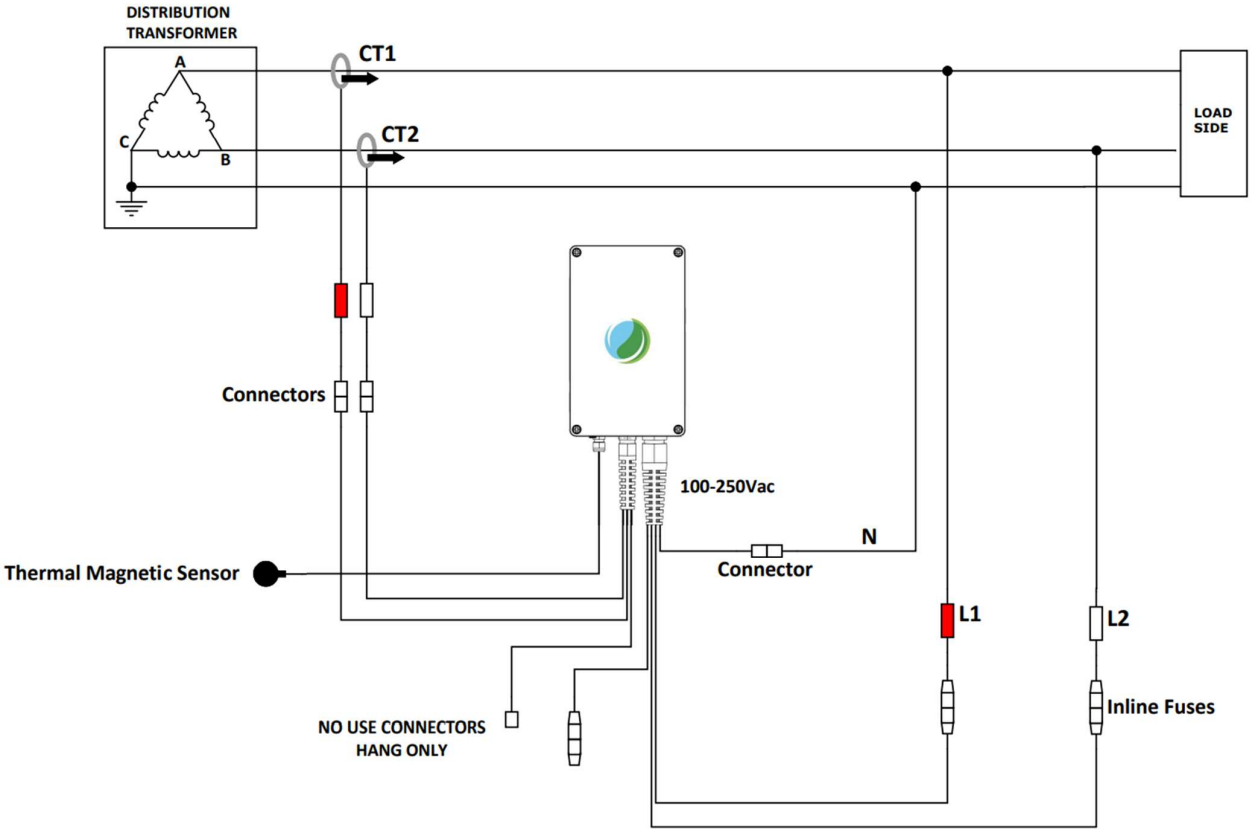


Single Phase (3-Wire) Line-to-Line

Fig. 3

4. Three Phase (3-Wire) Delta with Line-C Earthed Configuration

CoAP command: transformerconfig 4

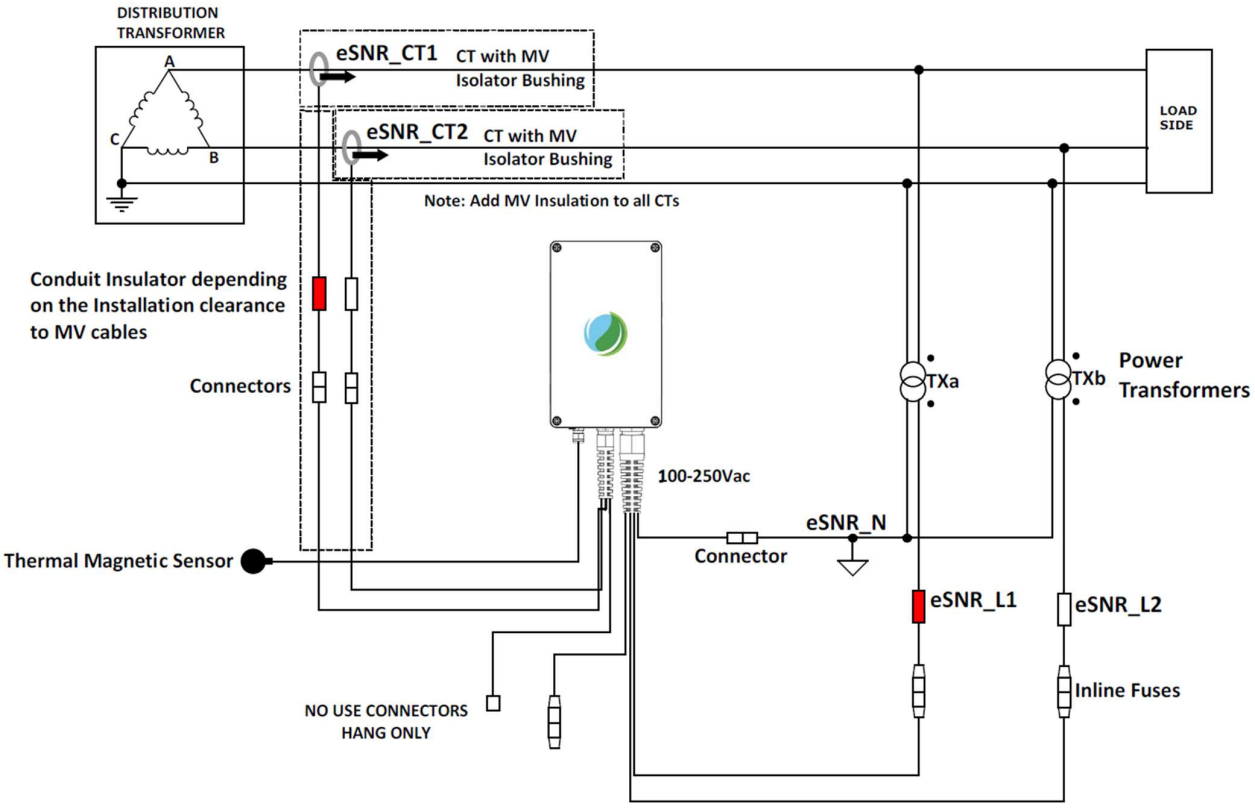


Note:
1. One of the "Line" terminal of the Transformer is Earthed.
2. Input rating of eSensor Line-to-Neutral is 277Vac maximum. Please use Power Transformer if Voltage Line-to-Line of Distribution Transformer exceeds eSensor input rating.

Three Phase (3-Wire) Delta with Line-C Earthed
Fig. 4

4.A. Three Phase (3-wire, 2PT) Delta with Line-C Earthed – Medium Voltage Configuration

CoAP command: transformerconfig 4



Three Phase (3-wire, 2PT) Delta with Line-C Earthed – Medium Voltage

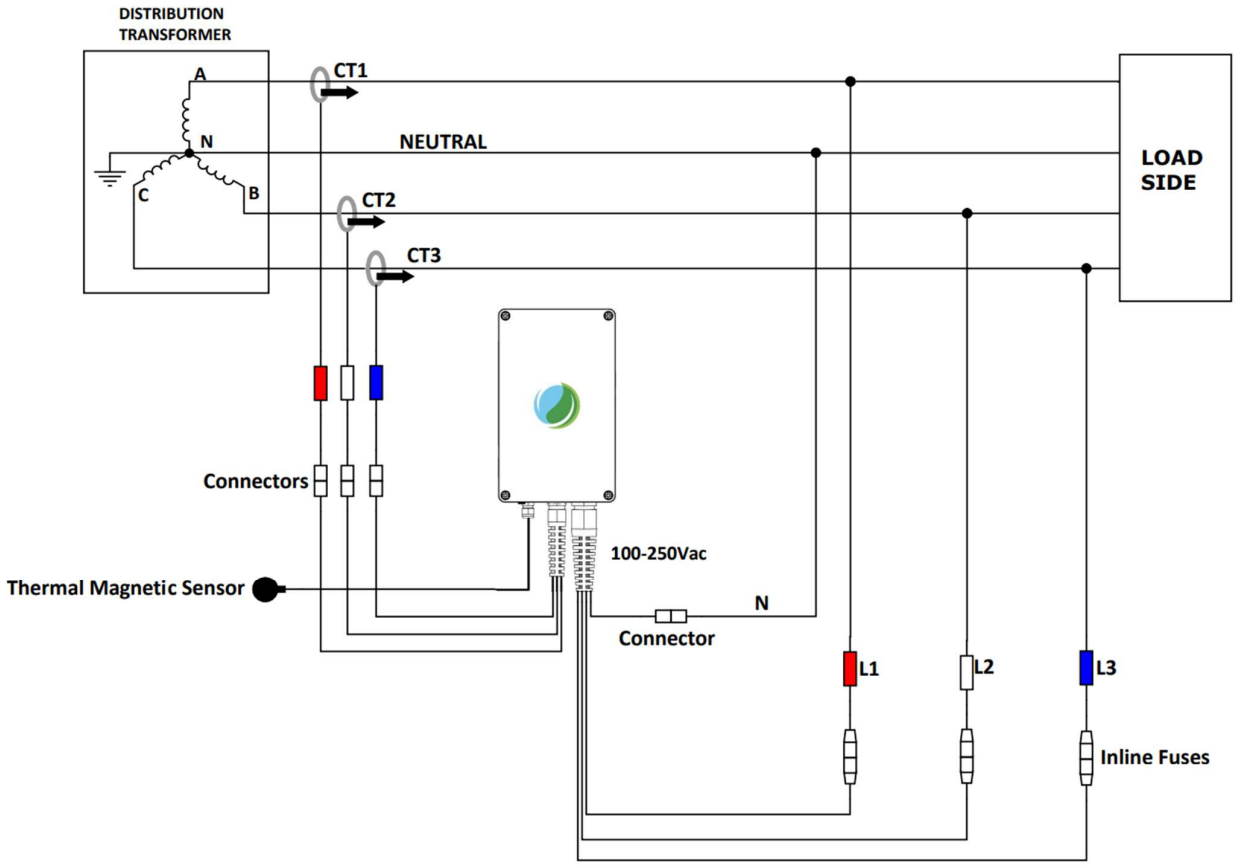
Fig. 4A

Note:

1. One of the “Line” terminals of the Transformer is Earthed.
2. Refer to 3. Voltage Current Transformer Isolator Bushing Installation under X. Installation Procedure for installation instructions for isolator bushing.

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

CoAP command: transformerconfig 3

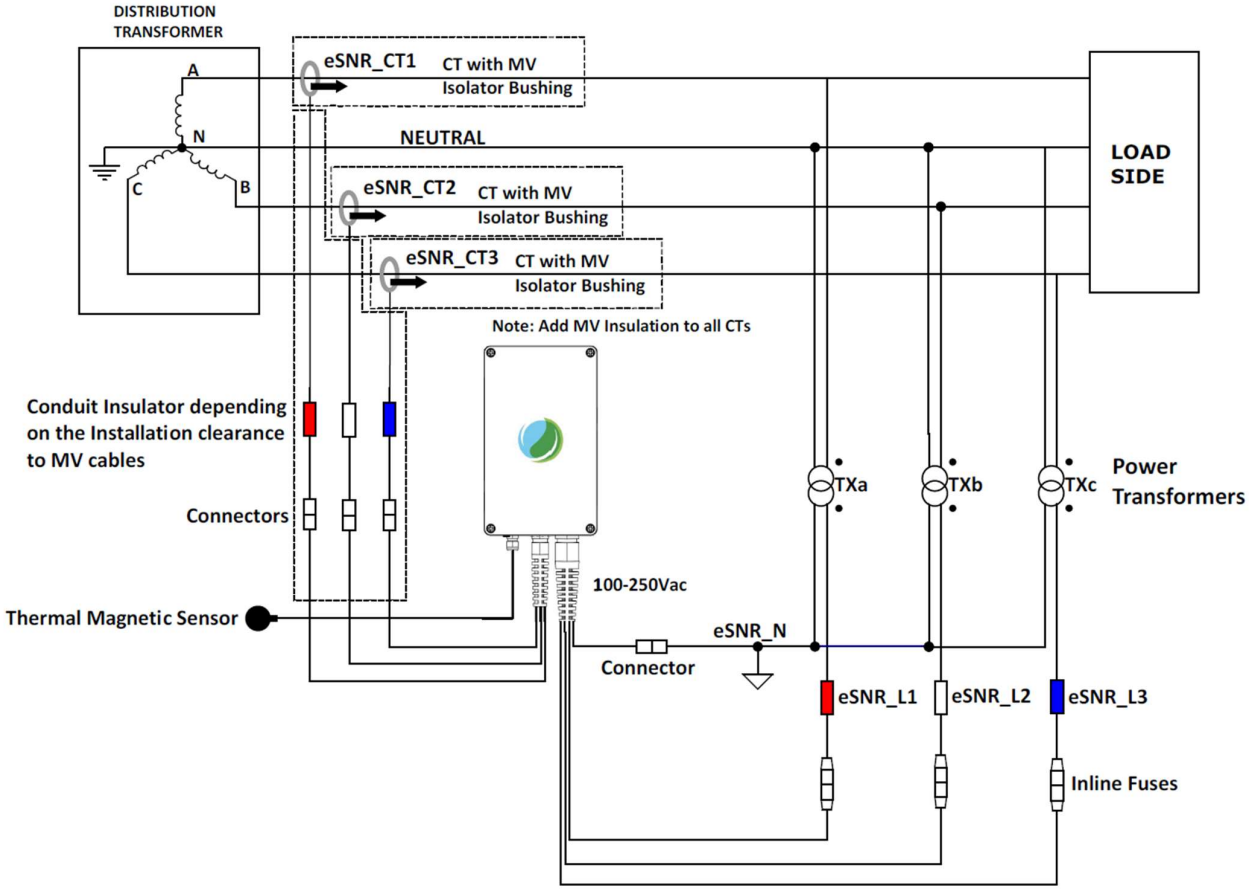


Three Phase (4-wire) Wye Line-to-Neutral

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

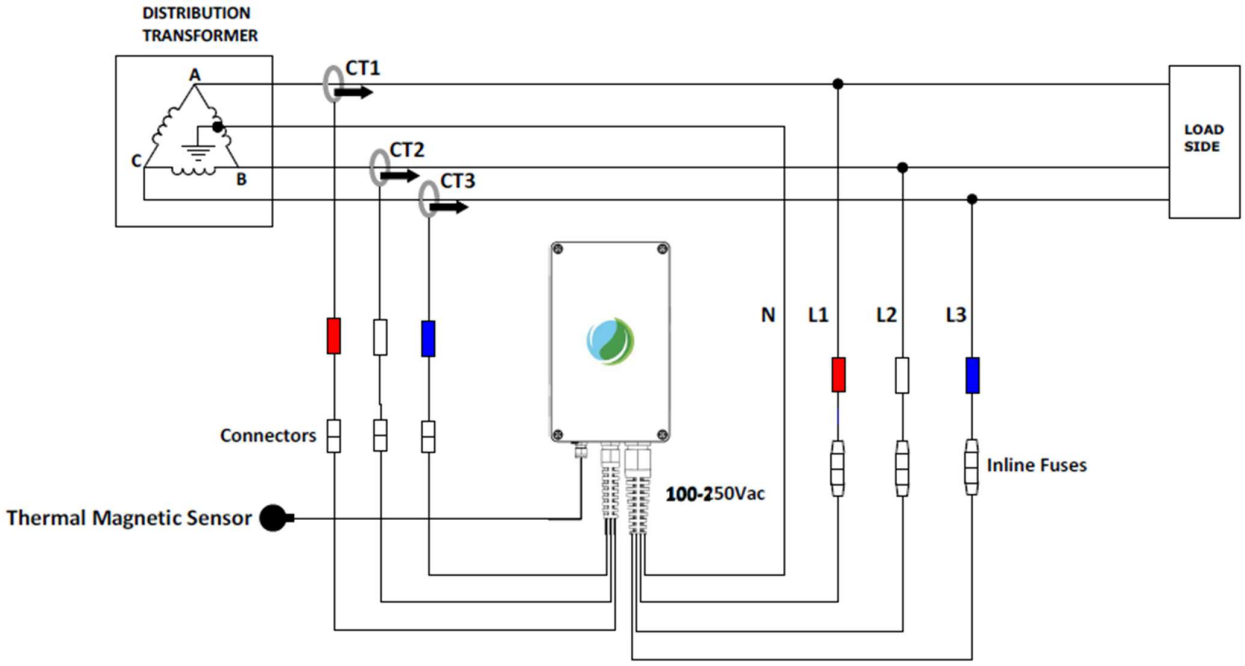
Fig. 6A

Note:

1. Refer to 3. Voltage Current Transformer Isolator Bushing Installation under X. Installation Procedure for installation instructions for isolator bushing.

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

CoAP command: transformerconfig 7



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

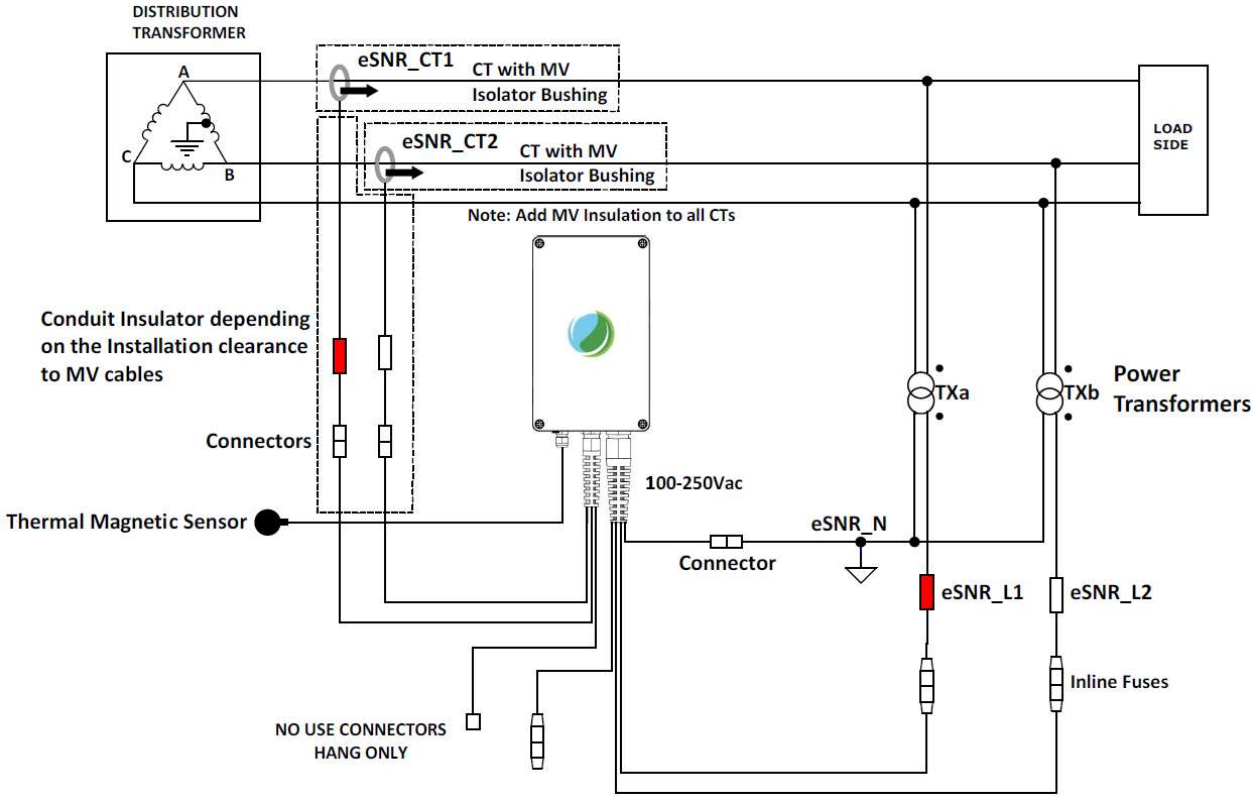
Fig. 7

Note:

1. Input rating of eSensor Line-to-Neutral is 277Vac maximum. Please use Power Transformer if Voltage Line-to-Line of Distribution Transformer exceeds eSensor input rating.

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 3. Voltage Current Transformer Isolator Bushing Installation under X. Installation Procedure for installation instructions for isolator bushing.

VIII. BOX CONTENTS

1. eSensor Unit

- eSensor ..... 1 pc.
- Rogowski CT ..... 1 pc. (if 1PH)
  ..... 2 pcs. (if 2PH)
  ..... 3 pcs. (if 3PH)
- Transformer Magnetic Temperature sensor with 2.5M cable ..... 1 pc.
- Pole mounting steel belt ..... 2 pcs.
- Cable tie ..... 4 pcs.
- Label sticker ..... 1 pc.
- Installation Manual ..... 1 pc.
- Circuit Installation Diagram ..... 1 pc.

eSensor Unit
Fig. 4

2. eSensor Unit with Detachable Sensors

- eSensor Detachable (Base Unit)>..... 1 pc.
- Accessories eSensor Detachable
  - eSensor Accessory: Coreless Current Sensor ..... 1 pc. (if 1PH)
    ..... 2 pcs. (if 2PH)
    ..... 3 pcs. (if 3PH)
  - eSensor Accessory: Voltage Sensor Wire ..... 1 set
  - eSensor Accessory: Magnetic Thermal Sensor ..... 1 pc.
  - eSensor Accessory: Mounting Accessories ..... 1 set
  - eSensor External Antennae and Accessories..... 1 set

eSensor Detachable
Fig. 5

Coreless Current Sensor
Fig. 6

Voltage Sensor Wire
Fig. 7

Magnetic Thermal Sensor
Fig. 8

External Antenna
Fig. 8a

Circular Pole Mount
Fig. 9

Pad Mount
Fig. 9b

Stobie Pole Mount
Fig. 9a

Universal Mount
Fig. 9C

Wooden Mount
Fig. 9d

IX. CAUTION

IMPORTANT

Installation and wiring termination of the eSensor shall be performed by a qualified personnel, in compliance with local electrical and safety standards.

eSensor comes with Safety Rated Flexible Rogowski Coils for Current Sensing with proper insulation and UV protection.
Always connect the eSensor's 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.

X. INSTALLATION PROCEDURE

1. eSensor Unit Preparation

Applicable for eSensor with Detachable Cables

1.1. Preparation of the eSensor Accessory: **Voltage Sensor Wire**

1.1.1. Remove the fuse holder and insulating boot from the eSensor as shown.

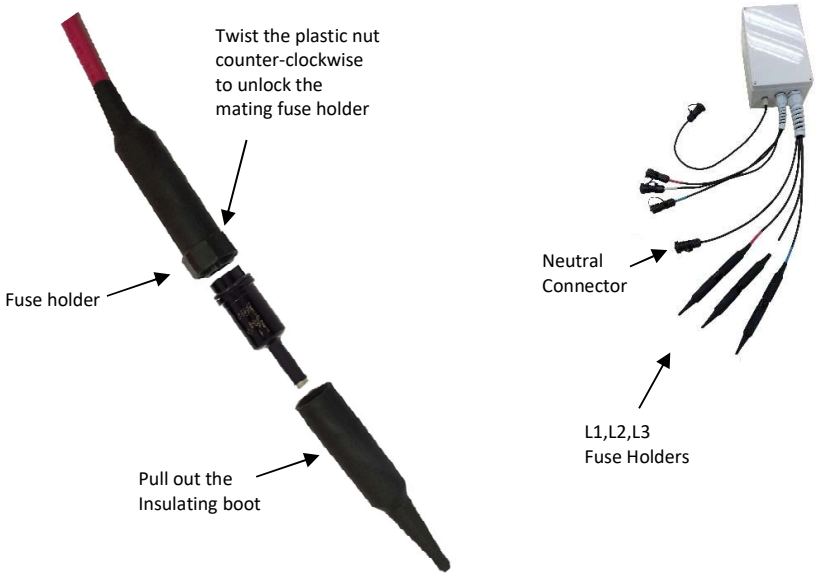


Fig. 10

1.1.2. Insert the eSensor Accessory Voltage Sensor Wire into the insulating boot.

The wire accessories are color coded to match the connection Phase from the eSensor base unit. Red banded wire for L1, White banded Wire for L2, Blue banded Wire for L3. To install into the fuse holder, cut & strip the wire and assemble as shown.

Fig. 11

1.1.3. Insert the stripped wire in the wire barrel of the fuse holder and crimp the wire barrel in 2 places approximately in 1/3 and 2/3 of the length of wire barrel as shown. Make sure wire is crimped and secure and will not be removed. Refer to recommended crimping tools or use equivalent in Fig. 13.

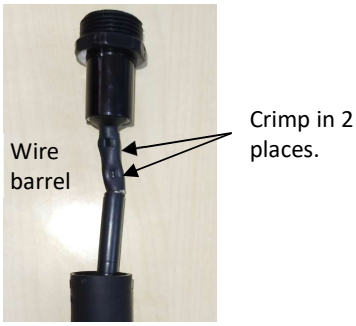


Fig. 12

BUSSMAN RECOMMENDED CRIMPING TOOLS

HEB terminal	T & B P/N (Die)
A	WT-111M (Die C)
	Sta-Kon ERG4002 (Die C)
B	WT-115A (Die D)
C	TBM5 (Grey Die)
	WT-115A (Die E)
D	TBM5 (Brown Die)
	TBM8 (Brown Die)
	WT-115A (Die F)
Z	WT-111M (Die A)
	Sta-Kon ERG4002 (Die A)
N, P, Q, R, T	TBM8 (Orange Die)

Fig. 13

1.1.4. Push the insulation boots up to the threaded cap, covering the fuse holder body as shown.

Fig. 14

1.1.5. Install the supplied fuse inside the fuse holder, see Fig. 15. Press the threaded cap against the plastic nut and twist the nut clockwise using a spanner , see Fig. 16. Ensure the nut is tight to ensure water do not penetrate the fuse holder.

Fig. 15

Fig. 16

1.1.6. Neutral Wire Assembly

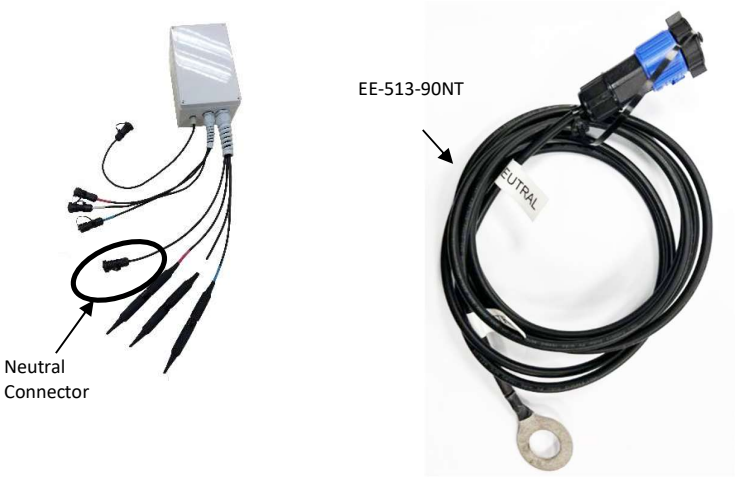


Fig. 19

1.1.7. Remove the covering cap of both Female Connector and Male Connector by rotating the cap counter-clockwise then pull the cap, see Fig. 20.

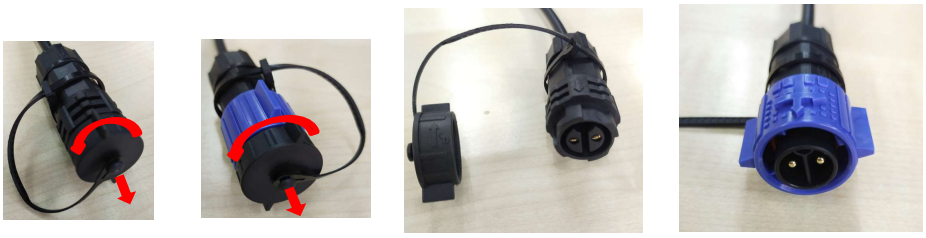


Fig. 20

1.1.8. Connect the two connectors by pushing both connectors towards each other until a clicking sound is heard and the arrows align, as shown in Fig. 22. This signifies the connector is fully engaged and locked.

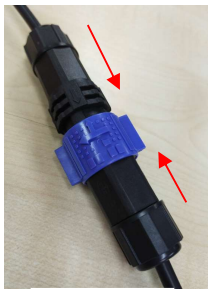


Fig. 21

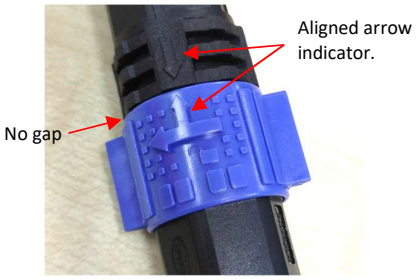


Fig. 22

1.2. Preparation of the eSensor Accessory: **Coreless Current Sensor Wire**

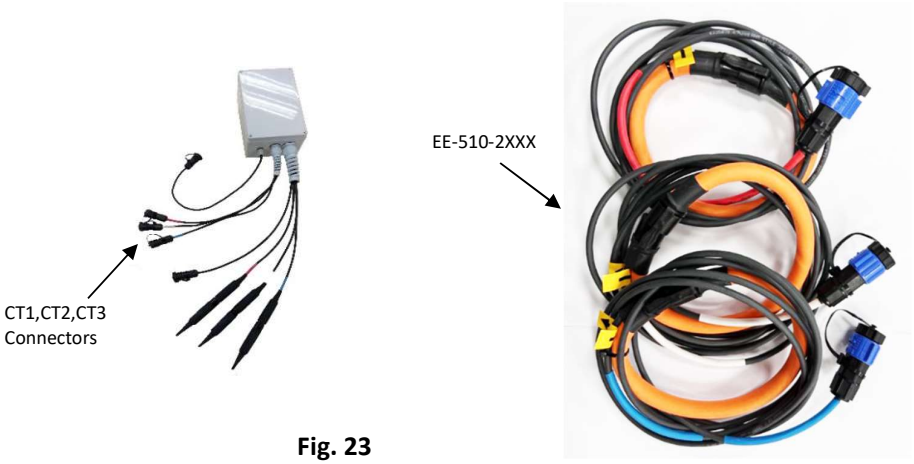


Fig. 23

1.2.1. Remove the covering cap of both Female Connector and Male Connector by rotating the cap counterclockwise then pull the cap as shown in Fig. 24. Just leave the covering cap attached to the connector body.

Fig. 24

1.2.2. Connect the two connectors by pushing both connectors towards each other until a clicking sound is heard and the arrows align, as shown in Fig. 26. This signifies the connector is fully engaged and locked.

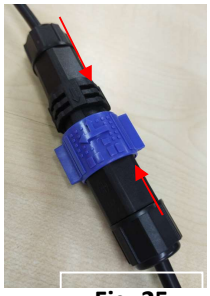


Fig. 25

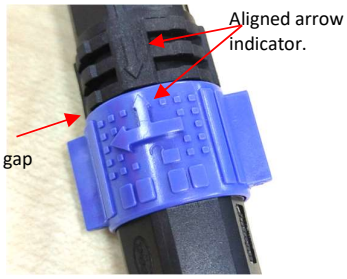


Fig. 26

The CT accessories are supplied color coded with Red band for CT1, White band for CT2, Blue band for CT3.

1.3. Preparation of the eSensor Accessory: **Magnetic Thermal Sensor**

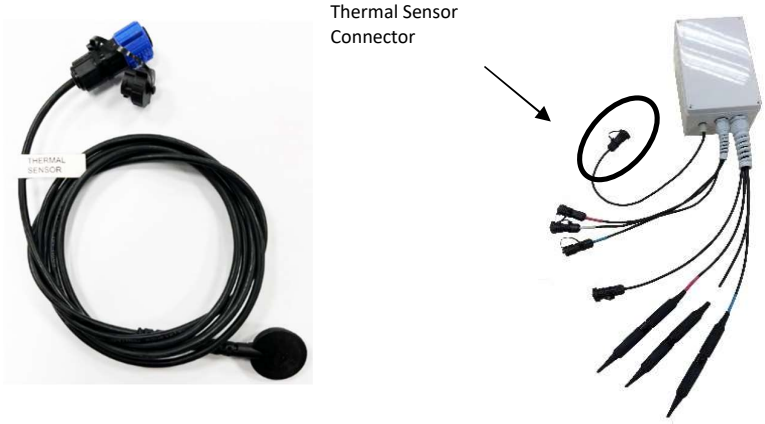


Fig. 29

1.3.1. Remove the covering cap of both Female Connector and Male Connector by rotating the cap counter-clockwise, then pull the cap as shown in Fig. 30. Just leave the covering cap attached to the connector body.

Fig. 30

1.3.2. Connect the two connectors by pushing both connectors towards each other until a clicking sound is heard and the arrows align, as shown in Fig. 32. This signifies the connector is fully engaged and locked.

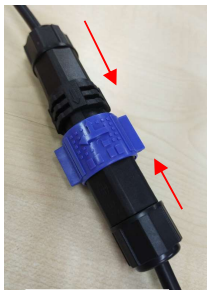


Fig. 31

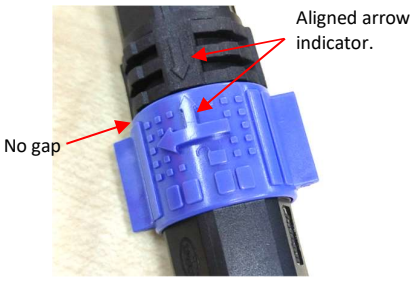


Fig. 32

1.4 Preparation of the Mounting Accessories

1.4.1 Position and install the metal bracket on the back side of the eSensor unit as shown in Fig. 33. Fix the metal bracket using the supplied self-drilling screw. Apply a torque of 2.0 to 2.2Nm.

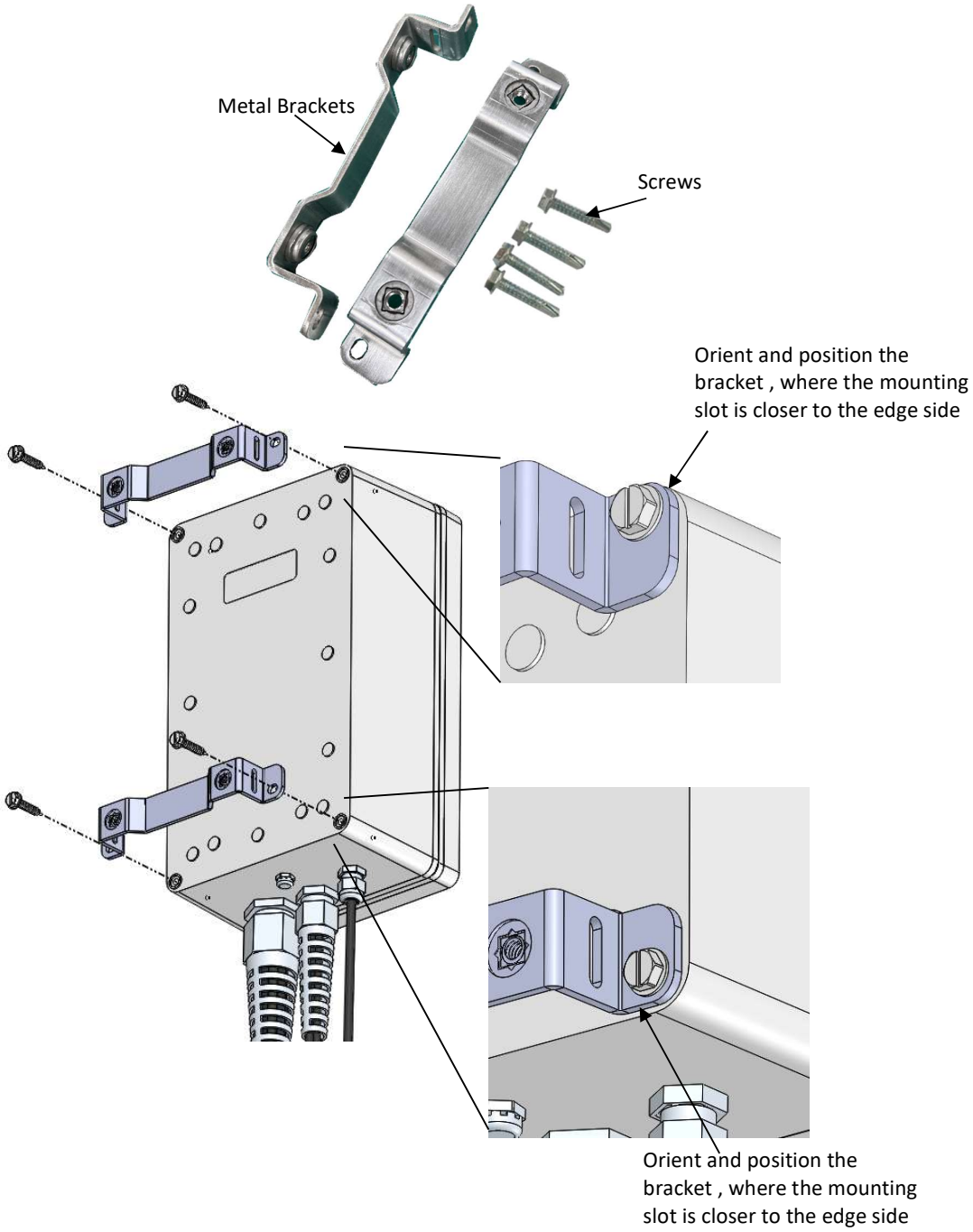
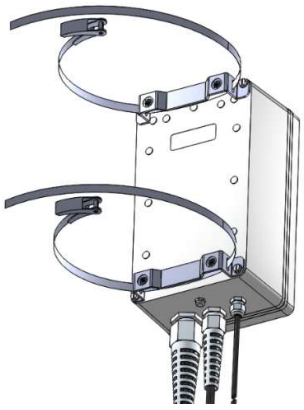


Fig. 33

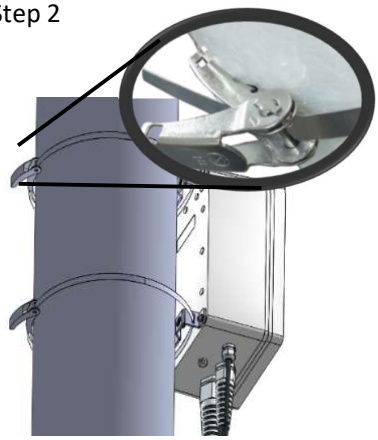
1.5 Circular Mount Accessory Installation

Step 1



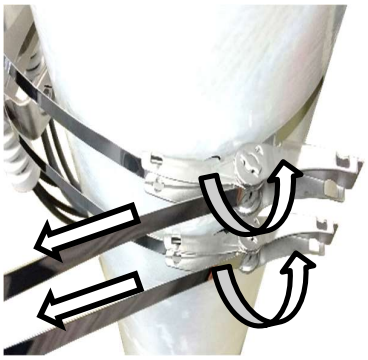
Insert the supplied steel belt (PKB-10S) into the slots of the upper and lower brackets as shown.

Step 2



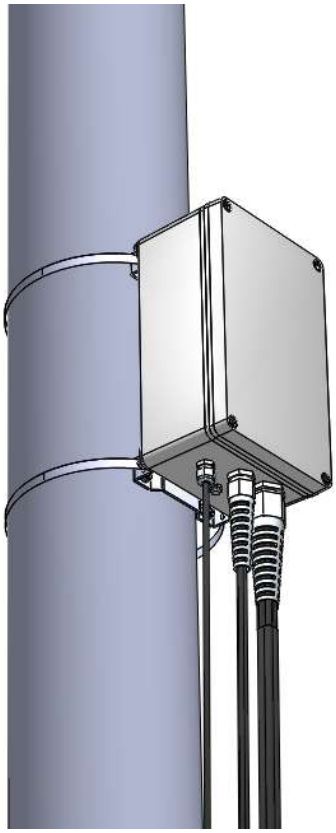
Position the eSensor vertically as shown and wrap the steel belt around the pole.

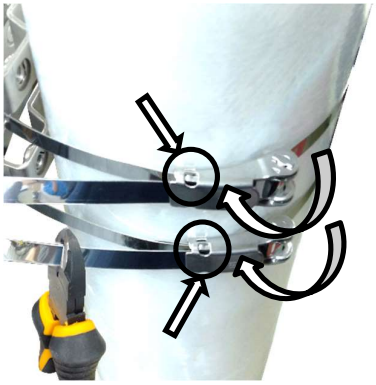
Step 3



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

Final Installed Unit on Cylindrical Pole

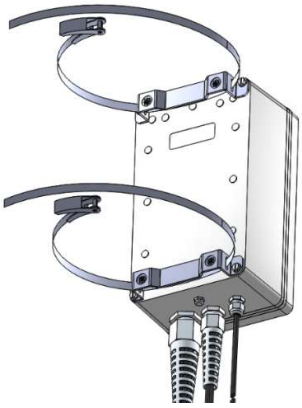




Cut the excess steel band to desired length using cutting tools.

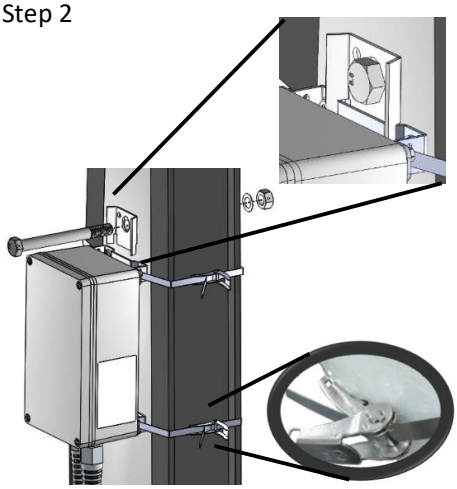
1.6 Stobie Mount Accessory Installation

Step 1



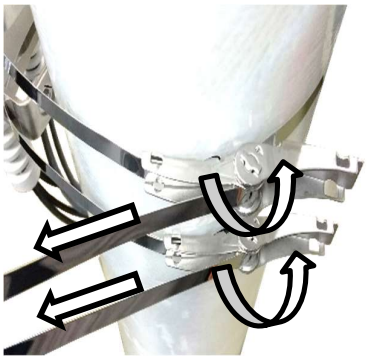
Insert the supplied steel belt (PKB-10S) into the slots of the upper and lower brackets as shown.

Step 2



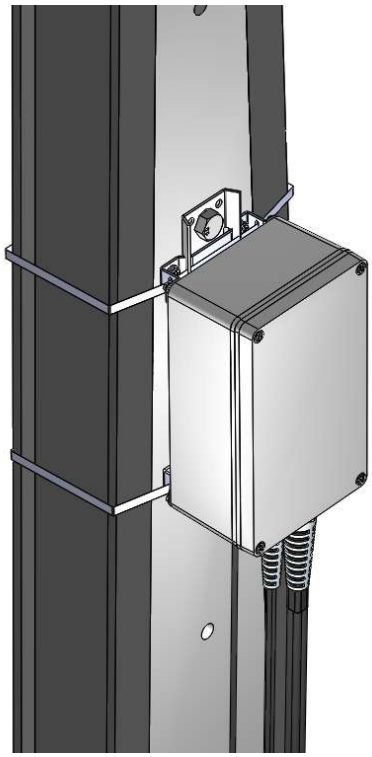
Install first the Top hanger(EE-509-0009) and M16 bolt hardware set. Position the eSensor's bracket beneath the Top hanger and wrap the steel belt around the Stobie pole as shown.

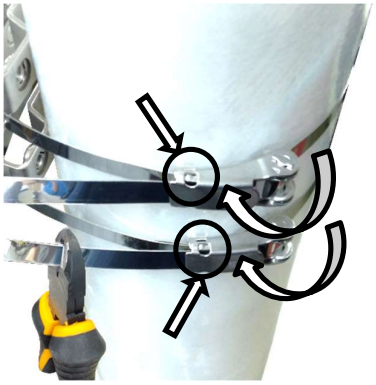
Step 3



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

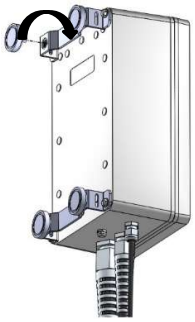
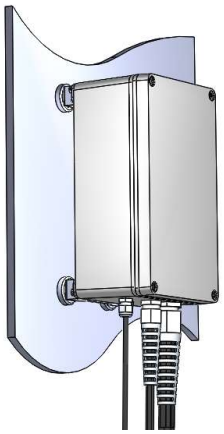
Final Installed Unit on Stobie Pole





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

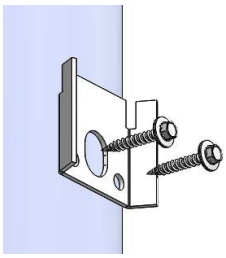
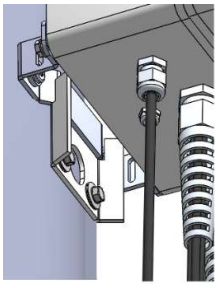
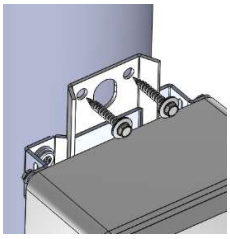
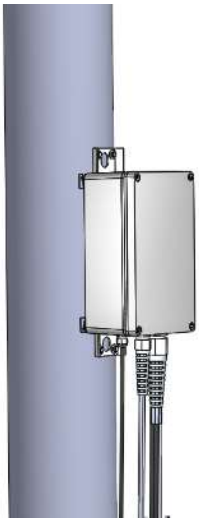
1.7 Pad Mount Accessory Installation

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 eSensor unit into the metal surface starting at the bottom magnet as shown.	 Tilt the top of the eSensor 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 eSensor with magnet mounting, perform the reverse of the installation with caution.

1.8 Wood Mount Accessory Installation

Step 1	Step 2	Step 3	Final Installed Unit on Wood Pole
 Orient and install the supplied Top Hanger Plate(EE-509-0009) as shown. Fix using preferred wood tapping screw. Hole size of Top Hanger Plate is 8mm.	 Mount the eSensor by inserting the bottom metal bracket of the unit into the Top hanger Plate as shown.	 Finish-off the installation by installing the second Top Hanger Plate(EE-509-0009) into the upper metal bracket of the eSensor. Fix the Top Hanger Plate using the preferred wood tapping screw.	

1.9 Universal Mount Accessory Installation

Select the appropriate parts from the Universal Mount Accessories for the chosen installation mounting for the eSensor by referring to the following install procedure:

- Circular Mount Accessory Installation
- Stobie Mount Accessory Installation
- Pad Mount Accessory Installation
- Wood Mount Accessory Installation

1.10 After completing the wiring install, the eSensor shall be up and running.

Notes:

1.10.1 For eSensor Detachable LED should be Solid Green.

1.10.2 Refer to the Label LED Status at the left side of the eSensor Unit for different status that LED indicate.

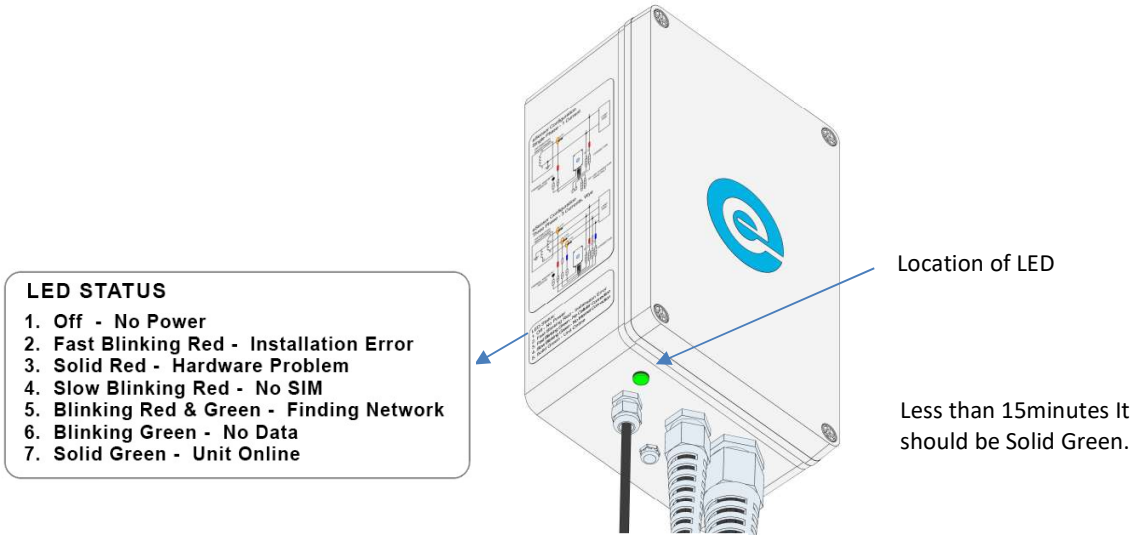


Fig. 34

Device Status (3G / 4G CAT-1 / LTE CAT-M1)						LED Indicator	
Power to eSensor	Install Error	MCU to Modem Comms	SIMCARD	Network Connection	Cloud / CoAP Connection	(Red)	(Green)
OFF	x	x	x	x	x	OFF	OFF
ON	ERROR	x	x	x	x	Fast Blink (4Hz)	OFF
ON	NO	DISCONNECTED	x	x	x	ON (SOLID)	OFF
ON	NO	CONNECTED	DISCONNECTED	x	x	2s ON - 1s OFF	OFF
ON	NO	CONNECTED	CONNECTED	DISCONNECTED	x	1s Red	1s Green
ON	NO	CONNECTED	CONNECTED	CONNECTED	DISCONNECTED	OFF	2s ON - 1s OFF
ON	NO	CONNECTED	CONNECTED	CONNECTED	CONNECTED	OFF	ON (SOLID)

2. eSensor Unit Installation

1. Mount the eSensor on a pole, minimum of 1 meter below the transformer.
2. Insert the pole mounting belt each into the slot of the upper and lower mounting bracket located at the back of the box as shown.
3. Wrap the belt around the pole. Tighten using the belt lever and close the lever to lock it in position.

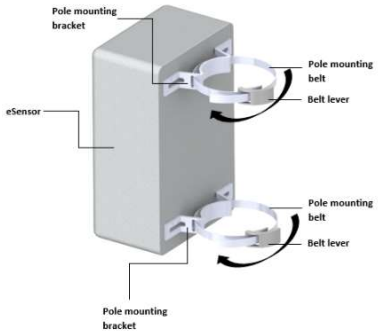


Fig.35

4. Ensure to clean and dry the surface where the magnetic thermal sensor and label sticker will be installed.
5. Position and mount the flat side surface of the magnetic thermal sensor to the transformer body approximately 70mm(2.7”) below the top lid of the transformer.
6. Install the included label sticker on the thermal sensor cable approximately bottom of the cable strain relief as shown.

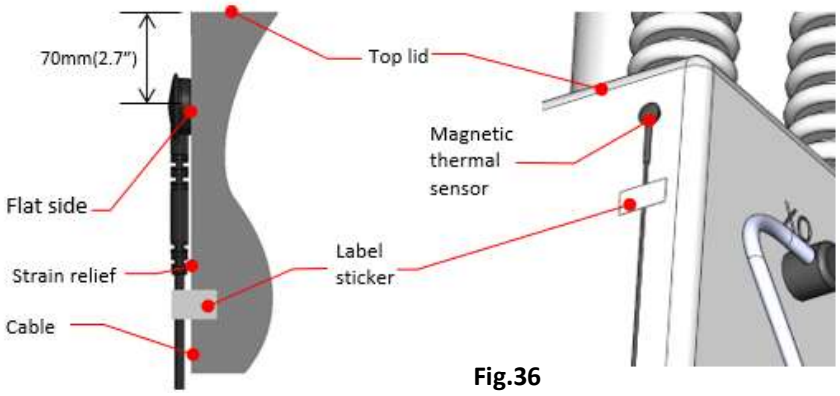


Fig.36

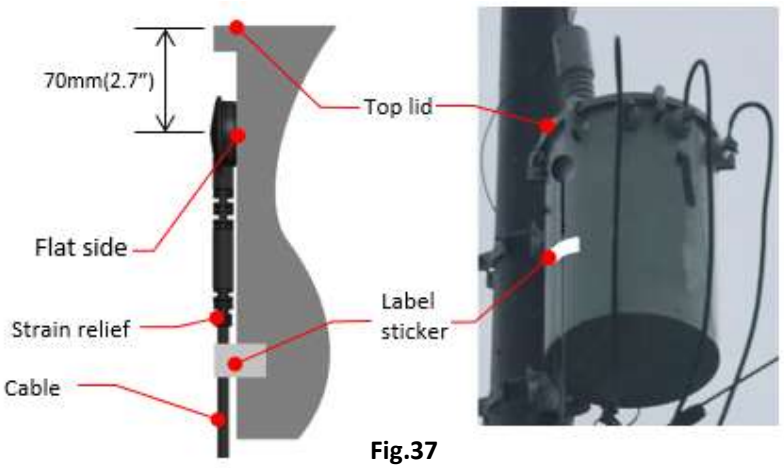
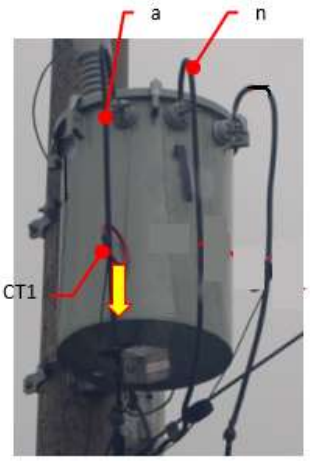


Fig.37

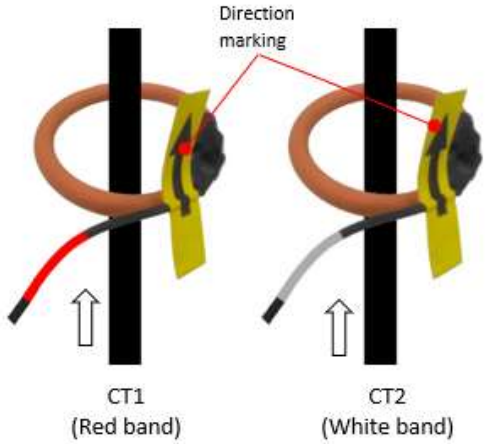
7. Install the eSensor's Rogowski CT's to the transformer's low voltage line and follow the correct CT direction. Refer to the CT's Arrow marking labels for the current direction.

IMPORTANT: Wrong installation for the Rogowski current direction shall result to inaccurate measurement of the eSensor.

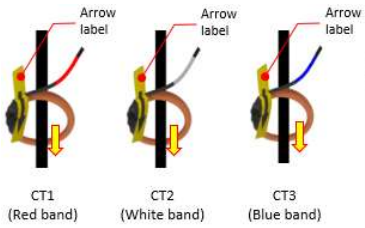


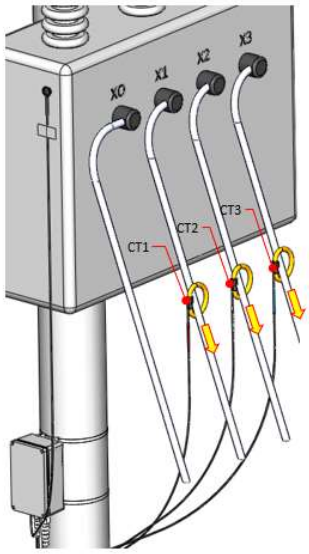
1 Ph, 2 Wire Configuration
Fig.38

2Ph, 3 Wire Configuration
Fig.39



CAUTION:
For 2Ph, 3Wire Configuration, install the CT1(red band) to L1 and CT2(white band) to L2 of the transformer.
Refer to Fig.39





CAUTION:
For 3PH, 4 Wire (Neutral) Configuration, install the CT1(red band) to L1 , CT2(white band) to L2 and CT3(blue band) to L3 of the transformer.

For 3 Phase, 4 Wire Configuration
Fig. 40

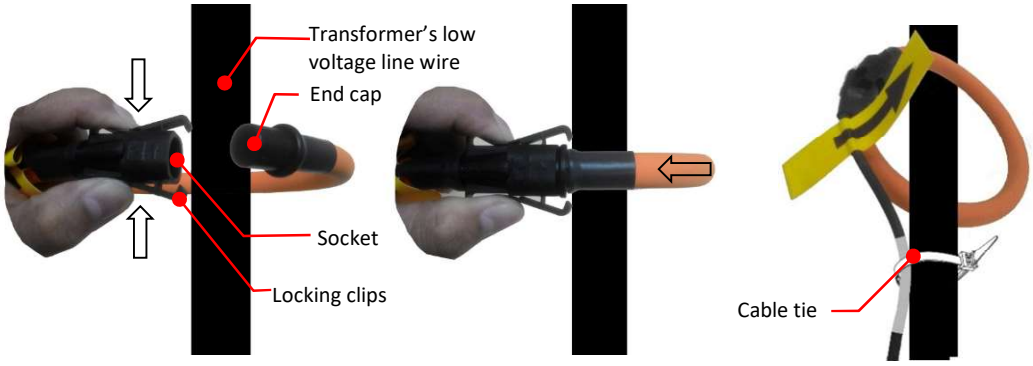
8. Rogowski CT special installation instructions:

SNAP-LOCKING TYPE

8.1 Press the locking clip and pull the CT plastic end cap out of the socket and wrap the CT around the transformer low voltage line.

8.2 While pressing down the locking clip, fully insert the CT plastic end cap back to the socket and release the locking clip.

8.3 Secure the Rogowski cable to the voltage line with the supplied cable tie.



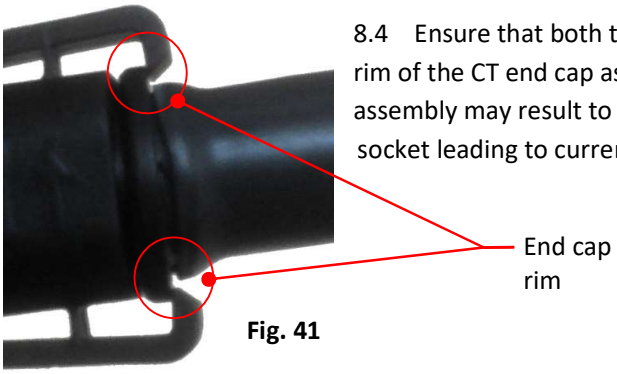
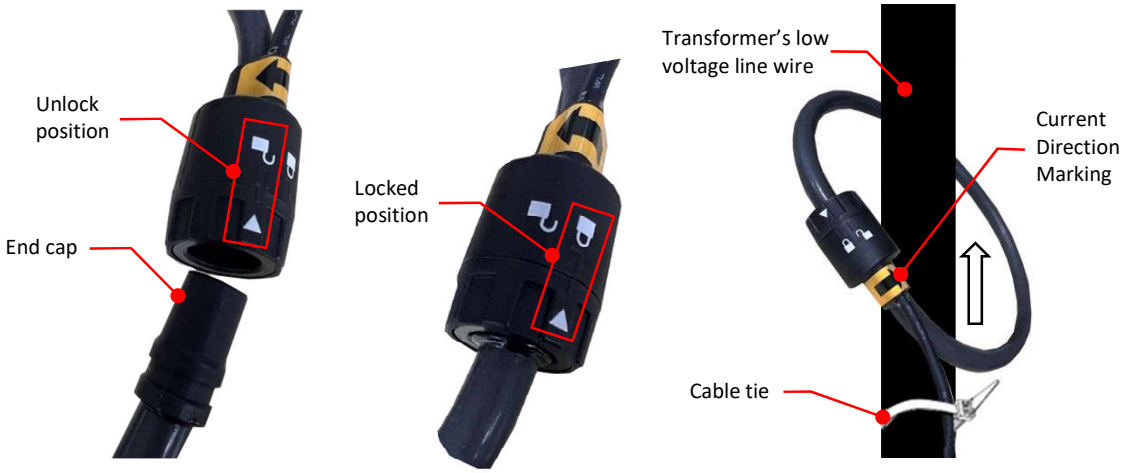


Fig. 41

8.4 Ensure that both the CT locking clips are engaged around the rim of the CT end cap as shown in Fig. 41. **IMPORTANT:** Improper assembly may result to having the Rogowski CT detached from the socket leading to current measurement problem for the eSensor.

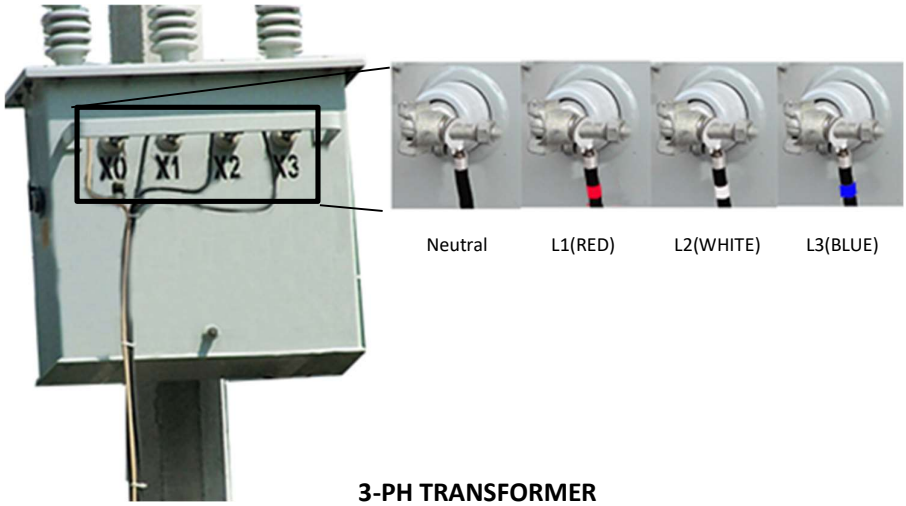
TWIST-LOCKING TYPE

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

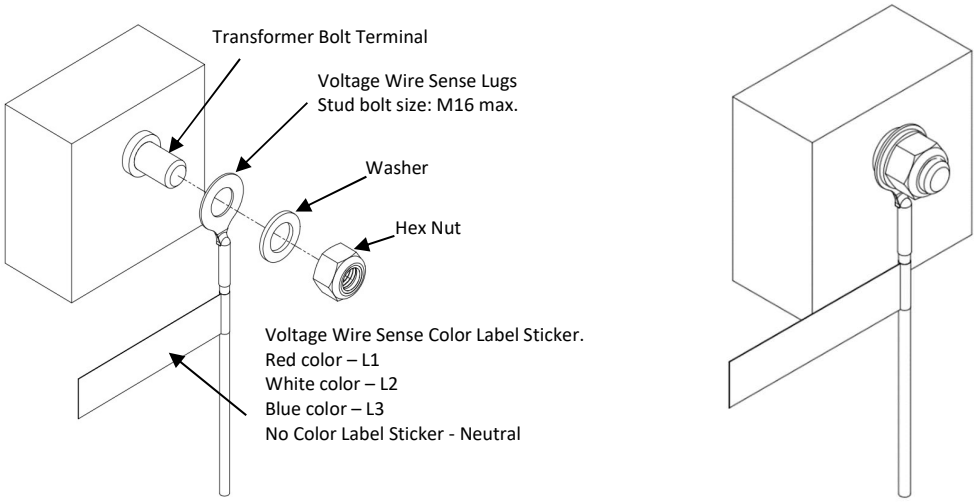


9. Connecting the eSensor's voltage sense wires to the Neutral, L1, L2, and L3 of the transformer can be done in two ways:

   9.1. If transformer has terminal block for voltage connections, simply screw the voltage wires of eSensor to transformer's terminal block as shown in Fig. 42 and Fig. 43



3-PH TRANSFORMER
Fig. 42



Voltage Wire Sense Final Assembly
Fig. 43

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

9.2. If transformer does not have terminal block for voltage connections, voltage wire of eSensor can be directly connected to the transformer's voltage wires via the IPC accessory provided.

9.2.1. Cut the terminal lug of the eSensor voltage wires as shown in Fig. 44.

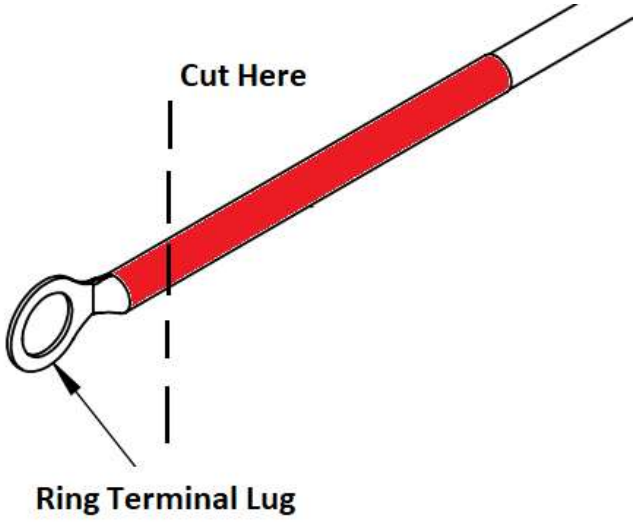


Fig. 44

9.2.2. Fig. 45 shows how the eSensor Voltage Wire and Transformer Voltage Wire would be clamped together using the IPC accessory.

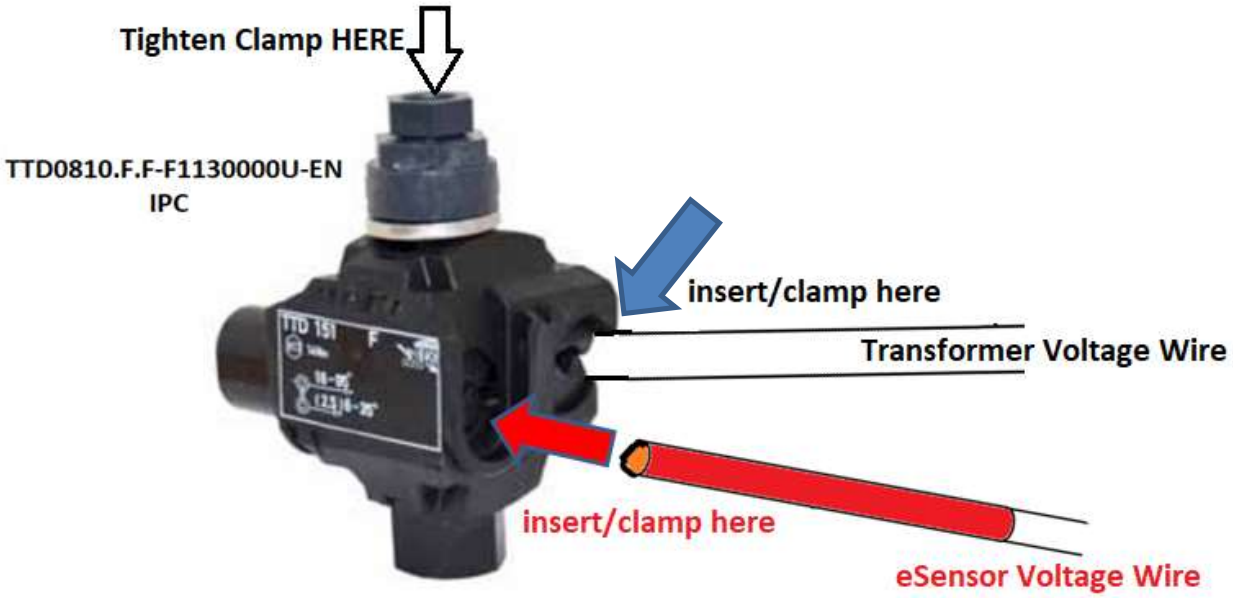


Fig.45

9.2.3. Fig. 46 shows typical installation of eSensor Voltage Wires using IPC.

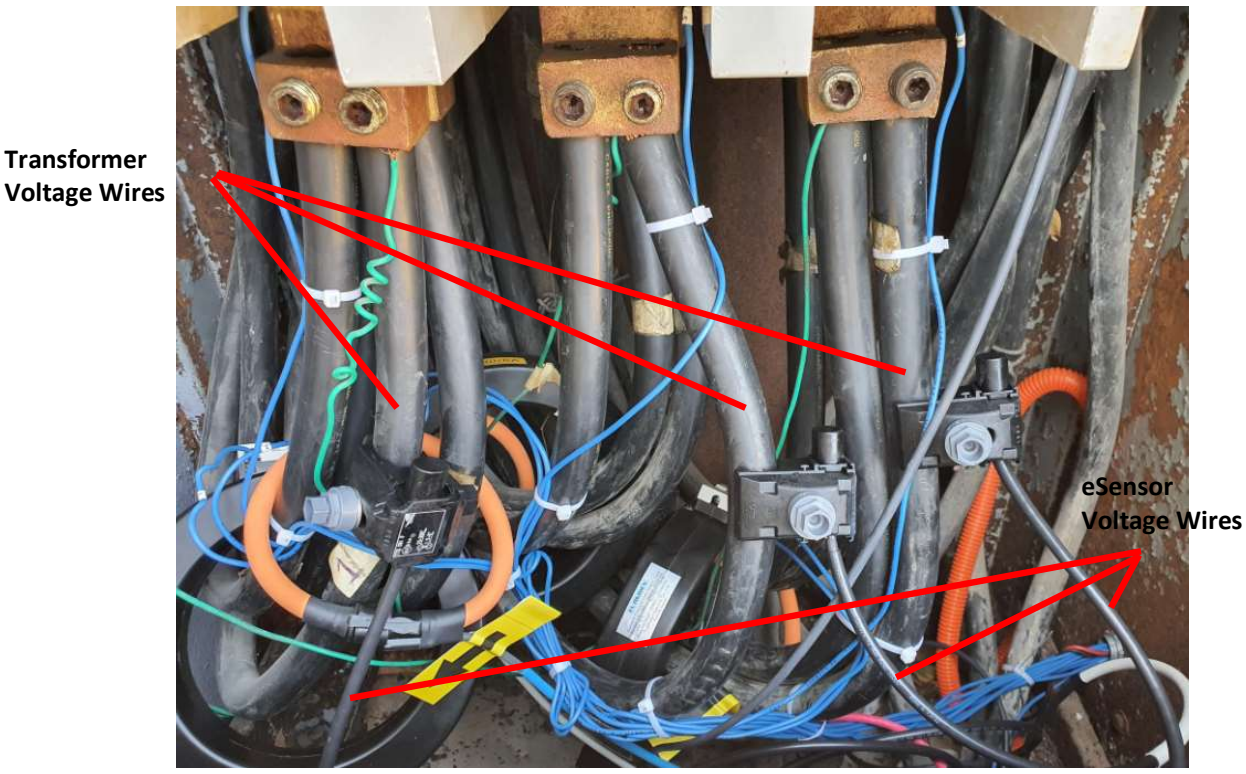


Fig. 46

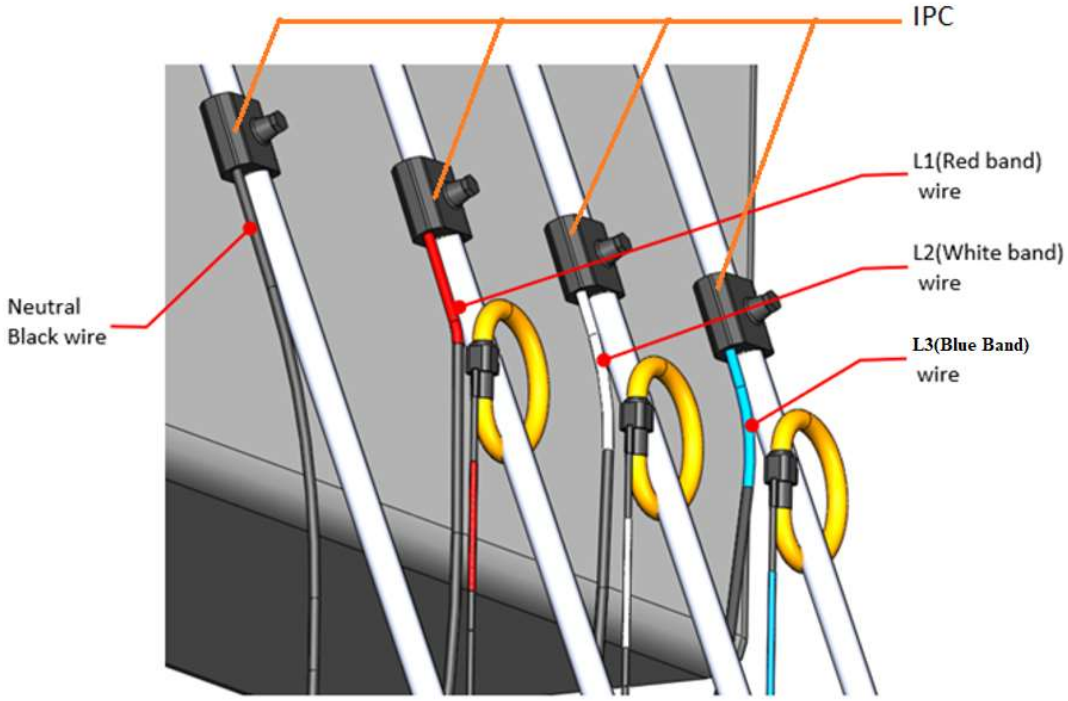
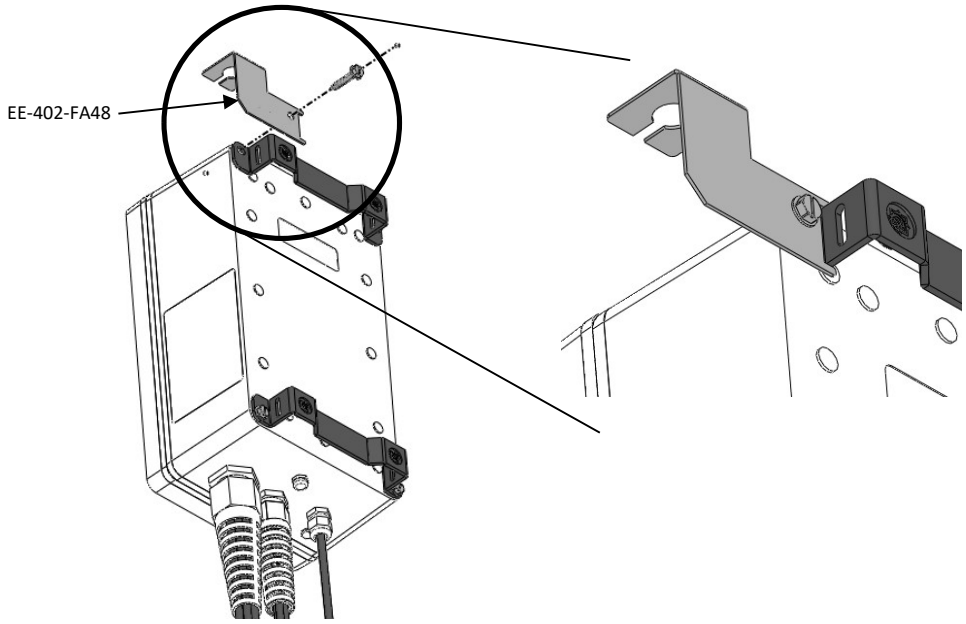


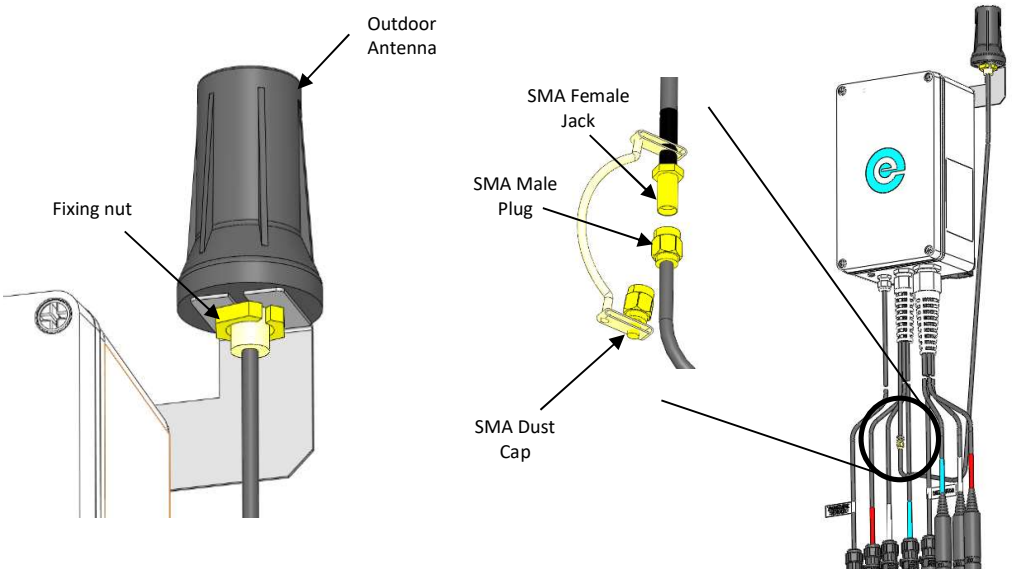
Fig. 47

10. Antenna Installation

10.1 Remove the screw of the eSensor Bracket and install the eSensor Antenna Bracket Mount (PN: EE-402-FA48) as shown. Tighten screw to 2.0-2.2Nm.



10.2 Install the supplied Outdoor Antenna on the Antenna bracket mount as shown. Tighten the nut to 2.5- 3.0Nm. Remove the SMA dust cap and plug the SMA Male Plug into the SMA Female Jack of the eSensor Unit. Tighten the SMA connectors to ensure it is fixed and sealed.



3. Medium Voltage Current Transformer Isolator Bushing Installation

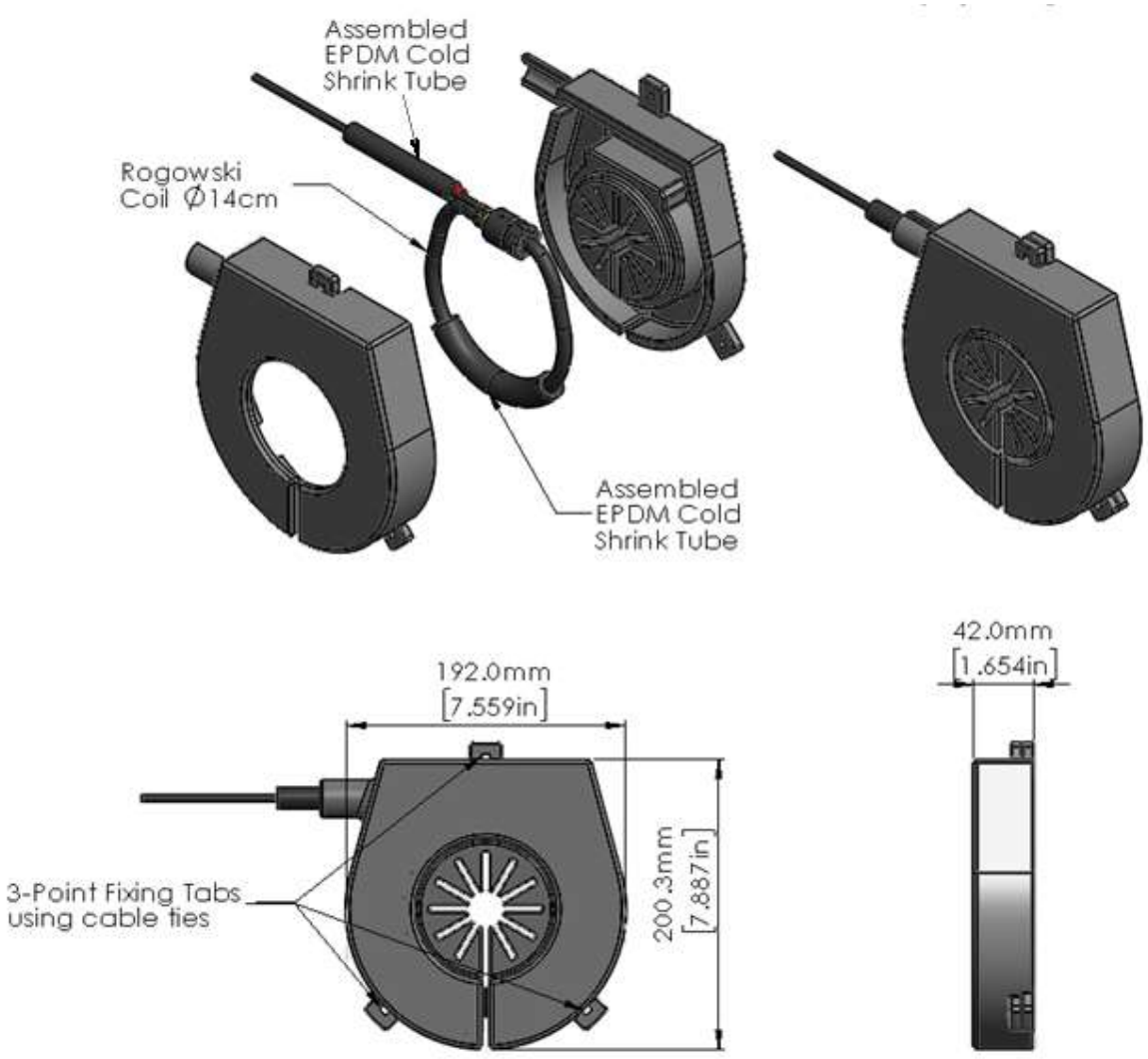
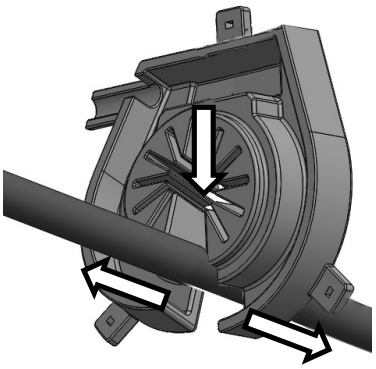
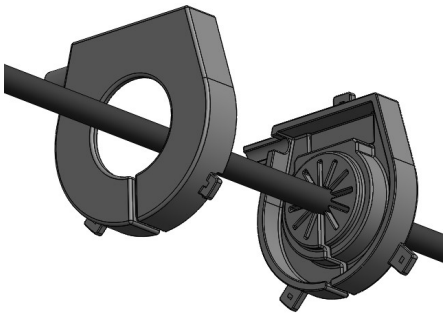
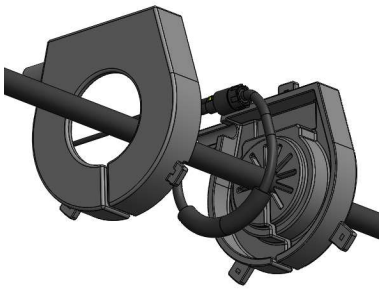
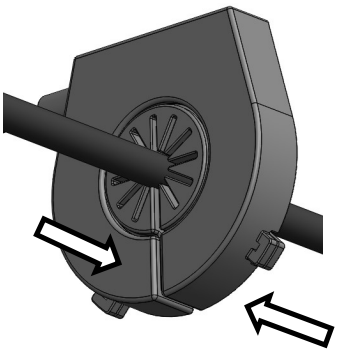
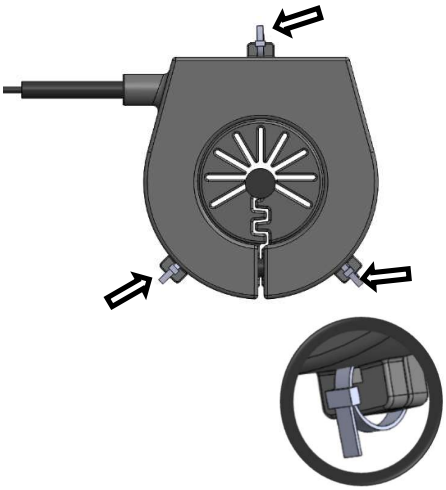


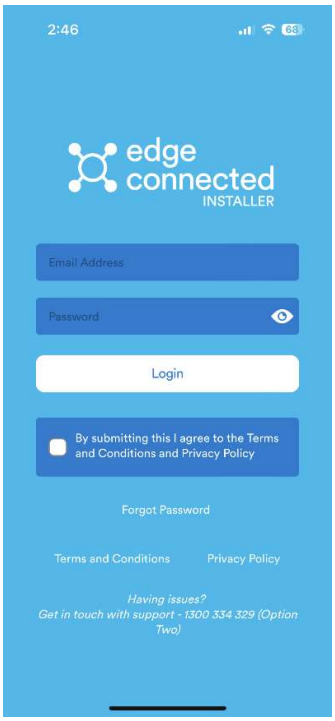
Figure: Outline Dimension with Rogowski Coil

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. 

XI. COMMISSIONING

The commissioning process can be conducted via either downloading the installer app as shown below or logging into the EdgeConnected platform at https://sapn.edgeconnected.com



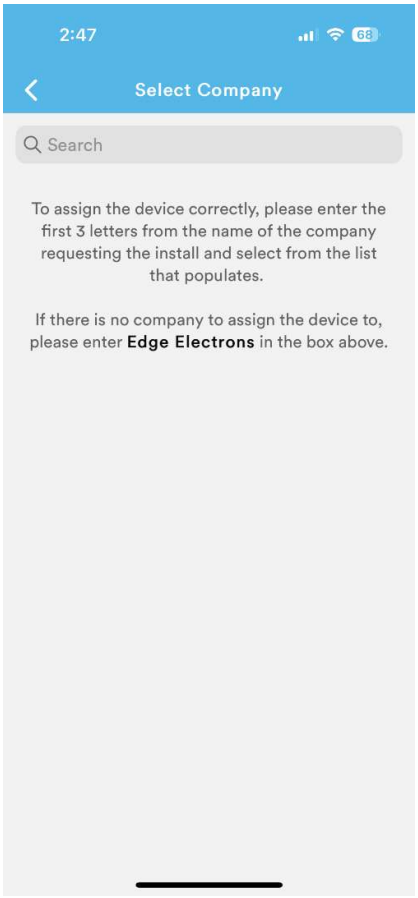
Login to EdgeConnected device commissioning app to begin process.

The App is available for both iPhone and Android.

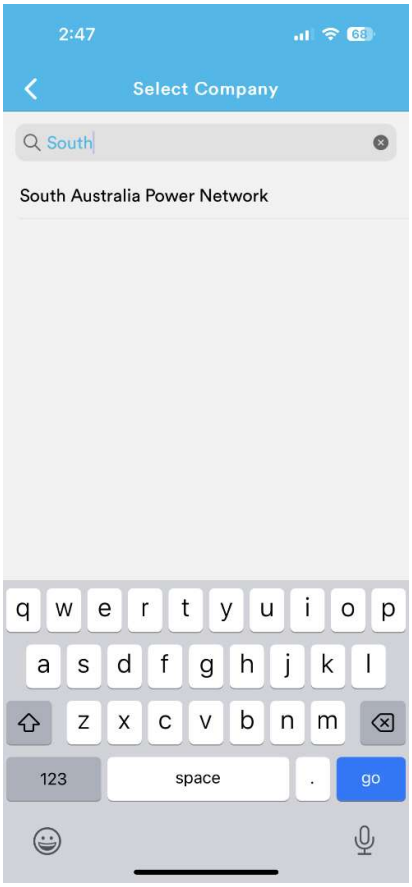
Account creation and links to the App are initiated by the account administrator.

Apple App Store
Edge Connected Installer App

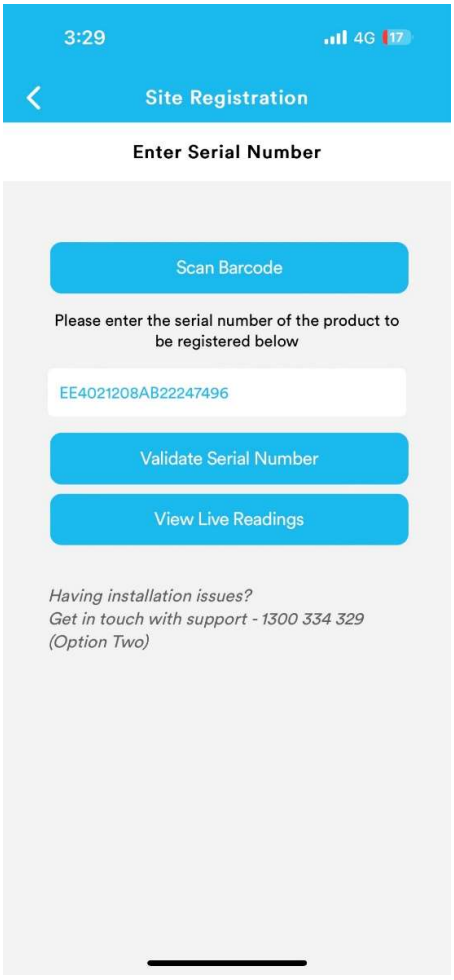
Google Play Store
Edge Connected Installer App



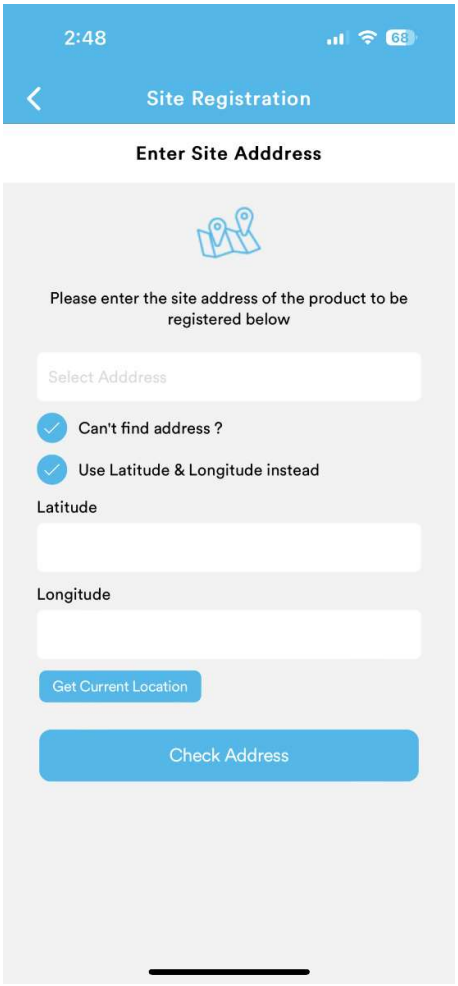
Type in “South Australia Power Network” to continue.



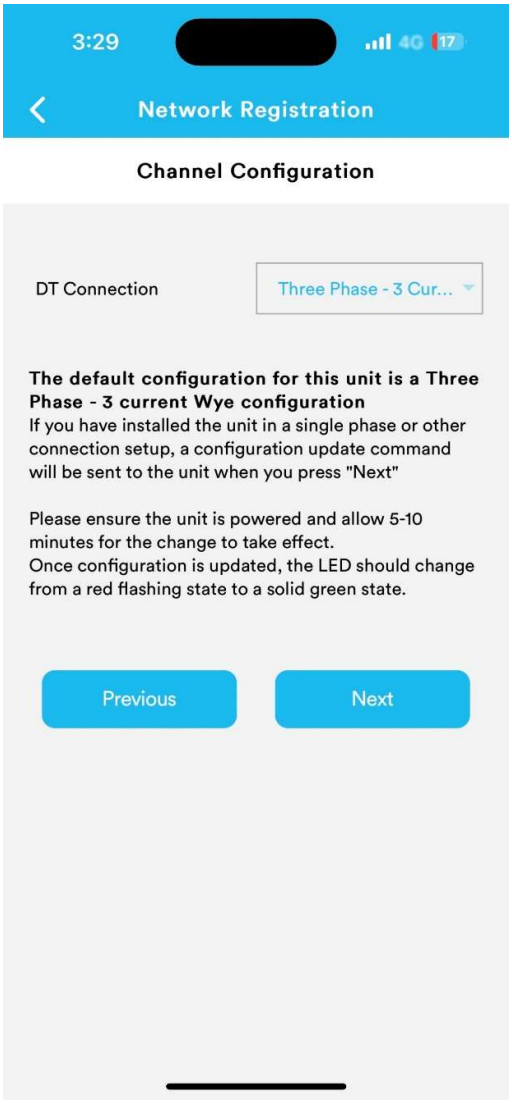
Select the “Network Site” installation button to continue.



Type in or scan the serial number of the unit being installed. The serial number is on the side of the unit as well as the packaging. The serial number begins with EE402xxxx

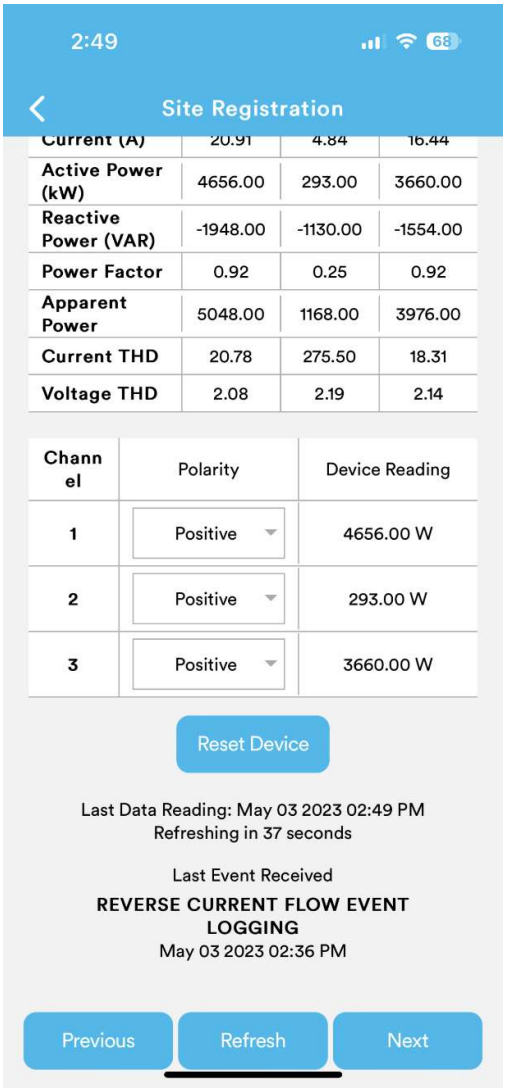


Enter the closest physical address of the installation or choose the “Latitude & Longitude” option which will take the GPS coordinates from the App.



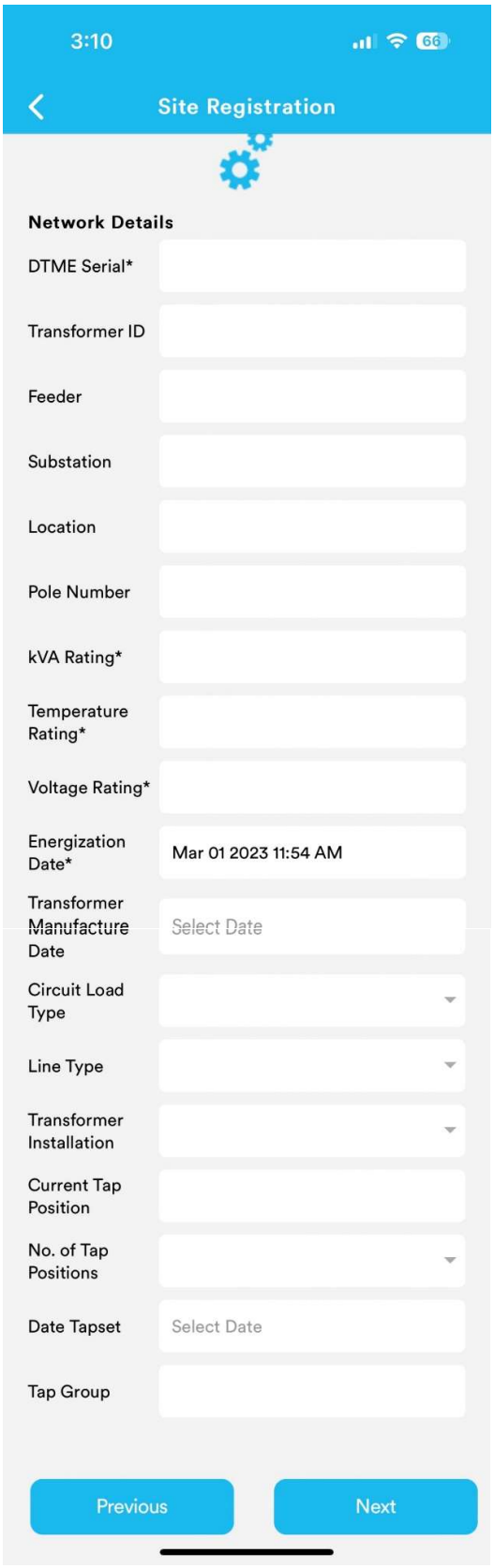
Choose the winding type of the transformer.

Single and 3 phase windings are supported as well as Delta and Wye configurations.



Review live data readings based on winding configuration type selected.

If data does not match configuration, select the previous button to confirm chosen selection.



Enter transformer name plate information into the configuration.
Fields marked with a * are mandatory fields. Other fields can be updated via the admin tools at a later date.

DTME ID: Transformer ID

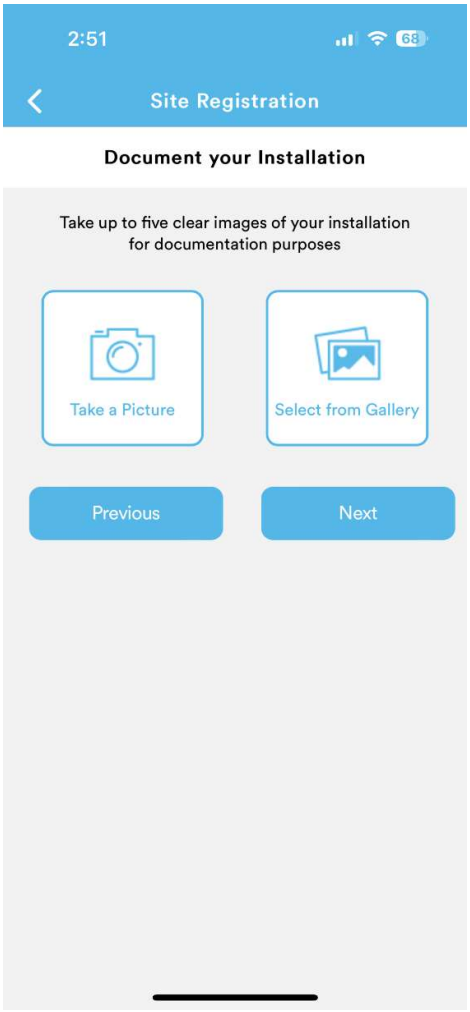
KVA Rating: Transformer Size

Temp Rating: Max Transformer operating temp

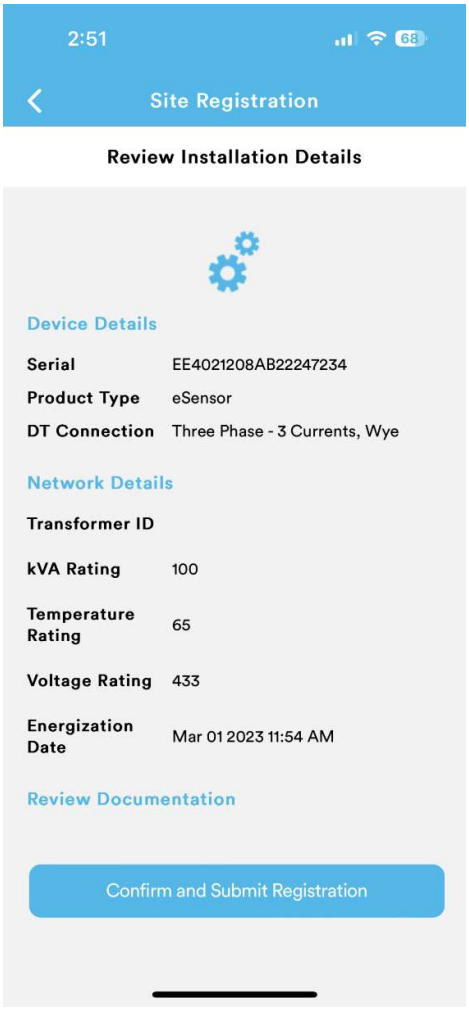
Voltage Rating: Transformer voltage rating

VNOM: Nominal voltage rating

Energisation Date: Date of monitoring installation



Take up to 5 photos of the installation which will be used as part of the approval process.



Confirm completion of commissioning process and submit for review.