



# **PdMA<sup>®</sup>EYE**

# **Installation Manual**

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# PdMAEYE Installation Manual

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## PdMAEYE Installation

### Introduction

The PdMAEYE allows facilities to test energized AC electric motors and generators, without opening the MCC or switchgear doors. The PdMAEYE uses Signal Conditioning Modules (SCMs) to condition the signal for input into the Data Acquisition system in the PdMAEYE Base Module. There are 4 SCM slots (ports) on the PdMAEYE Base Module in which each SCM has up to 3 channels for a total of 12 channels of acquisition.

Please review this entire document before installing and testing with the PdMAEYE.

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## System Connection Overview

Refer to Figure 1 for a general overview of the connections for the PdMAEYE system.

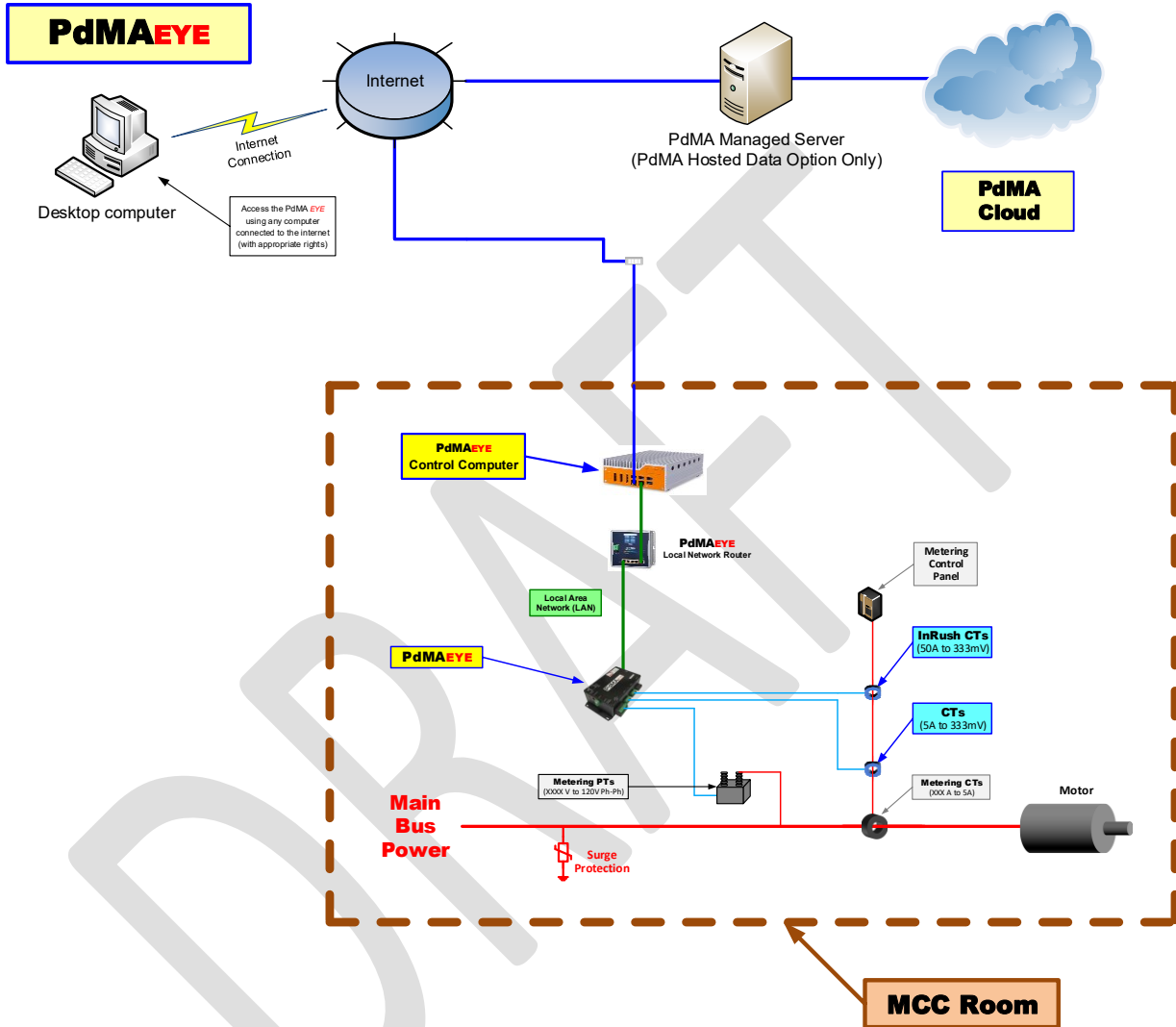


Figure 1 - System Connection Overview (EXAMPLE)

# PdMAEYE Installation Manual

## PdMAEYE Installation Overview

The following steps provide an overview of the installation process. Detailed installation information is provided in the remainder of this document.

1. Follow ALL electrical and other safety standards at your facility.
2. Gather all materials and tools needed for installation.
3. De-energize the motor and perform LOCKOUT, TAG-OUT following facility safety procedures.
4. Determine mounting locations for the PdMAEYE.
5. Mount the PdMAEYE in the desired location. Typically, the PdMAEYE units will be mounted inside or near the motor control switchgear.
6. Using Ethernet Cable connect each PdMAEYE.
7. Connect the signal inputs for each of the Signal Conditioning Modules installed in the PdMAEYE Base Module.

**Note:** DO NOT EXCEED THE ⚠️ MAXIMUM VOLTAGE/CURRENT INPUT LIMITS FOR EACH OF THE Signal Conditioning Modules (SCMs) installed.

8. Follow facility safety procedures and restart the motor.

## PdMAEYE Installation Planning Guide

### Before You Begin

Remember to follow all safety precautions.

De-energize motor and starter cabinet before installation.

Have the following recommended tools and materials available.

### Recommended Tools

Drill

Drill bits for mounting bolts

Screwdrivers

- 1/8 inch (2.5mm) flathead to connect wires to the SCMs

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- Phillips screwdrivers, #1 and #2 to mount the PdMAEYE and its Power Supply as necessary

Wrench or nut driver to mount PdMAEYE

Pliers

Wire cutters/stripping tool

Wire crimping tool

Camera (optional) to document installation

## Recommended Materials (not included with the product)

Spool of #14-#22 AWG insulated copper wire for Voltage or other signal inputs as necessary

Twisted Shielded Cable for Signal Inputs (appropriately rated)

Hardware to terminate wire and the shield of shielded signal cable as necessary

Network Cable – Cat 5 or better

Screws, bolts, washers, and related hardware to mount the PdMAEYE

Split Flex tubing for chaffing protection of wire or cable as necessary

Wire tie wraps

Adhesive tie holders

## Materials Provided With this Product

(1) PdMAEYE Base Module

(4) Signal Conditioning Modules

(Example: 1 Voltage, 2 Current, and 1 Blank SCMs installed)

Note: CTs may or may not be included depending on specified options ordered.

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## Physical Overview of the PdMAEYE

The PdMAEYE has 4 Slots for Signal Conditioning Modules (SCMs) as shown in Figure 2. SCMs are used to condition signals such as Voltage, Current, or Transducer Outputs to a  $\triangle 3.0V$  Peak for the PdMAEYE Data Acquisition System in the PdMAEYE Base Module. Although there are a variety of SCMs that can be provided for each slot, a typical configuration may be (1) 3 Phase Voltage SCM such as the 120/240V (Slot 1), (2) 333mV SCMs (Slots 2 & 3), and (1) Blank SCM (Slot 4). A slot cannot be left open, a SCM is required to be in each slot for the system to operate properly.

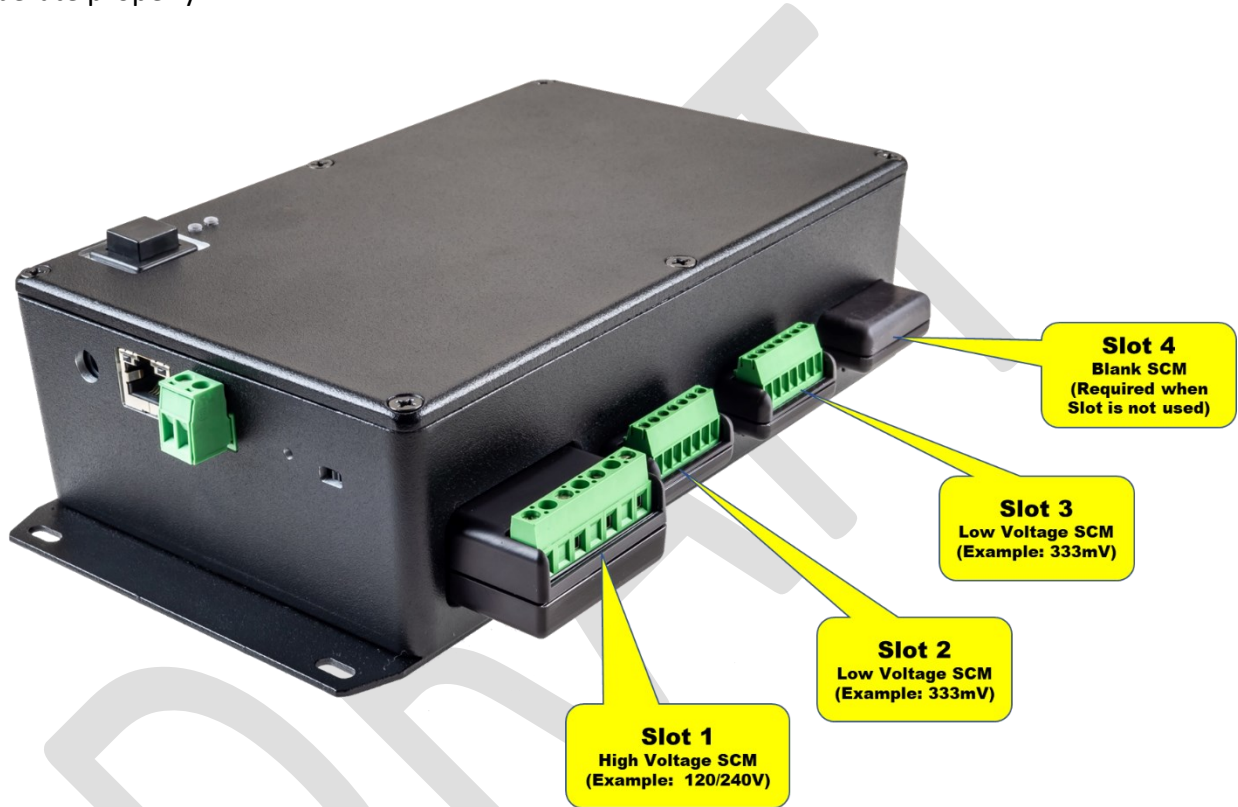


Figure 2 - PdMAEYE SCM Slots (Example)

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## Signal Conditioning Modules (SCM)

### Slot 1 High Voltage SCM (Up to ⚠ 600 V RMS)

Slot 1 is for a High Voltage SCM up to ⚠ 600 Volts RMS and is physically sized different than SCMs designed to be installed in the Low Voltage SCM Slots.

### Slots 2-4 Low Voltage SCMs (Up to ⚠ 10 V RMS)

Slots 2-4 are for Low Voltage SCMs up to ⚠ 10 Volts RMS such as Current, Transducer, Blank, etc.

**Note:** DO NOT EXCEED THE ⚠ MAXIMUM VOLTAGE/CURRENT INPUT LIMITS for each of the Signal Conditioning Modules (SCMs) installed.

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## Power Supply and Other Ports (Figure 3)

- **External DC Power Supply Jack** – ⚠️ 12V, 1.5A
  - Used only if Power Over Ethernet (POE) is not available from the Network Switch.
- **Ethernet Port**
  - Used to connect the PdMAEYE to a Local Area Network.
- **Relay Contacts (Passive)**
  - Controlled by the software to switch the contacts in response to a condition set by the end user.
  - Rated: ⚠️ 250V, 5A max (see table below)

● **Contacts**

Item	Classification	Standard High durability General purpose		High temperature	
		Resistive load	Inductive load (cos φ = 0.4)(L/R = 7 ms)	Resistive load	Inductive load (cos φ = 0.4)(L/R = 7 ms)
Load					
Contact Type	Cross bar twin				
Contact material	Ag-Alloy and Au plating *				
Rated load		5 A at 250 VAC 5 A at 30 VDC	2 A at 250 VAC 2 A at 30 VDC	5 A at 250 VAC 5 A at 30 VDC	1 A at 250 VAC 2 A at 30 VDC
Rated carry current	5 A				
Max. switching voltage	277 VAC, 125 VDC				
Max. switching current	5 A				

- **PdMAEYE Reset**
  - Used to reset the IP Configuration back to Factory Default.
- **Static/Dynamic IP Switch (Default Dynamic)**
  - Used to select either Dynamic or Static IP Configuration.

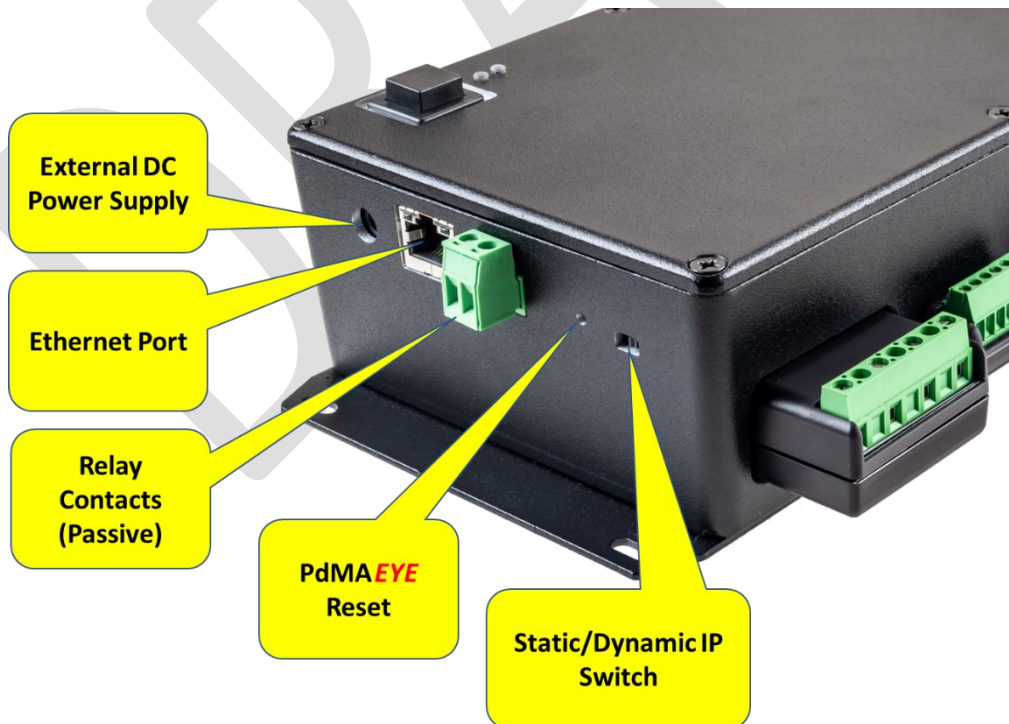
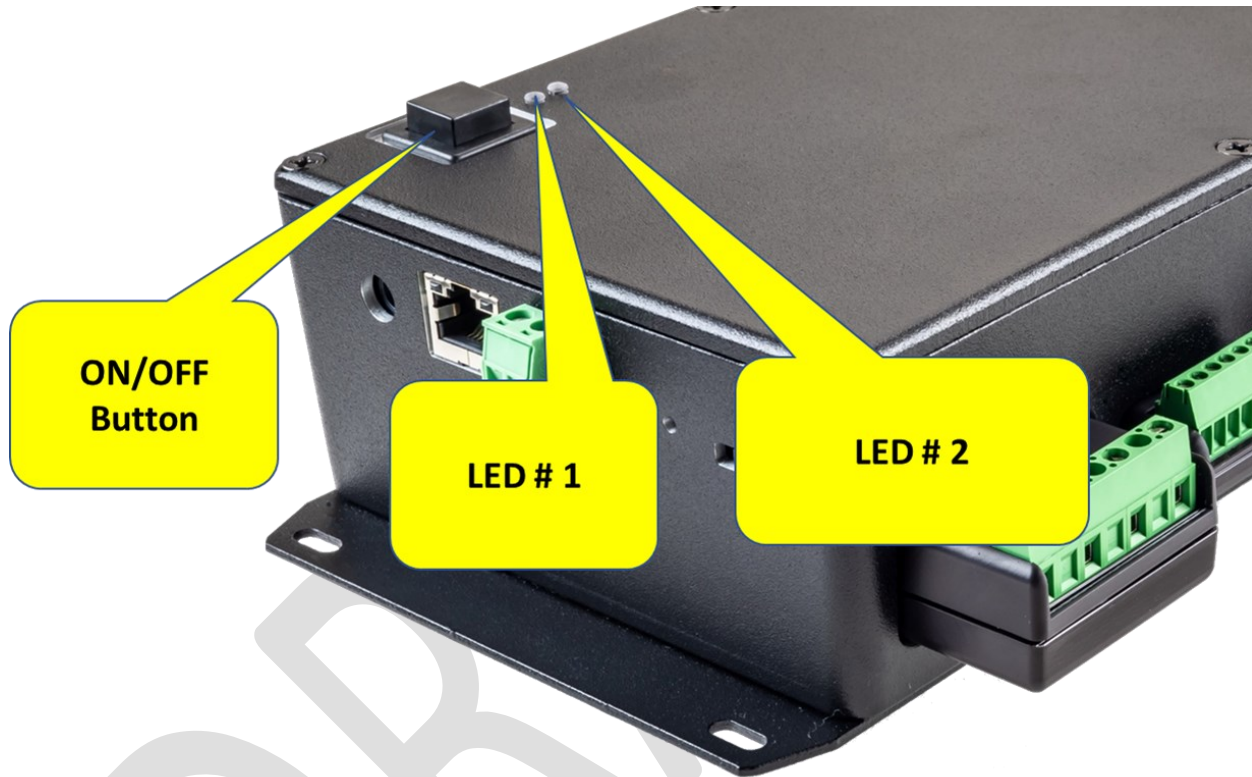


Figure 3 - Power Supply and Other Ports

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## Power and Status Indication (Figure 4)

- ON/OFF Button used for a “safe” shutdown.
- LEDs give status indications.



*Figure 4 - Power and Status Indication*

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## PdMAEYE Installation Instructions

Carefully read all of the instructions before attempting to install the PdMAEYE.

### WARNINGS:

1. Ensure the ⚠Maximum Rated Input Voltage rating of the High Voltage SCM is NOT EXCEEDED by the intended voltage to be measured.
2. Ensure that Signal inputs to the Low Voltage SCMs DO NOT EXCEED the ⚠Maximum Rated VOLTAGE/CURRENT input limits for each SCM installed.
3. Verify that all circuits are de-energized before installing this device.
4. Follow your facility's safety procedures when working with electrical circuits.
5. If the PdMAEYE module is used or installed in a manner not specified by PdMA, the protection provided by the equipment may be impaired.
6. Ensure the desired mounting location of the PdMAEYE is within the specified Environmental Ratings:
  1. Temperature Rating: 60° C Maximum Ambient.
  2. Relative Humidity: 90 % non-condensing.
7. Use either Figure 5 for a Medium Voltage Circuit or Figure 6 for a Low Voltage Circuit, as a guide to determine where in the Motor Circuit to connect the PdMAEYE.
8. **Ensure that ALL Electrical Codes and Facility Local Disconnect and/or Fusing Requirements are followed for all Inputs to the PdMAEYE.**

### Location of connections in the Motor Circuit

Consult your facility engineering team to determine the appropriate location to connect the PdMAEYE using either Figure 5 for a Medium Voltage Circuit or Figure 6 for a Low Voltage Circuit, as a guide to determine where in the Motor Circuit to connect the PdMAEYE. Consideration should be given to Offline testing as well as Online testing.

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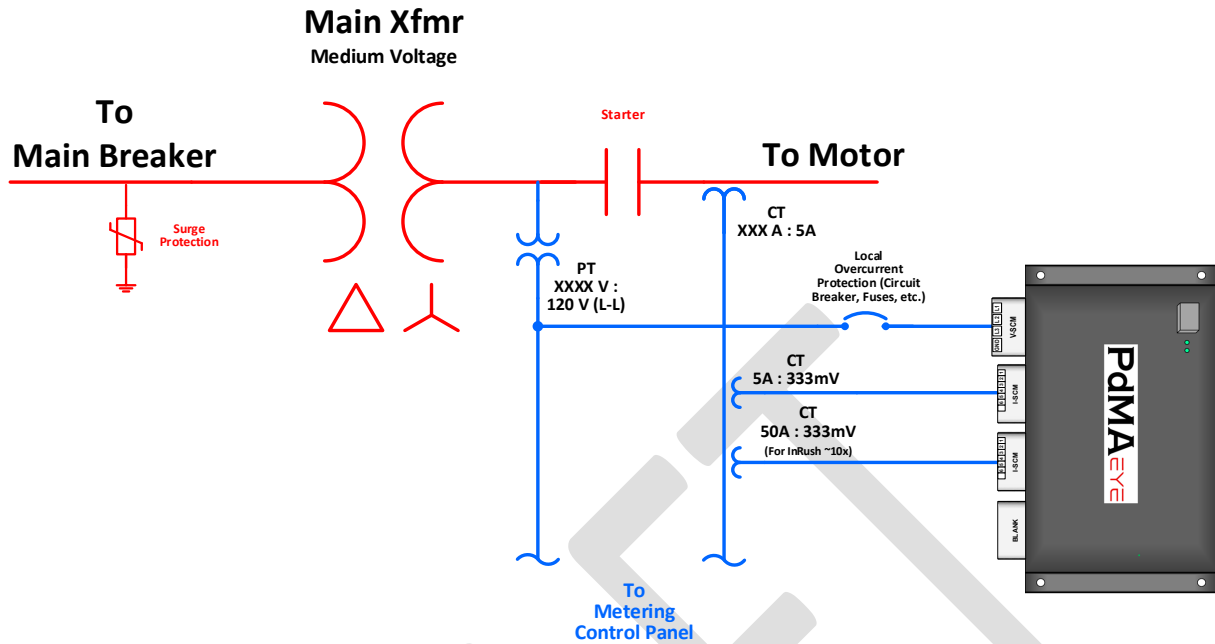


Figure 5 – Recommended general location of connections in a Medium Voltage Motor Circuit (Example)

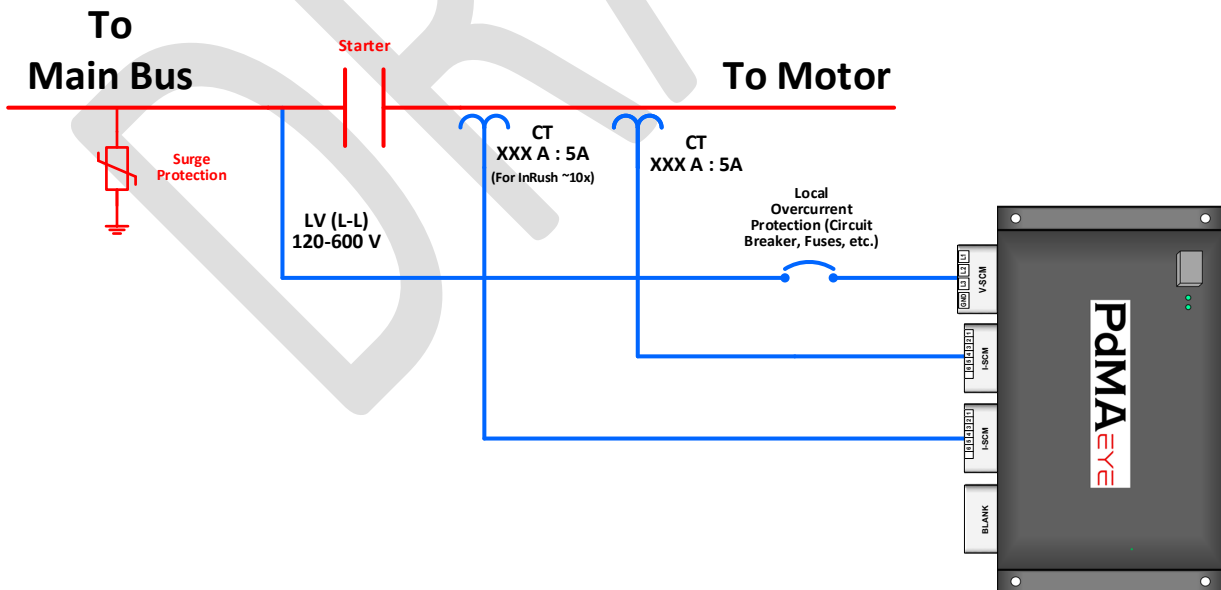


Figure 6 - Recommended general location of connections in a Low Voltage Motor Circuit (Example)

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## Mounting the PdMAEYE

1. Identify a suitable location to mount the PdMAEYE and its Optional Power Supply as necessary.
2. Use the drawing shown in Figure 7 to locate the four mounting holes and drill or punch the mounting holes. For further details see <https://www.hammpfg.com/part/1590DF>.
3. Mount the PdMAEYE using appropriate machine screws, lock washers, and nuts.
4. Plug the Ethernet Cable from the PdMAEYE Network Switch into the appropriate port on the PdMAEYE.
5. If Power Over Ethernet (POE) is not available to provide power to the PdMAEYE, the Optional Power Supply will be required. Insert the Power Supply connector into the appropriate port on the PdMAEYE.

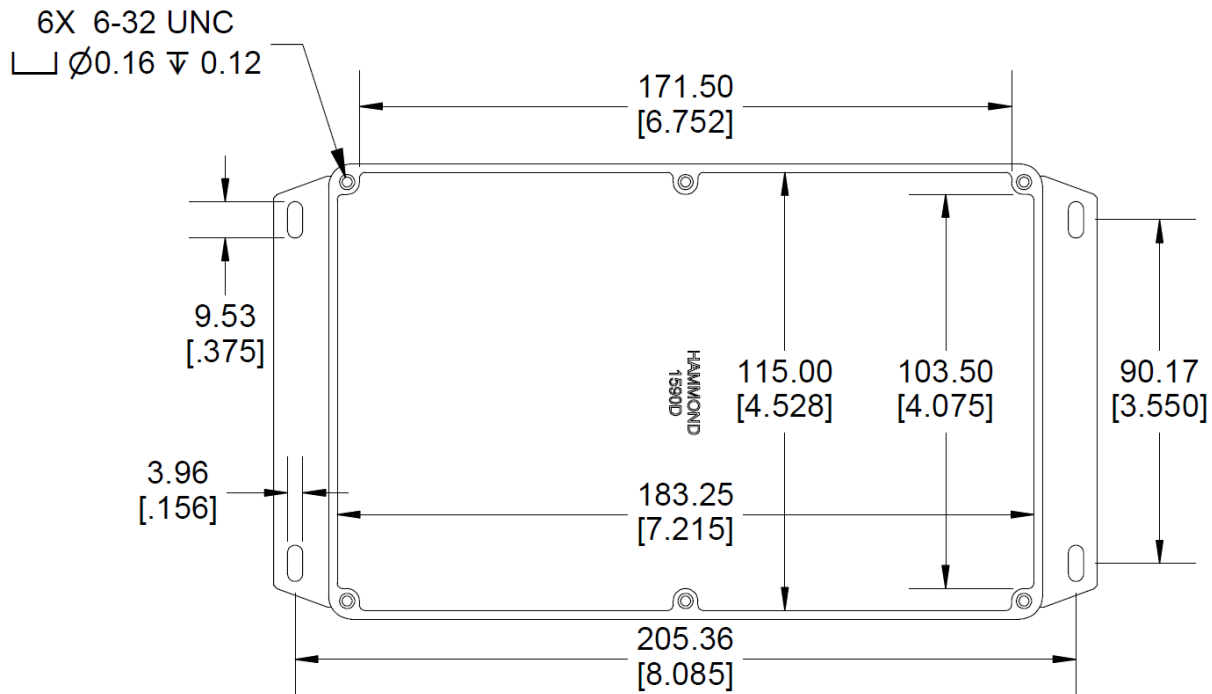


Figure 7 – Mounting Hole Locations (not drawn to scale)

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## Wiring High Voltage SCMs (Slot 1)

Use the appropriate wiring diagram from Figure 8 to Figure 10 that coincides with either the Power System configuration or the Potential Transformer (PT) Voltage configuration.

### Open-Delta – Corner Grounded

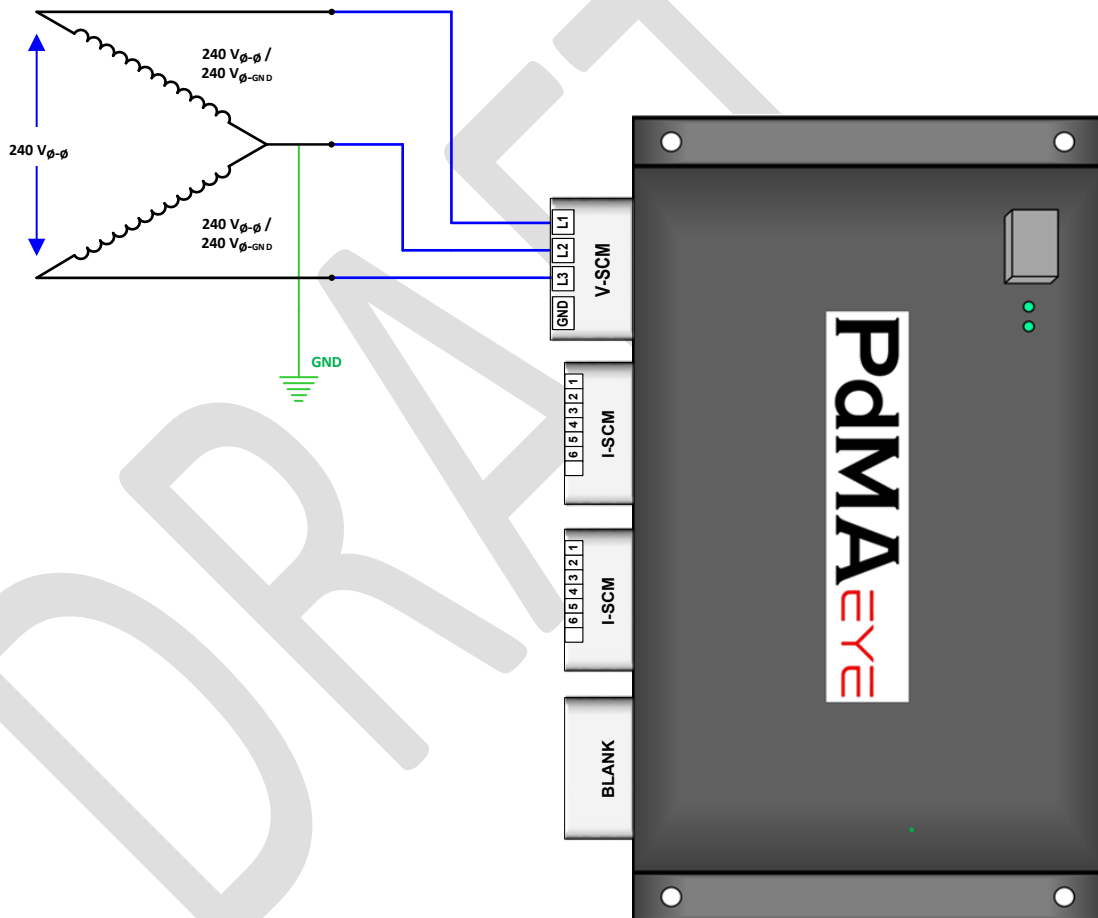


Figure 8 - Open-Delta - Corner Grounded (Typical Medium Voltage Installation)

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## Floating Delta - No True Ground

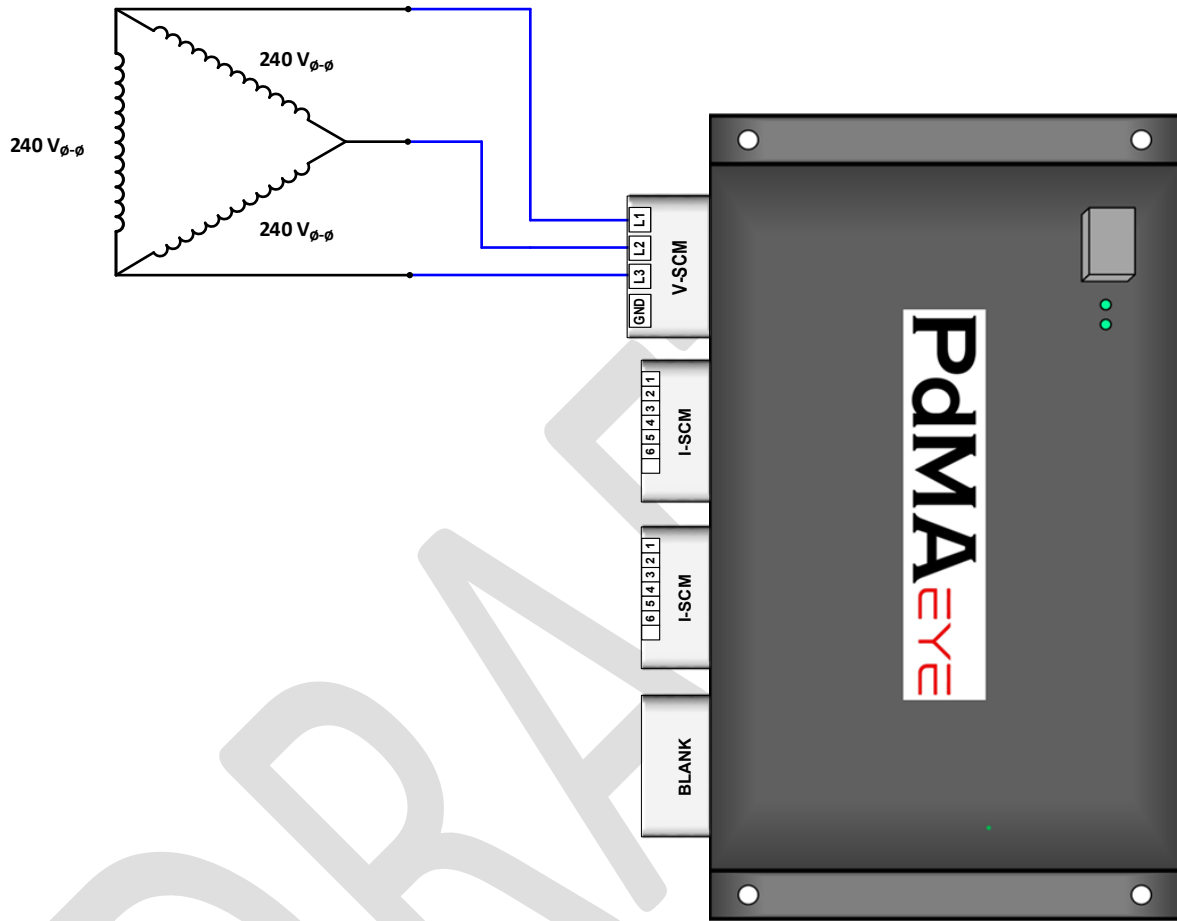


Figure 9 – Delta (Typical Low Voltage Installation)

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## Wye – Neutral Grounded

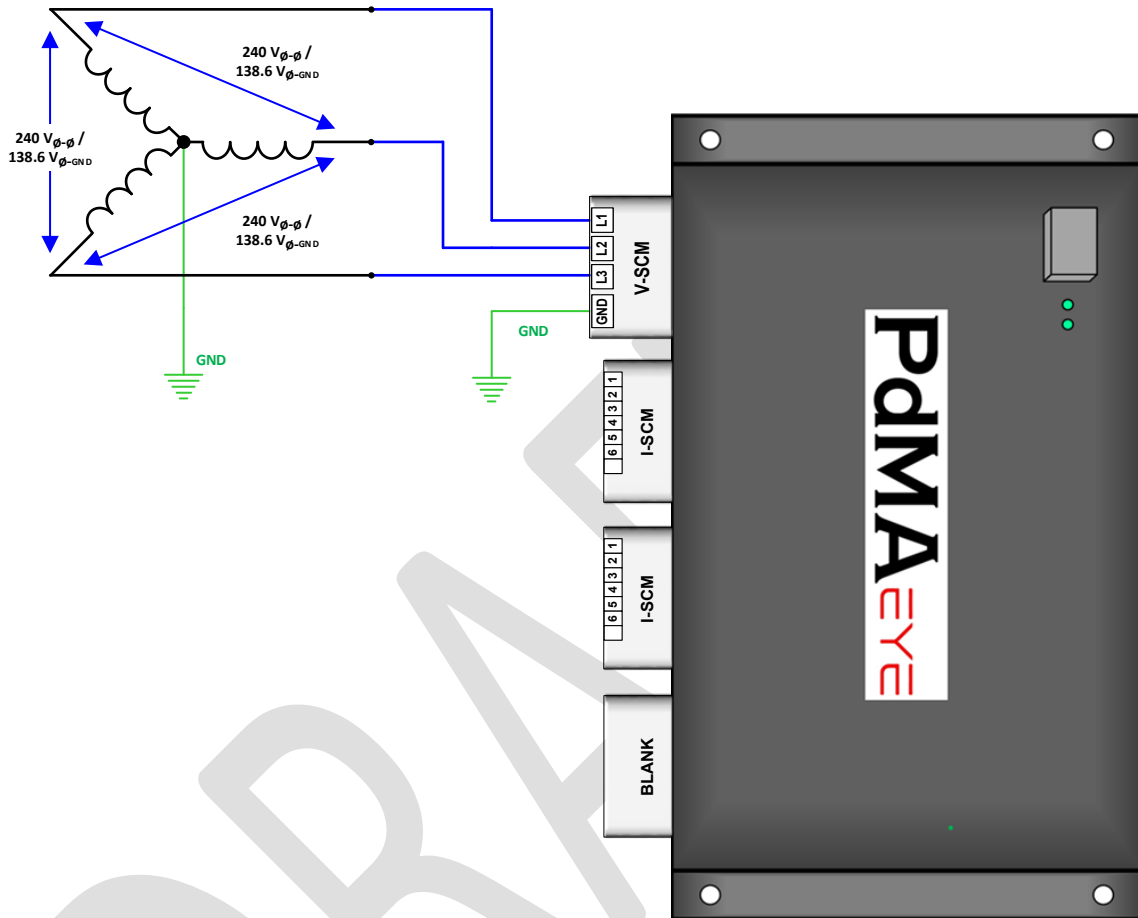


Figure 10 – Wye-Neutral Grounded (Typical Low Voltage Installation)

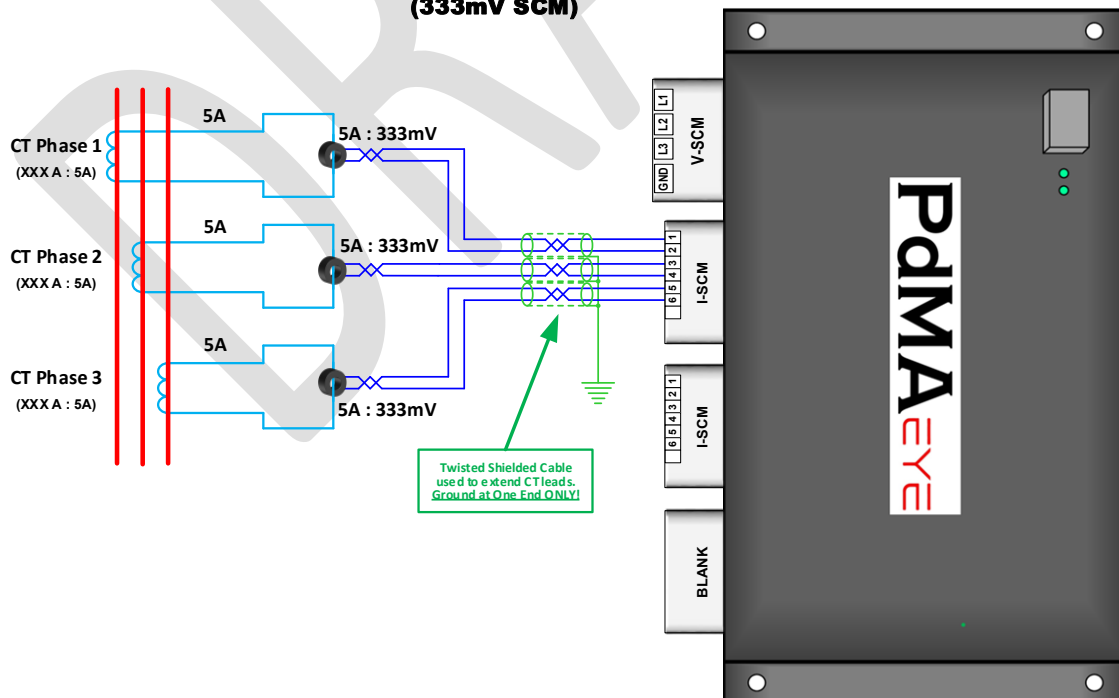


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## Wiring Low Voltage SCMs

- The 333mVAC RMS SCM is an example of a Low Voltage SCM, which is commonly referred to as a “Current SCM”. The 333mV SCM input terminal block accepts a ⚠333mVAC RMS signal that represents current measured by a Current Transformer. Current Transformers (CTs) supplied by PdMA have the appropriate burden resistor to output a low voltage ⚠333mV AC RMS signal to work with the 333mV (Current) SCMs for the PdMAEYE.
- For safety considerations, a CT must never be open-circuited while in operation. CTs supplied by PdMA have built-in burden resistors thus preventing an accidental open circuit.
- If using non-PdMA supplied CTs that have burden resistors connected to external terminals, then take appropriate steps to minimize the possibility of an accidental open-circuit.
- When installing CTs, be aware that CT accuracy can be affected by nearby magnetic fields. Mount the CTs to minimize interference from nearby devices containing coils, such as contactors, relays, and transformers.
- If the leads supplied with the CT are not long enough, the leads may be extended by using Twisted Shielded Cable. Only ground the shield at one end!

### CT Connections Secondary CTs (XXX A : 5A) (333mV SCM)



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Figure 11 - Connections to Secondary CTs (Example)

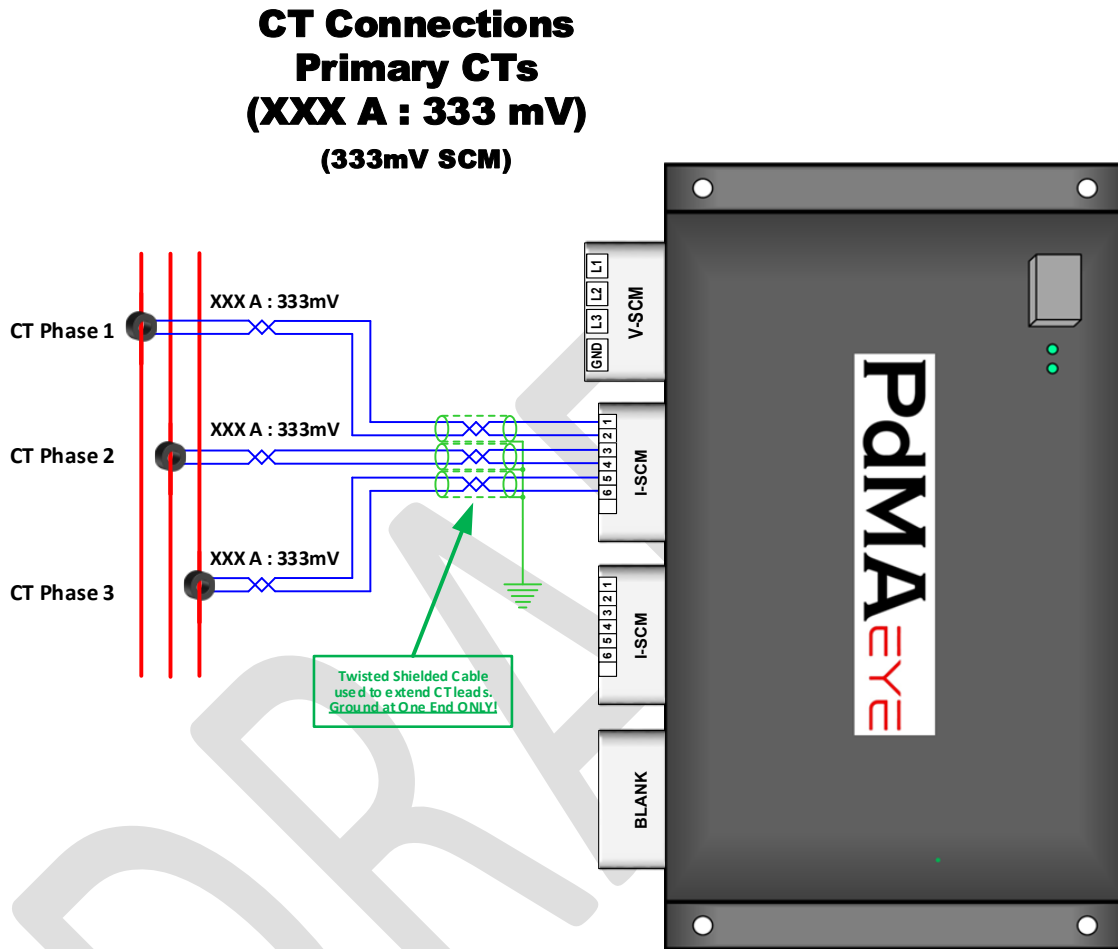


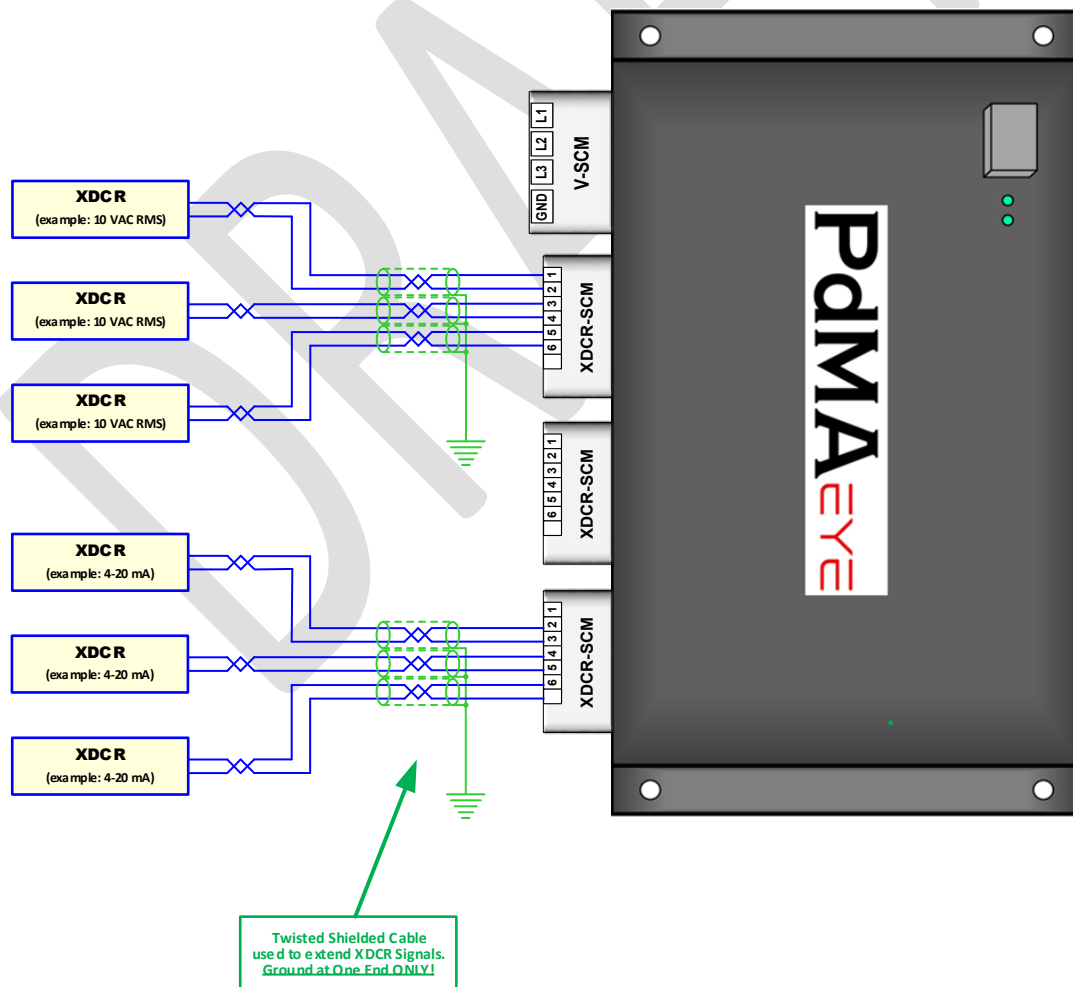
Figure 12 - Connections without using Secondary CTs (Example)

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## Wiring Low Voltage Transducer SCMs

- There are two types of Low Voltage Transducer (XDCR) SCMs used with the PdMAEYE a Voltage Transducer SCM and a Current Transducer SCM. Voltage Transducer SCMs, such as the 2.5/4.0/10.0 V model, can accept a Low Voltage signal output by a Transducer that is below the SCM's maximum rated voltage (⚠10 VAC RMS in this example). Current Transducer SCMs such as the 4-20 mA model can accept a Current signal output by the Transducer that is below the SCM's maximum rated current of ⚠20 mA.
- Follow all manufacturer's instructions for application, installation, and use of Transducers, Sensors, and Transducer Power Supplies.
- If long leads for the Transducer and the PdMAEYE are needed the signal leads may be extended by using Twisted Shielded Cable. Only ground the shield at one end!

## XDCR SCM Connections



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## RECORDS

Remove drawing references, title pages and this page then create a .PDF file and store it along with work instruction.

## REVISION HISTORY

revision	description	date

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