User Manual **MN150001EN**

Effective July 2019
Supersedes July 2017

Power Xpert® Multi-Point Meter User Manual

Contents

Powering Business Worldwide

1: Introduction

1.1 Safety Precautions

All safety codes, safety standards, and/or regulations must be strictly observed in the installation, operation, and maintenance of this device.

⚠ WARNINGS

THE WARNINGS AND CAUTIONS INCLUDED AS PART OF THE PROCEDURAL STEPS IN THIS DOCUMENT ARE FOR PERSONNEL SAFETY AND PROTECTION OF EQUIPMENT FROM DAMAGE. AN EXAMPLE OF A TYPICAL WARNING CALL-OUT IS SHOWN ABOVE. THIS WILL HELP TO ENSURE THAT PERSONNEL ARE ALERT TO WARNINGS THAT MAY APPEAR THROUGHOUT THE DOCUMENT. IN ADDITION, CAUTIONS ARE ALL UPPER CASE AND BOLDFACED AS SHOWN BELOW.

⚠ WARNING

COMPLETELY READ AND UNDERSTAND THE MATERIAL PRESENTED IN THIS DOCUMENT BEFORE ATTEMPTING INSTALLATION, OPERATION, OR APPLICATION OF THE EQUIPMENT. ONLY QUALIFIED PERSONS SHOULD BE PERMITTED TO PERFORM ANY WORK ASSOCIATED WITH THE EQUIPMENT. THE WIRING, INSTALLATION AND APPLICATION USE INSTRUCTIONS PRESENTED IN THIS DOCUMENT MUST BE FOLLOWED PRECISELY.. FAILURE TO DO SO COULD CAUSE PERMANENT EQUIPMENT DAMAGE, BODILY INJURY, OR DEATH.

⚠ WARNING

DO NOT ATTEMPT TO INSTALL OR PERFORM MAINTENANCE ON EQUIPMENT WHILE IT IS ENERGIZED. DEATH, SEVERE PERSONAL INJURY, OR SUBSTANTIAL PROPERTY DAMAGE CAN RESULT FROM CONTACT WITH ENERGIZED EQUIPMENT. ALWAYS VERIFY THAT NO VOLTAGE IS PRESENT BEFORE PROCEEDING WITH THE TASK, AND ALWAYS FOLLOW GENERALLY ACCEPTED SAFETY PROCEDURES.

EATON IS NOT LIABLE FOR THE MISAPPLICATION OR MISINSTALLATION OF ITS PRODUCTS.

1.2 Product Overview

The Eaton Power Xpert® Multi-Point Meter (PXMP Meter) offers a highly modular approach to high density metering applications in electrical power distribution equipment. The PXMP Meter is compatible with most 3-phase industrial, commercial, and single-phase residential low voltage electrical power systems. Typical applications include feeder and branch circuit load monitoring found in switch and panel boards, however higher level voltage metering is possible with interposing load sensors and potential transformers. The modularity of the PXMP Meter allows this metering system to be customized to suit each metering installation based on the number and type of circuits to be metered. Up to 10 different PXMP Meter Modules (PXMP-MMs) can be mixed and matched within a PXMP Meter Base (PXMP-MB) to accommodate a total of up to 60 poles of metering channels from a variety of 1, 2, and 3 pole loads.

Various meter modules can be mixed and matched in a single PXMP Meter Base with support for split core sensors, solid core sensors, or both based on the circuits that need to be metered. In addition, PXMP Pulse Input Modules (PXMP-PIMs) can be installed into a PXMP Meter base for pulse metering from other electricity, gas, water, air, or steam meters.

Output modules are available for either remote control over Modbus or automatic control by the PXMP Meter based on customer configured threshold triggers. A PXMP Energy Portal Module (PXMP-EPM) is available that can make metered data available to individual tenants via an embedded WEB server. The Energy Portal module also supports a variety of protocols including Modbus TCP, SMTP, SNMP, SFTP, HTTP, HTTPS, and more. In addition to Ethernet, the Energy Portal Module supports an optional dial up telephone connection for interface with remote billing software. A Touch Screen Display is available for local display of metered data from any circuit.

1.3 Ordering Information

The PXMP Meter system offers the flexibility to be used in a variety of applications and can be customized, using the modular components, to fit most installations. Table 1 lists the modular components available for the PXMP Meter system.

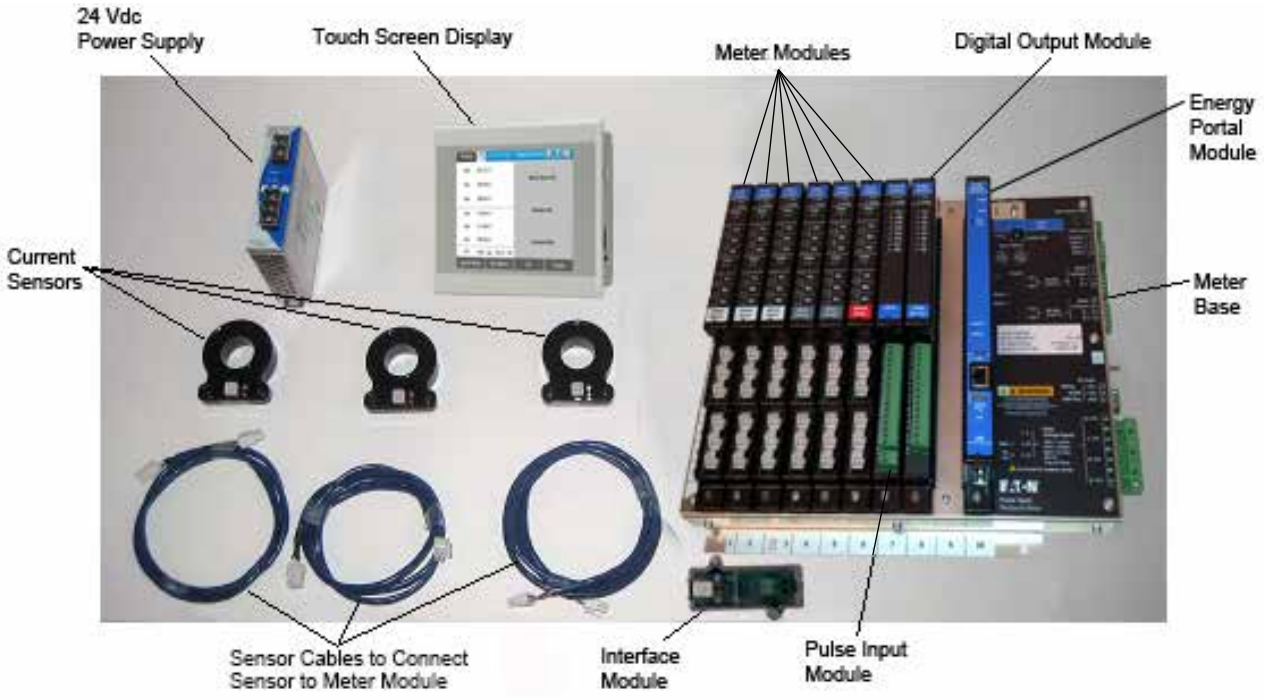

Figure 1. Components of the PXMP Meter.

Table 1. PXMP Meter System – Modular Components.

Catalog Number	Description
	PXMP-MB Meter Bases
PXMP-MB*	PXMP Meter Base - 3PH/1PH 2W w/ ABCN Voltage Inputs
PXMP-MB-AB**	PXMP Meter Base - 1PH 3W w/ ABN Voltage Inputs
	PXMP-MMXXXXX Meter Modules
PXMP-MM10MA	PXMP Meter Module w/ 6 10 mA Inputs
PXMP-MM100MA	PXMP Meter Module w/ 6 100 mA Inputs
PXMP-MM333MV	PXMP Meter Module w/ 6 333 mV Inputs
PXMP-MM10MA-AB	PXMP Meter Module w/ 6 10 mA Inputs - 1 PH 3W
PXMP-MM100MA-AB	PXMP Meter Module w/ 6 100 mA Inputs - 1 PH 3W
PXMP-MM333MV-AB	PXMP Meter Module w/ 6 333 mV Inputs - 1 PH 3W
PXMP-PIM	PXMP Meter Pulse Input Module w/ 8 Inputs
PXMP-DOM	PXMP Meter Digital Output Module w/ 8 Outputs
	PXMP-EPM Energy Portal Modules
PXMP-EPM	PXMP Meter Energy Portal Module
PXMP-EPM-M	PXMP Meter Energy Portal Module w/ Modem
	PXMP-CSXXX Current Sensors with 100 mA Max. Outputs
PXMP-CS125-3	PXMP CS125 Sensor (100 mA output) - Kit x 3
PXMP-CS250-3	PXMP CS250 Sensor (100 mA output) - Kit x 3
PXMP-CS400-3	PXMP CS400 Sensor (100 mA output) - Kit x 3

*** = PXMP-MB only supports PXMP-MM10MA-AB, PXMP-MM100MA-AB, and PXMP-MM333MV-AB.**
**** = PXMP-MB-AB only supports PXMP-xxxxxxx-AB modules.**

Catalog Number	Description
	CSXXX - Current Sensors with 10 mA Max. Outputs
CS070	Current Sensor Module 70 Amps (10 mA output) - Kit x 6
CS125	Current Sensor Module 125 Amps (10 mA output) - Kit x 3
CS200	Current Sensor Module 200 Amps (10 mA output) - Kit x 3
CS400	Current Sensor Module 400 Amps (10 mA output) - Kit x 3
CS005	Current Sensor Module 5 Amps (10 mA output) (For use with 5 Amp CTs) - Kit x 3
	Sensor Cables for PXMP-CSXXX and PXMP-IMXXX
PXMP-SC4-3	PXMP Sensor Cable, 4 Ft. (1.22 m) - (male/male) Kit x 3
PXMP-SC6-3	PXMP Sensor Cable, 6 Ft. (1.8 m) - (male/male) Kit x 3
PXMP-SC8-3	PXMP Sensor Cable, 8 Ft. (2.44 m) - (male/male) Kit x 3
PXMP-SC12-3	PXMP Sensor Cable, 12 Ft. (3.66 m) - (male/male) Kit x 3
PXMP-SC28-3	PXMP Sensor Cable, 28 Ft. (8.5 m) - (male/male) Kit x 3
	Sensor Cable Extensions
PXMP-SCE8-3	PXMP Sensor Extension Cable, 8 Ft. (2.44 m) - (male/female) Kit x 3
PXMP-SCE16-3	PXMP Sensor Extension Cable,16 Ft. (4.88 m) - (male/female) Kit x 3
	(Current Sensor) Interface Modules
PXMP-IM333MV-3	PXMP Current Sensor Interface Module (for 333 mV) -Kit x 3
PXMP-IM100MV-3	PXMP Current Sensor Interface Module (for 100 ma) -Kit x 3
	PXMP-DISP Display
PXMP-DISP-6-XV	6-inch Color Touch-Screen Interface, Preloaded and Optimized for Use with the PXMP-MB (-AB)
PXMP-DISP-6-TM	6-inch Color Touch-Screen Interface, Preloaded and Optimized for Use with the PXMP-MB (-AB), limited menu items - designed for tenant use.
PXMP-DISP6XV-DAT	Replacement Cable - PXMP-DISP-6-XV
PX-PMBH-XV	PXM-DISP-6 to PXM-DISP-6-XV Adapter Plate
	24 Vdc Power Supplies
PSG60E	85-264 Vac 1-PH / 120-375Vdc Input, 24Vdc @2.5A (60W) Output
PSG120E	85-264 Vac 1-PH / 120-375Vdc Input, 24Vdc @5A (120W) Output
PSG240E	85-264 Vac 1-PH / 120-375Vdc Input, 24Vdc @10A (240W) Output
PSG480E	85-264 Vac 1-PH / 120-375Vdc Input, 24Vdc @20A (480W) Output
PSG60F	320-575 Vac 3-PH / 450-800Vdc Input, 24Vdc @2.5A (60W) Output
PSG120F	320-575 Vac 3-PH / 450-800Vdc Input, 24Vdc @5A (120W) Output
PSG240F	320-575 Vac 3-PH / 450-800Vdc Input, 24Vdc @10A (240W) Output
PSG480F	320-575 Vac 3-PH / 450-800Vdc Input, 24Vdc @20A (480W) Output

For more information on PSG Series DC Power Supplies go to; www.eaton.com > Products & Solutions > Electrical > Products & Services > Automation & Control > Power Supplies and Temperature Controllers > PSG series DC Power Supplies

1.4 Metering Compatibility

See Appendix A for additional information.

Direct Mains Voltage Monitoring with the PXMP Meter is possible up to a system maximum rating of:

- 480VL:G (corner grounded Delta)
- 347VL:N & 600VL:L maximum for Wye applications
- 480VL:G & L:L maximum on grounded Delta applications

Higher Voltage ratings or floating Delta applications will require the use of interposing potential transformers to stay within the PXMP maximum voltage ratings.

PXMP Load Current measurements are directly compatible with current sensor (instrument transformers) outputs in three ranges of secondary maximum outputs by using matching range PXMP Meter Modules:

- 10 mA;
- 100 mA; or
- 333 mV.

Applications requiring 5A Current Transformer outputs require the use of the CS005 Class 10 Current Sensor as an interposing sensor which reduces the input to the meter module to <10ma. ANSI C12.20 class 0.5% accuracies may be achieved using either the Eaton CSXXX 10 mA or PXMP-CSXXX 100 mA current sensors and direct voltage metering. Interposing Potential and current transformers may introduce additional error.

The PXMP Meter supports a variety of current sensors. Eaton offers some sensors specially designed for use with our products. We also support the use of industry standard current sensors. When specifying current sensors, in general, note that:

- Solid core sensors tend to have higher accuracy than split core designs.
- Split core sensors are often installed in Retrofit applications where it is not practical to disconnect the load conductors in order to mount a solid core sensor.
- Current loop output sensors tend to have accuracy and noise immunity advantages over 333 mV output sensors.
- 333 mV sensors are very useful since they eliminate open circuit risks and are available in a wide range of primary current ratings.
- Eaton's CS005 enables the PXMP Meter to interface to standard 5 A current transformers, either split core or solid core.

See sections 2 and 4 for details on sensors.

1.4.1 PXMP Meter System Power Requirements

The base PXMP Meter Base power supply input, Digital (Discrete) I/O External Circuit Groups, PXMP Pulse Input Module and Digital Output Module External Circuit Groups and Touch Screen Display are all designed to operate off external 24 Vdc (+/- 20%) sources. If all external circuits have no isolation conflicts, then a single 24 Vdc power supply can serve all of these power requirements. The choice of a proper supply must at least factor in the following requirements:

- Total summation of system worst case power consumption;
- System worst case ambient temperature within the enclosure;
- Matching of supplies mains rating; and
- Possible requirements for isolation between external circuit groups (solution = multiple supplies).
- 24 Vdc source should be a local, dedicated bus for PXMP use only. Do not connect to a CAT III DC bus.

1.4.2 Enclosure

The PXMP Meter must be housed in an enclosure that keeps the internal environment within the PXMP's environmental specification ranges (See Appendix A) and provides User protection from hazardous circuits during normal operation.

1.5. Component Overview

Power Xpert Multi-Point Meter **(PXMP Meter)**

- There are two distinct Meter Bases and two distinct groups of Meter Modules for 3-phase and single-phase applications.
- The Meter Base is equipped with 256 MB of non-volatile memory for interval demand recording. Stores up to two years of 15 minute interval demand data (W For Demand, W Reverse Demand, Q1-Q4 kVAR Demand, Q1/Q4 kVA Demand, Q2/Q3 kVA Demand).
- See **Figures 50 through 61** for wiring examples.
- Store up to two years of 15 minute interval demand and energy recording:
  - W Forward demand (import)
  - W Reverse demand (export)
  - Q1 kVAR demand (inductive/motor load)
  - Q2 kVAR demand (inductive generator)
  - Q3 kVAR demand (Capacitive generator)
  - Q4 kVAR demand (Capacitive load)
  - Q1,Q4 KVA demand (import)
  - Q2,Q3 KVA demand (export)
  - Energy forward
  - Energy reverse

PXMP Meter Modules (PXMP-MMs)

- Require that the current sensors be connected to a Meter Module input that correspnds to the matching phase voltage input on the meter base
- Monitor meter values and send them to processor on the Meter Base
- Plug into the PXMP Meter Base
- Two distinct groups of Meter Modules for 3-phase and single-phase applications.
- Three standard Meter Modules 10 mA, 100 mA, and 333 mV.
- Each Meter Module can be configured for up to six single pole sub-meters, three two-pole sub-meters, or two three-pole sub-meters (or combinations not to exceed six poles).
- All of the poles for a 2- or 3-pole meter must be on the same Meter Module. Meters cannot be configured to span across multiple modules.

PXMP Current Sensors

- Three different types of current sensors can be used with the PXMP Meter based on secondary output type and range.
  - 10 mA sensors connect to 10 mA Meter Modules;
  - 100 mA sensors connect to 100 mA Meter Modules; or
  - 333 mV sensors connect to 333 mV Meter Modules.
- Interposing current transformers such as CS005 are used to connect 5 A CT to the PXMP Meter Module when CT's with a 5A secondary are used for primary current sensing.
- Current Sensing is directional/polarity sensitive and mounted on insulated load cables.
- PXMP Meter Modules are directly compatible with the CSXXX 10 mA and PXMP-CSXXX 100 mA current sensors corresponding to the Meter Module current input rating.

- CSXXX 10 mA Current Sensors are used with the PXMP-MM10MA 10 mA Meter Module
  - 48" (1.22 m) Sensor cables are built integral with the sensor.
  - 8 ft and 12 ft (2.44 and 3.66 m) extension cables are available but do not exceed 20 ft total length.
  - These sensors support 0.5% accuracy.
  - CS005 used to interface 5 A CT secondary to PXMP Meter Module, 5A Secondary CT adds additional error to PXMP measurements.
  - No clamp alarm or Locator LEDs
- PXMP-CSXXX 100 mA current sensors are used with the PXMP-MM100MA 100 mA Meter Module
  - Equipped with a 4-position terminal plug therefore requires the use of PXM-SC/SCE sensor cables to connect to PXMP-MM100MA 100 mA Meter Module.
  - Maximum length not to exceed 28 ft (8.54 m).
  - Equipped with Clamp Alarm LED and Locator LEDs.
  - Supports identification and tamper detect circuit.
  - These sensors, when used properly with Power Xpert Multipoint, will result in 0.5% metering performance.
- Generic 333 mV or 100 mA current sensors must use the PXMP-IM333MV Interface Modules to interface with the PXMP Meter Module – this will also require a PXMP-SC Sensor Cable.

PXMP-IM333mV Interface Modules

- Used to interface 333 mV secondary output current sensors to PXMP Meter Modules.

PXMP-SC/SCEXX Sensor Cables

- Used to connect between PXMP-CSXXX or PXMP-IM and PXMP-MM's.
- Maximum length not to exceed 28 ft (8.54 m) in order to avoid accuracy/burden issues.

PXMP Pulse Input Module (PXMP-PIM)

- Used to meter other utilities such as gas, water, and steam.
- Can be configured for up to eight pulse meters.
- Requirement for Input from Source Pulse
  - Pulse type with voltage rating of 24 V +/- 20% or switchable intermediate conversion.
  - Must be dry contact otherwise an interposing solid state relay is required to isolate PXMP.
- Can capture a pulse rate maximum of 20 Hz square wave
- Pulse should be self-compensated for energy measurement
- Requires a 24 Vdc power supply to provide exciting voltage for the input circuit.
- Pulse Input Module has a 2.2 Kohm input impedance drawing approximately 10 mA per closed input.

PXMP Digital Output Module (PXMP-DOM)

- Provides outputs to be used for control or indicate alarm conditions – typical installation might be for a building automation systems.
- Digital Output Module can be controlled remotely via Modbus or driven by internal logic.
- Requires an external power source of 24 V +/- 20%
- Each solid state relay supports maximum load of 80 mA.

PXMP Energy Portal Module (PXMP-EPM)

- Supported in slot 10 only.
- Provides Web enabled metering capability.
- PXMP-EPM-M supports internal dial up telephone modem.
- Comes standard with front facing RJ-45 configuration port and LAN/WAN RJ-45 Ethernet port.
- Equipped with 2 GB of non-volatile memory and capable of storing over 10 years of tenant metering 15 minute interval demand data.

PXMP Touch Screen Display (PXMP-DISP-6-XV)

- Eaton XV-102-H4-57TVRL-10 programmed with PXMP display capabilities and 6 ft. (1.8 m) cable.
- Provides means to view meter readings and view power system metering data.
- Cannot be used to configure PXMP Meter. PXMP Configuration requires PXMP Configuration Software.

PXMP Configuration Software

- JAVA application provided on CD accompanying the PXMP Meter Base. Can also be downloaded from Eaton web site.
- Supports Java 1.7 or higher.
- Connection of a laptop to the PXMP Meter Base, to configure the PXMP Meter and Modules, can be accomplished through either the PXMP Meter Base USB port (Type B) or either Com 1 or Com 2 RS-485 Modbus.
- Wizard guides operator through configuration process.
- Supports Online and Offline configuration session.
- Refer to PXMP Configuration Software Manual MN150002EN for details.

24 Vdc Power Source Required

- 24 Vdc required for PXMP-MB, PXMP-MB-AB, PXMP Pulse Input Module, PXMP Digital Output Module, and optional PXMP-DISP-6.
- 24 Vdc power source must be adequate for total load at maximum anticipated ambient temperature.
- 24 Vdc power source must be matched to ratings of application's source and provide isolation from mains.

The following maximum possible 24 Vdc loads need to be considered in a PXMP Meter power system:

- 15 W - Meter Base 24 Vdc PS input;
- 2 W - Meter Base digital Output x 1 on max. rated of 80 mA;
- 1 W - Meter Base digital Inputs x 3 contact energized (dry contact closed);
- 9.5 W - PXMP Display
- 2 W - Per Pulse Input Module with all eight inputs energized (dry contact closed);
  - 20 W worst case for ten cards;
- 15.4 W - Per Digital Output Module with eight solid state outputs energized;
  - Worst case module load total is 154 W (based on 10 digital output modules).

Eaton PSG family of power supplies are good match for most PXMP Meter applications:

- PSG E suffix, CPT style mains supplies and their output ratings:
- PSG60E - 2.5 Amp (60 W);
- PSG120E - 5 Amp (120 W);
- PSG240E - 10 Amp (240 W);
- PSG480E - 20 Amp (480 W).

PSG F suffix, 3-phase 400-500 VL:L rated Wye mains supplies and their output ratings:

- PSG60F - 2.5 Amp (60 W);
- PSG120F - 5 Amp (120 W);
- PSG240F - 10 Amp (240 W);
- PSG480F - 20 Amp (480 W).

Note: All of the PSG series require de-rating above 50°C (122°F) to 50% load at 70°C (158°F) or below 0°C (32°F) to 80% at -20°C (-4°F).

If any of the 24 Vdc external circuit groups require isolation from the other external circuit groups, then separate power supplies should be used to provide the needed isolation barrier.

1.6 Symbols

The following symbols are used in this PXMP Meter User manual.


Diode


Fuse


Protective Earth Ground


Resistor


Switch

ELECTRICAL WARNING: Refers to instructions that, if not followed, can result in death or injury.

WARNING: Refers to instructions that, if not followed, can result in death or injury.

CAUTION: Refers to instructions that, if not followed, can result in equipment damage.

2: Hardware Overview

2.1 General Overview

The Eaton Power Xpert Multi-Point Meter (PXMP Meter) offers a highly modular approach to high density metering applications in electrical power distribution systems. The modularity of the PXMP Meter allows this metering system to be customized to suit each metering installation based on the number and type of circuits to be metered. Up to 10 different PXMP Meter Modules (PXMP-MMs) can be mixed and matched within a PXMP Meter Base (PXMP-MB) to accommodate a total of up to 60 poles of metering channels from a variety of 1-, 2-, and 3-pole loads.

Various meter modules can be mixed and matched in a single Meter Base assembly with support for split core sensors, solid core sensors, or both based on the circuits that need to be metered. In addition, PXMP Pulse Input Modules (PXMP-PIM) can be installed into a Meter base assembly for pulse metering from other electricity, gas, water, air, or steam meters.

PXMP Digital Output Modules (PXMP-DOMs) are available for either remote control over Modbus or automatic control by the PXMP Meter based on customer configured threshold triggers. A PXMP Energy Portal Module (PXMP-EPM) is available that can make metered data available to individual tenants via an embedded Web server. The Energy Portal Module supports individual Tenant User Names and Passwords to ensure that tenant access is limted only to authroized information. The Energy Portal Module also supports a variety of protocols including Modbus TCP, SMTP, SNMP, SFTP, HTTP, HTTPS, BACnet/IP, and more. In addition to Ethernet, the Energy Portal Module supports an optional dial up telephone connection for interface with remote billing software. A PXMP Touch Screen Display (PXMP-DISP-6-XV) is available for local display of metered data from any circuit.

Modules plug into the motherboard in the Meter Base assembly. They are secured with captive screws that, when tightened, ground the module to the Meter Base and to the earth ground stud.

2.2 Power Xpert Multi-Point Meter (PXMP Meter)

2.2.1 PXMP Meter Base (PXMP-MB) Assembly

The PXMP Meter Base assembly comes in two configurations:

- PXMP-MB (3-phase meter base that can support single-phase metering) and
- PXMP-MB-AB (single-phase meter base) Optimized for single phase 3 wire electric supply voltage.

The **PXMP-MB** assembly, with no "AB" suffix, is designed for metering 3-phase Wye or Delta systems. It is designed to accommodate 3-phase systems and distributes 2 sets of 3-phase voltages to each meter module. The corresponding current sensor connections are indicated using the A1, B1, C1, A2, B2, C2 connection sequence designations on the white sequence label. It can also be used to support single-phase metering.

Note: The PXMP-MB can be used on 3-Phase, 2-Phase, and single-phase applications as long as the current sensor inputs are matched with the voltage sequencing as indicated on the white label. The PXMP-MB-AB can **ONLY** be used on single-phase applications where the supply voltage is single phase 3 wire.

Figure 2. PXMP-MB Assembly, Showing Cover Plates on All Module Locations.

The **PXMP-MB-AB** assembly is designed for metering residential single-phase service. It is designed to accommodate A1, B1, A2, B2, and A3, B3 sequences and has a yellow sequence label.

Figure 3. PXMP-MB-AB Assembly Populated with Three PXMP Meter Modules.

Table 2 lists the system types supported by each PXMP Meter Base assembly.

Table 2. PXMP Meter Base Assemblies - Supported System Types.

Base Assembly	Supported Systems
PXMP-MB	3-PH 3-Wire Delta (Grounded) *Floating Delta Requires an Interposing Potential Transformer (PT)*
	3-PH 4-Wire Wye
	Single-Phase Metering
PXMP-MB-AB	120/240 V, Single-Phase 3-Wire Service

Both PXMP Meter Base assembly models are shipped without modules. The front of the base has a label indicating 10 positions, or slots (1-10) where modules can be mounted. Each position is covered with a metal slot cover secured to the assembly with screws. The slot covers protect the backplane of the Meter Base assembly. Slot covers are removed to insert modules, but should be left in place if the slot is not being used.

Figure 4. Meter Base Assembly as Shipped (PXMP-MB Shown).

Note: Even though the voltage input label on the PXMP-MB-AB shows A, B, C, and N, the C connection will never be used in PXMP-MB-AB applications.

Figure 5. PXMP-MB-AB Voltage Input Label.

The ten slots provided are multi-purpose. They can accommodate any combination of Meter Modules (10 mA, 100 mA, or 333 mV), Pulse Input Modules, or Digital Output Modules.

Normally, however, slot ten is reserved for the Energy Portal Module, described in Section 2.2.5 – PXMP Energy Portal Module (PXMP-EPM). The Energy Portal Module is required for Ethernet and modem communications and advanced tenant metering functionality. The Energy Portal Module **CAN ONLY** be used in slot ten.

If slots one through nine are filled and a tenth Meter Module, Pulse Input Module, or Digital Output Module is required, the tenth slot can be used for that purpose. But, that will prevent the use of the Energy Portal Module and the functionality it provides.

The Meter Base assembly requires a 24 Vdc control power supply to operate. Usually, the power supply is mounted on a DIN rail in a common enclosure, as described in 4.3.3 - Installing a 24 Vdc Power Supply in the Enclosure.

The power supply 24 Vdc terminal plug fits into the terminal header on the right side of the Meter Base assembly. The power supply terminal includes an optional shield cable connection which can be used for enhanced EMC performance. Refer to Appendix A for power supply requirements.

Grounding of the system is required. A stud is provided on the Meter Base assembly for connection to an appropriate protective earth (PE) ground. Modules plugged into the motherboard in the Meter Base assembly are secured with captive screws that, when tightened, ground the module to the Meter Base assembly and to the earth ground.

Figure 6. 24 Vdc Input, Shield, and Ground Connections on the Meter Base Assembly.

Metering voltage inputs connect to the right side of the PXMP-MB and PXMP-MB-AB assemblies. Inputs are marked **A (V1), B (V2), C (V3), and N (VR)** on both the PXMP-MB and PXMP-MB-AB assemblies. If connecting to a Delta system, the unused N (VR) terminal should be connected to chassis ground. A cover for the voltage terminal is provided as a barrier to hazardous terminal access (see **Figure 7**).

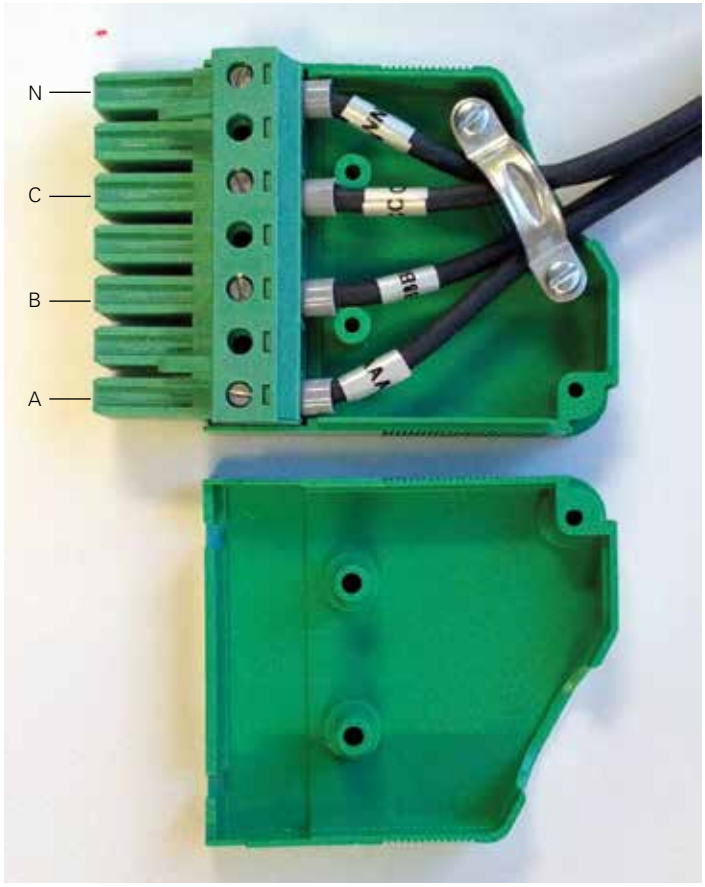

Figure 7. Meter Voltage Input Terminal Plug and Cover.

Figure 8. A, B, C, and N Connections on the PXMP-MB Assembly Meter Voltage Input.

Note: On the PXMP-MB-AB, even though the voltage input label on the assembly lists the "C" connection, it will never be used in PXMP-MB-AB applications.

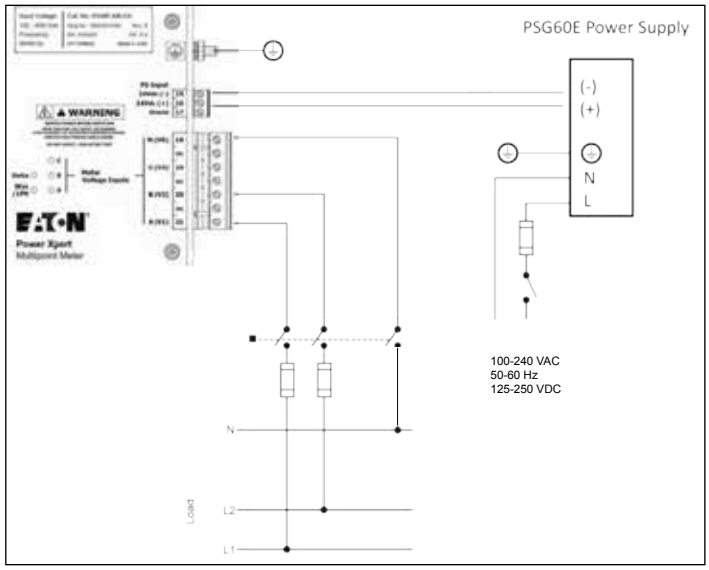

Figure 9. Single-Phase 3-Wire 120/240 (Refer to Section 4.4, Figure 55 for more detailed drawing).

The Voltage Input connections are conditioned and distributed across the Meter Base assembly backplane to the Meter Module connectors. The relationship between the voltage terminal inputs and the current sensor inputs is hard wired. The circuit to be metered should be connected to the voltage input terminals following the wiring schematics in Section 4.4 - Recommended Wiring Connections.

Note: When commissioning a PXMP Meter, ensure that the phasing is consistent between the voltage input terminal and the load current sensor input connections on the Meter Modules. If a current sensor is plugged into a connection point on the Meter Module that is assigned to a different phase voltage, metering errors will result due to the current and voltage phasing mismatch (see Sections 4.3.4 - Current Sensor Installation and 6 - Configuring and Commissioning for detailed information).

The Meter Base assembly includes a solid-state relay output that can be configured as a Pulse Initiator output assigned to any one of the tenant meters or to the aggregate sum of the tenant meters. An external local 24 Vdc power supply is required to drive the load limited to 80 mA maximum. Use a local 24VDC local source dedicated to PXMP use, do not connect to a CAT III bus.

The Meter Base assembly also includes three digital status inputs that can be used to indicate conditions such as a demand synch pulse or a rate alert. These digital inputs require external 24 Vdc voltage +/- 20% to operate. Again use a local 24VDC source dedicated to PXMP use, do not connect to a CAT III bus.

The Mode DIP switches are located behind the metal door cover at the top left corner of the black label face of the Meter Base assembly panel. These Mode switches are used to secure the PXMP Meter in one of three levels of hardware enforced security modes. Note the tab off the base that can be used to seal the door shut for security purposes. Refer to Appendix C for detailed information.

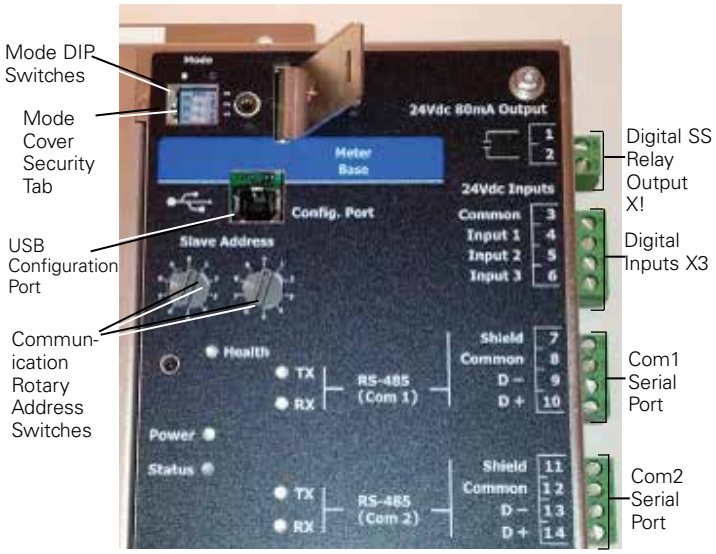

Figure 10. Location of the Mode DIP and Communications Rotary Address Switches, Configuration and Coms Ports, and Digital Output and Inputs.

The slave USB connector supports a serial communications session with the PXMP Configuration Software. The software is described in Section 3 - Software Overview and is used to fully configure the PXMP Meter

The Meter Base assembly includes two RS-485 Modbus slave communication ports, Com 1 and 2, to permit connection to two different Modbus Masters (refer to Appendix B - Modbus Registers) for details and a list of Modbus Registers and Section 5 on Serial Communications Setup.

The Meter Base assembly includes the following LED indicators (see **Figure 11**):

- Three LEDs marked A, B, and C adjacent to the Meter Voltage Input connector indicate if voltage is applied to the meter phase inputs and is within the expected range.
- Two LED's are marked Delta or Wye/1PH and used to indicate the active metering mode configuration.
- Red and green TX and RX LED's adjacent to Com 1 and Com 2 provide visual indication of Transmit and Receive activity on the communication ports.
- A Health LED indicates that the Meter Base main microprocessor is functioning correctly.
- A Power LED indicates that 24 Vdc is applied to the 24 Vdc input to the Meter Base.
- A Status LED indicates that communication activity between the Meter Base and Meter Modules.

The LEDs blink while connecting/reading information, are solid indicating the function is active, and are off when the function is not available.

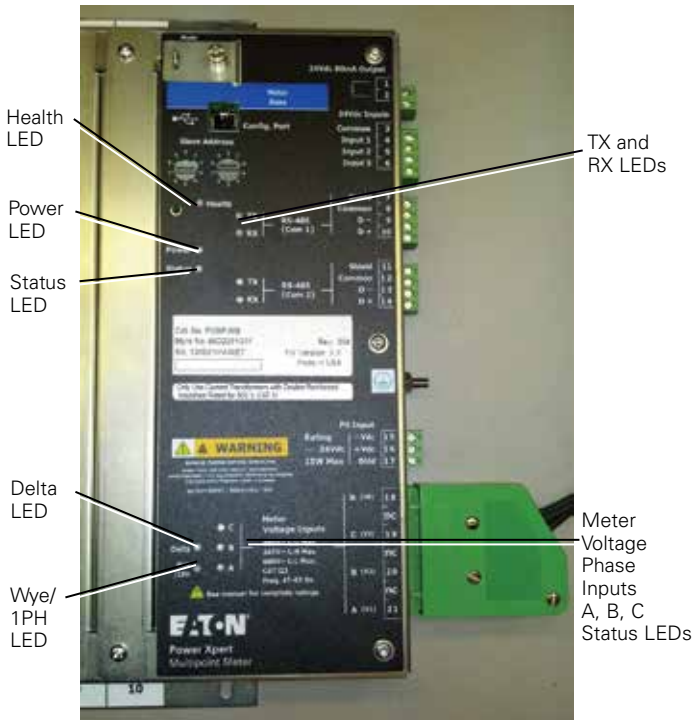

Figure 11. LEDs on the PXMP-MB Assembly Face.

To determine the phase assignments for Meter Module current sensor input, refer to the labelling on the lower left edge of the Meter Base assembly, shown in **Figure 12**. This label shows the phase assignments from **bottom to top** (see Section 2.2.2).

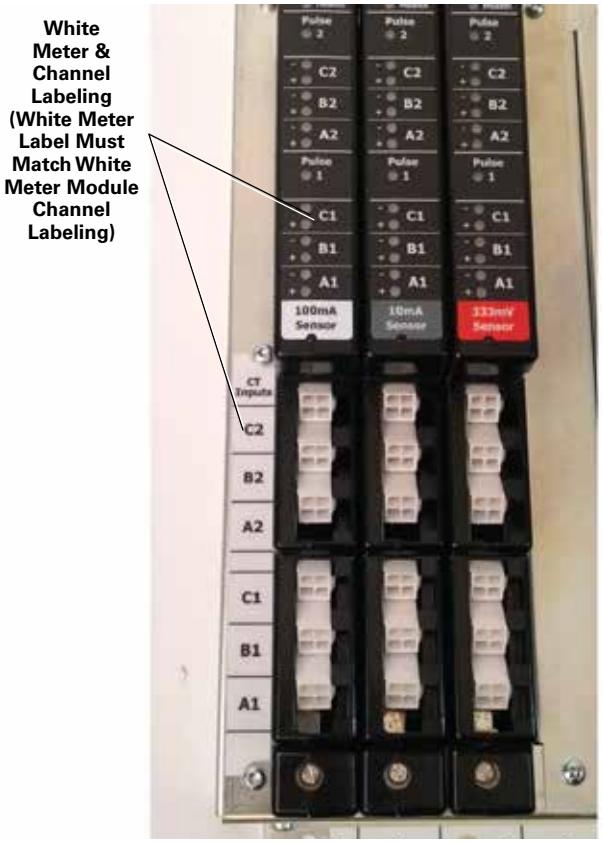

Figure 12. Phase Assignment Label: PXMP-MB Assembly. Note Matching Black/White Meter Base and Meter Module Lens Phase Markings.

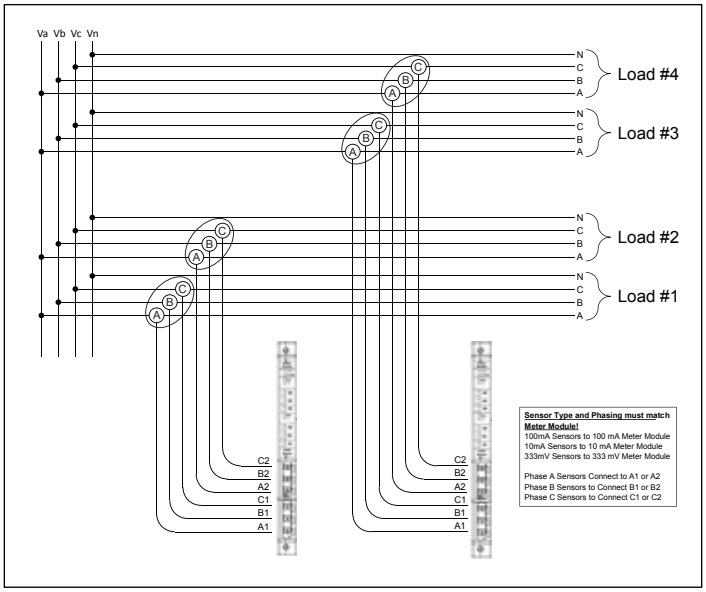

Figure 13. 3-Phase 4-Wire Service (Refer to Section 4.4, Figure 56 for more detailed drawing).

Each Meter Module has six 2 x 2 receptacles (female) for current sensor connections. Each 2 x 2 receptacle can be considered to be in one of six rows of connection points for the Meter Modules that are normally installed in slots one through nine. Each horizontal row is paired with the phase voltage indicated on the phase assignment label to the left.

Note: Slot ten is normally reserved for the PXMP Energy Portal Module.

For the standard Meter Base assembly, the bottom row of three connectors is always Phase A, the second row from the bottom is always Phase B, and the third row from the bottom is always Phase C (see **Figure 12**). The same applies to the upper set of three connectors. Note the PXMP-MB CT inputs label is White and the PXMP-MB-AB CT Inputs label is yellow to help distinguish between these two Meter Base designs. For the PXMP-MB-AB assembly, the bottom row is always Phase A1, then working upwards Phase B1, Phase A2, Phase B2, Phase A3, and Phase B3 at the top (see **Figure 14**).

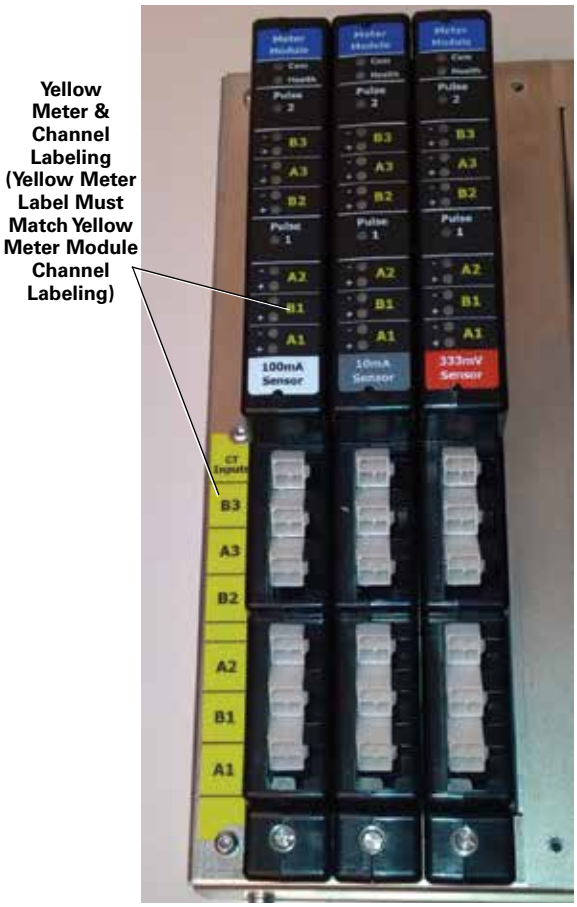

Figure 14. Phase Assignment Label: PXMP-MB-AB Assembly. Note Matching Yellow/Black Labels Meter Base to Meter Lens Phase Markings.

For information on how the Meter Base assembly is installed in an enclosure, please refer to 4.3 - Installing the PXMP-MB Assembly in the Enclosure.

2.2.2 PXMP Meter Modules (PXMP-MMs)

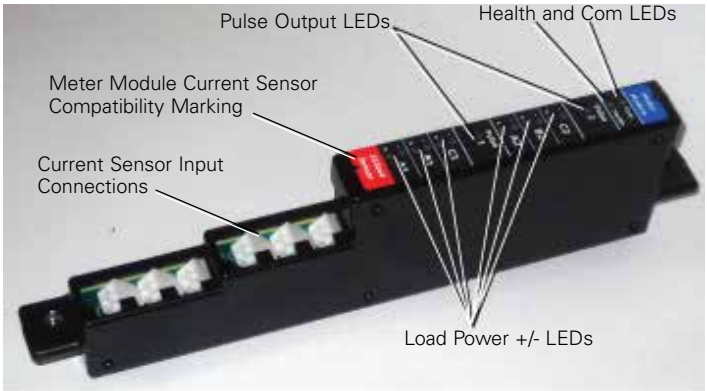

Figure 15. Typical PXMP-MM.

PXMP Meter Modules monitor meter values and send them to the processor on the Meter Base. The Meter Modules perform metering calculations by combining Current Sensor inputs with the corresponding voltage inputs. Voltages are bussed across the backplane of the Meter Base assembly from the voltage input connector to the each Meter Module's mating connectors, located on the rear of the module.

The PXMP Meter includes two distinct families of Meter Bases designed for use in two different types of power distribution applications:

- Standard 3-phase Meter Base (PXMP-MB) and
- Single-phase, 3-wire Meter Base (PXMP-MB-AB).

Correspondingly, there are also two distinct groups of Meter Modules to support the 3- or single-phase applications. Each family of Meter Modules is described below.

All of the Meter Modules have a common appearance and design. The module identification labels are color coded above the sensor input connections to indicate current sensor secondary type. Grey indicates a 10 mA Meter Module, white a 100 mA Meter Module, and red a 333 mV Meter Module.

Meter Modules are equipped with a series of red and green LED's designed to help with commissioning and troubleshooting (refer to Sections 3 – Software Overview, 4 – Power Xpert Multi-Point Meter (PXMP Meter) Installation, and 7 - Maintenance and Cleaning. A Comm LED at the top of each Meter Module turns on to indicate when the module is communicating with the PXMP Meter system. The LED may appear solid on or flash depending on the mode of the meter system. A Health LED flashes approximately once per second to indicate that the module is functioning properly.

Each Meter Module's Current Sensor input has a corresponding pair of red and green -/+ reverse/forward Power LED's to indicate the direction of current flow per load. The green LED lights when current is flowing out of the load side of the current sensor. The red LED lights when current is flowing into the load side of the current sensor. Green is considered normal. Red indicates that the sensor is either installed backwards on the load conductor, or that current is flowing into the load side of the sensor from another source, such as a solar inverter acting as a generator not a load.

The Red and Green LED's have an alternate use during commissioning or troubleshooting. For each individual current sensor connection, the red and green Power LEDs can be flashed simultaneously with a remote blue locator LED on the PXMP-CSXXX current sensors or PXMP-IM interface modules as a part of a commissioning test. This feature allows quick verification of meter and load circuit pairing. This process is described in the PXMP Meter **Configuration Software Manual (MN150002EN).**

The Meter Modules plug into the Meter Base assembly backplane. They are secured with captive screws that, when tightened, ground the module to the Meter Base assembly and to the earth ground.

Typical wiring arrangements are shown in **Figures 50 to 61**.

2.2.2.1 Pulse LED

The Pulse LEDs are pulsed optical outputs for use with a meter calibration system – **Figure 15**. These LEDs can be configured to represent energy from one or more of the Meter Module channels. Pulse rates are configurable using the PXMP Configuration Software.

2.2.2.2 Standard 3-Phase Metering

Three standard Meter Modules are used in the standard Meter Base assembly. The module identification labels are color coded above the sensor input connections (gray, white, and red) for easy identification. The three standard meter modules are:

- **PXMP-MM10MA** **Meter Module w/6 10 mA inputs (Grey);**
- **PXMP-MM100MA** **Meter Module w/6 100 mA inputs (White); and**
- **PXMP-MM333MV** **Meter Module w/6 333 mV inputs (Red).**

The standard Meter Modules and standard Meter Base assembly are designed to support 3-phase metering applications, powering single- or 3-phase loads. Typical wiring arrangements, such as 3PH 3-Wire Delta and 3PH 4-Wire Wye service are shown in Section 4.4 - Recommend Wiring Connections. This section also includes wiring diagrams for 120/240 V single-phase 3-wire residential service, used with the PXMP-MB-AB for residential use.

The overlay on the top half of the Meter Module indicates the phase current assignments of the Meter Module connections, marked in black/white. The connections from **bottom to top** are A1 B1 C1/A2 B2 C2 (see **Figure 15**). When wiring current sensors to the meter card sensor input connectors, it is essential that the phasing of voltage and current be consistent with the markings on the device. Connecting a current sensor mounted on a Phase B power conductor to either a Phase A or Phase C Meter module input will result in metering errors.

2.2.2.3 120/240 V Single-Phase, 3-Wire Residential Metering

The PXMP Meter has a family of Meter Modules specially designed to meter single-phase 3 wire service such as 120/240 V single-phase 3-wire residential services. They are:

- **PXMP-MM10MA-AB** **Meter Module w/6 10 mA inputs - 1 PH 3W (Gray)**
- **PXMP-MM100MA-AB** **Meter Module w/6 100 mA inputs - 1 PH 3W (White)**
- **PXMP-MM333MV-AB** **Meter Module w/6 333 mV inputs - 1 PH 3W (Red)**

These Meter Modules have three sets of two sensor inputs marked in black/yellow from bottom to top A1, B1/ A2, B2/ and A3, B3 to support up to three single-phase 3-wire residential loads per module. The family of Meter Modules whose model numbers end in the –AB suffix are compatible with the PXMP-MB-AB assembly. Even though the PXMP-MB-AB is designed for metering single-phase 3 wire residential services, it can also be used to meter single-phase 2 wire loads.

The Meter Modules have current inputs marked A1, B1/ A2, B2/ A3, B3 (see **Figure 14**). These A and B inputs should be matched to the residential service's L1 and L2 phases connected to the Meter Base assembly voltage inputs marked A and B. Mismatching a current sensor installed on an L1 (phase A) power conductor to a Meter Module input internally wired to L2 (phase B) will result in metering errors.

In single-phase applications, each current sensor input channel A1, A2, and A3 are internally measured relative to the corresponding phase A voltage input on the Meter Base assembly. Similarly, the current sensor input channels B1, B2, and B3 are internally measured relative to the phase B voltage inputs on the Meter Base assembly. The voltage/current relationship between the Meter Base voltage input and the Meter Module current sensor inputs are hard wired and cannot be re-configured.

2.2.2.4 PXMP-MM Load Monitoring Accessories

The Meter Modules are directly compatible with Eaton's CSXXX 10 mA and PXMP-CSXXX 100 mA current sensors. The CSXXX current sensors have an integral yellow 4 ft (1.22 m) cable while the PXMP-CSXXX current sensors require a separate PXMP-SC sensor cable that is available in 4/6/8/12/28 ft. (1.22/1.83/2.44/3.66/8.50 m) lengths to help cleanly match the application dimensions. 333 mV max. output current sensors must use the PXMP-IM333MV Interface Module and a PXMP-SC Sensor Cable to interface with a PXMP Meter Module. See Section 4 – Power Xpert Multi-Point Meter (PXMP Meter) Installation, for more detail.

2.2.2.4.1 CSXXX Current Sensors – 10 mA Outputs

In a PXMP Meter System, the CSXXX 10 mA secondary output sensors should be connected only to a PXMP-MM10MA 10 mA Meter Module. The 10 mA sensor cables are yellow in color, ~ 48 in. (1.22 m) long and are built integral with the sensor. Eight and 12 ft (2.44 and 3.66 m) extensions are available to extend the distance between the sensor and the Meter (see **Table 3**). **Do not exceed 20 ft (6.10 m) total length.**

There is no clamp alarm or Locator LEDs on the CSXXX 10 mA series of sensors. It is advised not to unplug/open circuit this sensor secondary cable with load current flowing through the sensors. However an internal clamp within the current sensor circuit will ensure that the secondary output does not become dangerous in the case of an accidental cable disconnected with primary load drive. In addition, the CSXXX current sensors support an identification and a tamper detect circuit. Sensors compatible with 10 mA applications are detailed in Table 3 along with their dimensions. These sensors will support 0.5% accuracy. However, when using the CS005 as an interposing sensor, the 5 A CT wired into the CS005 contributes additional error base on its published performance specification. These current transformer sensors are qualified as double/reinforced insulation, 600 V, CAT III. **Figure 16** shows the proper current sensor load direction for the CS050/125/200/400.

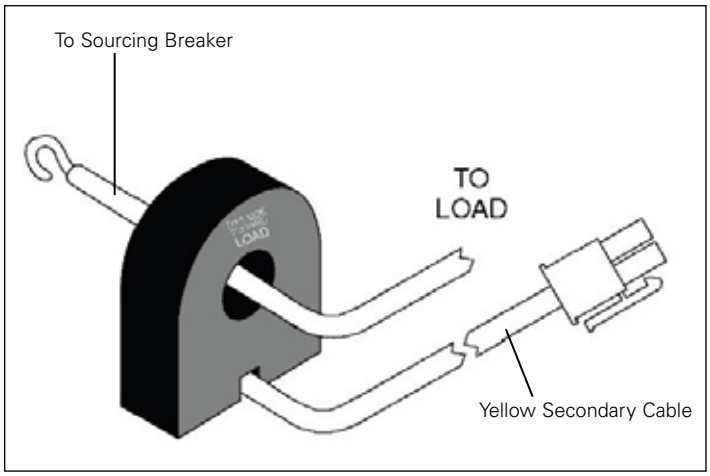

Figure 16. CS050/125/200/400 Current Sensors – Load Orientation.

Table 3. CSXXX Solid Core 10 mA Sensors Compatible with PXMP-MM10MA Modules.

Catalog Number	Prim. Max Rated	Turns Ratio	Dim. A Inch/mm	Dim. B Inch/mm	Dim. C Inch/ mm	Dim. ID Inch/mm	Dim. E Inch/ mm
CS005	5 A	5000:5	2.28/57.9	NA	2.60/66.0	Term. Strip	0.54/13.7
CS050	50 A	5000:1	1.55/39.4	0.96/24.4	1.18/30.0	0.32/8.1	0.50/12.
CS125	125 A	12500:1	2.10/53.3	1.24/31.5	1.73/43.9	0.55/14.0	0.58/14.7
CS200	200 A	20000:1	3.06/77.7	1.72/43.7	2.69/68.3	0.77/19.6	0.75/19.1
CS400	400 A	39500:1	4.48/113.8	2.62/66.5	3.67/93.2	1.75/44.4	1.08/27.4

Note: CSXXX sensors support a 600 V max. primary Voltage rating. The CS50/125/200 do not have mounting screw holes. However the CS400 and CS005 have mounting screw holes.

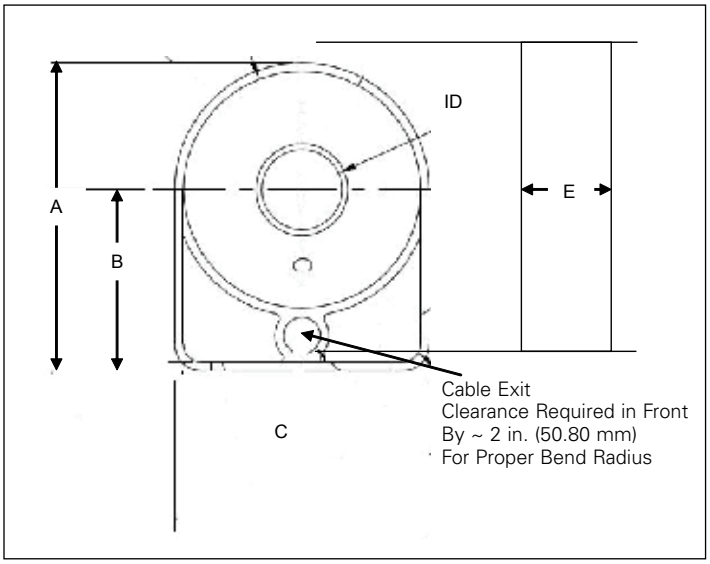

Figure 17. CSXXX Current Sensor Dimensions.

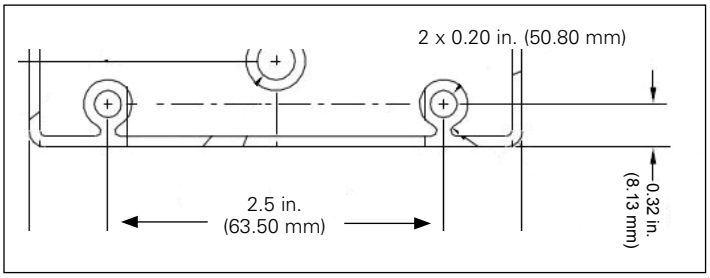

Figure 18. CS400 Mounting Holes.

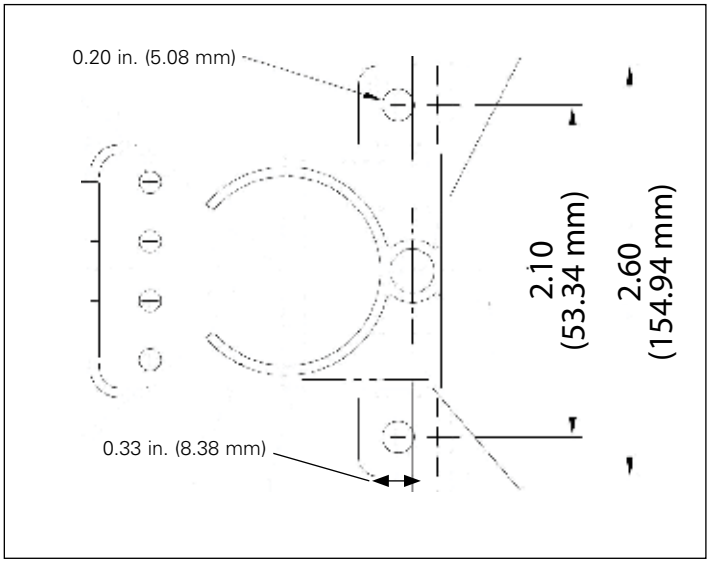

Figure 19. CS005 Mounting Feet Dimensions.

2.2.2.4.2 PXMP-CSXXX Current Sensors – 100 mA Outputs

The PXMP-CSXXX 100 mA secondary output sensors should be connected only to a PXMP-MM100MA 100 mA Meter Module. The 100 mA sensors are equipped with a 4-position terminal plug socket. They are intended for use with Eaton PXM-SC/SCE cables that are blue in color, and come in 4, 6, 8, and 12 ft (1.22, 1.83, 2.44, and 3.66 m) lengths, 8 and 16 ft (2.44 and 4.88 m) extensions are available (see Table 4). The PXMP-CSXXX current sensors come with two LEDs, Blue and Red. The blue LED is used in conjunction with the PXMP Configuration Software. During configuration, the software can be used to "flash" the blue LED paired with the Meter Module green/red load LEDs to help verify that the sensor is connected to the correct Meter Module circuit. It is advised not to unplug/open circuit this sensor secondary cable when load current is flowing through the sensor. However, an internal clamp circuit will ensure that the secondary output does not become dangerous in the case of an accidental cable disconnected with load current slowing. In addition, a solid red LED on the sensor will serve to indicate that the clamp circuit is active (above ~ 5% load) and that the sensor secondary output cable is not properly connected to a Meter Module. Current sensors compatible with 100 mA applications are shown in Table 4. These sensors will support 0.5% accuracy class. The PXMP-CSXXX current sensors also support an identification and tamper detect circuit. These current transformer sensors are qualified as double/reinforced insulation, 600 V, CAT III.

Figure 20. PXMP-CSXXX Current Sensor - 100 mA.

Table 4. 100 mA Sensors Compatible with PXMP-MM100MA Modules.

Catalog Number	Description – Solid Core 100 mA Max. Secondary Outputs, 600 V Max. Primary Voltage Rating		
	Primary Max.	ID	Turns Ratio
PXMP-CS125	125 A:	0.53 in. (13.4 mm)	1250:1
PXMP-CS250	250 A	1.12 in. (28.5 mm)	2500:1
PXMP-CS400	400 A:	1.74 in. (44.2 mm)	4000:1

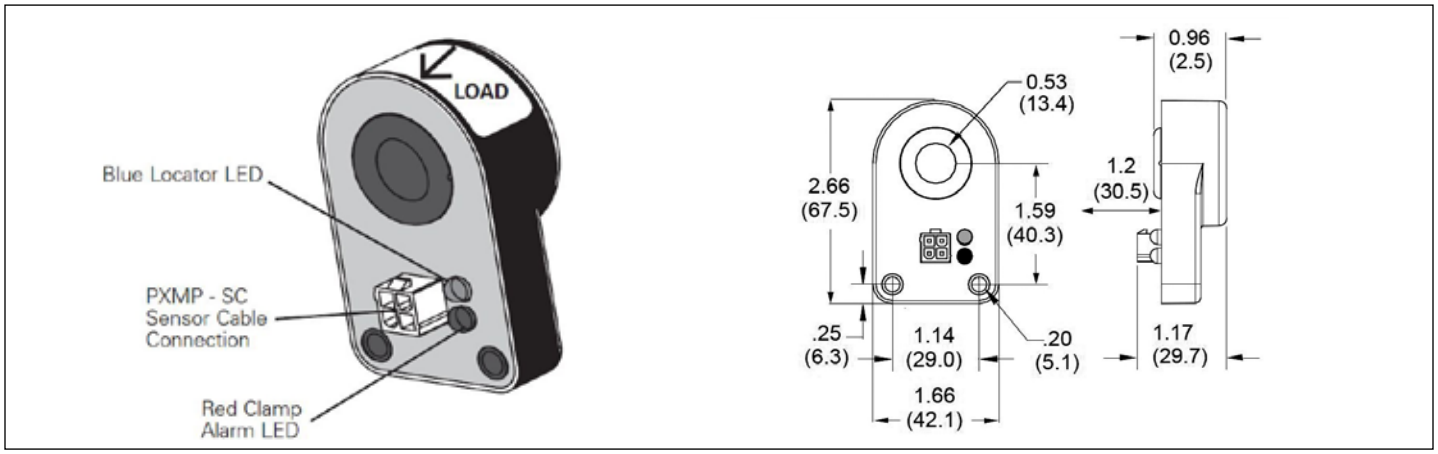

Figure 21. PXMP-CS125.

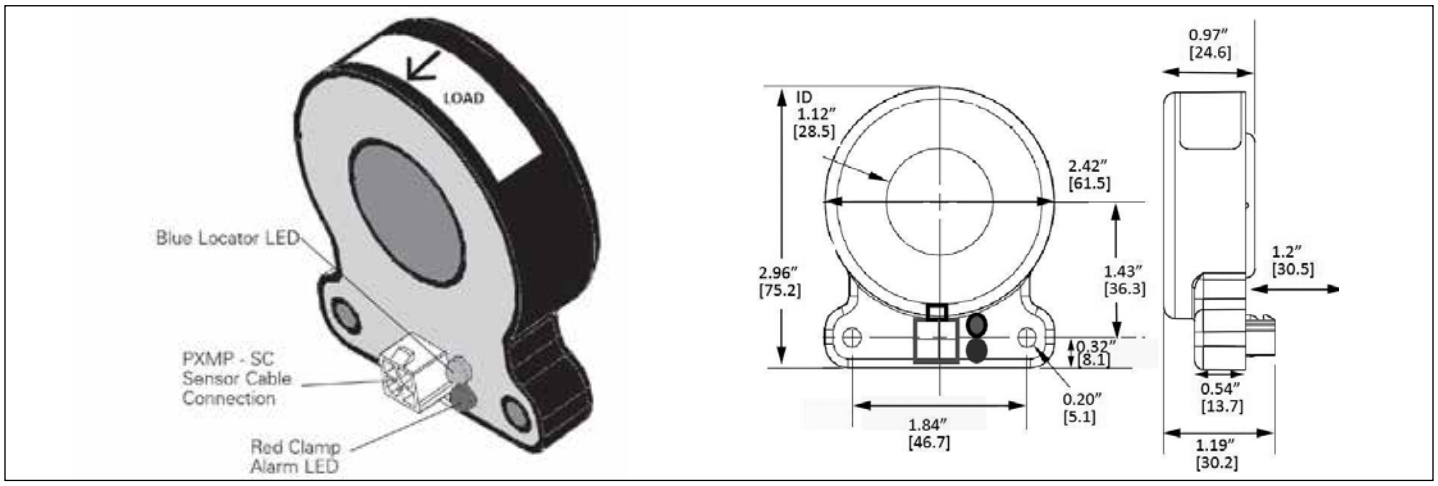

Figure 22. PXMP-CS250.

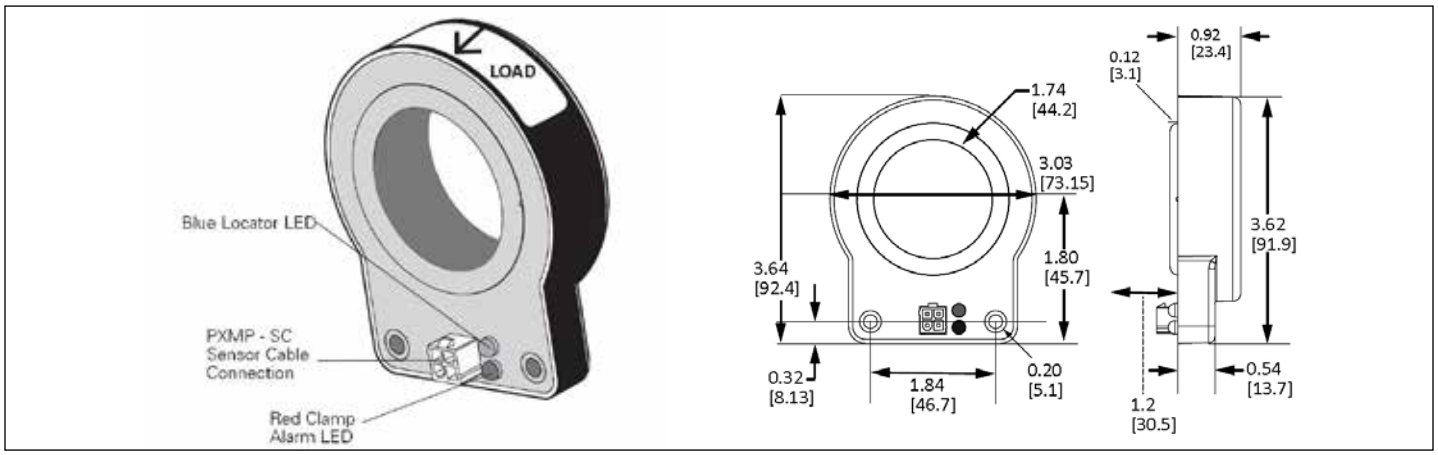

Figure 23. PXMP-CS400.

2.2.2.4.3 PXMP-SC/SCEXX Sensor Cables

The Meter Modules, PXMP-IM Interface Modules, and PXMP-CSXXX Current Sensors are equipped with 2 x 2 receptacles. The PXMP-SC Sensor Cables are designed to connect between the Meter Modules and either a PXMP-CSXX Current Sensor or PXMP-IM Interface Module.

The PXMP Current Sensor Cables are listed in the Table 5.

Table 5. PXMP-SC/SCEXX Current Sensor Cables.

PXMP Cable	Length
PXMP-SC4	PXMP Sensor Cable, 4 ft (1.22 m)
PXMP-SC6	PXMP Sensor Cable, 6 ft (1.83 m)
PXMP-SC8	PXMP Sensor Cable, 8 ft (2.44 m)
PXMP-SC12	PXMP Sensor Cable, 12 ft (3.66 m)
PXMP-SC28-3	PXMP Sensor Cable, 28 ft (8.50 m)
PXMP-SCE8	PXMP Sensor Extension Cable, 8 ft (2.44 m)
PXMP-SCE16	PXMP Sensor Extension Cable, 16 ft (4.88 m)

The PXMP-SC Sensor Cable comes in lengths of 4/6/8/12/28 ft (1.22/1.83/2.44/3.66/8.50 m) with both ends consisting of male connector plugs. In the case of a system that consists of several panels or switch boards, the PXMP-SCE Sensor Cable Extension can be used to extend to the adjacent structure and allow cables to be disconnected mid-way to facilitate shipping splits. The PXMP-SCE Sensor Extension Cable comes in 8 and 16 ft (2.4 and 4.9 m) lengths with one end as a male plug into the PXMP-CSXXX Current Sensor and the other end a female housing to receive the male plug of the PXMP Sensor Cable.

For accuracy/burden issues, the maximum total length of cable between the PXMPCSXXX Current Sensor and the Meter Module is 28 ft (8.5 m).

The sensor cables consist of a 4-position white 2 x 2 plug on each end and four insulated wires in a jacketed cable. Two wires conduct the measured signal proportional to the metered load. The other two wires connect to a sensor identification and tamper detection circuit.

The second two wires also support a locator circuit for use in a special commissioning mode that turns on a blue LED on PXMP-CSXXX Current Sensors or PXMP-IM Interface Modules paired with the red and green LED's on the Meter Module for the same load. During commissioning or troubleshooting the PXMP Commissioning Software can flash LED's for each metered channel to ring out the Meter Module Input and Sensor pairing to verify that a current sensor is paired properly with the specific meter load circuit without having to trace cables or check wire markers. This commissioning mode requires Eaton's PXMP Configuration Software to activate (refer to Sections 3– Software Overview and 6 - Configuring and Commissioning).

2.2.2.4.4 PXMP-IM333MV Interface Modules

333mV secondary output current transformer sensors qualified for double/reinforced insulation, 600V, CAT III can be used with the PXMP Mete by using an interposing PXMP-IM333MV Interface Module and a PXMP-SCXX Sensor Cable. This Interface Module provides functionality similar to the PXMP-CS Current Sensors, including:

- Termination and strain relief of current sensor secondary wires (14 AWG [2.08 mm^2]) max. wires;
- Conversion to PXMP-SCX cables;
- 333 mV CT identification and tamper detection;
- Blue LED sensor locator indicator; and
- 600 V rated housing – Dimensions 3.06 x 1.82 x 0.77 in. (77.72 x 46.23 x 19.56 mm).

Sensors must be rated to provide insulation from the metered circuit's conductor. The CT secondary wires should be cut to the desired length, stripped, and terminated at the terminal block on the adapter module. A strain relief strap from the kit should be looped through the interface board and around the current sensor wires pulling them tight to the board as shown. Typically, current sensor wires secondary output wires are color coded Black/White to indicate Start/Finish winding relationship in harmony with a load direction indication on the sensor assembly. If the Meter Module Load Power LEDs show inversion then you will have to reverse these connections. The cover should be placed around the assembly and screwed together to secure the housing (see **Figure 24**). Choose a PXMP-SCXX Sensor Cable with a length to reach the Meter Module. The Cable and Interface Modules should be routed and positioned so that they do not come in contact with the load cables.

⚠ WARNING

BE SURE THAT LOAD POWER IS OFF WHEN ASSEMBLING THE PXMP-IM INTERFACE MODULES.

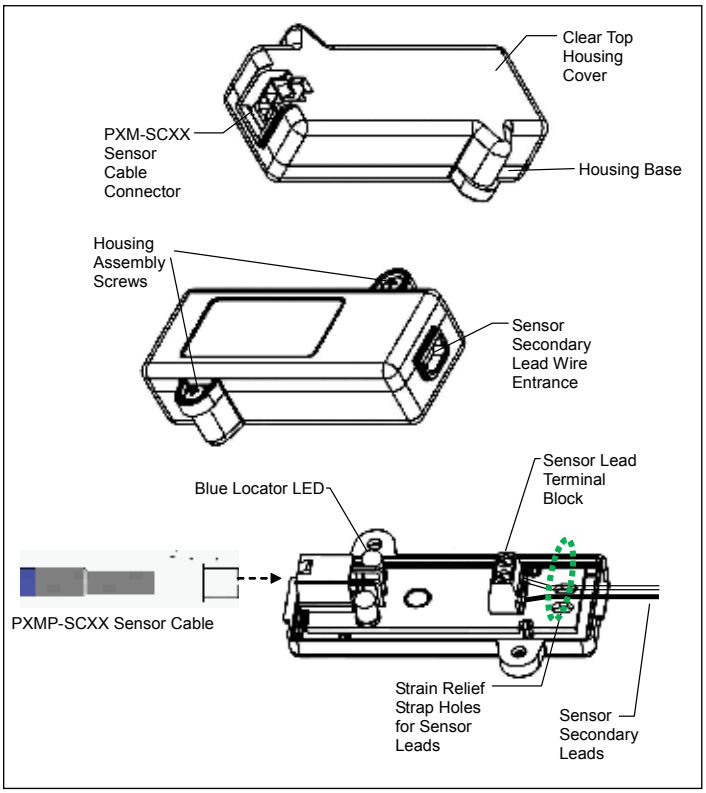

Figure 24. PXMP-IM333mV Interface Module.

2.2.3 PXMP Pulse Input Module (PXMP-PIM)

While the Meter Module (see Section 2.2.2) meters electrical consumption, such as for tenants of an apartment complex, the PXMP Pulse Input Module meters other utilities, such as gas, water, and steam.

The Pulse Input Module requires the customer to have a pulse type output compatible with the PXMP input voltage ratings (24 +/- 20% V), or a switchable intermediate conversion and can capture a pulse rate maximum of 20 Hz square wave. The pulse outputs should be self-compensated for energy measurements.

Figure 25. PXMP-PIM.

Figure 26. PXMP-DOM.

The Pulse Input Module plugs into the Meter Base. It is secured with captive screws that, when tightened, ground the module to the Meter Base and to the earth ground. The Pulse Input Module has terminals for eight digital inputs.

Eight front facing LEDs on the Pulse Input Module flash when digital inputs transition. The LED's are used to indicate pulse counting is active. The Pulse Input Modules are not intended for application status indication however the LED status does indicate the state of the input

- LED On = Contact closed, current flowing into input;
- LED Off = Contact open; no current flowing into input;

Therefore, they can be used for commissioning purposes. Other LEDs indicate COM Status and Health.

The Pulse Input Module has a 2-position, 24 V power supply terminal that must be connected to a local external 24 Vdc power supply dedicated for PXMP use, do not connect to a CAT III power bus. The same 24 V power supply that is used for the Meter Base assembly can be used for the Pulse Input Modules. This 24 V provides 24 V exciting voltage for the input circuit.

Input of the source pulse must be a dry contact. If contact must be made with a device that sources its own voltage output, then an interposing solid state relay may be placed in the middle to isolate the PXMP from the voltage of the output device.

Each Pulse Input Module has a 2.2 K ohm input impedance drawing approximately 10 mA per closed input. All the commons are tied together internally (refer to **Figure 47** - PXMP-PIM Pulse Input Circuitry).

Metering of ten, 3-phase tenants, for example, would require five Meter Modules to meter ten, 3-phase loads (two tenants per meter module). If each tenant also had a gas and a water meter with pulse outputs, this would require metering two pulses per tenant (20 total). Three Pulse Input Modules would be required to meter the 20 pulse inputs (up to eight pulses per module).

This arrangement would occupy eight slots in the Meter Base, leaving two slots free: one could be a PXMP Digital Output Module and one a PXMP Energy Portal Module. The PXMP Digital Output Module is described in Section 2.2.4 and the Energy Portal Module in Section 2.2.5.

2.2.4 PXMP Digital Output Module (PXMP-DOM)

The PXMP Digital Output Module provides outputs from the Meter Base logic to external circuit groups. These outputs are used for control or to indicate alarm conditions. A typical installation might be for building automation systems.

The Digital Output Module can be controlled remotely over Modbus, or driven by logic from the Meter Base, based on customer configuration. See the Modbus register map for control via Modbus (refer to **Section 3** – Software Overview and Appendix B for Modbus Register Map).

The Digital Output Module requires an external power source of 24 +/- 20% V. Use a local 24VDC source dedicated for PXMP use, do not connect to a CAT III bus. Each solid state relay can support a maximum load of 80 mA. Each Solid state relay circuit is electrically separate (see **Figures 48 and 49** –"Digital Output Module" for wiring arrangements).

The Digital Output Module plugs into the Meter Base with captive screws. These screws, when tightened, ground the module to the Meter Base and to the earth ground. The Digital Output Module has eight front-facing LEDs to display the status of each output. Other LEDs indicate COM Status and Health.

2.2.5 PXMP Energy Portal Module (PXMP-EPM)

The PXMP Energy Portal Module adds sophisticated Web enabled metering capability to the PXMP Meter. A typical application would be WEB enabled Tenant metering in an Apartment complex. The Energy Portal enables each tenant to view graphical comparisons of their day to day and month to month energy usage to help them understand their energy usage patterns. Each Tenant can be provided with unique logon credentials that permit them to see only their power and energy consumption data. The Energy Portal provides a graphically rich HTML5 applet that loads automatically into a standard internet browser when the browser is directed to the Energy Portal IP address.

This module can be ordered as PXMP-EPM-M which supports internal dial up telephone modem with RJ11 connection at the bottom of the module for interface with remote billing software in applications where network connections are not possible or practical.

Once the Energy Portal Module is configured with an IP address, the user interface can be accessed over a Local Area Network (LAN) (see Section 3 – Software Overview). Metering data can be viewed for each tenant, as well as an aggregated sum of the tenant meters. Power Xpert Multipoint Meters equipped with the Energy Portal module also support the use of the Eaton E-Allocation software. E-Allocation software is available for download from the Eaton WEB site. This application allows tenant contributions to an overall utility bill to be divided among the tenants. E-Allocation can allocate costs from Pulse metering such as Gas and Water as well as Electrical.

The Energy Portal Module comes standard with a front facing Ethernet RJ-45 configuration port and a LAN/WAN RJ-45 Ethernet jack on the bottom end (see **Figure 27**).

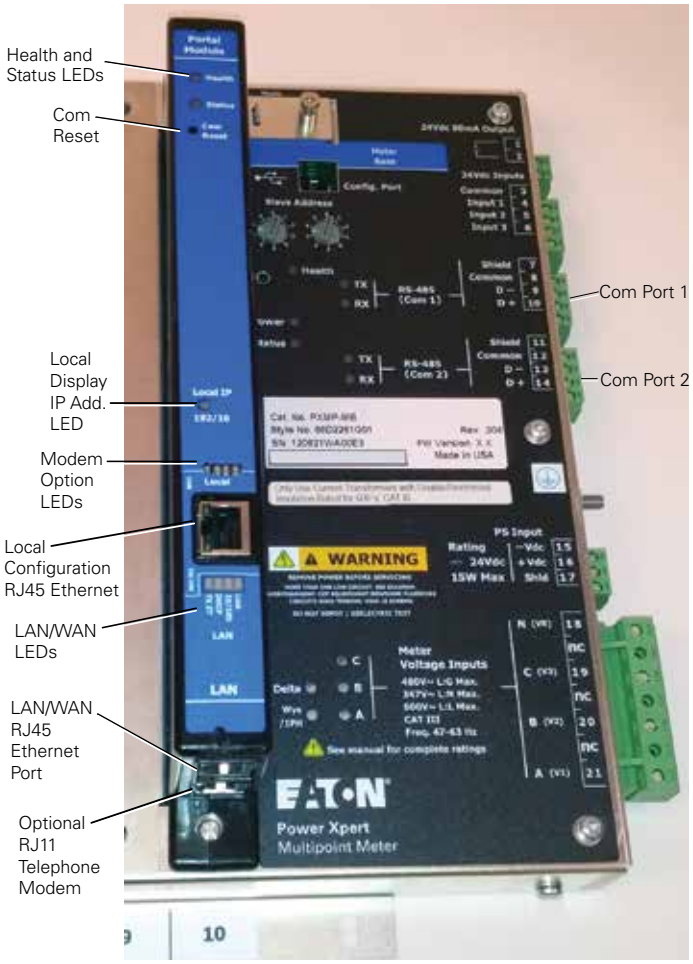

Figure 27. PXMP-EPM and Connections.

The Energy Portal Module plugs into the tenth slot of the Meter Base assembly. It will not function properly in any other slot.

The Energy Portal Module is secured with captive screws that, when tightened, ground the Energy Portal Module to the Meter Base and to the earth ground. For configuration and application details please refer to the "PXMP Energy Portal Web Interface and User Manual" - document number MN150003EN.

3: PXMP Configuration Software Overview

The PXMP Configuration Software is a JAVA application provided free of charge by Eaton to support the configuration and commissioning of the PXMP Meter. This utility is included on a CD provided with each PXMP Meter Base (PXMP-MB). The software can also be downloaded from the Eaton Power Xpert Multi-Point Meter Web site. Please refer to the PXMP Configuration Software Manual MN150002EN for details.

For local configuration of a PXMP Meter, the software can be run on a laptop computer equipped with JAVA 1.7 or higher. For instructions on the use of the PXMP Configuration Software Manual MN150002EN.

To simplify PXMP configuration, a Wizard is provided that guides the operator through a complete configuration process. The software supports both online and offline configuration sessions. To conduct an online session, connect the laptop to the USB port on the Meter Base using a standard USB cable with a Type B USB connector to interface with the meter. Start the software and it will automatically connect to the PXMP Meter. Configuration can also be done over an RS-485 Modbus communications link to either of the PXMP Meter's Com ports 1 or 2.

When launched, the PXMP Configuration Software presents the User with a screen that allows the base information for the electrical system to be entered.

Figure 28. Main Screen for Entering the Meter Base Electrical System Information.

After the base electrical system information has been entered, the PXMP Configuration Software allows the User to enter the information for each slot in the Meter Base assembly.

Figure 29. New Configuration Screen - Used to Enter Information for Each Slot in the Meter Base.

For details on the PXMP Configuration Software, please refer to the User Manual supplied with the software (MN150002EN).

In addition to device configuration, to verify correct device configuration and commissioning, the software can also be used in Monitor Mode to view the metering data for each tenant meter.

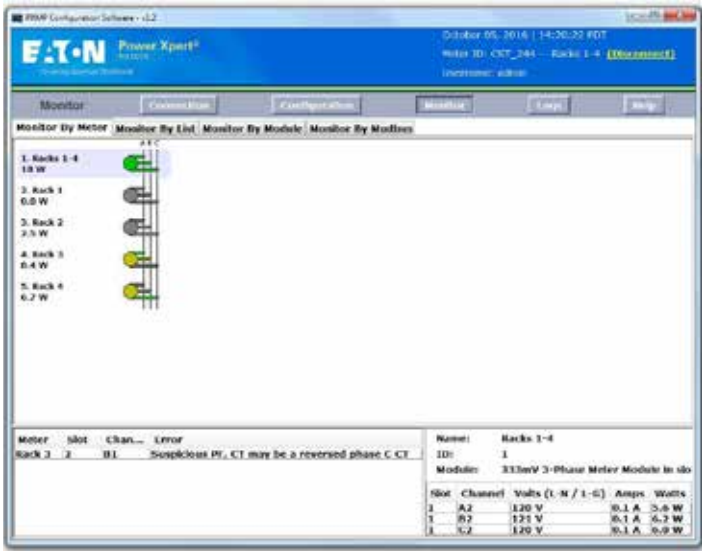

Figure 30. Software in Monitor Mode to View the Metering Data for Each Tenant Meter.

The PXMP Configuration Software is not intended for use as a permanently installed software solution and does not provide cost allocation functionality. Note also that the USB port is intended for temporary configuration setup, commissioning, and debug purposes only.

Figures 31 and 32 are examples from the E-Allocation Software User Guide manual, publication number MN150004EN,

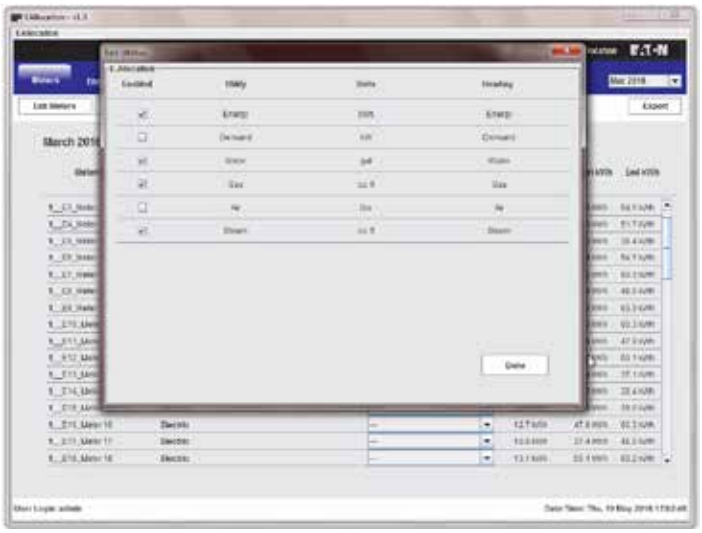

Figure 31. E-Allocation Software Screen.

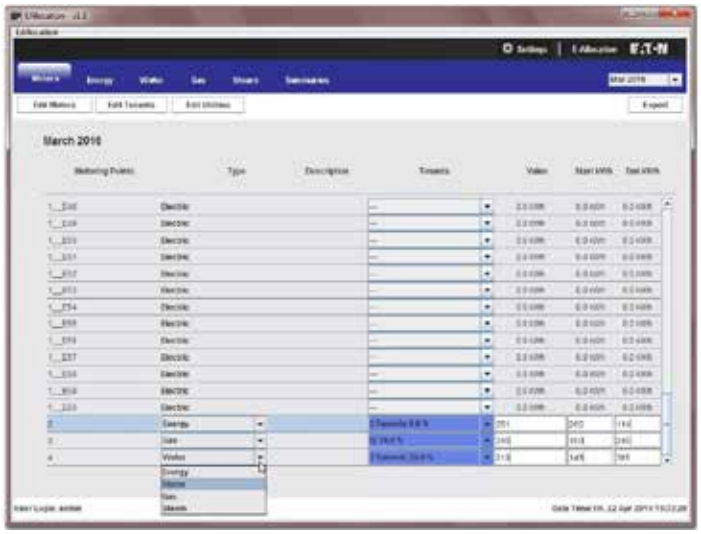

Figure 32. E-Allocation Software Screen.

3.1 Demand Recording

The PXMP Configuration Software enables the User to create a PXMP configuration consisting of a Main Meter, multiple Sub-meters, and multiple Pulse meters. The maximum number of Sub-meters depends on the number of PXMP Meter Modules installed in the Meter Base. Each Meter Module can be configured for up to six single pole sub-meters, three two-pole meters, or two three-pole meters (or combinations not to exceed six poles). Each PXMP Pulse Input Module (PXMP-PIM) can be configured for up to eight pulse meters.

The Meter Base assembly is equipped with 256 MB of non-volatile memory for interval by interval demand recording. For the main and each Sub-meter, the Meter Base stores 60 days of interval by interval demand and energy readings for the following parameters:

- W Forward demand (Import)
- W Reverse demand (Export)
- Q1 kVAR demand (Inductive/Motor Load)
- Q2 kVAR demand (Inductive Generator)
- Q3 kVAR demand (Capacitive Generator)
- Q4 kVAR demand (Capacitive Load)
- Q1,Q4 KVA demand (Import)
- Q2,Q3 KVA demand (Export)
- Energy forward
- Energy reverse

For pulse meters, the Meter Base stores the pulse count for each interval.

The PXMP Energy Portal Module (PXMP-EPM) is equipped with 2 GB of non-volatile memory and is capable of storing over 10 years of 15 minute interval by interval demand data.

4: Power Xpert Multi-Point Meter (PXMP Meter) Installation

4.1 Introduction

To begin the Power Xpert Multi-Point Meter (PXMP Meter) installation, the following minimum components are typically needed (see **Figure 33**).

- An Enclosure to house the PXMP Meter System
- PXMP Meter Base (PXMP-MB) assembly
- At least one PXMP Meter Module (PXMP-MM)
- Load Current Sensors and Sensor Cable
- Power Supply (24 Vdc Control Power); example PSG60E

In addition, these optional components may be useful:

- PXMP Energy Portal Module (PXMP-EPM);
- PXMP Pulse Input Module (PXMP-PIM);
- PXMP Digital Output Module (PXMP-DOM); and
- PXMP External Local Touch Screen Display(PXMP-DISP-6-XV).

The PXMP Meter and current sensors must be housed in a NEMA or UL enclosure which keeps the internal environment within the PXMP's environmental specification ranges and provides suitable fire and mechanical protection in the end product installation.

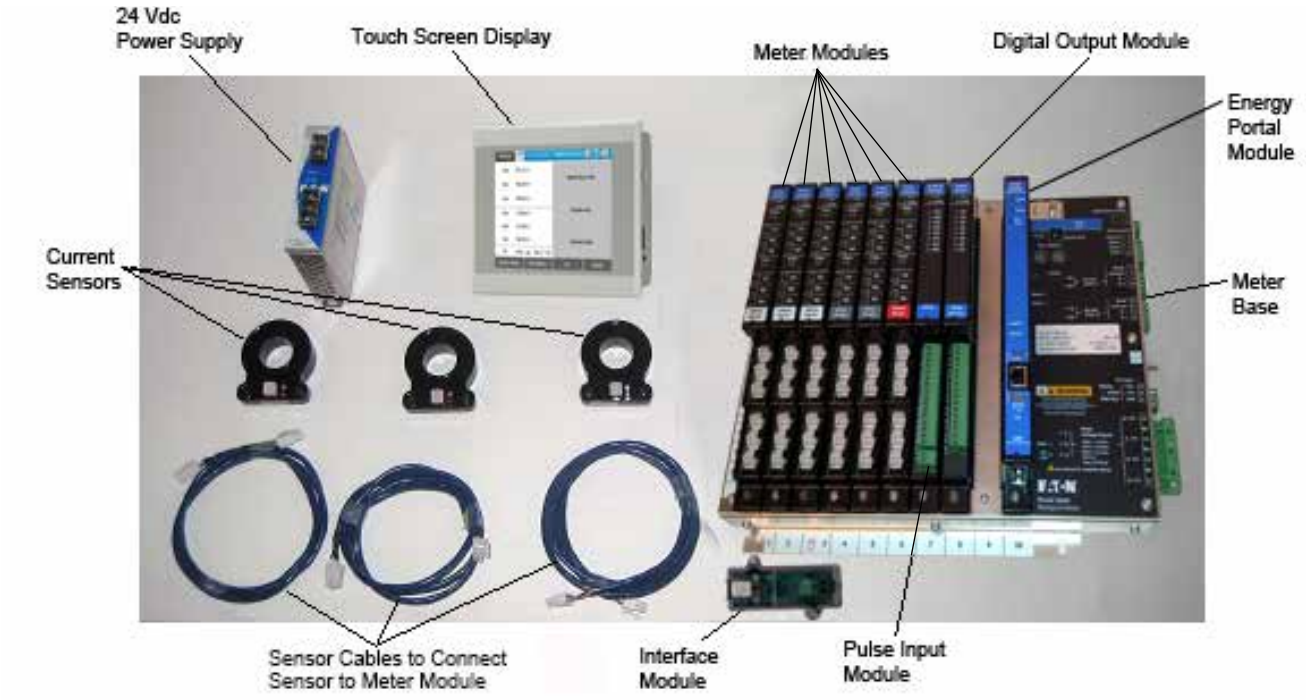

Figure 33. Basic Components Needed for PXMP Meter Installation.

Figure 34. PXMP Meter Base Installed in an Enclosure (without Modules Installed).

Note: If the Meter Base assembly and Energy Portal Module were purchased pre-installed in an enclosure or as part of an Eaton Power Distribution Equipment assembly, refer to the documentation supplied with the Meter Base assembly and enclosure for detailed information and instructions.

4.2 Installing a Meter, Pulse Input, Digital Output, and/or Energy Portal Module in the Meter Base Assembly

While it is possible to install Meter, Pulse Input, Digital Output, and Energy Pulse Modules in the Meter Base assembly after it is mounted, Eaton recommends installing all modules in the Meter Base assembly before it is installed. This makes the process easier and safer then installing modules after the Meter Base is mounted.

Note: If installing an Energy Portal Module, it must be installed in Slot 10.

Before beginning the process of installing a module, place the Meter Base assembly on an appropriate, clean, and well-lit work surface.

1. Remove the mounting hardware securing the cover plate over the slot in which the module will be installed (see **Figure 35**). Remove the cover plate (see **Figure 36**).

Figure 35. Removing the Mounting Hardware and Cover Plate.

Figure 36. Cover Plate Removed from Slot 1.

2. Align the connectors on the module with the receptacle in the open slot. Once properly aligned, press the module into the slot until fully seated. Secure the module in the slot with the captive screws (see **Figure 37**).

Figure 37. Module Installed in the Meter Base Assembly.

3. Repeat the process until all the modules needed for this Meter Base assembly have been installed.

4.3 Installing the Meter Base Assembly in the Enclosure

Note: The PXMP Meter and current sensors must be housed in a NEMA or UL enclosure which keeps the internal environment within the PXMP's environmental specification ranges, provides suitable fire and mechanical protection and support all applicable safety codes in the end product installation. See **Figure 38** for Meter Base dimensions and **Figure 34** for an example of a possible enclosure layout.

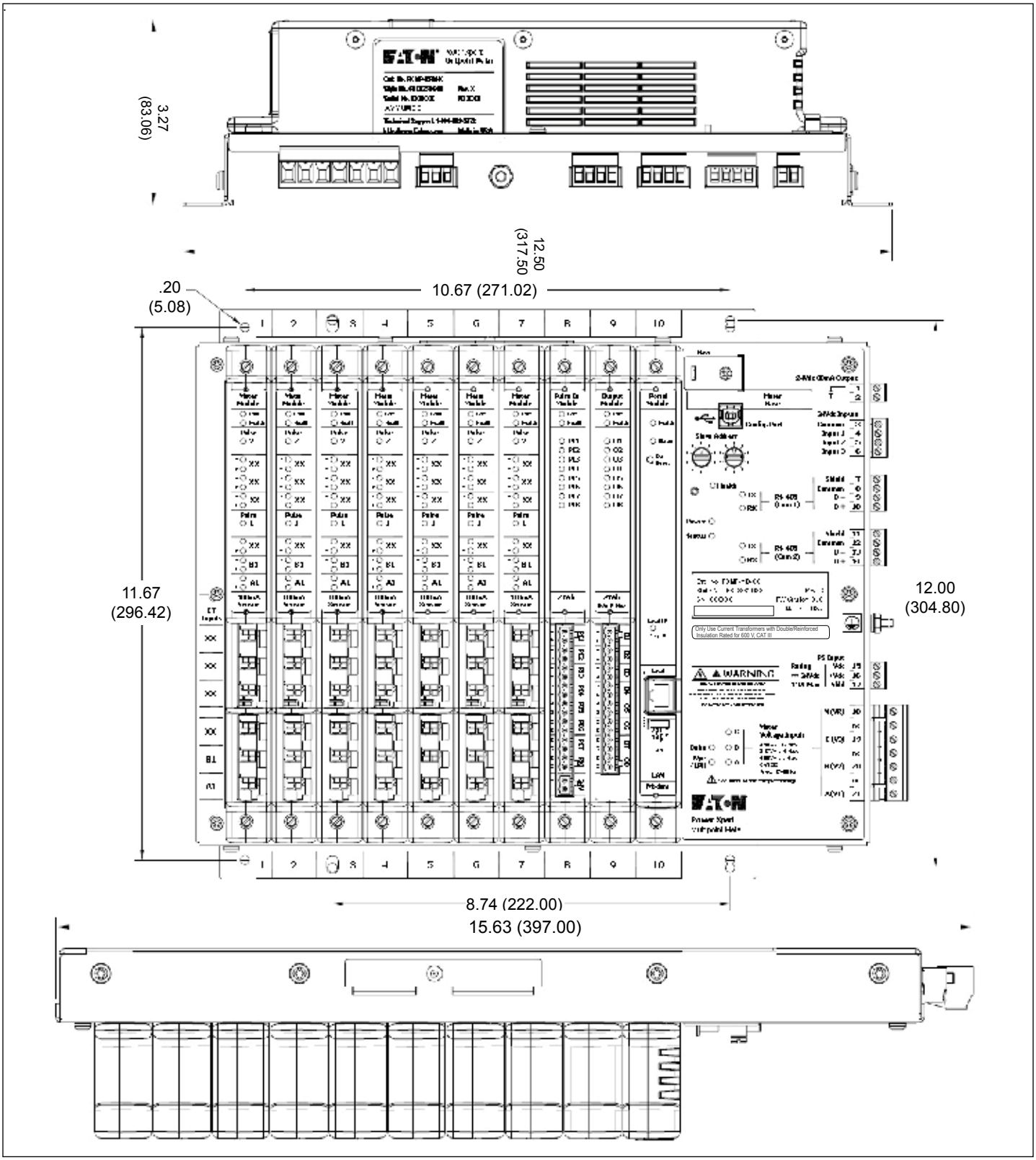

Figure 38. PXMP Meter Assembly Dimensions.

4.3.1 Before Attempting to Install the PXMP Meter Assembly in the Enclosure

⚠ WARNING

COMPLETELY READ AND UNDERSTAND THE MATERIAL PRESENTED IN THIS DOCUMENT BEFORE ATTEMPTING INSTALLATION, OPERATION, OR APPLICATION OF THE EQUIPMENT. ONLY QUALIFIED PERSONS SHOULD BE PERMITTED TO PERFORM ANY WORK ASSOCIATED WITH THE EQUIPMENT. ANY WIRING INSTRUCTIONS PRESENTED IN THIS DOCUMENT OR WITH THE PRODUCT MUST BE FOLLOWED PRECISELY. FAILURE TO DO SO COULD CAUSE PERMANENT EQUIPMENT DAMAGE, BODILY INJURY, OR DEATH.

⚠ WARNING

DO NOT ATTEMPT TO INSTALL OR PERFORM MAINTENANCE ON EQUIPMENT WHILE IT IS ENERGIZED. DEATH, SEVERE PERSONAL INJURY, OR SUBSTANTIAL PROPERTY DAMAGE CAN RESULT FROM CONTACT WITH ENERGIZED EQUIPMENT. ALWAYS VERIFY THAT NO VOLTAGE IS PRESENT BEFORE PROCEEDING WITH THE TASK, AND ALWAYS FOLLOW GENERALLY ACCEPTED SAFETY PROCEDURES.

⚠ WARNING

SWITCH MAIN POWER OFF AND WAIT FIVE (5) MINUTES BEFORE MAKING ANY CONNECTION OR DISCONNECTION ON THE DEVICE. DANGER OF EXPLOSION!

EATON IS NOT LIABLE FOR THE MISAPPLICATION OR MISINSTALLATION OF ITS PRODUCTS.

⚠ CAUTION

BEFORE ATTEMPTING TO INSTALL THIS EQUIPMENT IN AN EXISTING OEM ENCLOSURE, MAKE SURE THE ENCLOSURE IS SECURELY MOUNTED AND THAT THE MOUNTING AND ALL EXISTING WIRING MEETS OR EXCEEDS ALL APPLICABLE CODES AND STANDARDS.

1. Disconnect and lockout all power to the enclosure. Verify that no power is present in the enclosure.
2. Inspect the enclosure to determine the best mounting location for the PXMP Meter assembly. The mounting location must include:

- Sufficient open area to provide clearance around and in front of the PXMP Meter assembly (see **Figure 39** for dimensions) after it is mounted in the enclosure;
- Access to a DIN rail, or an open area to mount the supplied DIN rail, for mounting the 24 Vdc Power Supply;
- Space and paths to route wires to and from the meter;
- Access to a protective earth safety ground between the enclosure and meter base.

3. Once a preliminary mounting area in the enclosure has been identified, examine the inside of the door of the enclosure for any potential problems/interferences. If none are found, slowly close the enclosure door and observe any movement of components or cables/wiring that may interfere with the PXMP Meter assembly when the door is closed.

4.3.2 Mounting the PXMP Meter Assembly in the Enclosure

1. Once a suitable mounting location is determined in the enclosure (see Section 4.3.1), use the mounting template (see **Figure 39**) to prepare the mounting surface.

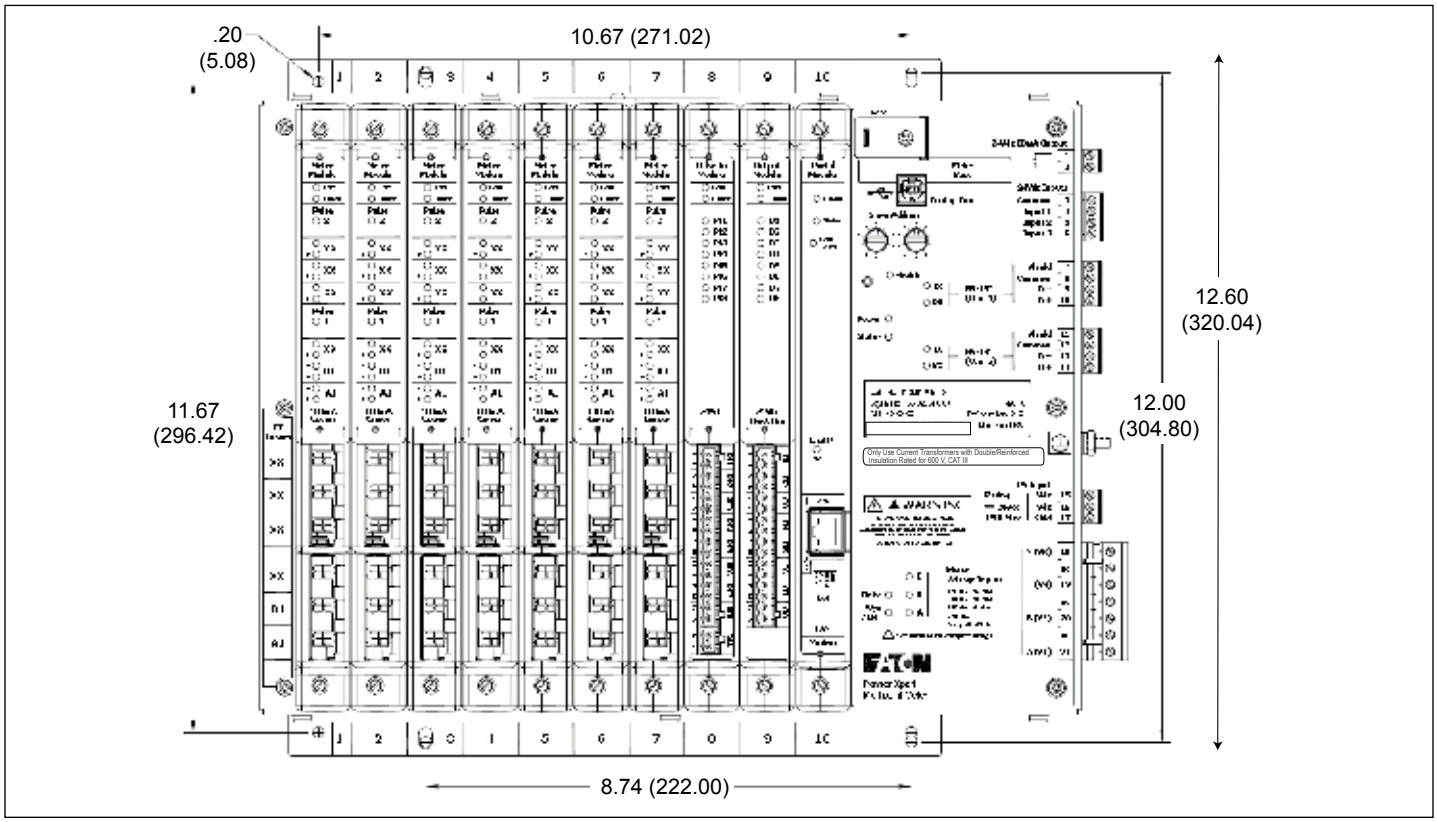

Figure 39. Mounting Template for the PXMP Meter Assembly.

⚠ CAUTION

BEFORE DRILLING, TAKE THE APPROPRIATE STEPS TO ENSURE THAT DRILL SHAVINGS DO NOT FALL ONTO OR INTO ANY COMPONENTS WITHIN THE ENCLOSURE. DRILL SHAVINGS CAN CAUSE SHORT CIRCUITS AND DAMAGE TO THE COMPONENTS WITHIN THE ENCLOSURE.

2. Align the Meter Base assembly with the holes just drilled in the enclosure. Secure the Meter Base assembly to the enclosure using the mounting hardware supplied.
3. Connect a protective earth safety ground between the enclosure and the safety ground terminal on the Meter Base assembly.

4.3.3 Installing a 24 Vdc Power Supply in the Enclosure

⚠ CAUTION

FOR SUFFICIENT CONVECTION COOLING, KEEP A DISTANCE OF 2 IN. (50.8 MM) ABOVE AND BELOW THE DEVICE AS WELL AS A LATERAL DISTANCE OF 0.8 IN. (20.3 MM) TO OTHER UNITS.

THE ENCLOSURE OF THE DEVICE CAN BECOME VERY HOT DEPENDING ON THE AMBIENT TEMPERATURE AND LOAD OF THE POWER SUPPLY. IT CAN PRESENT A RISK OF BURNS!

A 24 Vdc power source is required to power the Meter Base assembly and any related input or output external circuit groups including those associated with the Meter Base assembly Discrete Input and Output circuits, Pulse Input and Digital Output modules. Use a local 24VDC source dedicated for PXMP use only, do not connect to a CAT III bus. The power rating of the sourcing power supply must be adequate for the total load supplied at the maximum anticipated ambient temperature. This power supply must also be matched to ratings of the application's mains source and provide isolation from mains.

The following maximum possible 24 Vdc loads need to be considered in a PXMP Meter power system:

- 15 W - Meter Base 24 Vdc PS input;
- 2 W - Meter Base Digital Output X 1 on max. rated of 80 mA;
- 1 W - Meter Base Digital Inputs X 3 contact energized (dry contact closed);
- 9.5 W - PXMP Display
- 2 W - Per Pulse Input Module with all eight inputs energized (dry contact closed);
  - 20 W worst case for ten cards;
- 15.4 W – Per Digital Output Module with eight solid state outputs energized;
  - 154 W worst case for ten cards.

The Eaton PSG family of power supplies is a good match for most PXMP Meter Systems. Those supplies with an E suffix have a 100 – 240 Vac rating which would require a Control Power Transformer (CPT) to step down from higher rated mains source. Those with an F suffix can power directly off of a 480 V Wye mains source.

PSG E suffix, CPT style mains supplies and their output ratings:

- PSG60E - 2.5 amperes (60 W);
- PSG120E - 5 amperes (120 W);
- PSG240E - 10 amperes (240 W);
- PSG480E - 20 amperes (480 W).

PSG F suffix, 3-phase 400-500 VL:L rated Wye mains supplies and their output ratings:

- PSG60F - 2.5 amperes (60 W);
- PSG120F - 5 amperes (120 W);
- PSG240F - 10 amperes (240 W);
- PSG480F - 20 amperes (480 W).

Note: All of the PSG series require de-rating above 50°C (122°F) to 50% load at 70°C (158°F) or below 0°C (32°F) to 80% at -20°C (-4°F).

If any of the 24 Vdc external circuit groups require isolation from the other external circuit groups, then separate power supplies should be used to provide the needed isolation barrier.

For 100-240 V 50/60 Hz mains applications, the Eaton PSG60E 24 Vdc output power supply may be an adequate choice depending on field circuit loads. The PSG60E power supply unit is to be mounted on a 35 mm DIN rail in accordance with EN 60715. The device should be installed vertically with input terminal blocks on the bottom for optimum convection cooling. Each device is delivered ready to install. Follow the mounting instructions supplied with the power supply and review the supply's specification to ensure they meet the application need.

Refer to **Figure 40** for the following power supply installation procedure.

1. Tilt the power supply slightly upwards and insert it into the DIN rail.
2. Push the power supply downwards until it stops.
3. Firmly press against the bottom front side of the power supply to "lock" it into place.

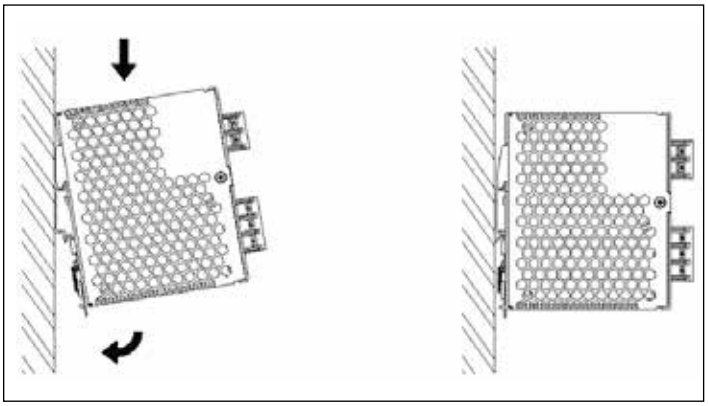

Figure 40. Installing the PSG60E Power Supply on the DIN Rail in the Enclosure.

4. Shake the power supply slightly to ensure that it is secured on the DIN rail.

4.3.4 Current Sensor Installation

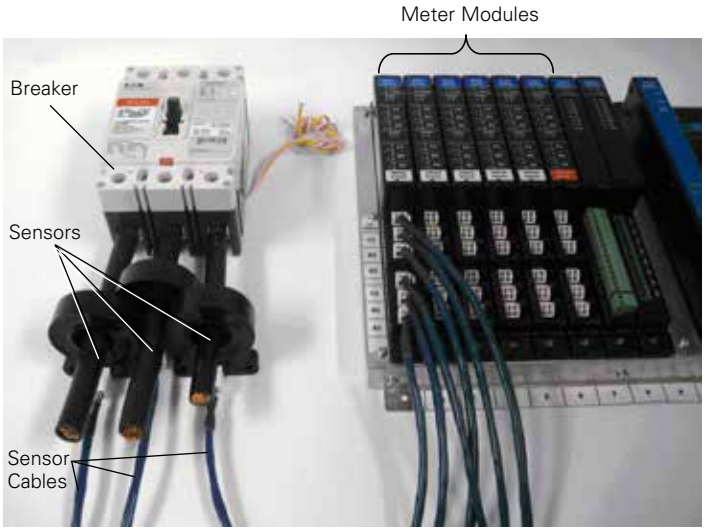

Figure 41. Typical Wiring Arrangement of Sensor Connected to Meter Module.

Three different types of current sensors can be used with the PXMP Meter based on secondary output type and range. The PXMP Meter is compatible with direct connection to 100 mA, 10 mA, and 333 mV maximum rated secondary current sensors. By using interposing current transformers such as the CS005, current transformers with 5 Amp outputs can be interfaced. Each current sensor is slightly different. Some require special mounting. Note that all current sensors used with the PXMP meter should be enclosed in a suitable NEMA enclosure which provides adequate fire and mechanical protection and be qualified as double/reinforced insulation, 600 V, CAT III.

Note: Sensor types and Meter Module types should not be interchanged. The sensor type and Meter Module type must have matching, full scale sensor secondary signal levels:

- 10 mA sensors connect to 10 mA Meter Modules;
- 100 mA sensors to 100 mA Meter Modules;
- 333 mV sensors to 333 mV Meter Modules.

Selecting the proper current sensor type compatible with the Meter Module type is important to ensure correct metering. Sensors should be sized so that the primary current rating of the sensor is not exceeded during normal operation (refer to the Product Specifications in Section 1 and Appendix A for details).

Table 1 in Section 1 and Tables 3 and 4 in Section 2 list two types of Eaton Current (Transformer) Sensors specifically design for use with the PXMP Meter. These sensors are rated for use with primary load circuits rated for 600 V or less. The sensor interface for these current sensors is designed to plug into the Meter Modules using the 2 x 2 plugs.

These Eaton Current Sensors are:

- CSXXX series with 10 mA maximum secondary outputs. (The yellow interface cable is integral to the sensor. This series is only compatible with the PXMP Meter's PXMP-MM10MA Meter Module.)
- PXMP-CSXXX series with 100 mA maximum secondary outputs. (This series is only compatible with the PXMP Meter's PXMP-MM100MA Meter Module. The blue PXMP-SCXX interface cable is a separately purchased assembly.)

Third party 333 mV maximum secondary CTs can also be interfaced to Meter Modules with the use of the interposing Interface Modules and PXMP-SC Sensor Cables. These Interface Modules provide functionality similar to the PXMP-CS current sensors, including; current transformer secondary termination, Third party 333 mV identification, sensor LED locator circuitry along with an interface to the PXMP-SC sensor cables that then can plug into the Meter Modules.

- PXMP-IM333MV Interface Module for use with 333 mV maximum secondary CTs.

To connect between the Sensor Interface module and the Meter Module, use the blue PXMP-SCXX Eaton cables referred to in Tables 5 and 6. 333 mV current sensors have a built in burden resistor that eliminates open circuit concerns. Sensors should be selected based on installation and accuracy considerations. These sensor cables come in 4/6/8/12/28 ft (1.22/1.83/2.44/3.66/8.50 m) lengths. Eight and 16 ft (2.44 and 4.88 m) extensions are also available.

The orientation of the sensor relative to the load current flow is important for proper metering. Current sensing is directional. Sensors should be mounted on the insulated load cables facing the load current back to front as shown by the arrow on top of the sensor or similar direction marking. An incorrect orientation results in an incorrect energy reading. Two LED indicators per load circuit on the Meter Module will indicate the power polarity. Note that the green LED on the Meter Module indicates current flow towards the load. The red LED indicates current is flowing from the load towards the source. Normally, a red LED indicates that the sensor is mounted backwards. The red LED would be correct if the circuit being monitored is a generator, not a load. Any of the following conditions will result in indicators being off:

- Insufficient Current flowing
- Sensor Cable disconnected
- Meter Base Assembly powered down
- Meter Voltages are disconnected

Figure 42. 2x2 Load Facing Side of a 100 mA PXMP-CS250 Solid Core Current Sensor Showing 4-Pin Connector Compatible with External PXMP-SCXX Sensor Cable Locator, and Clamp Active Alarm LEDs.

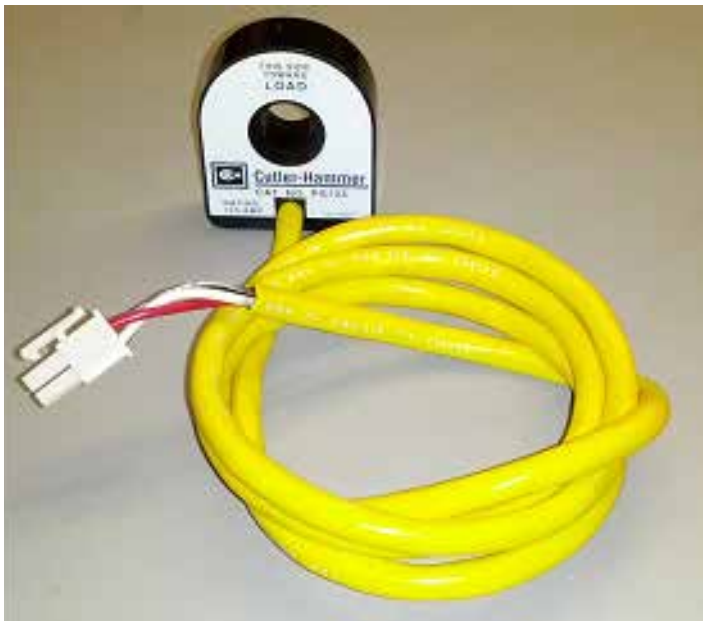

Figure 43. 10 mA CS125 Solid Core Current Sensor with Integral 48 in. (1.22 m) Cable.

Note: As each sensor is installed, Eaton suggests that the Installer mark each sensor cable as to which breaker and pole it is connected. Later in the installation process, this will aid in connecting the sensor cables to the Meter Modules.

4.3.4.1 CS005 Current Transformer

In PXMP Meter applications where a 5 A current transformer is preferred, the CS005 current transformer can be installed to act as an interposing sensor. The CT 5 A secondary should be connected to the primary terminals of the CS005 (see **Figure 44**). The secondary 2 x 2 plug should be connected to the 10mA Meter Module 2 x 2 mating receptacle corresponding phase.

For example, if the 5 A CT is monitoring Phase A current, the secondary 2 x 2 plug of the CS005 should be connected to the 2 x 2 receptacle on the 10mA Meter Module.

Example: A1, A2, or A3 if applicable.

The CS005 Current Sensor can also be used in an installation with existing 5 A Secondary Current Transformer. Connect the wire from polarity side of 5 A Secondary Current Transformer to H1(+) terminal of the CS005 Current Sensor and connect the wire from non-polarity side of the 5 A Current Transformer to H2(-) terminal of the CS005 Current Sensor. Eaton recommends using a shorting block between the 5 A Secondary Current Transformers and CS005 Current Sensors.

In some applications, a PXMP-SC-XOVER Crossover Cable is required when using the CS005 in order to measure watts with the proper polarity (see **Figure 44**).

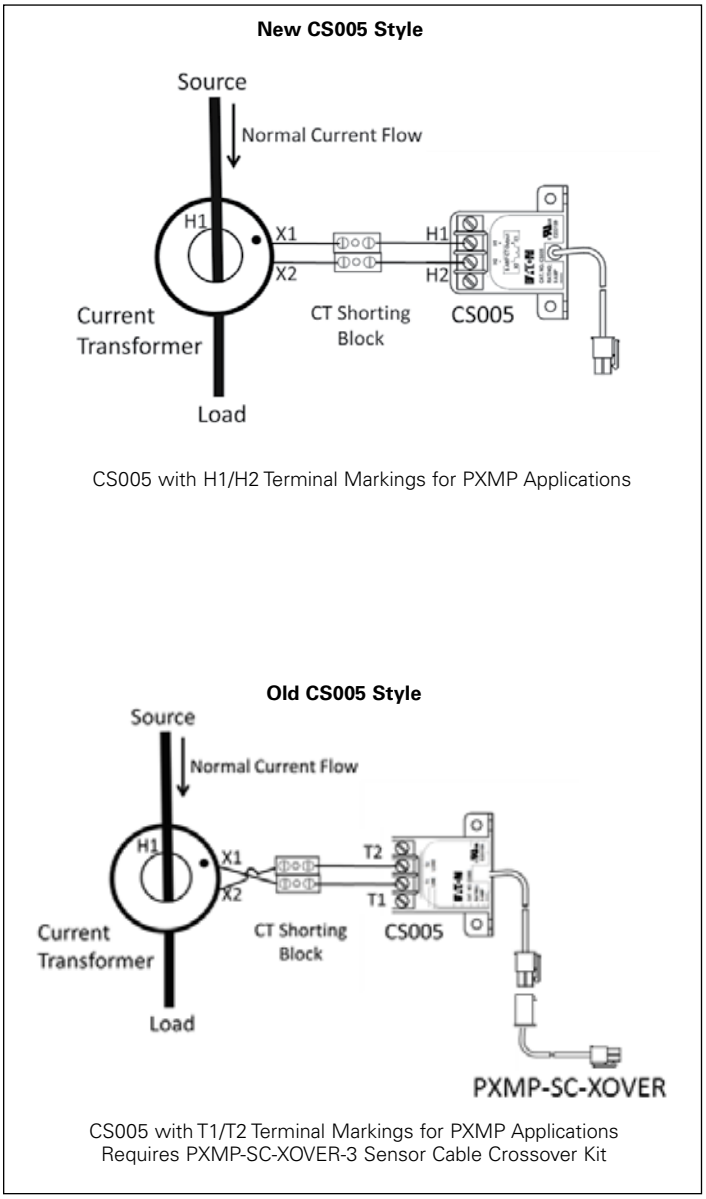

Figure 44. Examples of 3-Phase 4-Wire Service Using 5 Amp CTs and CS005 Sensors (Refer to Section 4.4, Figure 63 for more detailed drawing).

⚠ WARNING

DO NOT DETACH THE CT SECONDARY WIRES FROM THE CS005 UNDER LOAD. THE OPEN CIRCUIT CLAMP DOES NOT PROTECT AGAINST CIRCUIT DISCHARGE WHEN THE CT SECONDARY WIRES FROM THE CS005 ARE DISCONNECTED.

Note: The polarity markers on the current transformer should match with the markers on the CS005.

Any standard 5 A secondary current transformer can be used with CS005 for the red line.

For accuracy, a revenue grade CT should be applied. The User will need to configure the current transformer ratio using the PXMP Configuration Software.

Example: If the circuit to be metered is rated for 2000 A, 2000:5 current transformers could be installed on the primary conductor. The secondary 5 A circuit would be wired to the CS005 as shown in **Figure 44**. The polarity mark side of the 5 A circuit should be connected to the terminal on the CS005 marked "To Line".

The PXMP Configuration Software can then be used to configure the 2000:5 CT ratio for metering to be correct.

4.3.4.2 Cables and Sensors Supported by the PXMP Meter

The PXMP Meter supports the following types of sensors:

- CS005, CS50, CS125, CS200, CS400 – 10 mA maximum secondary output sensors;
- PXMP-CS125, PXMP-CS250, and PXMP-CS400 – 100 mA maximum secondary output sensors;
- Third party 333 mV secondary maximum rated output.

See Table 6 for sensor to cable information.

Table 6. PXMP Meter Compatible Sensor Cable Overview.

Sensor	Cable Color	Cable Length	Connector Gender	Catalog Number
10 mA	Yellow	4 ft (1.22 m)	Male	Integral
	Blue	8 ft (2.44 m) Ext.	Male/Female	PXMP-SCE8-3
	Blue	16 ft (4.88 m) Ext.	Male/Female	PXMP-SCE16-3
100 mA	Blue	4 ft (1.22 m)	Male/Male	PXMP-SC4-3
		6 ft (1.83 m)	Male/Male	PXMP-SC6-3
		8 ft (2.44 m)	Male/Male	PXMP-SC8-3
		12 ft (3.66 m)	Male/Female	PXMP-SC12-3
		8 ft (2.44 m) Ext.	Male/Female	PXMP-SCE8-3
		16 ft (4.88 m) Ext.	Male/Female	PXMP-SCE16-3
		28 ft (8.50 m) Ext.	Male/Female	PXMP-SCE28-3
PXMP-IM333 MV	Blue	4 ft (1.22 m)	Male/Male	PXMP-SC4-3
		6 ft (1.83 m)	Male/Male	PXMP-SC6-3
		8 ft (2.44 m)	Male/Male	PXMP-SC8-3
		12 ft (3.66 m)	Male/Female	PXMP-SC12-3
		8 ft (2.44 m) Ext.	Male/Female	PXMP-SCE8-3
		16 ft (4.88 m) Ext.	Male/Female	PXMP-SCE16-3
		28 ft (8.50 m) Ext.	Male/Female	PXMP-SCE28-3
PXMP Cable Crossover	Blue	6 in (152.4 mm)	Male/Female	PXMP-SC-XOVER

Note: Using the PXMP Configuration Software, each Meter Module can be configured as up to two 3-phase meters, up to three 2-pole meters, and up to six single-pole meters. Combinations of 3-pole, 2-pole, and single-pole meters can be configured on the same Meter Module as long as the total number of poles is six or less. All of the poles for a 2- or 3-pole meter must be on the same Meter Module. Meters cannot be configured to span across multiple modules.

4.3.5 Sensor Installation Procedure

⚠ WARNING

DO NOT ATTEMPT TO INSTALL OR PERFORM MAINTENANCE ON EQUIPMENT WHILE IT IS ENERGIZED. DEATH, SEVERE PERSONAL INJURY, OR SUBSTANTIAL PROPERTY DAMAGE CAN RESULT FROM CONTACT WITH ENERGIZED EQUIPMENT. ALWAYS VERIFY THAT NO VOLTAGE IS PRESENT BEFORE PROCEEDING WITH THE TASK, AND ALWAYS FOLLOW GENERALLY ACCEPTED SAFETY PROCEDURES.

EATON IS NOT LIABLE FOR THE MISAPPLICATION OR MISINSTALLATION OF ITS PRODUCTS.

1. Ensure that the breaker is de-energized (Lock Out/Tag Out).
2. Confirm that the breaker is securely mounted.
3. Disconnect the load wire to be metered from the breaker.
4. Slide the current sensor (10 mA, 100 mA, or 333 mV) over the load wire to be metered. Position the sensor over the insulated wire sheath so the current flow is from back to front. For the CSXXX 10 mA current sensors, the flat side is the back to be placed towards the breaker while the cable side faces the load. For the PXMP-CSXXX 100 mA Current Sensors, the side with the white 2 x 2 connector and LEDs should face the load. Also the arrow on top must point to the load. In special reverse feed cases where the breaker cable lugs are fed from the line side instead of feeding the load side, the LED's and 2x2 connector should still be mounted facing away from the breaker. This may result in reverse power flow indication but may be mechanically necessary to mount on reverse fed breakers.
5. Mount the sensor appropriately for your installation. The PXMP-CSXXX sensors have two 0.2 in. (5.08 mm) I. D. holes near the bottom of the housing. For mounting details, refer to Section 2.
6. Re-connect the load wire removed from the breaker.
7. Select the proper cable and length for the application. Include extensions if necessary (refer to Table 6 - PXMP Meter Compatible Sensor Cable Overview).

⚠ CAUTION

PLUG ONE END OF THE CABLE INTO THE 2 X 2 RECEPTACLE ON THE PXMP-CSXXX CURRENT SENSOR OR SENSOR INTERFACE MODULE.

PLUG THE OPPOSITE END OF THE CABLE INTO THE METER MODULE SOCKET FOR THE CORRECT PHASE TO BE METERED. BE CERTAIN THAT THE METER MODULE TYPE MATCHES THE SENSOR TYPE. USE AN EXTENSION CABLE IF REQUIRED.

Note: Third party 333mV sensors come with two leads and requries the use of the applicable Interface Module. The Interface Module has a terminal block on one side and a 2 x 2 receptacle on the other side. Plug the sensor cable into Interface Module. Ensure that the secondary wires from the 100ma current sensor are wired to the terminal block on the interface module before any load current is passed through the sensor to avoid dangerous open circuit voltages.

- If using a third party or 333 mV current sensor, then cut the current sensor leads to the desired length, strip, and terminate the leads to the interface modules terminal block following Black/White (Polarity/Non-Polarity) color coding to preserve polarity to the terminal block of the module.
- A nylon pull strap should be woven through the holes in the interface board printed circuit board next to the terminal block and then around the sensor leads. Pull this strap tight for strain relief and cut off the excess strap.
- Add the protective cover on the assembly as per the directions included with the Interface Module and the details in Section 2.2.2.4.4 - PXMP-IM333mV Interface Modules.
- Configure the Meter Module as required (refer to Section 3 for information regarding PXMP Configuration Software.).
- Ensure that all safety issues are addressed and then restore power to the breaker.

4.3.6 Installing the Optional PXMP Touch Screen Display

Eaton recommends purchasing an optional 5.7 in. (144.78 mm) touch screen display PXMP-DISP-6-XV. This is an Eaton XV-102-H4-57TVRL-10 pre-programmed with PXMP display capabilities. A 6 ft (1.8 m) cable is provided with the display to connect between the Display and the PXMP meter base. The display provides the User with the ability to locally view meter readings to help troubleshoot problems that may arise, and view power system metering data when a computer is not handy or available.

The optional display is for system monitoring purposes only and cannot be used to set-up the PXMP Meter. Set-up of the meter must be done using the PXMP Configuration Software running on the computer. Refer to PXMP Configuration Software manual MN150002EN

Please reference TD150030EN for installation details.

4.4 Recommended Wiring Connections

4.4.1 Input/Output (use a local PXMP dedicated external 24VDC source, do not connect to a CAT III bus).

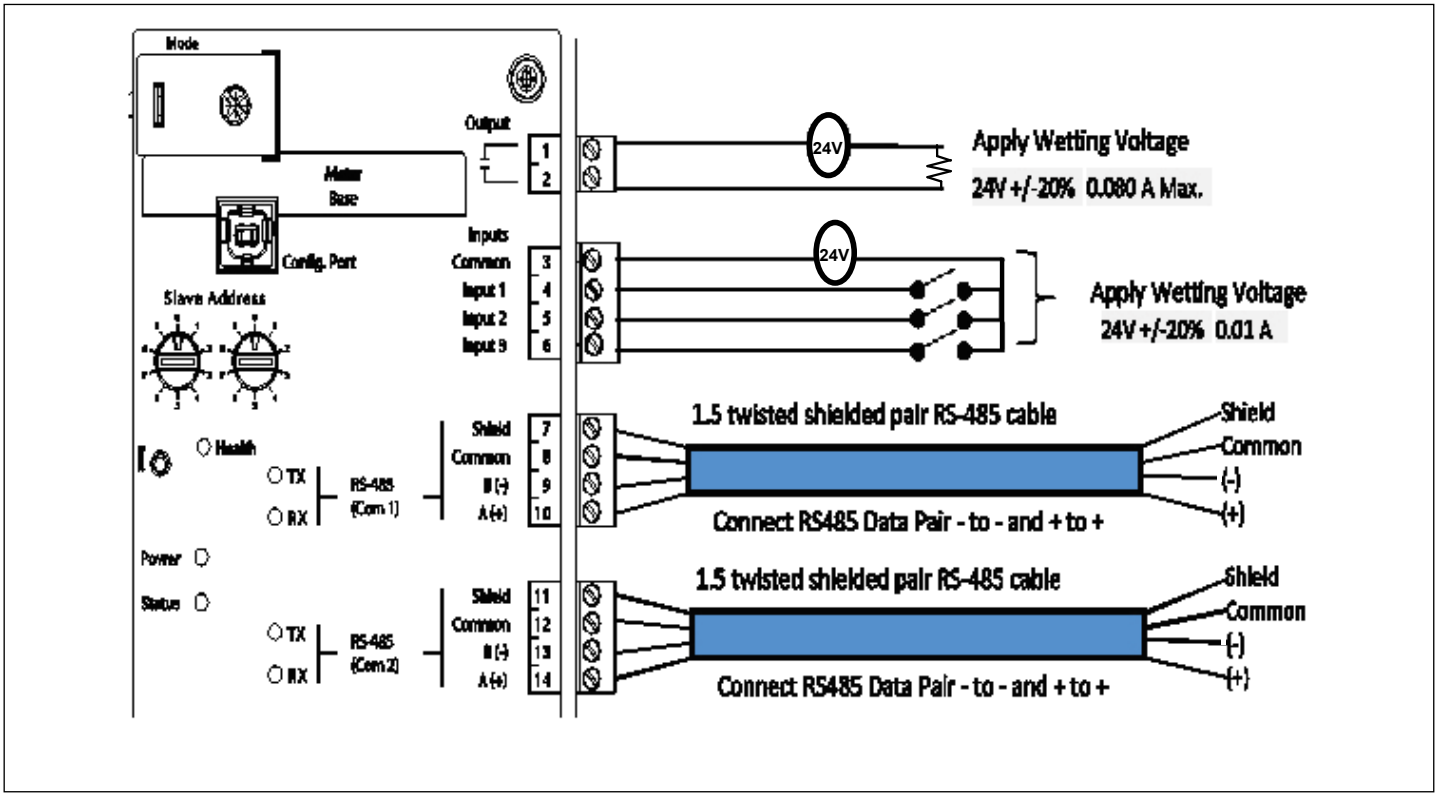

Figure 45. PXMP Meter Base Assembly Digital Input/Output Connections.

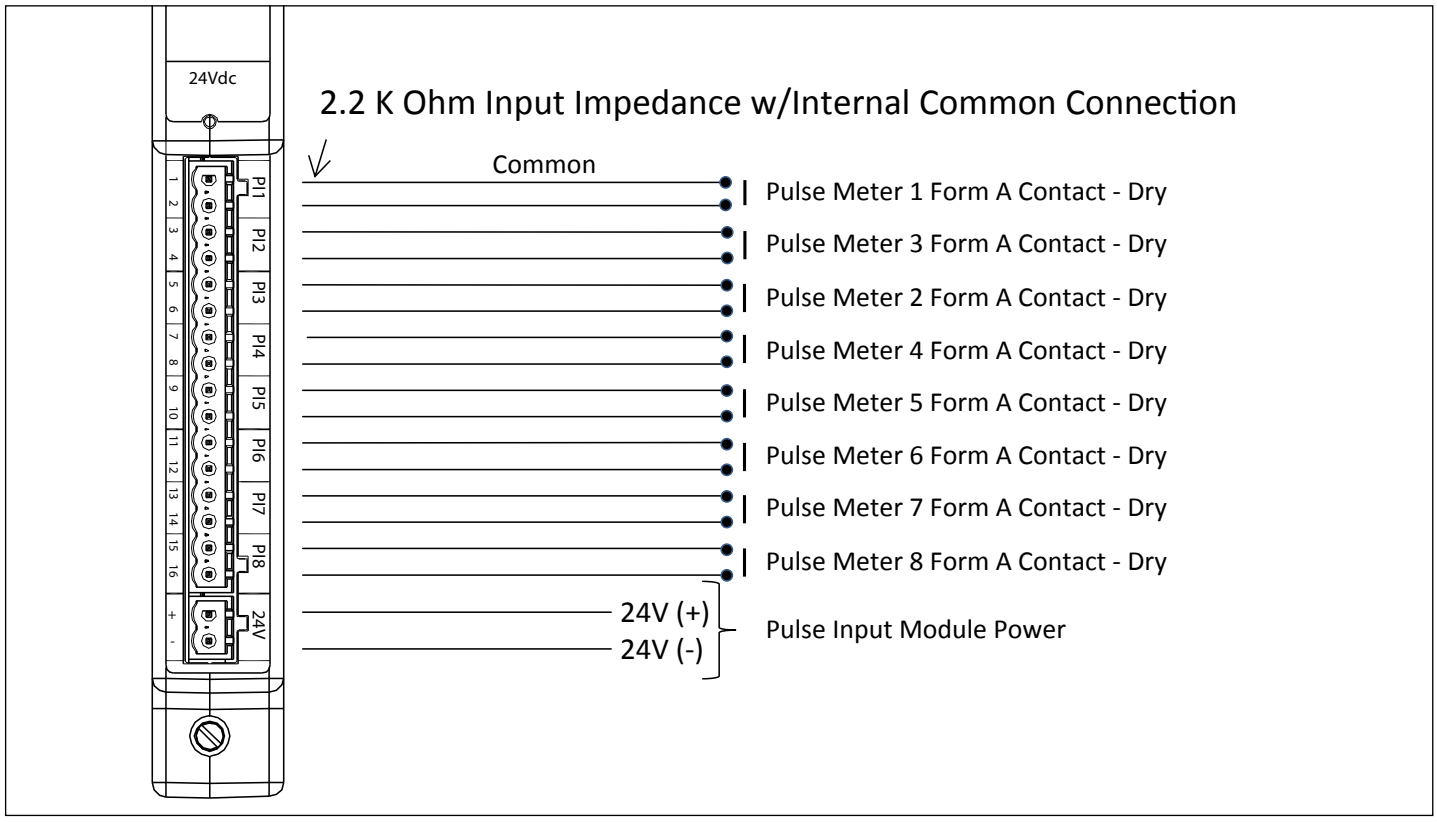

Figure 46. PXMP Pulse Input Module Connections.

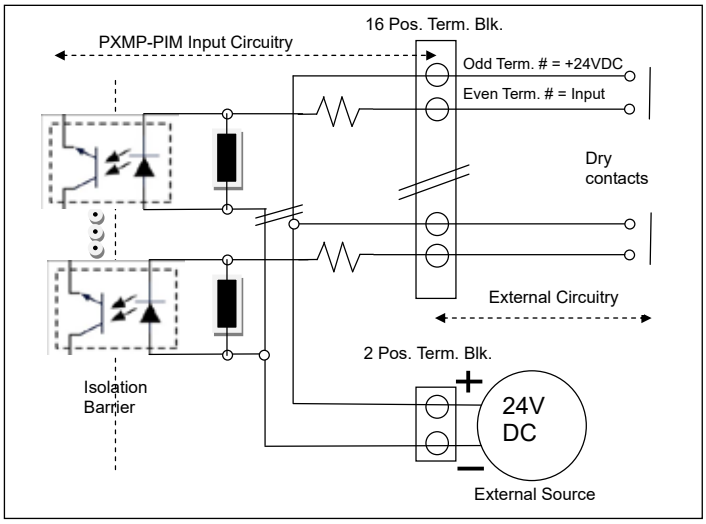

Figure 47. PXMP Pulse Input Circuitry (Note That the 24 Vdc Is Common to All Eight Inputs Per Module).

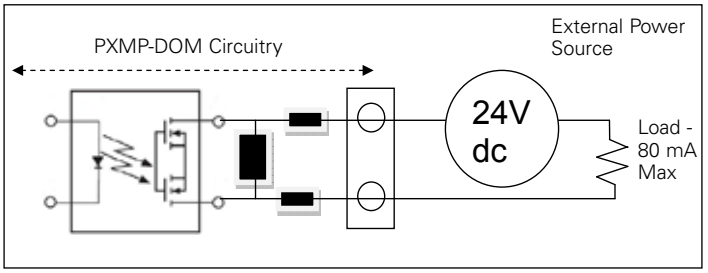

Figure 49. PXMP Digital Output Module Individual Inputs Are Isolated Per Channel.

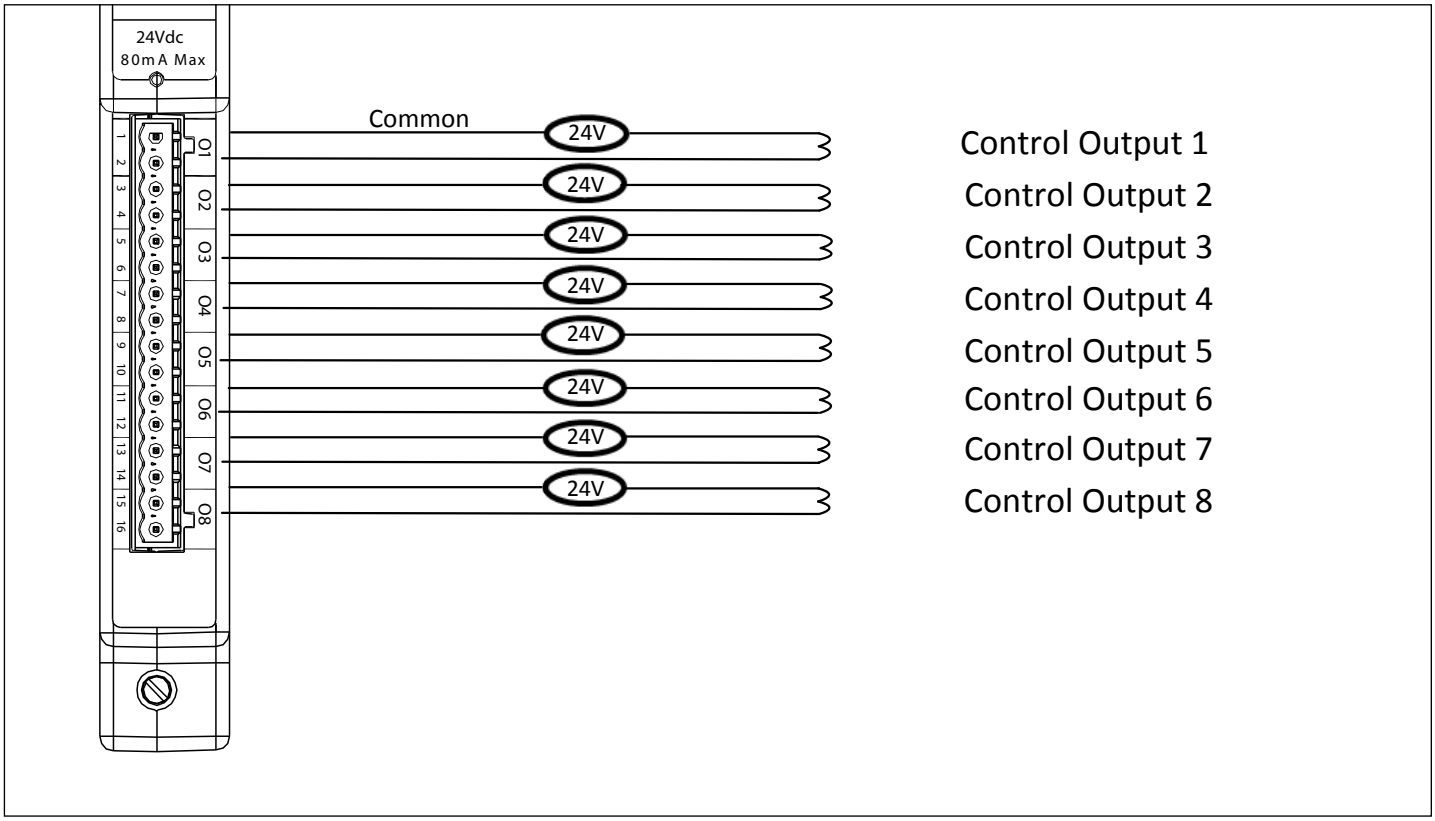

Figure 48. PXMP Digital Output Module Connections.

4.4.2 Voltage Connection Inputs

Note: For all voltage connections - Fuses should be sized in accordance with best practices to protect the instrumentation wire.

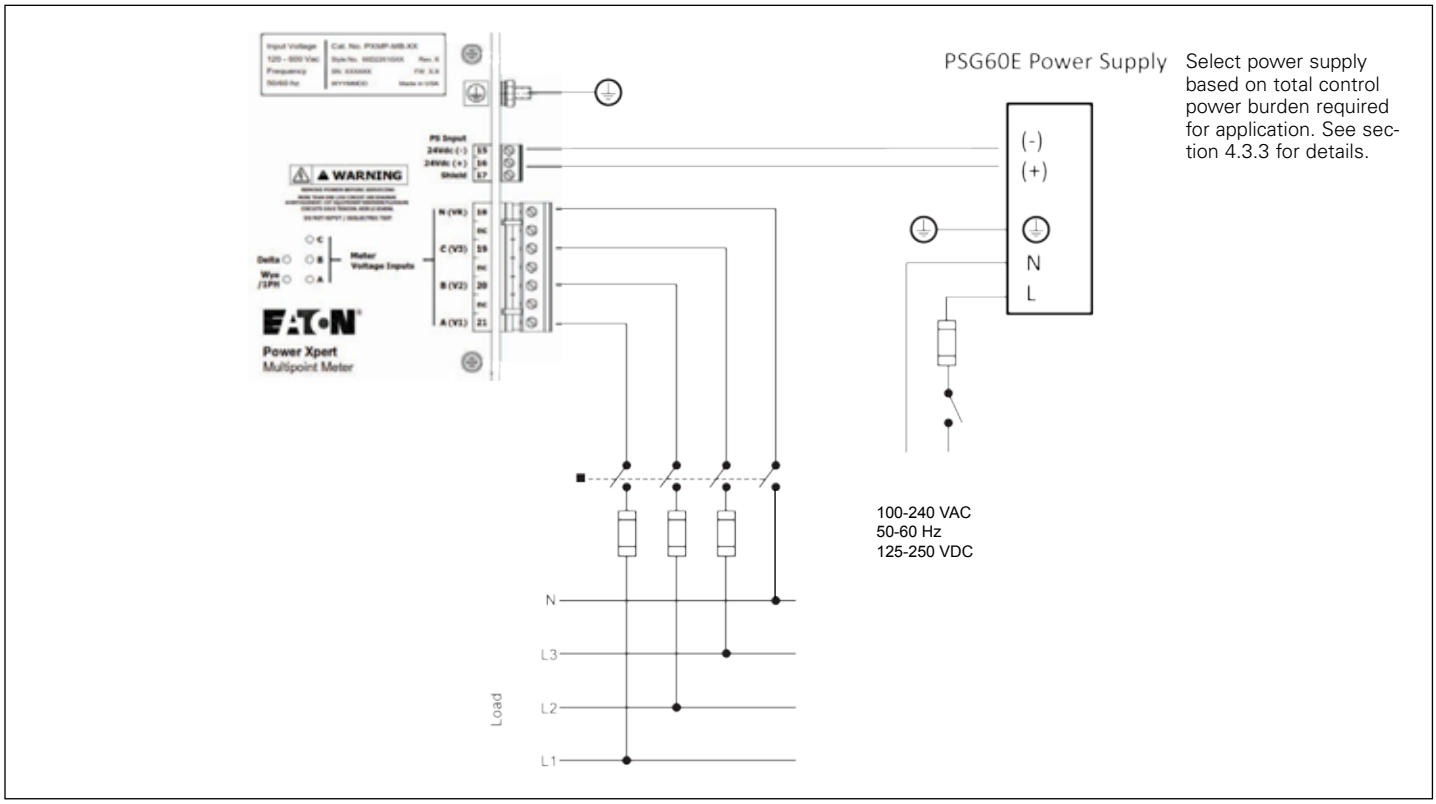

Figure 50. 4-Wire Wye.

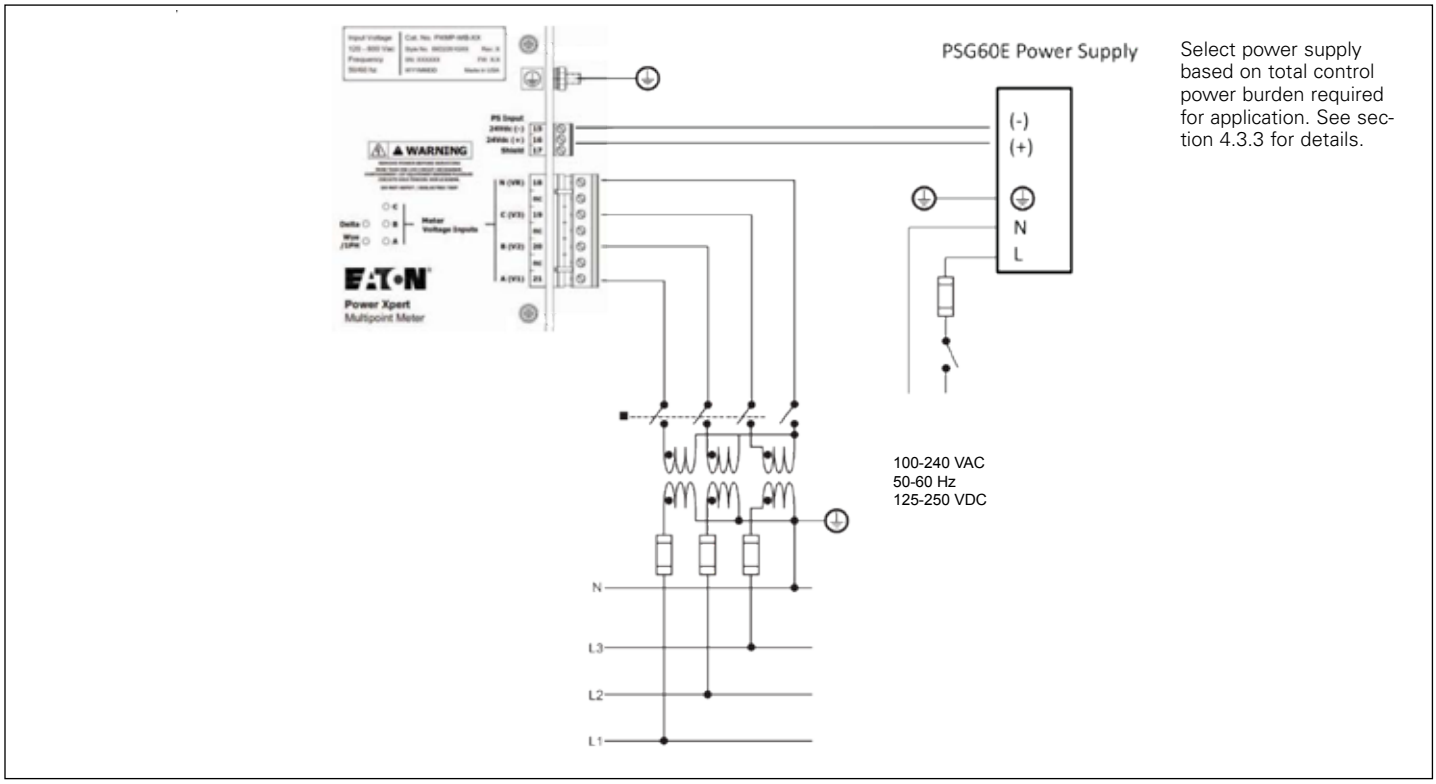

Figure 51. 4-Wire Wye with VTs.

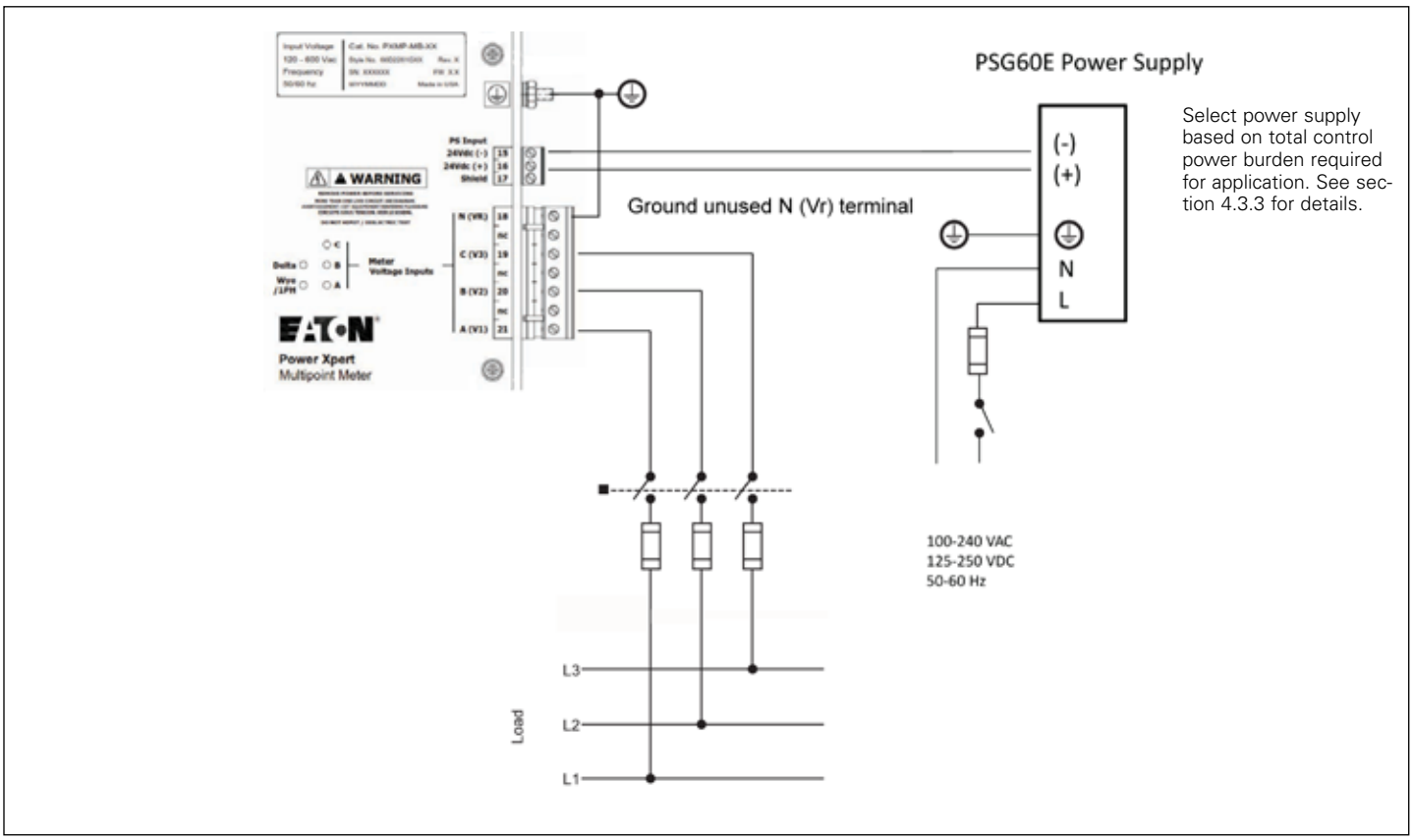

Figure 52. 3-Wire Delta.

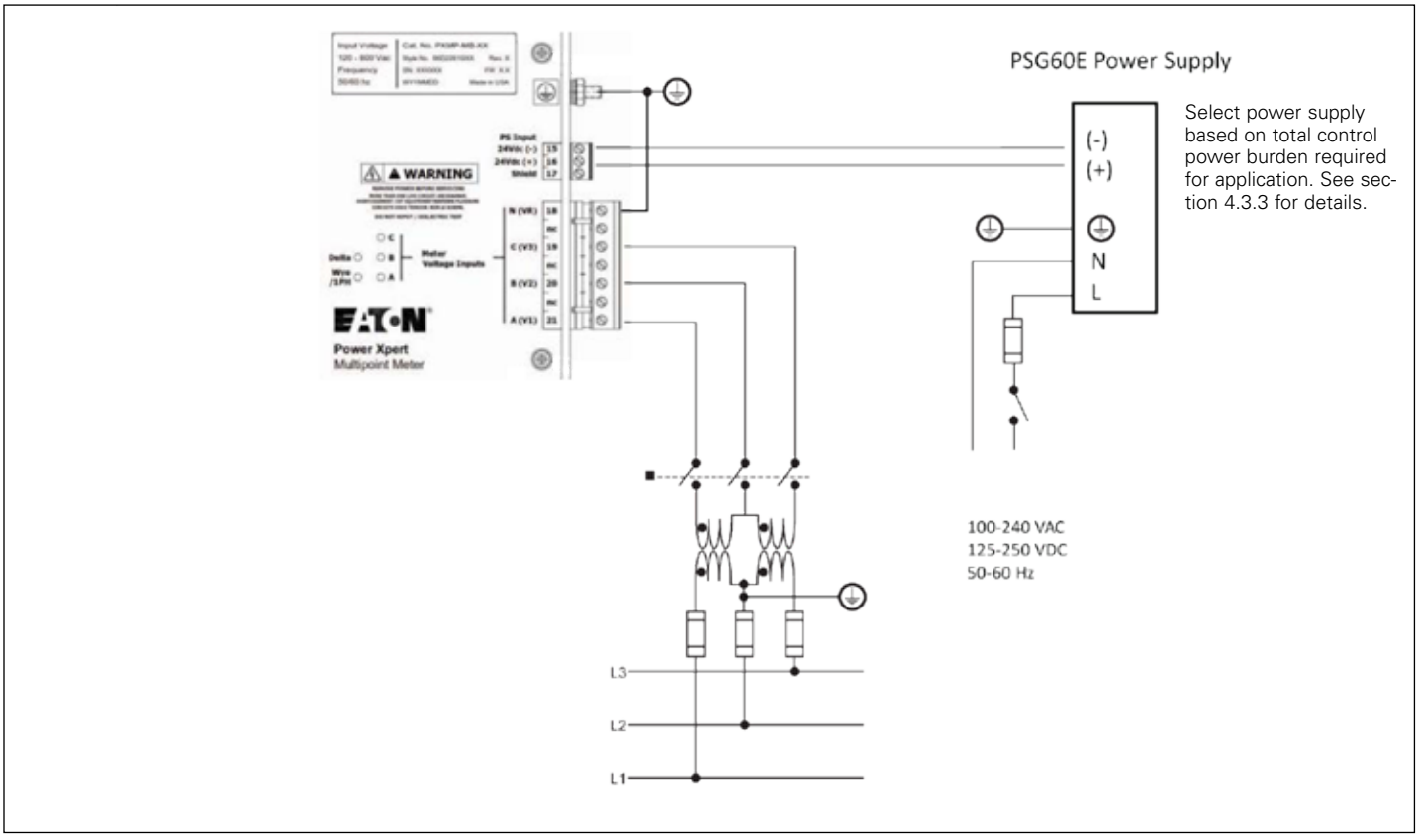

Figure 53. 3-Wire Delta with VTs.

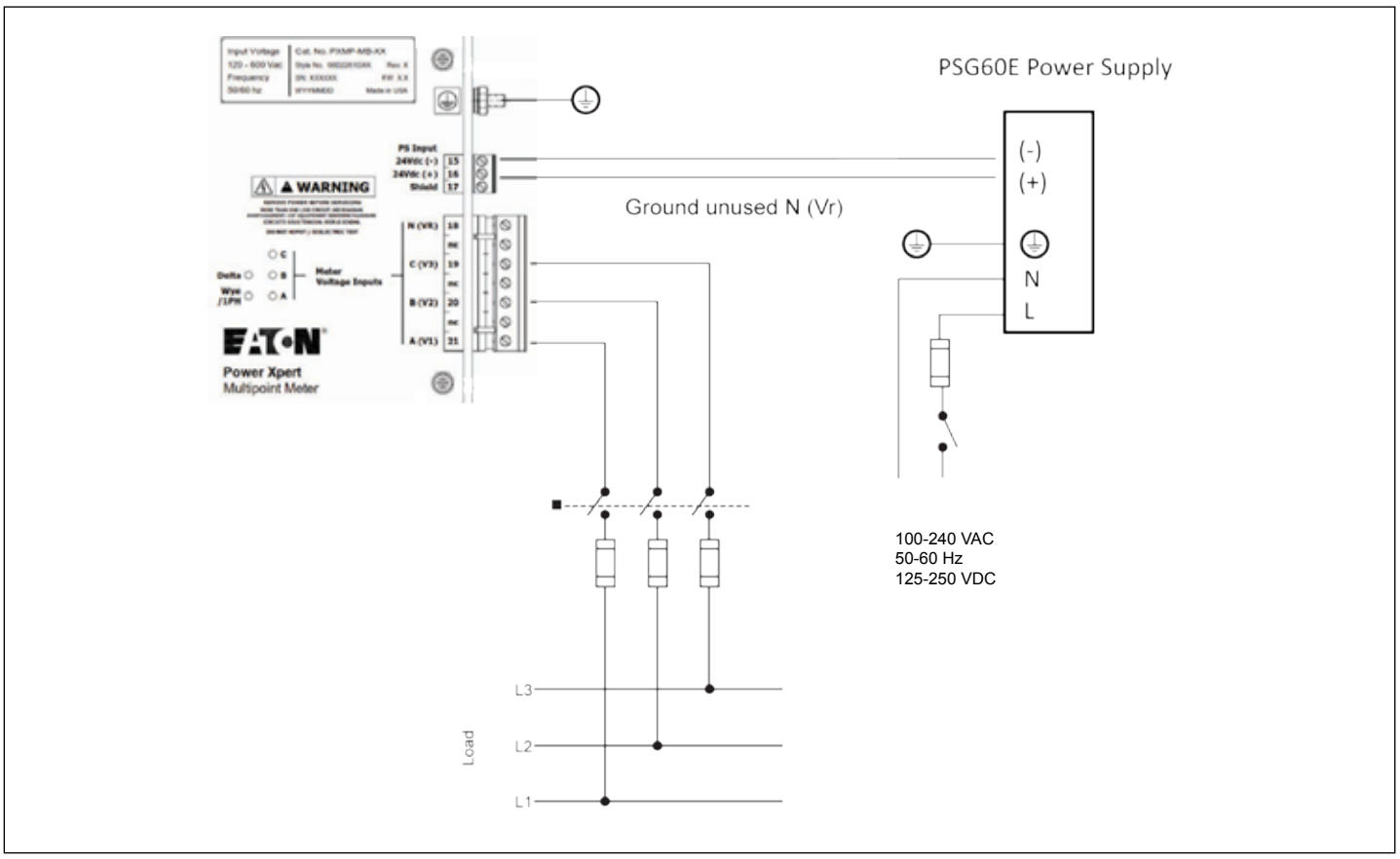

Figure 54. 3-Wire Delta (No "N").

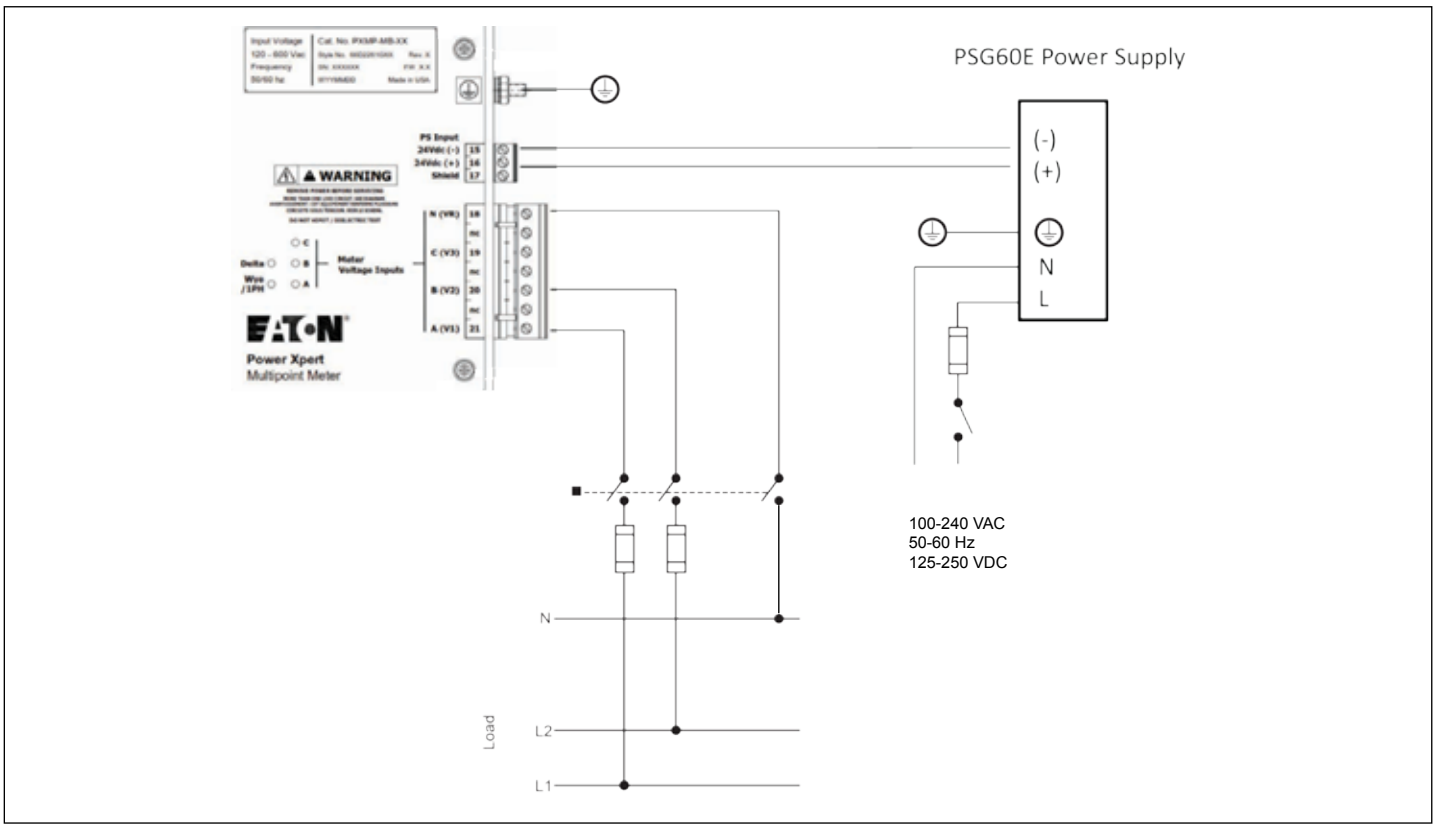

Figure 55. Single-Phase 3-Wire 120/240.

4.4.3 Current Sensor Connections

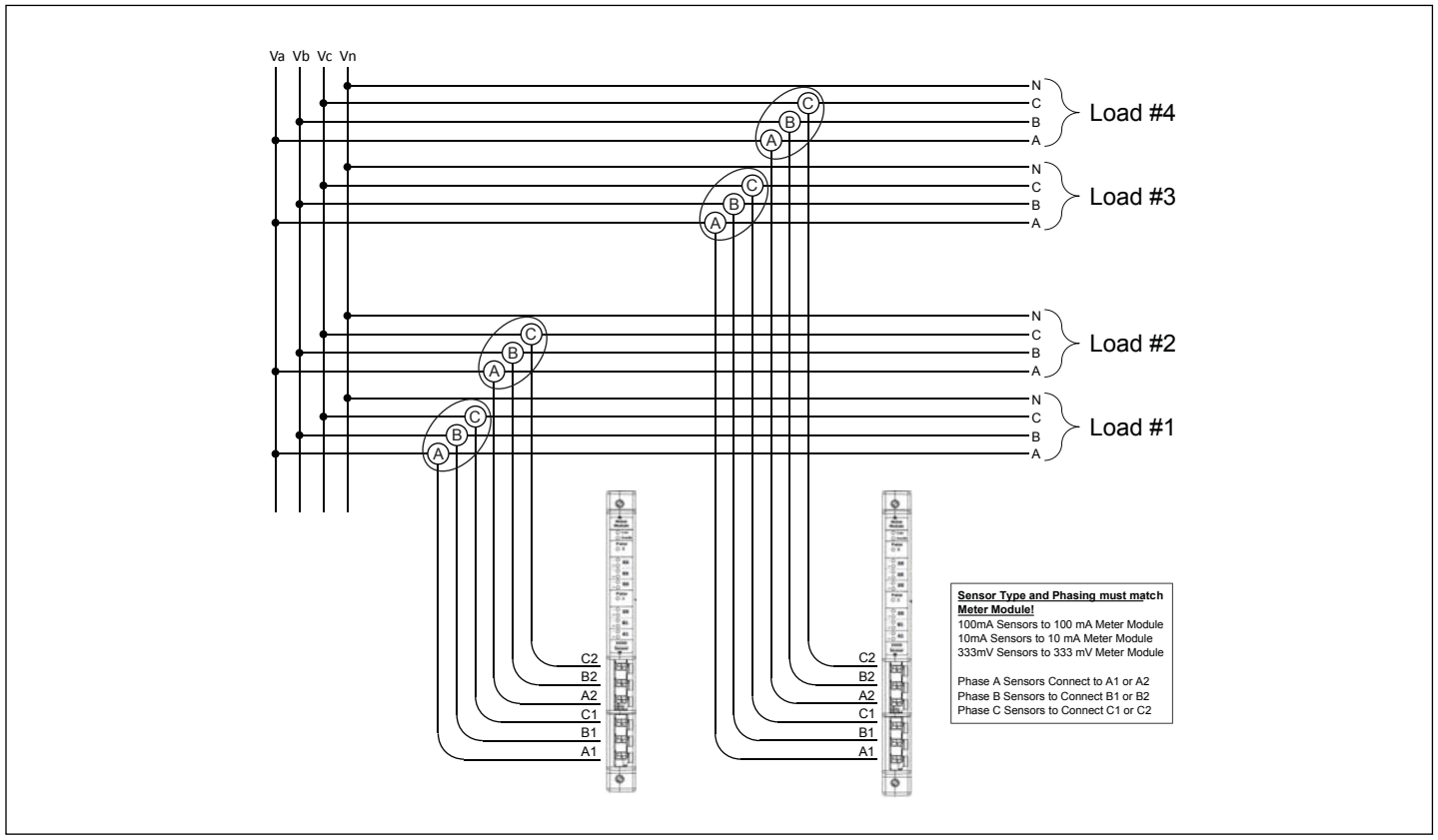

Figure 56. 3-Phase 4-Wire Service.

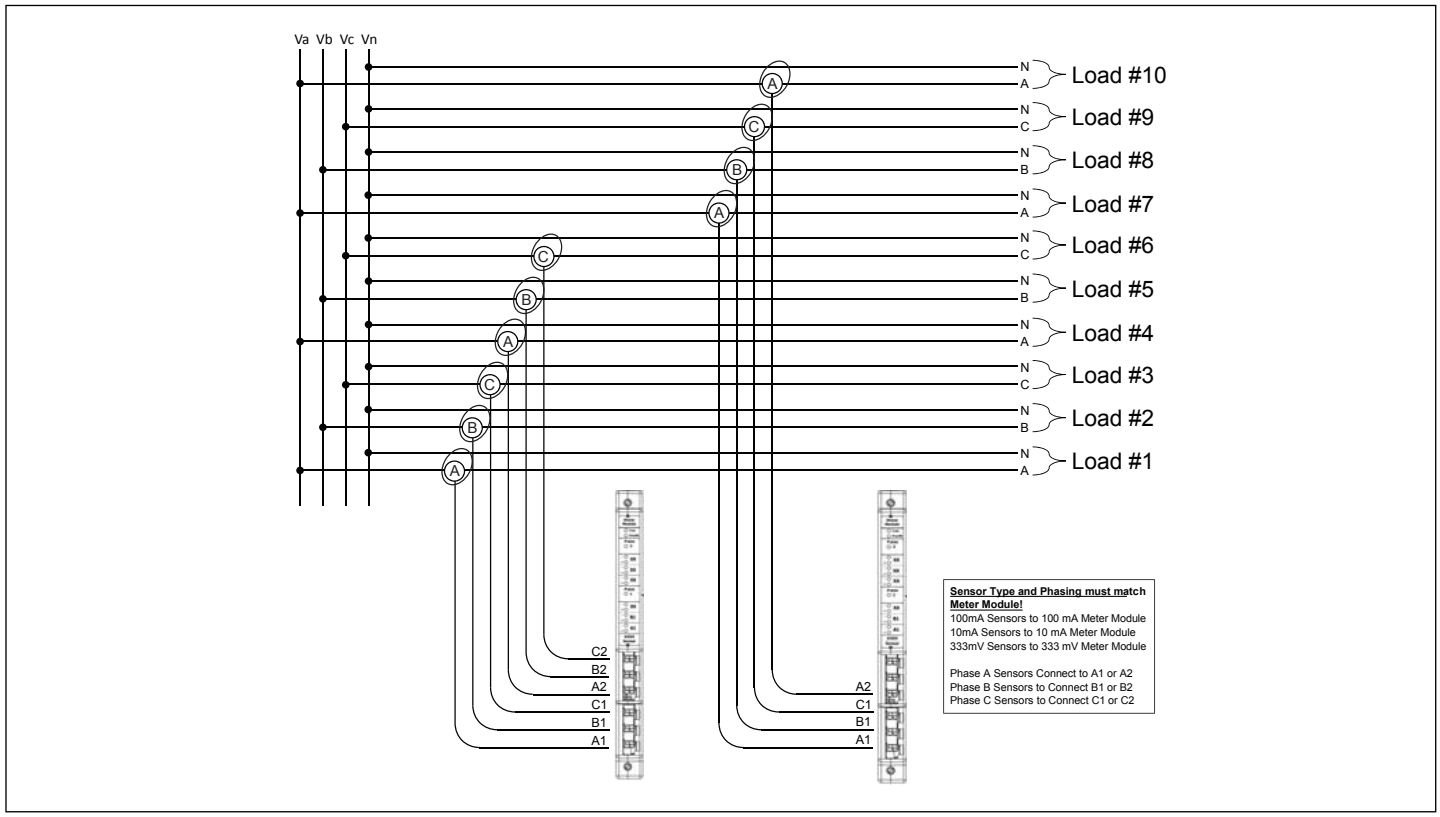

Figure 57. 3-Phase 4-Wire Service (Ten 1-Phase 1-Pole).

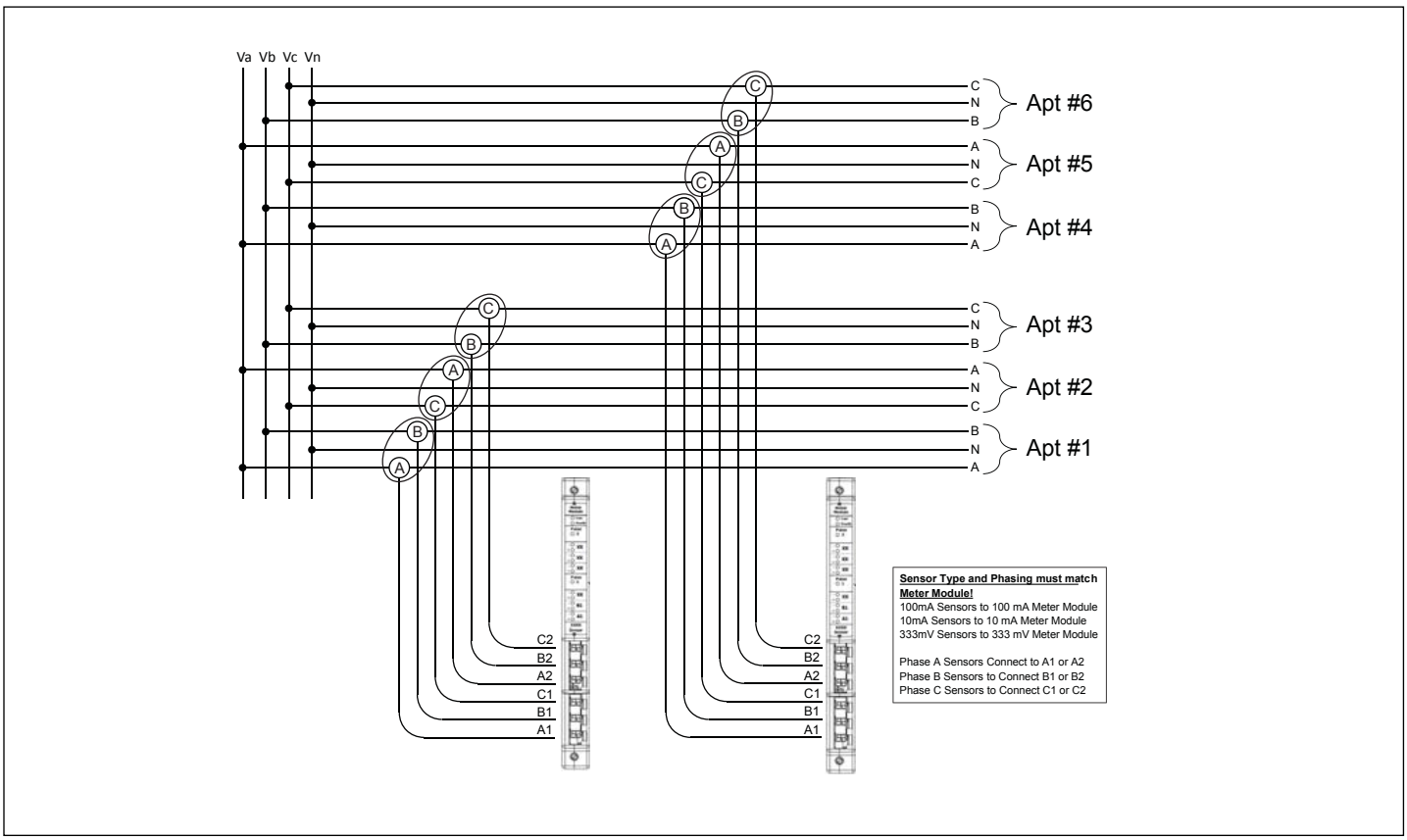

Figure 58. Network 120/208 3-Wire Apartment Service.

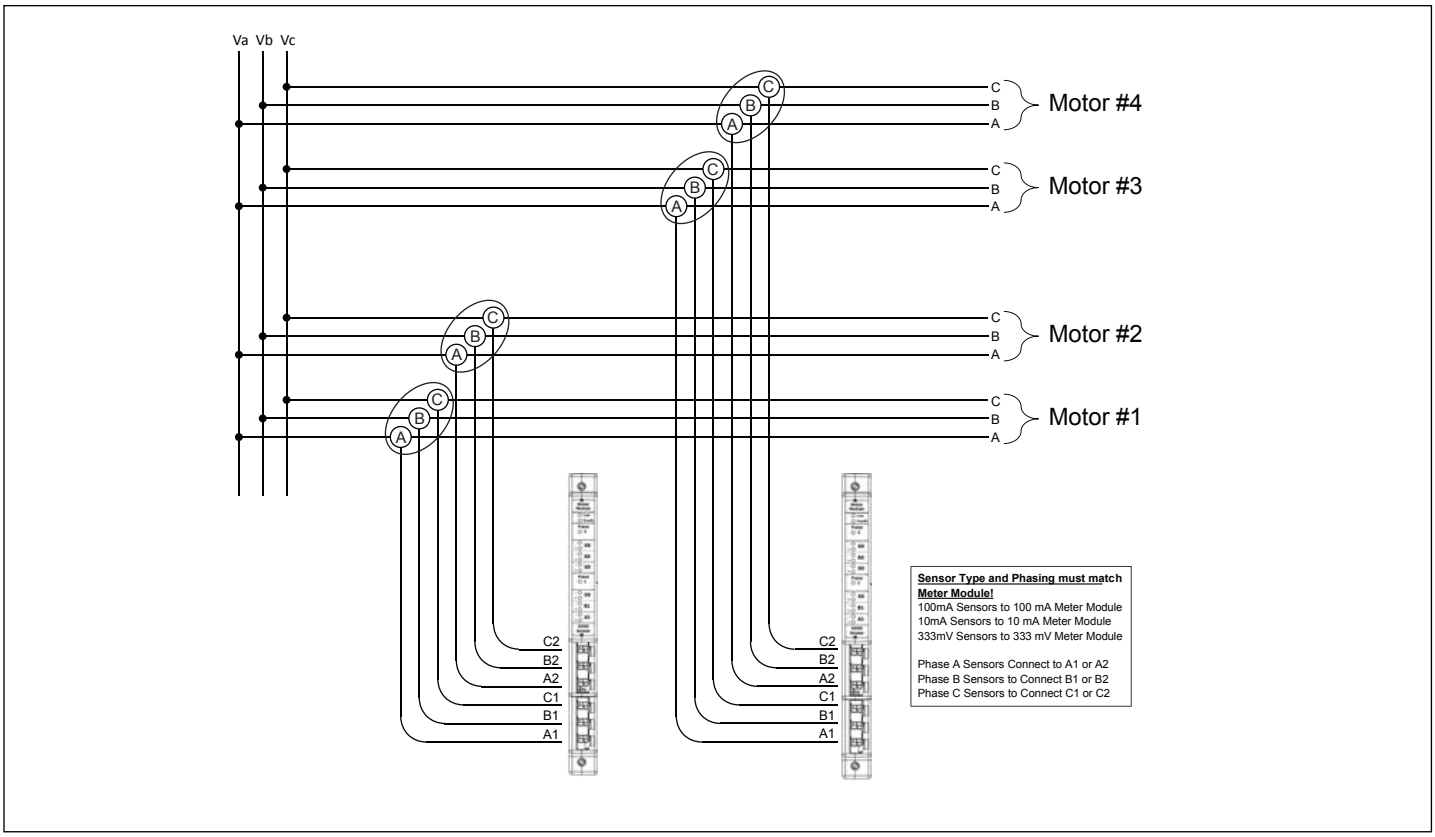

Figure 59. 3-Phase 3-Wire Delta Service.

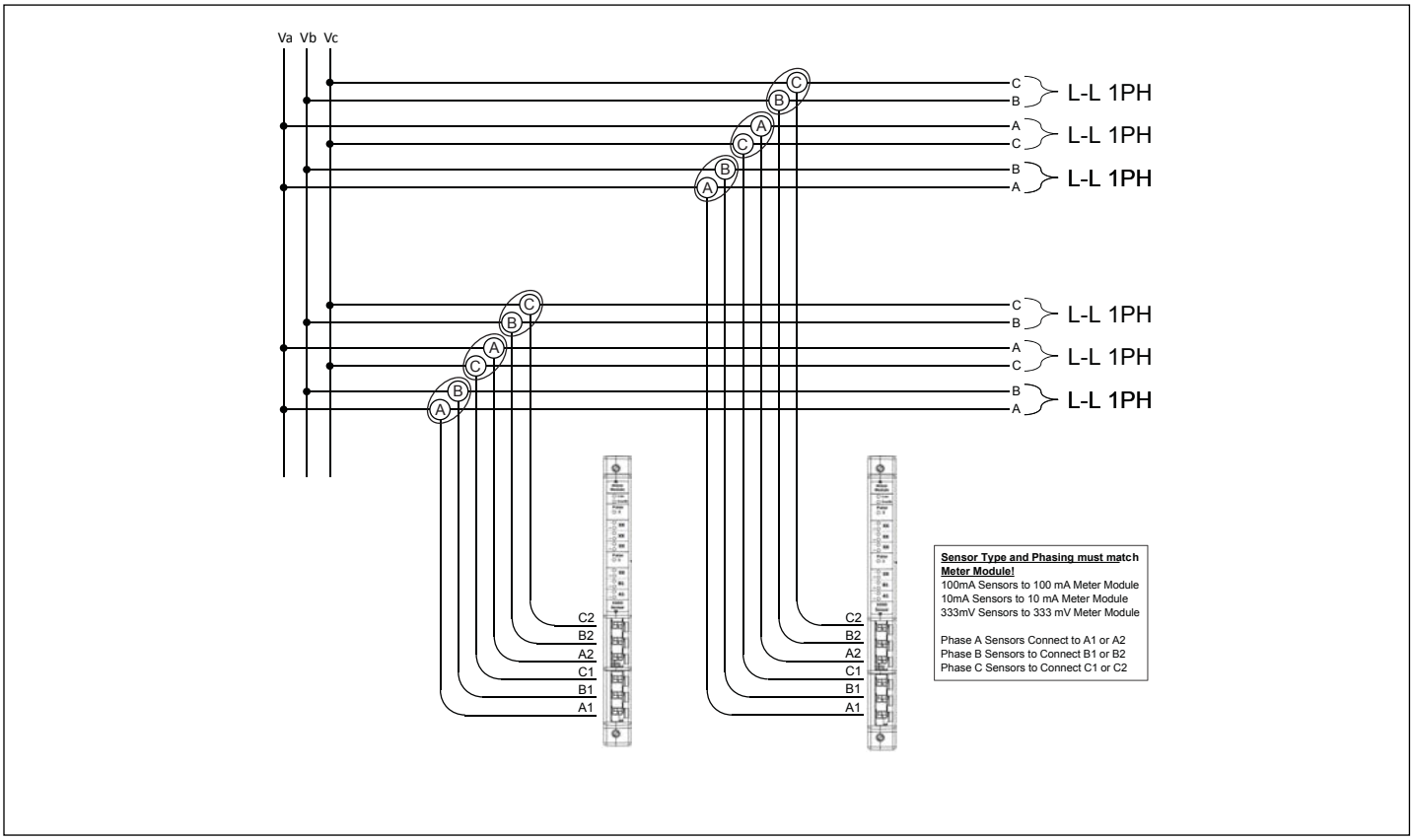

Figure 60. "Special Delta" Service With Individual 1-Phase 2-Wire L-L Services.

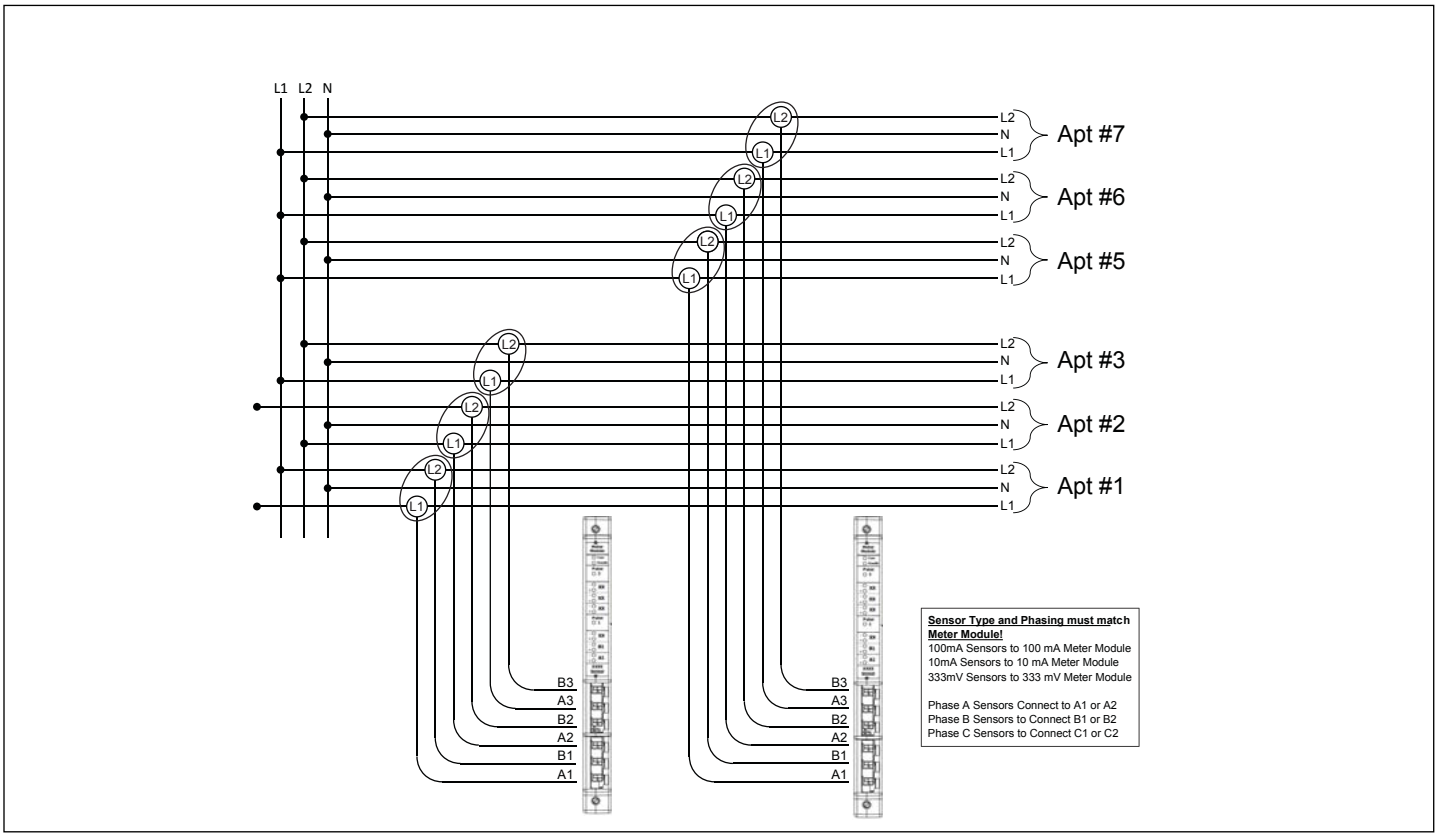

Figure 61. 120/240 1-Phase 3-Wire Service.

4.4.4 24 Vdc Power Connections

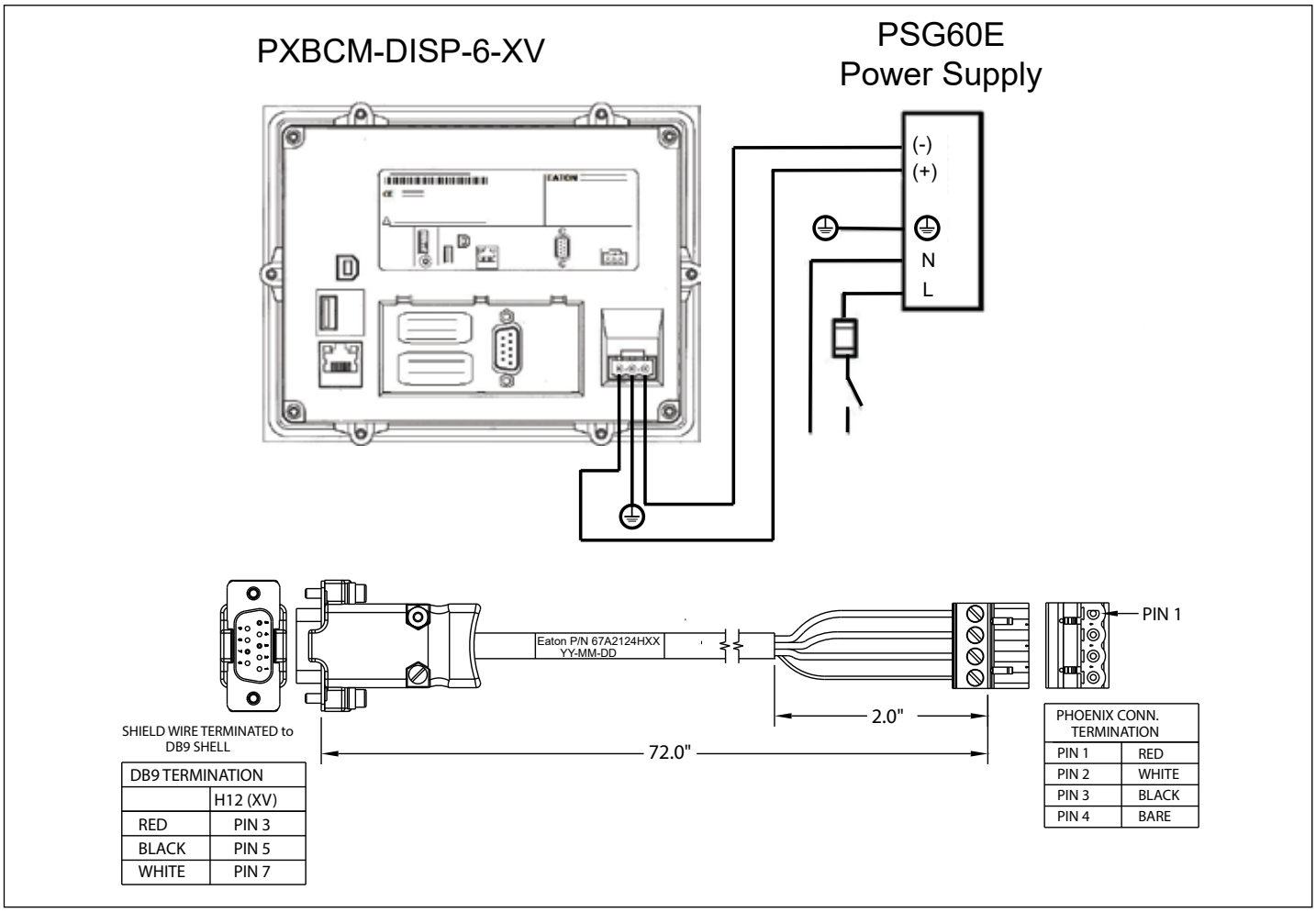

Figure 62. Power and Com Port Connections for the PXMP Touch Screen Display.

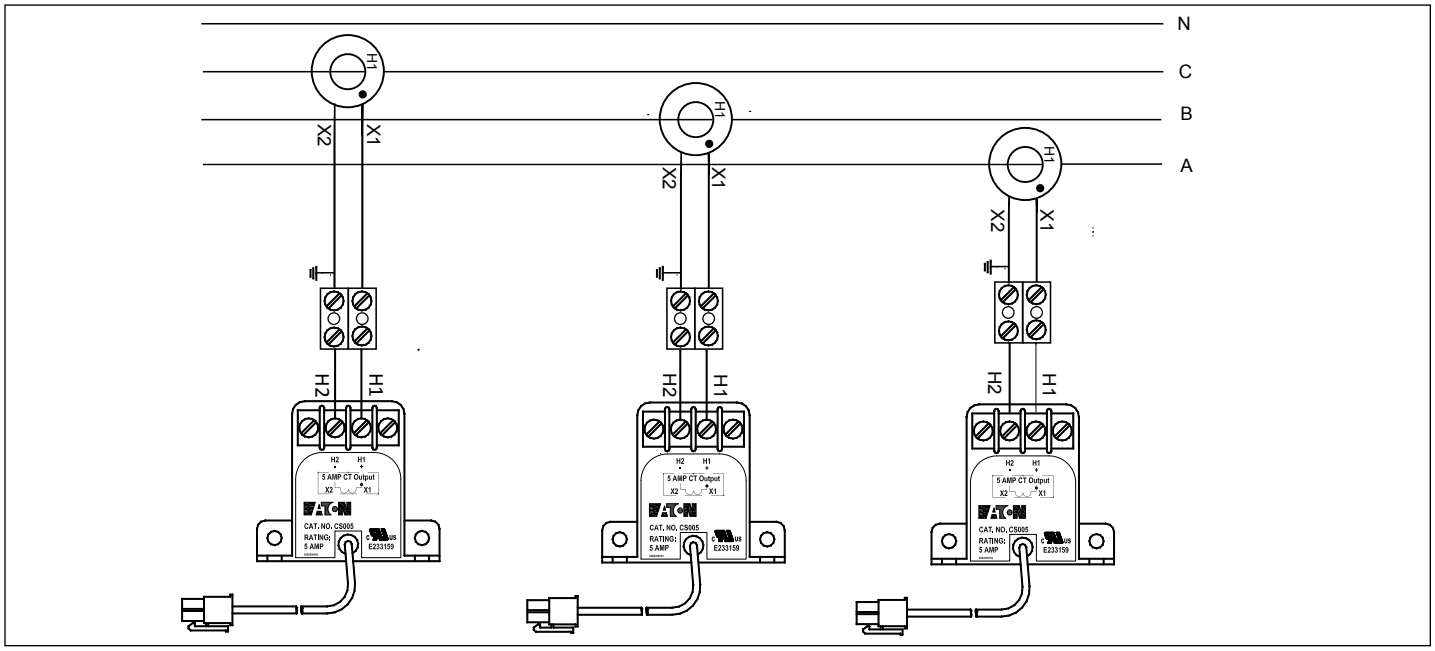

Figure 63. Example of 3-Phase 4-Wire Service Using 5 Amp CTs and CS005 Sensors.

5: Serial Communications Setup

5.1 PXMP Meter Communication

The PXMP Meter provides two Com ports with RS485 serial interfaces supporting Slave Modbus RTU protocol. The Modbus Map of registers can be found in **Appendix B**.

5.1.1 RS485 Com 1 and Com 2

Com 1 and Com 2 provide two RS-485 serial communication ports supporting Modbus Slave RTU protocol.

Both RS-485 Modbus slave ports can be addressed from 1 to 99 using two rotary switches on the face of the PXMP Meter Base (PXMP-MB) assembly. The Modbus slave ID selected with the rotary switches applies to both Modbus Slave ports. The default communication settings are 115.2 K baud, no parity, one stop bit.

The PXMP Configuration Software can be used to adjust these communication settings. Refer to Section 3 - Software Overview and the PXMP Configuration Software User Manual (MN150002EN) for more information about how to use the PXMP Configuration Software.

The slave port connectors include a Data+ (D+), Data- (D-), Common, and Shield terminals. Eaton recommends the use of RS-485 wiring that includes a twisted pair for data, a conductor for common, and a separate shield for optimal signal integrity and noise immunity. There are some variations on RS-485 wiring. If the Meter Base assembly is to be inserted into a daisy-chain that does not have an independent common and shield, the common and shield terminals can be jumpered externally on the terminal block so that the RS485 common will connect via the shield between nodes. **Figure 65** shows the detail of a two Data wire RS485 connection with separate common and shield.

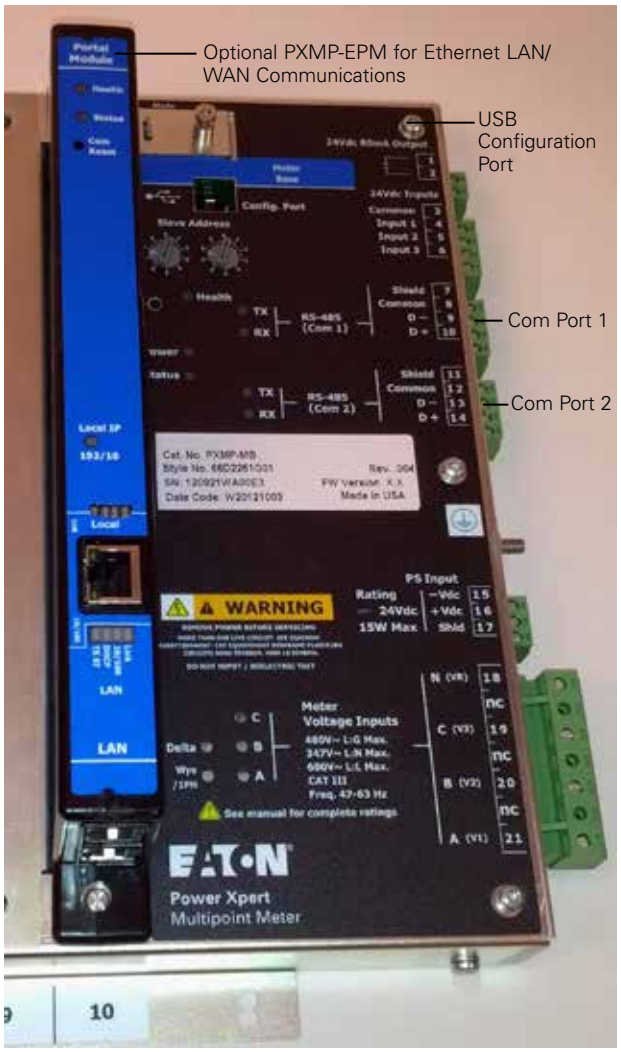

Figure 64. PXMP Meter Base Serial Coms.

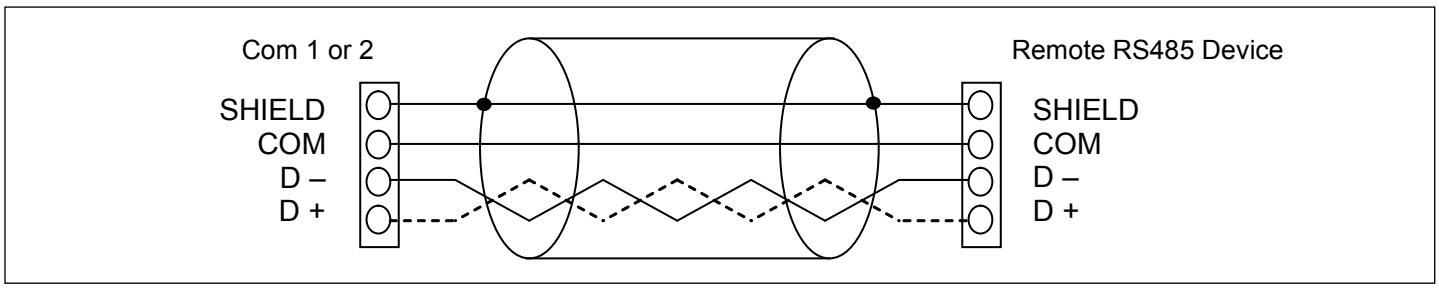

Figure 65. Two Data-Wire RS485 Connection.

Notes:

For All RS485 Connections:

- Use a shielded twisted pair cable designed for RS485 communications. It should typically be 22 AWG (0.33 mm^2) or thicker conductors, have an impedance of 100-120 ohms with a low line to line capacitance and grounded shield, preferably at one location only.
- Establish point-to-point configurations for each device on a RS485 bus: connect (+) terminals to (+) terminals; connect (-) terminals to (-) terminals.
- The User may connect up to 31 meters on a single bus using RS485. Before assembling the bus, each meter must have a unique address (refer to **Appendix A** for details).
- Protect cables from sources of electrical noise.
- Do not use "Star" and "Tee" connections, daisy chain only.
- **No Star arrangements are permitted.** No more than two data cables should be connected at any one point on an RS485 network, whether the connections are for devices, converters, or terminal strips.
- Include all segments when calculating the total cable length of a network. If the User is not using an RS485 repeater, the maximum length for cable connecting all devices is 4000 ft (1219.20 m) at 19.2 K baud or 2,000 ft (609.60 m) at 115.2 K baud.
- Connect common to RS485 Master and individual devices as shown in **Figure 65**. If separate common is not available, jumper the slave common connection to shield on the terminal connection.
- **Termination Resistors (RTs) are needed** on both ends of long length transmission lines. For short connections, end of line termination resistors may not be needed. When they are used, the value of the RT is determined by the electrical impedance of the cable (typically 100-120 ohms).

Figure 66 shows a representation of an RS485 daisy chain connection.

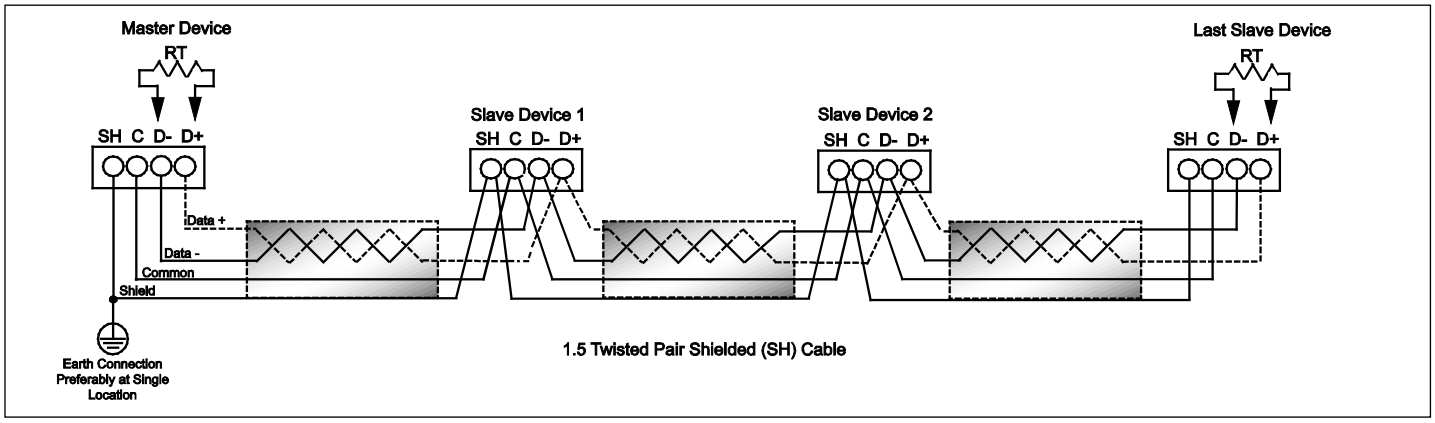

Figure 66. RS485 Daisy Chain Connection.

5.2 PXMP Meter Communication Information

The PXMP Meter does not include an **integral** user interface on the front face of the meter for accessing metering data. The RS485 Com ports connection on the right side of the meter shown in **Figure 64** can be used for accessing this data with an external device such as the PXMP Display. The configuration software can also use these Com ports or the local USB configuration port.

5.2.1 Meter Connection

The RS485 cable attaches to the Com port terminals Shield/Common/Data-/Data+ as shown in **Figure 65**.

5.2.2 Initiating Communications with PXMP Meter

Configure the Modbus master device to match the communications settings for the PXMP Meter.

Note: Factory default RS-485 communications are:

- Baud Rate: 115.2 K baud;
- Parity: None; and
- Stop Bits: One.

Set the slave ID rotary switches (see **Figure 10**) to a slave ID between 1 and 99. Take care that the slave ID selected does not conflict with any other slave on the RS-485 daisy chain.

Connect to the PXMP Meter RS-485 communications port in accordance with the instructions in this section.

The Modbus master should now be able to communicate with the PXMP Meter at the slave ID configured by the rotary switches. Successful communications can be observed using the TX and RX LEDs on the PXMP Meter. If the PXMP Meter receives and understands a valid request from a Modbus master, the RX LED will blink followed by the TX LED. If the RX LED blinks but there is no TX LED activity, check the communications settings to be sure that the master and slave match.

6: Configuring and Commissioning

Once the PXMP Meter assembly has been installed in a suitable NEMA rated enclosure, 24 Vdc power supplied, the sensors have been installed and connected to the Meter Modules (PXMP-MMs), and all wiring and communications connections have been made, the PXMP Meter can be configured and commissioned via the PXMP Configuration Software running on a PC or laptop computer.

Once the PXMP Meter has been configured and commissioned, data from the meter can be read via the PXMP Meter Configuration Software or the optional PXMP Display.

7: Maintenance and Cleaning Instructions

The PXMP Meter is maintenance free once properly commissioned. There are no User serviceable components or features.

Cleaning of the PXMP housing should only be done with power and mains disconnected. A clean dry rag can be used to remove dust. **No liquids** should be used.

8: Reading Meter Settings and Data Via the Optional PXMP Display

The Power Xpert Multi-Point Touch Screen Display (PXMP Display) is an essential tool that provides visibility to configuration, meter, and diagnostic data. With access to the entire Modbus map of the meter, the PXMP Display not only shows data but also becomes an invaluable tool for verification and validation of the entire PXMP Meter. The intent is to display all system meter data and sub-meter data without support for trends, profiles, resets, or other controls. The display can also be a window into the status of inputs and outputs as well as their associated counters.

The PXMP Display has no setup capabilities. What is shown on the display is the information the display is reading from the PXMP Meter. The display is a totally flexible viewer that can adapt to any configuration programmed into the meters by the Installer/User via the PXMP Configuration Software (see MN150002EN).

When functioning as the "System" meter, the PXMP Display will show either what is being received from a meter that is monitoring the entire system or an internal summation of all the meters within the system as if they were all one meter. This depends on how the meter is set up during the configuration process.

Please reference PXMP-DISP-6-XV Feature Walkthrough (IB150022EN) for additional details.

Appendix A: Specifications

A.1 Environmental

The PXMP Meter and current sensors must be housed in a NEMA or UL enclosure that keeps the internal environment within the PXMP's environmental specification ranges and provides suitable fire and mechanical protection in the end product installation. Temperature Range: -20 to +70°C (-4 to +158°F)

- Storage Temperature Range: -40 - 85°C
- Humidity: 5-95% Non-condensing Environment
- Pollution Degree: II
- Elevation: 0 to 9,843 ft (0 to 3000 m)
- Housing: IP20

CE Mark

EMC EN61326

Emissions Conducted and Radiated:

- FCC part 15 class B
- CISPR 11 class B

Electromagnetic Immunity

Standard	Description	Level
EN61000-4-2	ESD	3
EN61000-4-3	RF Radiated	3
EN61000-4-4	Electrical Fast Transient	3
EN61000-4-5	Surge	3*
EN61000-4-6	RF Conducted	3
EN61000-4-11	Volt Sag/Swell/Variation	

* 24VDC PXMP inputs are for a local bus which is surge level 2. PXG60E AC mains connection will support level 3.

Product Safety:

- IEC/EN61010-1
- UL61010-1 File E185559
- CNL evaluation to CAN/C22.2 No 1010.1.92

Accuracy:

- ANSI C12.20 - Accuracy Class 0.5% with Either CSXXX or PXMP-CSXXX sensors
  - Measurement Canada Approval Pending

A.2 External Circuit Group Specifications

PXMP-MB (-AB) Meter Base

Discrete Output:

- Qty. 1 – Solid State Relay Form A NO Bidirectional FET
- Polarity of external source is not important
- Isolation Circuit to ground 2 kV/1 min.
- Maximum external source voltage 28 Vdc
- Line to Line TVS clamp across switching element at 32 Vdc
- Solid State Relay On resistance 35 ohms maximum
- Maximum load current 80 mA
- Minimum pulse width 20 milliseconds
- Fixed 25 milliseconds for Pulse Initiator function
- Maximum pulse rate 25 Hz
- Wiring to 2-position removable terminal plug
  - 12-18 AWG (3.31-0.82 mm^2), wire ferrules recommended
  - T1 (Polarity not important)
  - T2 (Polarity not important)

Discrete Inputs:

- Qty. 3, common circuits Inputs1-3
- Group isolation 2 kV
  - No Input to Input circuit isolation
- All inputs per module share a common external 24 V (+/-10%) supply
  - 24 V externally sourced between common and inputs
  - Design to interface with external dry contact
  - Input impedance ~ 2.2 Kohm
  - Input current draw ~ 10 mA per input
- Minimum pulse width 10 milliseconds
- Maximum pulse rate 20 Hz
- Wiring to 4-position removable terminal plug
  - 12-18 AWG (3.31-0.82 mm^2), wire ferrules recommended
  - T3- Common (connect ext. 24 common here)
  - T4 – Input 1 (dry contact to 24 V hot)
  - T5 – Input 2 (dry contact to 24 V hot)
  - T6 – Input 3 (dry contact to 24 V hot)

Com 1 and Com2 RS485 Serial Ports:

- No D+/D- biasing, reliance on fail safe driver and biasing at Master
- Baud rate configurable between 9600 – 115 K baud (default)
- Use cable designed for RS485 communications
  - Low L:L capacitance
  - Impedance of ~ 100-120 ohms
  - Shield – Mylar for high freq., Braid for low freq.
  - Separate common and shield for best noise immunity
  - Maximum cable length is 4000 ft (1,219.2 m) with 32 nodes at 19.2 K baud increased data rates will reduce maximum cable distance
  - 2000 ft (609.6 m)with 32 total nodes at 115.2 K baud
- Isolation 300 V to ground due to TVS diode clamps
- Modbus RTU slave protocol, address defined by rotary switch
- Green Rx and Red Tx LEDs per channel
- Data + > Data – during idle marked, logic 1 state

- End of Line Termination resistance should match cable impedance (typ. 100-120 ohms)
- 4-Position Removeable Terminal Plug 18-22 AWG (0.82-0.33 mm^2) typical, wire ferrules recommended
  - Com 1
    - T7 - Shield
    - T8 - RS485 common
    - T9 - Data –
    - T10 - Data +
  - Com 2
    - T11 - Shield
    - T12 - RS485 common
    - T13 - Data –
    - T14 - Data +

PXMP-MB Power Supply Input:

- 24 Vdc +/- 20%.
  Use a local dedicated source for PXMP circuits only.
- 15 W maximum load
- 1 kV isolation barrier internal to PXMP-MB
- Externally fuse circuit to protect wire
- Green Power OK LED
- Three position terminal block 16-12 AWG (1.31-3.31 mm^2), wire ferrules recommended
  - T15 - 24 Vdc - (common)
  - T16 - 24 Vdc + (Hot)
  - T17 - Shield (Optional) Capacitively referenced to chassis ground for enhanced EMC performance

Meter Voltage Inputs:

- Over Voltage CAT III
- Maximum Voltage Rating
  - 480VL:G (corner grounded Delta)
  - 347VL:N
  - 600VL:L
- Frequency Rating 47-63 Hz
- Metering Range (Temporary Transitions)
  - 30-700VL:N
  - 30-700VL:L
- Abuse Withstand Rating 1000 V sustained
- High Pot Withstand Rating 2500 V/1min
- Input Impedance 4 Mohm
- Fuse inputs rated to protect wiring to mains. External fuses must be installed between the meter voltage terminal and the mains disconnect switch to the main lines to protect the lines. 600 V 1 A BUSS type KTK-R-1 Fast Acting or equivalent fuses are recommended.
- Wiring to removable terminal plug 10-18AWG (5.26-0.82 mm^2), wire ferrules recommended
  - T18 - N (VR)
  - T19 - C (V3)
  - T20 - B (V2)
  - T21 - A (V1)

PXMP Meter Modules (PXMP-MMs)

Compatible with all PXMP Meter Base slots 1-10

LED indicators:

- Health and Status green, blink to show activity
- Pulse Energy output 1 red per group of three loads
- Load Energy Direction Red/Green pair per load

All variations support six load inputs

Current Sensor connection is one 2 x 2 connector per load

Compatible with PXMP-SCXX Sensor Cables, total cable length to the sensor should not exceed 28 ft. (8.54 m).

Note that -AB suffix only affects what Voltage Channels the loads are paired with for metering purposes

PXMP-MM10MA supports the CSXXX series of 10 mA maximum secondary output current transformers

PXMP-MM100MA supports the PXMP-CSXXX series of 100 mA maximum secondary output current transformers.

PXMP-MM333MV Supports 333 mV maximum secondary output current transformers with the use of the PXMP-IM333MV Interface Module. Meter Module current secondary inputs are not isolated. Current Sensors must provided 600V double/reinforce CAT III insulation.

PXMP Digital Output Module (PXMP-DOM):

- Compatible with all PXMP-MB slots 1-10
- LED Indicators
  - Health and Status green, blink to show activity
  - Output On/Off Status 1 green per output
  - Eight individual Solid State Relay outputs
- Each circuit rated for 24 Vdc (+/-20%) with an 80 mA load maximum
- 24 Vdc is externally sourced, use a local dedicated source for PXMP use only.
- Group isolation to ground 2 kV
- Each circuit has its own separate common, circuit to circuit isolation 120 V
- 16-position removable terminal plug
  - 12-18 AWG (3.31-0.82 mm^2), wire ferrules recommended

PXMP Pulse Input Modules (PXMP-PIMs):

- Compatible with all PXMP-MB slots 1-10
- LED Indicators
  - Health and Status green, blink to show activity
  - Input On/Off Status 1 green per Pulse Input
- Eight Pulse Inputs to external dry contacts
- Maximum pulse rate is 20 Hz
- Minimum pulse width is 20 milliseconds
- External circuit groups rated for 24 Vdc (+/-20%)
  - All circuits share the same electrical common
  - Use a dedicated local source for PXMP circuits only
- External supply connects to the module with a two-position removable terminal plug
- The supply is internally fanned out to all circuits
- Group isolation limited to 300 V to ground due to TVS diode clamp
- Input impedance ~2.2 K causing a 10 mA load per input when energized
- External circuit groups connect with a 16-position removable terminal plug
  - Terminals support 12-18 AWG (3.31-0.82 mm^2), wire ferrules recommended

PXMP Energy Portal Module (PXMP-EPM):

- Only functionally compatible with PXMP-MB slot 10
- LED Indicators
  - Top Health and Status green, blink to show activity
  - Com. Reset button - reset to defaults
  - Local IP 192/10
  - RJ45 Front Facing Ethernet Configuration Port LEDs
    - Link (Tx/Rx blink)
    - 10/100 speed
- LED 4-stack for Bottom LAN/WAN Ethernet port
  - Link (Tx/Rx blink)
  - 10/100 speed
  - DHCP/Fixed
  - TX active
- Config. Ethernet RJ45 Cat 5 STP/UTP
  - 10 base T/100 base Tx
  - Auto Cross-over capability supported
  - Java web browser interface
- Bottom Facing LAN/WAN Ethernet Port
  - RJ45 Cat5 STP/UTP 10 base T/100 base Tx
  - STP required for full electromagnetic immunity
  - Auto Cross-over capability supported
  - Supports Modbus TCP and Java web browser interface
- Bottom facing Telephone Modem interface
  - Modem type V92/56 K Baud
  - RJ11 field interface

Appendix A: Specifications (Cont.)

Table A1. Power Xpert Multi-point Meter System – Hardware Specifications.

Components	Field Circuit	Power Source	Rated Voltage	Rated Current	Circuit Impedance	Isolation	Note 1	Note 2
PXMP-MB PXMP-MB-AB	Digital Output	External*	24 +/- 20% [2]	0.080 A Max.	35 Ohms Max.	2.0 kV		
	Digital Input	External*	24 +/-20% [2]	0.01 A	2.22 K	2.0 kV	Opto Drops Supply by 2 V	Group are electrically common
	Com 1 RS485	Internal	5 V [2]		50-60 Ohms	300 V	TVS Diode Clamped to PE	
	Com 2 RS485	Internal	5 V [2]		50-60 Ohms	300 V	TVS Diode Clamped to PE	
	Power Supply Input	External*	24 +/- 20% [2]	0.7 A Max.	N. A.	1.0 kV	Installation Class II Input	15W Max
	Voltage Inputs A (V1)/ B (V2)/ C (V3)/ N (VR)	Ext. Mains	480 V L:G [1]	0.12 mA	4.M Ohm	NA	Installation Class III	High Pot 2500 V/1 Min
			347 V L:N [1]	0.09mA	4.M Ohm	NA	Installation Class III	High Pot 2500 V/1 Min
			600 V L:L [1]	0.09mA	4.M Ohm	NA	Installation Class III	High Pot 2500 V/1 Min
PXMP-MM100MA	CT Secondary	External	N.A.	100 mA	14.6 Ohms	NA	20% Over-range	See sensor for Primary isolation
PXMP-MM10MA	CT Secondary	External	N.A.	10 mA	67 Ohms	NA	20% Over-range	See sensor for Primary isolation
PXMP-MM333MV	CT Secondary	External	0.333 V [1]	N.A.	50,000 Ohms	NA	20% Over-range	See sensor for Primary isolation
PXMP-DOM	Digital Output	External	24 +/- 20% [2]	0.080 A Max.	10 Ohms Max.	2 kV Group	120V isolation circuit to circuit	Isolation dependent on external source
PXMP-PIM	Pulse Input	External	24+/- 20% [2]	0.01 A	2.22 K ohms	300 V to Ground	TVS Diode Clamped to PE. Group Isolated, All Circuits Common to 24 V Ext. Source.	Note opto creates 2.2 V drop sourced by 2.2 Kohms. Isolation dependent on external source
PXMP-EPM	Ethernet 100 Bt	Internal		NA	NA	1 kV		
	POT Modem	Internal		NA	NA			

[1] AC RMS.

[2] DC

* Use a local dedicated 24VDC source for PXMP circuits, do not connect to a CAT III bus.

Appendix B: Modbus Registers

Table B.1. Summary of Modbus Register Blocks.

	Start	Start (Hex)	Regs.
Control (Low Security)	2901	B54	2
DIP Switch Position	2903	B56	1
Time	2921	B68	8
Time Zone (32 Character ASCII)	2929	B70	16
Product ID	4607	11FE	2
Product Status/ Cause of Status	4609	1200	2
Standard (Aggregate Meter)	4611	1202	6
	4621	120C	18
	4651	122A	6
	4659	1232	4
	4667	123A	18
	4691	1252	6
	6305	18A0	20
	6329	18B8	4
Control (with ID & Password)	10000	270F	10
Event Index	10010	2719	2
Event Push Down List (ASCII)	10020	2723	580
Event Push Down List (Enum./Value)	10600	2967	320
System Information	12000	2EDF	27
Module Information	13000	32C7	1470
Firmware Version Information	14470	3885	30
Per-Channel Meter Data	14500	38A3	20
System/Aggregate Meter	15000	3A97	490
Virtual Meter Data (by Parameter)	20000	4E1F	7320
Virtual Meter Data (by Tenant)	28000	6D5F	7320
Virtual Meter (Selected by Display)	35500	8AAB	131
80 Inputs (by Parameter)	40500	9E33	2640
80 Inputs (by Slot # and Input #)	43200	A8BF	2640
80 Outputs Status	45900	B34B	10
80 Outputs (by Parameter)	46000	B3AF	2720
80 Outputs (by Slot # and Input #)	48750	BE6D	2720
10 Output controls (by Slot#)	51480	C917	10
3 Built-In Inputs	51500	C92B	126
	51700	C9F3	51
1 Built-In Output	51800	CA57	30
Demand Reset Data #1 (most recent)	52000	CB1F	5307
Demand Reset Data #2	57500	E09B	5307
Coincident Peak Demand			
Forward Watts	63000	F617	984
Coincident Peak Demand			
Reverse Watts	64000	F9FF	984

Table B. 2. Control Register 2901 (Byte3 & Byte2) Register 2902 (Byte1 & Byte0).

Byte 3	Byte 2	Byte 1	Byte 0	Standard Control Definitions (BYTE 3=0)
0	0	0	4	Reset peak demand (W, var, VA, A)
0	0	0	8	Reset Energy
0	0	0	10H	Reset device software (reboot)
0	0	0	20H	Clear all events
0	0	0	40H	Reset (synchronize) demand windows
0	0	1	4	Reset all min/max values
0	0	1	6	Reset discrete input counters
0	3	0	3	Reset Com Port statistics
0	3	0	4	Acknowledge triggered events (clear unread events flag from status)
0	3	0	A	Begin Real Time Pricing
0	0	3	B	End Real Time Pricing
X	4	1	YY	Activate relay outputs on Slot X according to 8-bit mask YY
X	4	2	YY	De-activate relay outputs on Slot X according to 8-bit mask YY
X	4	3	YY	Turn on CT LEDs on Slot X according to 6-bit mask YY
X	4	4	YY	Turn off CT LEDs on Slot X according to 6-bit mask YY
X	4	5	YY	Blink CT LEDs on Slot X according to 6-bit mask YY
0	5	0	F	Reset all data

Table B.3. PXMP Meter Base DIP Switch Position on MODBUS Register 2903 (Holding Register).

DS1	DS2	DS3	Register 2903 Binary	Register 2903 Interger
OFF	OFF	ON	001	1
OFF	ON	OFF	010	2
OFF	ON	ON	011	3
ON	OFF	OFF	100	4
ON	OFF	ON	101	5
ON	ON	OFF	100	6
ON	ON	ON	111	7

Note: California (CA) requires a highly visible indication that a meter is not in Revenue Secure mode to prevent a CA County Weights and Measures technician from accidentally sealing a meter that can still have it's configuration changed.

Table B.4. Time Register 2921.

	Start	Start (Hex)
Month	2921	B68
Day	2922	B69
Year	2923	B6A
Day of Week (Deprecated)	2924	B6B
Hour	2925	B6C
Minute	2926	B6D
Second	2927	B6E
1/100th Second (Deprecated)	2928	B6F

Table B. 5. Secure Control Register 10000.

Start	Start (Hex)	Regs.	Description	Data Type
10000	7147	2	Control Function (same as codes for 2901/2902)	Uint32
10002	7147	4	8 character User ID	ASCII
10006	7147	4	8 character Password	ASCII

Table B. 6. Product Status/Cause of Status Register 4609.

Register	Cause of Status	Code	Description
4609	Primary Status (Upper Byte)	b15	Unacknowledged Event Flag
		b14	Rate Alert Flag/ Real-Time Pricing (RTP)
		b11-08	4 = Alarmed, 9 = Normal
	Secondary Status (Lower Byte)	b7	Tenant Overload Flag
		b3-0	1 = N/A, Normal 2 = Program/Discovery, 7 = Powered-up/Normal

Table B.7. Cause of Status Register 4610.

Register	Cause of Status	Code	Description
4610	Meter ID (Upper Byte)		If the Tenant Overload Flag is set, this byte indicates the associated MeterID.
			If more than 1 Overload is active, the byte is FF (255)
			Otherwise the byte is 00
	Cause of Status (Lower Byte)	0	N/A
		1	Normal
		11	Overvoltage
		12	Undervoltage
		18	Voltage Unbalance
		23	System Power
		26	Watt or Watt Demand
		27	VA or VA Demand
		28	VAR or VAR Demand
		70	Voltage Phase Loss (outage)

Table B. 8. Aggregate Meter (Eaton Standard Registers).

Start	Start (Hex)	Register Count	Description	Type Id	Units
2901	0B54	3	Slave Action [Controls] (see Register 2901 Table B.2)	Uint16	Encoded
2921	0B68	8	Time (MM/DD/YY day HH:MM:SS 100th)	Uint16	Misc
4607	11FE	2	Product ID (constant, 0x200C)	Uint32	
4609	1200	1	Primary/Secondary Status	Uint16	Encoded
4610	1201	1	Cause-Of-Status	Uint16	Encoded
4611	1202	2	IA	Float	Amps
4613	1204	2	IB	Float	Amps
4615	1206	2	IC	Float	Amps
4621	120C	2	Iavg	Float	Amps
4623	120E	2	VAB	Float	Volts
4625	1210	2	VBC	Float	Volts
4627	1212	2	VCA	Float	Volts
4629	1214	2	VLLavg	Float	Volts
4631	1216	2	VAN	Float	Volts
4633	1218	2	VBN	Float	Volts
4635	121A	2	VCN	Float	Volts
4637	121C	2	VLNavg	Float	Volts
4651	122A	2	Real Power (Watts)	Float	Watts
4653	122C	2	Reactive Power (Var)	Float	VAr
4655	122E	2	Apparent Power (VA)	Float	VA
4659	1232	2	Power Factor	Float	Hz
4661	1234	2	Frequency	Float	Hz
4667	123A	2	Phase A Watts	Float	Watts
4669	123C	2	Phase B Watts	Float	Watts
4671	123E	2	Phase C Watts	Float	Watts
4673	1240	2	Phase A var	Float	Var
4675	1242	2	Phase B var	Float	Var
4677	1244	2	Phase C var	Float	Var
4679	1246	2	Phase A VA	Float	VA
4681	1248	2	Phase B VA	Float	VA
4683	124A	2	Phase C VA	Float	VA
4691	1252	2	Phase A PFa [Apparent\True Power Factor]	Float	
4693	1254	2	Phase B PFa	Float	
4695	1256	2	Phase C PFa	Float	
6305	18A0	4	Forward Wh	Energy	0.1 kWh
6309	18A4	4	Reverse Wh	Energy	0.1 kWh
6313	18A8	4	Sum Total Wh	Energy	0.1 kWh
6317	18AC	4	Delivered/Leading varh	Energy	0.1 kvarh
6321	18B0	4	Received/Lagging varh	Energy	0.1 kvarh
6329	18B8	4	VAh	Energy	0.1 kVAh

Table B. 9. System Info.

Start	Start (Hex)	Regs.	SunSpec Name	Description
12000	2EDF	10	Assembly Name (Meter Base)	20 characters (PXM-MB-AB)
12010	2EE9	6	Part Number	12 characters (66C2261G01)
12016	2EEF	1	Assembly Rev	2 characters
12017	2EF0	1	SubAssembly Rev (board)	2 characters
12018	2EF1	8	Serial Number	16 characters

Table B. 10. Module Data.

Start	Start (Hex)	Regs.	Each Up to 60 Channels	Data Type
13000	32C7	100	Assembly Name	20 characters x 10 slots
13100	332B	60	Part Number	12 characters x 10 slots (e.g. 66C2652G01)
13160	3367	20	Assembly Rev (2char), SubAssembly Rev (2char)	4 characters x 10 slots
13180	337B	80	Serial Number	16 characters x 10 slots
13390	344D	60	Associated Meter (1-60)	16-bit unsigned integer x 10 slots x 6 channels
13450	3489	120	Load (% of Rating)	IEEE 754 32-bit float x 10 slots x 6 channels
13570	3501	120	Current	IEEE 754 32-bit float x 10 slots x 6 channels
13690	3579	120	Voltage	IEEE 754 32-bit float x 10 slots x 6 channels
13810	35F1	120	Watts	IEEE 754 32-bit float x 10 modules x 6 channels
13930	3669	120	var	IEEE 754 32-bit float x 10 slots x 6 channels
14050	36E1	120	VA	IEEE 754 32-bit float x 10 modules x 6 channels
14170	3759	120	PF	IEEE 754 32-bit float x 10 slots x 6 channels
14290	37D1	60	CT ID (enumeration)	16-bit unsigned integer x 10 slots x 6 channels
14350	380D	120	CT Rating	32-bit float x 10 slots x 6 channels

Table B. 11. Per-Channel Data.

Start	Start (Hex)	Regs.	Each Up to 60 Meters	Data Type
14500	38A3	1	Meter Slot Selection (1-10)	16-bit unsigned integer
14501	38A4	1	Channel Selection (1-6)	16-bit unsigned integer
14502	38A5	1	Associated meter (1-60)	16-bit unsigned integer
14503	38A6	2	Load (% of Rating)	IEEE 754 32-bit float
14505	38A8	2	Current	IEEE 754 32-bit float
14507	38AA	2	Voltage	IEEE 754 32-bit float
14509	38AC	2	Watts	IEEE 754 32-bit float
14511	38AE	2	var	IEEE 754 32-bit float
14513	38B0	2	VA	IEEE 754 32-bit float
14515	38B2	2	PF	IEEE 754 32-bit float
14517	38B4	1	CT ID (enumeration)	16-bit unsigned integer
14518	38B5	2	CT Rating	32-bit float

Table B. 12. System/Aggregate Meter Data.

Start	Start (Hex)	Regs.	System Values	Data Type
15000	3A97	2	Phase 1 Watts	IEEE 754 32-bit float
15002	3A99	2	Phase 2 Watts	IEEE 754 32-bit float
15004	3A9B	2	Phase 3 Watts	IEEE 754 32-bit float
15006	3A9D	2	System Watts	IEEE 754 32-bit float
15008	3A9F	2	Phase 1 var	IEEE 754 32-bit float
15010	3AA1	2	Phase 2 var	IEEE 754 32-bit float
15012	3AA3	2	Phase 3 var	IEEE 754 32-bit float
15014	3AA5	2	System var	IEEE 754 32-bit float
15016	3AA7	2	Phase 1 VA	IEEE 754 32-bit float
15018	3AA9	2	Phase 2 VA	IEEE 754 32-bit float
15020	3AAB	2	Phase 3 VA	IEEE 754 32-bit float
15022	3AAD	2	System VA	IEEE 754 32-bit float
15024	3AAF	2	V1	IEEE 754 32-bit float
15026	3AB1	2	V2	IEEE 754 32-bit float
15028	3AB3	2	V3	IEEE 754 32-bit float
15030	3AB5	2	Vab	IEEE 754 32-bit float
15032	3AB7	2	Vbc	IEEE 754 32-bit float
15034	3AB9	2	Vca	IEEE 754 32-bit float
15036	3ABB	2	Freq	IEEE 754 32-bit float
15038	3ABD	2	System PF	IEEE 754 32-bit float
15040	3ABF	2	Temperature	IEEE 754 32-bit float
15042	3AC1	2	Minimum Phase 1 Watts	IEEE 754 32-bit float
15044	3AC3	2	Minimum Phase 2 Watts	IEEE 754 32-bit float
15046	3AC5	2	Minimum Phase 3 Watts	IEEE 754 32-bit float
15048	3AC7	2	Minimum System Watts	IEEE 754 32-bit float
15050	3AC9	2	Minimum Phase 1 var	IEEE 754 32-bit float
15052	3ACB	2	Minimum Phase 2 var	IEEE 754 32-bit float
15054	3ACD	2	Minimum Phase 3 var	IEEE 754 32-bit float
15056	3ACF	2	Minimum System var	IEEE 754 32-bit float
15058	3AD1	2	Minimum Phase 1 VA	IEEE 754 32-bit float
15060	3AD3	2	Minimum Phase 2 VA	IEEE 754 32-bit float
15062	3AD5	2	Minimum Phase 3 VA	IEEE 754 32-bit float
15064	3AD7	2	Minimum System VA	IEEE 754 32-bit float
15066	3AD9	2	Minimum V1	IEEE 754 32-bit float
15068	3ADB	2	Minimum V2	IEEE 754 32-bit float
15070	3ADD	2	Minimum V3	IEEE 754 32-bit float
15072	3ADF	2	Minimum Vab	IEEE 754 32-bit float
15074	3AE1	2	Minimum Vbc	IEEE 754 32-bit float
15076	3AE3	2	Minimum Vca	IEEE 754 32-bit float
15078	3AE5	2	Minimum Freq	IEEE 754 32-bit float
15080	3AE7	2	Minimum System PF	IEEE 754 32-bit float
15082	3AE9	2	Minimum Temperature	IEEE 754 32-bit float
15084	3AEB	2	Maximum Phase 1 Watts	IEEE 754 32-bit float
15086	3AED	2	Maximum Phase 2 Watts	IEEE 754 32-bit float
15088	3AEF	2	Maximum Phase 3 Watts	IEEE 754 32-bit float
15090	3AF1	2	Maximum System Watts	IEEE 754 32-bit float
15092	3AF3	2	Maximum Phase 1 var	IEEE 754 32-bit float
15094	3AF5	2	Maximum Phase 2 var	IEEE 754 32-bit float
15096	3AF7	2	Maximum Phase 3 var	IEEE 754 32-bit float
15098	3AF9	2	Maximum System var	IEEE 754 32-bit float
15100	3AFB	2	Maximum Phase 1 VA	IEEE 754 32-bit float
15102	3AFD	2	Maximum Phase 2 VA	IEEE 754 32-bit float

Table B. 12. System/Aggregate Meter Data. (Cont.)

Start	Start (Hex)	Regs.	System Values	Data Type
15104	3AFF	2	Maximum Phase 3 VA	IEEE 754 32-bit float
15106	3B01	2	Maximum System VA	IEEE 754 32-bit float
15108	3B03	2	Maximum Va	IEEE 754 32-bit float
15110	3B05	2	Maximum Vb	IEEE 754 32-bit float
15112	3B07	2	Maximum Vc	IEEE 754 32-bit float
15114	3B09	2	Maximum Vab	IEEE 754 32-bit float
15116	3B0B	2	Maximum Vbc	IEEE 754 32-bit float
15118	3B0D	2	Maximum Vca	IEEE 754 32-bit float
15120	3B0F	2	Maximum Freq	IEEE 754 32-bit float
15122	3B11	2	Maximum System PF	IEEE 754 32-bit float
15124	3B13	2	Maximum Temperature	IEEE 754 32-bit float
15126	3B15	6	Min. Timestamp Phase 1 Watts	yyyy,mm,dd,hh,mm,ss
15132	3B1B	6	Min. Timestamp Phase 2 Watts	yyyy,mm,dd,hh,mm,ss
15138	3B21	6	Min. Timestamp Phase 3 Watts	yyyy,mm,dd,hh,mm,ss
15144	3B27	6	Min. Timestamp System Watts	yyyy,mm,dd,hh,mm,ss
15150	3B2D	6	Min. Timestamp Phase 1 var	yyyy,mm,dd,hh,mm,ss
15156	3B33	6	Min. Timestamp Phase 2 var	yyyy,mm,dd,hh,mm,ss
15162	3B39	6	Min. Timestamp Phase 3 var	yyyy,mm,dd,hh,mm,ss
15168	3B3F	6	Min. Timestamp System var	yyyy,mm,dd,hh,mm,ss
15174	3B45	6	Min. Timestamp Phase 1 VA	yyyy,mm,dd,hh,mm,ss
15180	3B4B	6	Min. Timestamp Phase 2 VA	yyyy,mm,dd,hh,mm,ss
15186	3B51	6	Min. Timestamp Phase 3 VA	yyyy,mm,dd,hh,mm,ss
15192	3B57	6	Min. Timestamp System VA	yyyy,mm,dd,hh,mm,ss
15198	3B5D	6	Min. Timestamp Va	yyyy,mm,dd,hh,mm,ss
15204	3B63	6	Min. Timestamp Vb	yyyy,mm,dd,hh,mm,ss
15210	3B69	6	Min. Timestamp Vc	yyyy,mm,dd,hh,mm,ss
15216	3B6F	6	Min. Timestamp Vab	yyyy,mm,dd,hh,mm,ss
15222	3B75	6	Min. Timestamp Vbc	yyyy,mm,dd,hh,mm,ss
15228	3B7B	6	Min. Timestamp Vca	yyyy,mm,dd,hh,mm,ss
15234	3B81	6	Min. Timestamp Freq	yyyy,mm,dd,hh,mm,ss
15240	3B87	6	Min. Timestamp System PF	yyyy,mm,dd,hh,mm,ss
15246	3B8D	6	Min. Timestamp Temperature	yyyy,mm,dd,hh,mm,ss
15252	3B93	6	Max. Timestamp Phase 1 Watts	yyyy,mm,dd,hh,mm,ss
15258	3B99	6	Max. Timestamp Phase 2 Watts	yyyy,mm,dd,hh,mm,ss
15264	3B9F	6	Max. Timestamp Phase 3 Watts	yyyy,mm,dd,hh,mm,ss
15270	3BA5	6	Max. Timestamp System Watts	yyyy,mm,dd,hh,mm,ss
15276	3BAB	6	Max. Timestamp Phase 1 var	yyyy,mm,dd,hh,mm,ss
15282	3BB1	6	Max. Timestamp Phase 2 var	yyyy,mm,dd,hh,mm,ss
15288	3BB7	6	Max. Timestamp Phase 3 var	yyyy,mm,dd,hh,mm,ss
15294	3BBD	6	Max. Timestamp System var	yyyy,mm,dd,hh,mm,ss
15300	3BC3	6	Max. Timestamp Phase 1 VA	yyyy,mm,dd,hh,mm,ss
15306	3BC9	6	Max. Timestamp Phase 2 VA	yyyy,mm,dd,hh,mm,ss
15312	3BCF	6	Max. Timestamp Phase 3 VA	yyyy,mm,dd,hh,mm,ss
15318	3BD5	6	Max. Timestamp System VA	yyyy,mm,dd,hh,mm,ss
15324	3BDB	6	Max. Timestamp Va	yyyy,mm,dd,hh,mm,ss
15330	3BE1	6	Max. Timestamp Vb	yyyy,mm,dd,hh,mm,ss
15336	3BE7	6	Max. Timestamp Vc	yyyy,mm,dd,hh,mm,ss
15342	3BED	6	Max. Timestamp Vab	yyyy,mm,dd,hh,mm,ss
15348	3BF3	6	Max. Timestamp Vbc	yyyy,mm,dd,hh,mm,ss
15354	3BF9	6	Max. Timestamp Vca	yyyy,mm,dd,hh,mm,ss
15360	3BFF	6	Max. Timestamp Freq	yyyy,mm,dd,hh,mm,ss
15366	3C05	6	Max. Timestamp System PF	yyyy,mm,dd,hh,mm,ss

Table B. 12. System/Aggregate Meter Data. (Cont.)

Start	Start (Hex)	Regs.	System Values	Data Type
15372	3C0B	6	Max. Timestamp Temperature	yyyy,mm,dd,hh,mm,ss
15378	3C11	2	W forward 1-Minute demand (import)	IEEE 754 32-bit float
15380	3C13	2	W reverse 1-Minute demand (export)	IEEE 754 32-bit float
15382	3C15	2	Q1 var 1-Minute demand (inductive/motor load)	IEEE 754 32-bit float
15384	3C17	2	Q2 var 1-Minute demand (inductive generator)	IEEE 754 32-bit float
15386	3C19	2	Q3 var 1-Minute demand (capacitive generator)	IEEE 754 32-bit float
15388	3C1B	2	Q4 var 1-Minute demand (capacitive load)	IEEE 754 32-bit float
15390	3C1D	2	Q1,Q4 VA 1-Minute demand (import)	IEEE 754 32-bit float
15392	3C1F	2	Q2,Q3 VA 1-Minute demand (export)	IEEE 754 32-bit float
15394	3C21	2	W forward demand (import)	IEEE 754 32-bit float
15396	3C23	2	W reverse demand (export)	IEEE 754 32-bit float
15398	3C25	2	Q1 var demand (inductive/motor load)	IEEE 754 32-bit float
15400	3C27	2	Q2 var demand (inductive generator)	IEEE 754 32-bit float
15402	3C29	2	Q3 var demand (capacitive generator)	IEEE 754 32-bit float
15404	3C2B	2	Q4 var demand (capacitive load)	IEEE 754 32-bit float
15406	3C2D	2	Q1,Q4 VA demand (import)	IEEE 754 32-bit float
15408	3C2F	2	Q2,Q3 VA demand (export)	IEEE 754 32-bit float
15410	3C31	2	pk W forward demand (import)	IEEE 754 32-bit float
15412	3C33	2	pk W reverse demand (export)	IEEE 754 32-bit float
15414	3C35	2	pk Q1 var demand (inductive/motor load)	IEEE 754 32-bit float
15416	3C37	2	pk Q2 var demand (inductive generator)	IEEE 754 32-bit float
15418	3C39	2	pk Q3 var demand (capacitive generator)	IEEE 754 32-bit float
15420	3C3B	2	pk Q4 var demand (capacitive load)	IEEE 754 32-bit float
15422	3C3D	2	pk Q1,Q4 VA (import)	IEEE 754 32-bit float
15424	3C3F	2	pk Q2,Q3 VA (export)	IEEE 754 32-bit float
15426	3C41	6	pk Timestamp W forward demand (import)	yyyy,mm,dd,hh,mm,ss
15432	3C47	6	pk Timestamp W reverse demand (export)	yyyy,mm,dd,hh,mm,ss
15438	3C4D	6	pk Timestamp Q1 var demand (inductive/motor load)	yyyy,mm,dd,hh,mm,ss
15444	3C53	6	pk Timestamp Q2 var demand (inductive generator)	yyyy,mm,dd,hh,mm,ss
15450	3C59	6	pk Timestamp Q3 var demand (capacitive generator)	yyyy,mm,dd,hh,mm,ss
15456	3C5F	6	pk Timestamp Q4 var demand (capacitive load)	yyyy,mm,dd,hh,mm,ss
15462	3C65	6	pk Timestamp Q1,Q4 VA (import)	yyyy,mm,dd,hh,mm,ss
15468	3C6B	6	pk Timestamp Q2,Q3 VA (export)	yyyy,mm,dd,hh,mm,ss
15474	3C71	2	Forward 0.1 kWh (import)	32-bit unsigned integer
15476	3C73	2	Reverse 0.1 kWh (export)	32-bit unsigned integer
15478	3C75	2	Q1 0.1 kvarh (inductive/motor load)	32-bit unsigned integer
15480	3C77	2	Q2 0.1 kvarh (inductive generator)	32-bit unsigned integer

Table B. 12. System/Aggregate Meter Data. (Cont.)

Start	Start (Hex)	Regs.	System Values	Data Type
15482	3C79	2	Q3 0.1 kvarh (capacitive generator)	32-bit unsigned integer
15484	3C7B	2	Q4 0.1 kvarh (capacitive load)	32-bit unsigned integer
15486	3C7D	2	Q1,Q4 0.1 kVAh (import)	32-bit unsigned integer
15488	3C7F	2	Q2,Q3 0.1 kVAh (export)	32-bit unsigned integer

Table B. 13. Sub-Meter Data (Organized by Parameter).

Start	Start (Hex)	Regs.	Each Up to 60 Meters	Data Type
20000	4E1F	960	Customer/Load Name	ASCII strings (32 characters) x 60 virtual meters
20960	51DF	60	Slot Number.[1-10]	16-bit unsigned integer x 60 virtual meters
21020	521B	60	Channel Mask [6bits]	16-bit x 60 virtual meters [bit-mapped channels]
21080	5257	120	W	IEEE 754 32-bit float x 60 virtual meters
21200	52CF	120	var	IEEE 754 32-bit float x 60 virtual meters
21320	5347	120	VA	IEEE 754 32-bit float x 60 virtual meters
21440	53BF	120	PF	IEEE 754 32-bit float x 60 virtual meters
21560	5437	120	W forward demand (import)	IEEE 754 32-bit float x 60 virtual meters
21680	54AF	120	W reverse demand (export)	IEEE 754 32-bit float x 60 virtual meters
21800	5527	120	Q1 var demand (inductive/motor load)	IEEE 754 32-bit float x 60 virtual meters
21920	559F	120	Q2 var demand (inductive generator)	IEEE 754 32-bit float x 60 virtual meters
22040	5617	120	Q3 var demand (capacitive generator)	IEEE 754 32-bit float x 60 virtual meters
22160	568F	120	Q4 var demand (capacitive load)	IEEE 754 32-bit float x 60 virtual meters
22280	5707	120	Q1,Q4 VA demand (import)	IEEE 754 32-bit float x 60 virtual meters
22400	577F	120	Q2,Q3 VA demand (export)	IEEE 754 32-bit float x 60 virtual meters
22520	57F7	120	pk W forward demand (import)	IEEE 754 32-bit float x 60 virtual meters
22640	586F	120	pk W reverse demand (export)	IEEE 754 32-bit float x 60 virtual meters
22760	58E7	120	pk Q1 var demand (inductive/motor load)	IEEE 754 32-bit float x 60 virtual meters
22880	595F	120	pk Q2 var demand (inductive generator)	IEEE 754 32-bit float x 60 virtual meters
23000	59D7	120	pk Q3 var demand (capacitive generator)	IEEE 754 32-bit float x 60 virtual meters
23120	5A4F	120	pk Q4 var demand (capacitive load)	IEEE 754 32-bit float x 60 virtual meters
23240	5AC7	120	pk Q1,Q4 VA (import)	IEEE 754 32-bit float x 60 virtual meters
23360	5B3F	120	pk Q2,Q3 VA (export)	IEEE 754 32-bit float x 60 virtual meters
23480	5BB7	360	pk Timestamp W forward demand (import)	yyyy,mm,dd,hh,mm,ss x 60 virtual meters
23840	5D1F	360	pk Timestamp W reverse demand (export)	yyyy,mm,dd,hh,mm,ss x 60 virtual meters
24200	5E87	360	pk Timestamp Q1 var demand (inductive/motor load)	yyyy,mm,dd,hh,mm,ss x 60 virtual meters
24560	5FEF	360	pk Timestamp Q2 var demand (inductive generator)	yyyy,mm,dd,hh,mm,ss x 60 virtual meters
24920	6157	360	pk Timestamp Q3 var demand (capacitive generator)	yyyy,mm,dd,hh,mm,ss x 60 virtual meters
25280	62BF	360	pk Timestamp Q4 var demand (capacitive load)	yyyy,mm,dd,hh,mm,ss x 60 virtual meters
25640	6427	360	pk Timestamp Q1,Q4 VA (import)	yyyy,mm,dd,hh,mm,ss x 60 virtual meters

Table B. 13. Sub-Meter Data (Organized by Parameter). (Cont.)

Start	Start (Hex)	Regs.	Each Up to 60 Meters	Data Type
26000	658F	360	pk Timestamp Q2,Q3 VA (export)	yyyy,mm,dd,hh,mm,ss x 60 virtual meters
26360	66F7	120	Forward 0.1 kWh (import)	32-bit unsigned integers x 60 virtual meters
26480	676F	120	Reverse 0.1 kWh (export)	32-bit unsigned integers x 60 virtual meters
26600	67E7	120	Q1 0.1 kvarh (inductive/ motor load)	32-bit unsigned integers x 60 virtual meters
26720	685F	120	Q2 0.1 kvarh (inductive generator)	32-bit unsigned integers x 60 virtual meters
26840	68D7	120	Q3 0.1 kvarh (capacitive generator)	32-bit unsigned integers x 60 virtual meters
26960	694F	120	Q4 0.1 kvarh (capacitive load)	32-bit unsigned integers x 60 virtual meters
27080	69C7	120	Q1,Q4 0.1 kVAh (import)	32-bit unsigned integers x 60 virtual meters
27200	6A3F	120	Q2,Q3 0.1 kVAh (export)	32-bit unsigned integers x 60 virtual meters

Table B. 14. Sub-Meter Data (Organized by Sub-meter/Tenant Number).

Start	Start (Hex)	Regs.	Each Up to 60 Meters	Data Type
28000	6D5F	16	Customer/Load Name	ASCII strings (32 characters)
28016	6D6F	1	Slot Number.[1-10]	16-bit unsigned integer
28017	6D70	1	Channel Mask [6bits]	16-bit x 60 [bitmapped channels]
28018	6D71	2	W	IEEE 754 32-bit float
28020	6D73	2	var	IEEE 754 32-bit float
28022	6D75	2	VA	IEEE 754 32-bit float
28024	6D77	2	PF	IEEE 754 32-bit float
28026	6D79	2	W forward demand (import)	IEEE 754 32-bit float
28028	6D7B	2	W reverse demand (export)	IEEE 754 32-bit float
28030	6D7D	2	Q1 var demand (inductive/motor load)	IEEE 754 32-bit float
28032	6D7F	2	Q2 var demand (inductive generator)	IEEE 754 32-bit float
28034	6D81	2	Q3 var demand (capacitive generator)	IEEE 754 32-bit float
28036	6D83	2	Q4 var demand (capacitive load)	IEEE 754 32-bit float
28038	6D85	2	Q1,Q4 VA demand (import)	IEEE 754 32-bit float
28040	6D87	2	Q2,Q3 VA demand (export)	IEEE 754 32-bit float
28042	6D89	2	pk W forward demand (import)	IEEE 754 32-bit float
28044	6D8B	2	pk W reverse demand (export)	IEEE 754 32-bit float
28046	6D8D	2	pk Q1 var demand (inductive/ motor load)	IEEE 754 32-bit float
28048	6D8F	2	pk Q2 var demand (inductive generator)	IEEE 754 32-bit float
28050	6D91	2	pk Q3 var demand (capacitive generator)	IEEE 754 32-bit float
28052	6D93	2	pk Q4 var demand (capacitive load)	IEEE 754 32-bit float
28054	6D95	2	pk Q1,Q4 VA (import)	IEEE 754 32-bit float
28056	6D97	2	pk Q2,Q3 VA (export)	IEEE 754 32-bit float
28058	6D99	6	pk Timestamp W forward demand (import)	yyyy,mm,dd,hh,mm,ss

Table B. 14. Sub-Meter Data (Organized by Sub-meter/Tenant Number). (Cont.)

Start	Start (Hex)	Regs.	Each Up to 60 Meters	Data Type
28064	6D9F	6	pk Timestamp W reverse demand (export)	yyyy,mm,dd,hh,mm,ss
28070	6DA5	6	pk Timestamp Q1 var demand (inductive/motor load)	yyyy,mm,dd,hh,mm,ss
28076	6DAB	6	pk Timestamp Q2 var demand (inductive generator)	yyyy,mm,dd,hh,mm,ss
28082	6DB1	6	pk Timestamp Q3 var demand (capacitive generator)	yyyy,mm,dd,hh,mm,ss
28088	6DB7	6	pk Timestamp Q4 var demand (capacitive load)	yyyy,mm,dd,hh,mm,ss
28094	6DBD	6	pk Timestamp Q1,Q4 VA (import)	yyyy,mm,dd,hh,mm,ss
28100	6DC3	6	pk Timestamp Q2,Q3 VA (export)	yyyy,mm,dd,hh,mm,ss
28106	6DC9	2	Forward 0.1 kWh (import)	32-bit unsigned integers
28108	6DCB	2	Reverse 0.1 kWh (export)	32-bit unsigned integers
28110	6DCD	2	Q1 0.1 kvarh (inductive/motor load)	32-bit unsigned integers
28112	6DCF	2	Q2 0.1 kvarh (inductive generator)	32-bit unsigned integers
28114	6DD1	2	Q3 0.1 kvarh (capacitive generator)	32-bit unsigned integers
28116	6DD3	2	Q4 0.1 kvarh (capacitive load)	32-bit unsigned integers
28118	6DD5	2	Q1,Q4 0.1 kVAh (import)	32-bit unsigned integers
28120	6DD7	2	Q2,Q3 0.1 kVAh (export)	32-bit unsigned integers
28122	6DD9	122	Virtual Meter #2	
28244	6E53	122	Virtual Meter #3	
28366	6ECD	122	Virtual Meter #4	
28488	6F47	122	Virtual Meter #5	
28610	6FC1	122	Virtual Meter #6	
28732	703B	122	Virtual Meter #7	
28854	70B5	122	Virtual Meter #8	
28976	712F	122	Virtual Meter #9	
29098	71A9	122	Virtual Meter #10	
29220	7223	122	Virtual Meter #11	
29342	729D	122	Virtual Meter #12	
29464	7317	122	Virtual Meter #13	
29586	7391	122	Virtual Meter #14	
29708	740B	122	Virtual Meter #15	
29830	7485	122	Virtual Meter #16	
29952	74FF	122	Virtual Meter #17	
30074	7579	122	Virtual Meter #18	
30196	75F3	122	Virtual Meter #19	
30318	766D	122	Virtual Meter #20	
30440	76E7	122	Virtual Meter #21	
30562	7761	122	Virtual Meter #22	
30684	77DB	122	Virtual Meter #23	
30806	7855	122	Virtual Meter #24	
30928	78CF	122	Virtual Meter #25	
31050	7949	122	Virtual Meter #26	
31172	79C3	122	Virtual Meter #27	
31294	7A3D	122	Virtual Meter #28	
31416	7AB7	122	Virtual Meter #29	
31538	7B31	122	Virtual Meter #30	
31660	7BAB	122	Virtual Meter #31	
31782	7C25	122	Virtual Meter #32	
31904	7C9F	122	Virtual Meter #33	
32026	7D19	122	Virtual Meter #34	

Table B. 14. Sub-Meter Data (Organized by Sub-meter/Tenant Number). (Cont.)

Start	Start (Hex)	Regs.	Each Up to 60 Meters	Data Type
32148	7D93	122	Virtual Meter #35	
32270	7E0D	122	Virtual Meter #36	
32392	7E87	122	Virtual Meter #37	
32514	7F01	122	Virtual Meter #38	
32636	7F7B	122	Virtual Meter #39	
32758	7FF5	122	Virtual Meter #40	
32880	806F	122	Virtual Meter #41	
33002	80E9	122	Virtual Meter #42	
33124	8163	122	Virtual Meter #43	
33246	81DD	122	Virtual Meter #44	
33368	8257	122	Virtual Meter #45	
33490	82D1	122	Virtual Meter #46	
33612	834B	122	Virtual Meter #47	
33734	83C5	122	Virtual Meter #48	
33856	843F	122	Virtual Meter #49	
33978	84B9	122	Virtual Meter #50	
34100	8533	122	Virtual Meter #51	
34222	85AD	122	Virtual Meter #52	
34344	8627	122	Virtual Meter #53	
34466	86A1	122	Virtual Meter #54	
34588	871B	122	Virtual Meter #55	
34710	8795	122	Virtual Meter #56	
34832	880F	122	Virtual Meter #57	
34954	8889	122	Virtual Meter #58	
35076	8903	122	Virtual Meter #59	
35198	897D	122	Virtual Meter #60	

Note: Regiser 35500 is a writable register that is used to select which meter's appears in the rest of the table.

Table B. 15. Sub-Meter Data (Organized to Query by Virtual-meter/Tenant Number).

Start	Start (Hex)	Regs.	Each Up to 60 Meters	Data Type
35500	8AAB	1	Virtual Meter Selection (1-60) (Write Meter ID here)	16-bit unsigned integer
35501	8AAC	16	Customer/Load Name	ASCII strings (32 characters)
35517	8ABC	1	Slot Number.[1-10]	16-bit unsigned integer
35518	8ABD	1	Channel Mask [6bits]	16-bit [bitmapped channels]
35519	8ABE	2	W	IEEE 754 32-bit float
35521	8AC0	2	var	IEEE 754 32-bit float
35523	8AC2	2	VA	IEEE 754 32-bit float
35525	8AC4	2	PF	IEEE 754 32-bit float
35527	8AC6	2	W Forward Demand (Import)	IEEE 754 32-bit float
35529	8AC8	2	W Reverse Demand (Export)	IEEE 754 32-bit float
35531	8ACA	2	Q1 var Demand (Inductive/ Motor Load)	IEEE 754 32-bit float
35533	8ACC	2	Q2 var Demand (Inductive Generator)	IEEE 754 32-bit float
35535	8ACE	2	Q3 var Demand (Capacitive Generator)	IEEE 754 32-bit float
35537	8AD0	2	Q4 var Demand (Capacitive Load)	IEEE 754 32-bit float
35539	8AD2	2	Q1,Q4 VA Demand (Import)	IEEE 754 32-bit float
35541	8AD4	2	Q2,Q3 VA Demand (Export)	IEEE 754 32-bit float
35543	8AD6	2	pk W Forward Demand (Import)	IEEE 754 32-bit float
35545	8AD8	2	pk W Reverse Demand (Export)	IEEE 754 32-bit float
35547	8ADA	2	pk Q1 var Demand (Inductive/Motor Load)	IEEE 754 32-bit float
35549	8ADC	2	pk Q2 var Demand (Inductve Generator)	IEEE 754 32-bit float
35551	8ADE	2	pk Q3 var Demand (Capacitive Generator)	IEEE 754 32-bit float
35553	8AE0	2	pk Q4 var Demand (Capacitive Load)	IEEE 754 32-bit float
35555	8AE2	2	pk Q1,Q4 VA (Import)	IEEE 754 32-bit float
35557	8AE4	2	pk Q2,Q3 VA (Export)	IEEE 754 32-bit float
35559	8AE6	6	pk Timestamp W Forward Demand (Import)	yyyy,mm,dd,hh,mm,ss
35565	8AEC	6	pk Timestamp W Reverse Demand (Export)	yyyy,mm,dd,hh,mm,ss
35571	8AF2	6	pk Timestamp Q1 var Demand (Inductive/Motor Load)	yyyy,mm,dd,hh,mm,ss
35577	8AF8	6	pk Timestamp Q2 var Demand (Inductive Generator)	yyyy,mm,dd,hh,mm,ss
35583	8AFE	6	pk Timestamp Q3 var Demand (Capacitive Generator)	yyyy,mm,dd,hh,mm,ss
35589	8B04	6	pk Timestamp Q4 var Demand (Capacitive Load)	yyyy,mm,dd,hh,mm,ss
35595	8B0A	6	pk Timestamp Q1,Q4 VA (Import)	yyyy,mm,dd,hh,mm,ss
35601	8B10	6	pk Timestamp Q2,Q3 VA (Export)	yyyy,mm,dd,hh,mm,ss
35607	8B16	2	Forward 0.1 kWh (Import)	32-bit unsigned integers
35609	8B18	2	Reverse 0.1kWh (Export)	32-bit unsigned integers
35611	8B1A	2	Q1 0.1 kvarh (Inductive/ Motor Load)	32-bit unsigned integers

Table B. 15. Sub-Meter Data (Organized to Query by Virtual-meter/Tenant Number). (Cont.)

Start	Start (Hex)	Regs.	Each Up to 60 Meters	Data Type
35613	8B1C	2	Q2 0.1 kvarh (Inductive Generator)	32-bit unsigned integers
35615	8B1E	2	Q3 0.1 kvarh (Capacitive Generator)	32-bit unsigned integers
35617	8B20	2	Q4 0.1 kvarh (Capacitive Load)	32-bit unsigned integers
35619	8B22	2	Q1, Q4 0.1 kVAh (Import)	32-bit unsigned integers
35621	8B24	2	Q2,Q3 0.1 kVAh (Export)	32-bit unsigned integers
35623	8B26	2	V1	IEEE 754 32-bit float
35625	8B28	2	V2	IEEE 754 32-bit float
35627	8B2A	2	V3	IEEE 754 32-bit float
35629	8B2C	2	Freq	IEEE 754 32-bit float

Table B. 16. Input Slot Data (Organized by Parameter).

Start	Start (Hex)	Regs.	Each Up to 80 Inputs	Data Type
40500	9E33	1280	Input Name	ASCII strings (32 characters) x 80 inputs
41780	A333	80	Slot Number.[1-10]	16-bit unsigned integer x 80 inputs
41860	A383	80	Channel Number [1-8]	16-bit x 80 inputs
41940	A3D3	80	Input Rollover Counter	16-bit unsigned integers x 80 inputs
42020	A423	160	Input Counter	32-bit unsigned integers x 80 inputs
42180	A4C3	160	Input Multiplier Setting	IEEE 754 32-bit float x 80 inputs
42340	A563	640	Units	ASCII strings (16 characters) x 80 inputs
42980	A7E3	160	Input Profile	IEEE 754 32-bit float x 80 inputs

Table B. 17. Input Slot Data (Organized by Input Slot/Channel).

Start	Start (Hex)	Regs.	Each Up to 80 Inputs	Data Type
43200	A8BF	16	Input Name	ASCII strings (32 characters)
43216	A8CF	1	Slot Number.[1-10]	16-bit unsigned integer
43217	A8D0	1	Channel Number [1-8]	16-bit
43218	A8D1	1	Input Rollover Counter	16-bit unsigned integer
43219	A8D2	2	Input Counter	32-bit unsigned integer
43221	A8D4	2	Input Multiplier Setting	IEEE 754 32-bit float
43223	A8D6	8	Units	ASCII strings (16 characters)
43231	A8DE	2	Input Profile	IEEE 754 32-bit float (average value)
43233	A8E0	33	Input #2	Slot#1 Input#2
43266	A901	33	Input #3	Slot#1 Input#3
43299	A922	33	Input #4	Slot#1 Input#4
43332	A943	33	Input #5	Slot#1 Input#5
43365	A964	33	Input #6	Slot#1 Input#6
43398	A985	33	Input #7	Slot#1 Input#7
43431	A9A6	33	Input #8	Slot#1 Input#8
43464	A9C7	33	Input #9	Slot#2 Input#1
43497	A9E8	33	Input #10	Slot#2 Input#2
43530	AA09	33	Input #11	Slot#2 Input#3
43563	AA2A	33	Input #12	Slot#2 Input#4

Table B. 17. Input Slot Data (Organized by Input Slot/Channel). (Cont.)

Start	Start (Hex)	Regs.	Each Up to 80 Inputs	Data Type
43596	AA4B	33	Input #13	Slot#2 Input#5
43629	AA6C	33	Input #14	Slot#2 Input#6
43662	AA8D	33	Input #15	Slot#2 Input#7
43695	AAAE	33	Input #16	Slot#2 Input#8
43728	AACF	33	Input #17	Slot#3 Input#1
43761	AAF0	33	Input #18	Slot#3 Input#2
43794	AB11	33	Input #19	Slot#3 Input#3
43827	AB32	33	Input #20	Slot#3 Input#4
43860	AB53	33	Input #21	Slot#3 Input#5
43893	AB74	33	Input #22	Slot#3 Input#6
43926	AB95	33	Input #23	Slot#3 Input#7
43959	ABB6	33	Input #24	Slot#3 Input#8
43992	ABD7	33	Input #25	Slot#4 Input#1
44025	ABF8	33	Input #26	Slot#4 Input#2
44058	AC19	33	Input #27	Slot#4 Input#3
44091	AC3A	33	Input #28	Slot#4 Input#4
44124	AC5B	33	Input #29	Slot#4 Input#5
44157	AC7C	33	Input #30	Slot#4 Input#6
44190	AC9D	33	Input #31	Slot#4 Input#7
44223	ACBE	33	Input #32	Slot#4 Input#8
44256	ACDF	33	Input #33	Slot#5 Input#1
44289	AD00	33	Input #34	Slot#5 Input#2
44322	AD21	33	Input #35	Slot#5 Input#3
44355	AD42	33	Input #36	Slot#5 Input#4
44388	AD63	33	Input #37	Slot#5 Input#5
44421	AD84	33	Input #38	Slot#5 Input#6
44454	ADA5	33	Input #39	Slot#5 Input#7
44487	ADC6	33	Input #40	Slot#5 Input#8
44520	ADE7	33	Input #41	Slot#6 Input#1
44553	AE08	33	Input #42	Slot#6 Input#2
44586	AE29	33	Input #43	Slot#6 Input#3
44619	AE4A	33	Input #44	Slot#6 Input#4
44652	AE6B	33	Input #45	Slot#6 Input#5
44685	AE8C	33	Input #46	Slot#6 Input#6
44718	AEAD	33	Input #47	Slot#6 Input#7
44751	AECE	33	Input #48	Slot#6 Input#8
44784	AEEF	33	Input #49	Slot#7 Input#1
44817	AF10	33	Input #50	Slot#7 Input#2
44850	AF31	33	Input #51	Slot#7 Input#3
44883	AF52	33	Input #52	Slot#7 Input#4
44916	AF73	33	Input #53	Slot#7 Input#5
44949	AF94	33	Input #54	Slot7 Input#6
44982	AFB5	33	Input #55	Slot#7 Input#7
45015	AFD6	33	Input #56	Slot#7 Input#8
45048	AFF7	33	Input #57	Slot#8 Input#1
45081	B018	33	Input #58	Slot#8 Input#2
45114	B039	33	Input #59	Slot#8 Input#3
45147	B05A	33	Input #60	Slot#8 Input#4
45180	B07B	33	Input #61	Slot#8 Input#5
45213	B09C	33	Input #62	Slot#8 Input#6
45246	B0BD	33	Input #63	Slot#8 Input#7

Table B. 17. Input Slot Data (Organized by Input Slot/Channel). (Cont.)

Start	Start (Hex)	Regs.	Each Up to 80 Inputs	Data Type
45279	B0DE	33	Input #64	Slot#8 Input#8
45312	B0FF	33	Input #65	Slot#9 Input#1
45345	B120	33	Input #66	Slot#9 Input#2
45378	B141	33	Input #67	Slot#9 Input#3
45411	B162	33	Input #68	Slot#9 Input#4
45444	B183	33	Input #69	Slot#9 Input#5
45477	B1A4	33	Input #70	Slot#9 Input#6
45510	B1C5	33	Input #71	Slot#9 Input#7
45543	B1E6	33	Input #72	Slot#9 Input#8
45576	B207	33	Input #73	Slot#10 Input#1
45609	B228	33	Input #74	Slot#10 Input#2
45642	B249	33	Input #75	Slot#10 Input#3
45675	B26A	33	Input #76	Slot#10 Input#4
45708	B28B	33	Input #77	Slot#10 Input#5
45741	B2AC	33	Input #78	Slot#10 Input#6
45774	B2CD	33	Input #79	Slot#10 Input#7
45807	B2EE	33	Input #80	Slot#10 Input#8

Table B. 18. Input Status.

Start	Start (Hex)	Regs.	Each of Up to 10 Slots	Data Type
45900	B34B	1	Inputs 1-8 Slot1	16-bit integer
45901	B34C	1	Inputs 1-8 Slot2	16-bit integer
45902	B34D	1	Inputs 1-8 Slot3	16-bit integer
45903	B34E	1	Inputs 1-8 Slot4	16-bit integer
45904	B34F	1	Inputs 1-8 Slot5	16-bit integer
45905	B350	1	Inputs 1-8 Slot6	16-bit integer
45906	B351	1	Inputs 1-8 Slot7	16-bit integer
45907	B352	1	Inputs 1-8 Slot8	16-bit integer
45908	B353	1	Inputs 1-8 Slot9	16-bit integer
45909	B354	1	Inputs 1-8 Slot10	16-bit integer

Table B. 19. Output Module Data (Organized by Parameter).

Start	Start (Hex)	Regs.	Each Up to 80 Outputs	Data Type
46000	B3AF	1280	Output Name	ASCII strings (32 characters) x 80 outputs
47280	B8AF	80	Slot Number.[1-10]	16-bit unsigned integer x 80 outputs
47360	B8FF	80	Channel Number [1-8]	16-bit unsigned integer x 80 outputs
47440	B94F	80	Output Function	Manual/AlarmTriggered (0-1)
47520	B99F	80	Output polarity	0=>Close upon active, 1=>Open upon active
47600	B9EF	80	Output State	0=>Opened, 1=>Closed
47680	BA3F	640	Output State (String)	ASCII strings (16 characters) x 80 outputs
48320	BCBF	160	Output Counter	32-bit integer
48480	BD5F	160	Measured Value	IEEE 754 32-bit float x 80 outputs
48640	BDFF	80	Event ID	16-bit Modbus register address x 80 outputs

Table B. 20. Output Module Data (Organized by Output Slot/Channel).

Start	Start (Hex)	Regs.	Each Up to 80 Outputs	Data Type
48750	BE6D	16	Output Name	ASCII strings (32 characters)
48766	BE7D	1	Slot Number.[1-10]	16-bit unsigned integer
48767	BE7E	1	Channel Number [1-8]	16-bit unsigned integer
48768	BE7F	1	Output Function	Manual/AlarmTriggered
48769	BE80	1	Output Polarity	0=>Close upon active, 1=>Open upon active
48770	BE81	1	Output State	0=>Opened, 1=>Closed
48771	BE82	8	Output State (string)	ASCII strings (16 characters)
48779	BE8A	2	Output Counter	32-bit integer
48781	BE8C	2	Measured Value	IEEE 754 32-bit float
48783	BE8E	1	Event ID	16-bit Modbus register address
48784	BE8F	34	Output #2	Slot#1 Output#2
48818	BEB1	34	Output #3	Slot#1 Output#3
48852	BED3	34	Output #4	Slot#1 Output#4
48886	BEF5	34	Output #5	Slot#1 Output#5
48920	BF17	34	Output #6	Slot#1 Output#6
48954	BF39	34	Output #7	Slot#1 Output#7
48988	BF5B	34	Output #8	Slot#1 Output#8
49022	BF7D	34	Output #9	Slot#2 Output#1
49056	BF9F	34	Output #10	Slot#2 Output#2
49090	BFC1	34	Output #11	Slot#2 Output#3
49124	BFE3	34	Output #12	Slot#2 Output#4
49158	C005	34	Output #13	Slot#2 Output#5
49192	C027	34	Output #14	Slot#2 Output#6
49226	C049	34	Output #15	Slot#2 Output#7
49260	C06B	34	Output #16	Slot#2 Output#8
49294	C08D	34	Output #17	Slot#3 Output#1
49328	C0AF	34	Output #18	Slot#3 Output#2
49362	C0D1	34	Output #19	Slot#3 Output#3
49396	C0F3	34	Output #20	Slot#3 Output#4
49430	C115	34	Output #21	Slot#3 Output#5
49464	C137	34	Output #22	Slot#3 Output#6
49498	C159	34	Output #23	Slot#3 Output#7
49532	C17B	34	Output #24	Slot#3 Output#8
49566	C19D	34	Output #25	Slot#4 Output#1
49600	C1BF	34	Output #26	Slot#4 Output#2
49634	C1E1	34	Output #27	Slot#4 Output#3
49668	C203	34	Output #28	Slot#4 Output#4
49702	C225	34	Output #29	Slot#4 Output#5
49736	C247	34	Output #30	Slot#4 Output#6
49770	C269	34	Output #31	Slot#4 Output#7
49804	C28B	34	Output #32	Slot#4 Output#8
49838	C2AD	34	Output #33	Slot#5 Output#1
49872	C2CF	34	Output #34	Slot#5 Output#2
49906	C2F1	34	Output #35	Slot#5 Output#3
49940	C313	34	Output #36	Slot#5 Output#4
49974	C335	34	Output #37	Slot#5 Output#5
50008	C357	34	Output #38	Slot#5 Output#6
50042	C379	34	Output #39	Slot#5 Output#7
50076	C39B	34	Output #40	Slot#5 Output#8
50110	C3BD	34	Output #41	Slot#6 Output#1
50144	C3DF	34	Output #42	Slot#6 Output#2

Table B. 20. Output Module Data (Organized by Output Slot/ Channel). (Cont.)

Start	Start (Hex)	Regs.	Each Up to 80 Outputs	Data Type
50178	C401	34	Output #43	Slot#6 Output#3
50212	C423	34	Output #44	Slot#6 Output#4
50246	C445	34	Output #45	Slot#6 Output#5
50280	C467	34	Output #46	Slot#6 Output#6
50314	C489	34	Output #47	Slot#6 Output#7
50348	C4AB	34	Output #48	Slot#6 Output#8
50382	C4CD	34	Output #49	Slot#7 Output#1
50416	C4EF	34	Output #50	Slot#7 Output#2
50450	C511	34	Output #51	Slot#7 Output#3
50484	C533	34	Output #52	Slot#7 Output#4
50518	C555	34	Output #53	Slot#7 Output#5
50552	C577	34	Output #54	Slot#7 Output#6
50586	C599	34	Output #55	Slot#7 Output#7
50620	C5BB	34	Output #56	Slot#7 Output#8
50654	C5DD	34	Output #57	Slot#8 Output#1
50688	C5FF	34	Output #58	Slot#8 Output#2
50722	C621	34	Output #59	Slot#8 Output#3
50756	C643	34	Output #60	Slot#8 Output#4
50790	C665	34	Output #61	Slot#8 Output#5
50824	C687	34	Output #62	Slot#8 Output#6
50858	C6A9	34	Output #63	Slot#8 Output#7
50892	C6CB	34	Output #64	Slot#8 Output#8
50926	C6ED	34	Output #65	Slot#9 Output#1
50960	C70F	34	Output #66	Slot#9 Output#2
50994	C731	34	Output #67	Slot#9 Output#3
51028	C753	34	Output #68	Slot#9 Output#4
51062	C775	34	Output #69	Slot#9 Output#5
51096	C797	34	Output #70	Slot#9 Output#6
51130	C7B9	34	Output #71	Slot#9 Output#7
51164	C7DB	34	Output #72	Slot#9 Output#8
51198	C7FD	34	Output #73	Slot#10 Output#1
51232	C81F	34	Output #74	Slot#10 Output#2
51266	C841	34	Output #75	Slot#10 Output#3
51300	C863	34	Output #76	Slot#10 Output#4
51334	C885	34	Output #77	Slot#10 Output#5
51368	C8A7	34	Output #78	Slot#10 Output#6
51402	C8C9	34	Output #79	Slot#10 Output#7
51436	C8EB	34	Output #80	Slot#10 Output#8

Table B. 21. Output Status.

Start	Start (Hex)	Regs.	Each of Up to 10 Module	Data Type
51480	C917	1	Outputs 1-8 Slot 1	16-bit integer
51481	C918	1	Outputs 1-8 Slot 2	16-bit integer
51482	C919	1	Outputs 1-8 Slot 3	16-bit integer
51483	C91A	1	Outputs 1-8 Slot 4	16-bit integer
51484	C91B	1	Outputs 1-8 Slot 5	16-bit integer
51485	C91C	1	Outputs 1-8 Slot 6	16-bit integer
51486	C91D	1	Outputs 1-8 Slot 7	16-bit integer
51487	C91E	1	Outputs 1-8 Slot 8	16-bit integer
51488	C91F	1	Outputs 1-8 Slot 9	16-bit integer
51489	C920	1	Outputs 1-8 Slot 10	16-bit integer

Table B. 22. Built-In Inputs (Organized by Parameter).

Start	Start (Hex)	Regs.	3 Onboard	Data Type
51500	C92B	48	Input Name	ASCII strings (32 characters) x 3 inputs
51548	C95B	3	Input Function (0-3)	None/PulseInputs/RateAlert/ DemandSync (0-3)
51551	C95E	3	Channel Number [1-3]	16-bit x 4 inputs
51554	C961	3	Input State	0=>Opened, 1=>Closed
51557	C964	24	Input State (String)	ASCII strings (16 characters) x 3 inputs
51581	C97C	3	Input Rollover Counter	16-bit unsigned integers x 3 inputs
51584	C97F	6	Input Counter	32-bit unsigned integers x 3 inputs
51590	C985	6	Input Multiplier Setting	IEEE 754 32-bit float x 3 inputs
51596	C98B	24	Units	ASCII strings (16 characters) x 3 inputs
51620	C9A3	6	Input Profile	IEEE 754 32-bit float x 3 inputs

Table B. 23. Built-In Inputs (Organized by Input).

Start	Start (Hex)	Regs.	Built-In Inputs	Data Type
51700	C9F3	1	Input Function (0-3)	None/PulseInputs/RateAlert/ DemandSync (0-3)
51701	C9F4	1	Input State	0=>Opened, 1=>Closed
51702	C9F5	1	Input Rollover Counter	16-bit unsigned integer
51703	C9F6	2	Input Counter	32-bit unsigned integer
51705	C9F8	2	Input Multiplier	IEEE 754 32-bit float
51707	C9FA	8	Units	ASCII strings (16 characters)
51715	CA02	2	Input Profile	IEEE 754 32-bit float (average value)
51717	CA04	17	Input #2	Built-In Input#2
51734	CA15	17	Input #3	Built-In Input#3

Table B. 24. Built-In Output.

Start	Start (Hex)	Regs.	Built-In Output	Data Type
51800	CA57	16	Meter (or Null)	ASCII strings (32 characters)
51816	CA67	1	Output Function (2-3)	PulseOutput(3),DemandSync(2)
51817	CA68	8	Measurement	ASCII strings (16 characters)
51825	CA70	2	Pulse Constant	IEEE 754 32-bit float (for PulseOutput)
51827	CA72	1	Output State	0=>Opened, 1=>Closed
51828	CA73	2	Output Counter	32-bit integer

Table B. 25. Virtual/Tenant Demand Data #1.

Start	Start (Hex)	Regs.	Each Up to 60 Meters	Data Type
52000	CB1F	1	Sequence#	16-bit unsigned integer
52001	CB20	6	Timestamp of Demand Reset	yyyy,mm,dd,hh,mm,ss
52007	CB26	2	pk W Forward Demand (Import)	IEEE 754 32-bit float
52009	CB28	2	pk W Reverse Demand (Export)	IEEE 754 32-bit float
52011	CB2A	2	pk Q1 var Demand (Inductive/ Motor Load)	IEEE 754 32-bit float
52013	CB2C	2	pk Q2 var Demand (Inductive Generator)	IEEE 754 32-bit float
52015	CB2E	2	pk Q3 var Demand (Capacitive Generator)	IEEE 754 32-bit float
52017	CB30	2	pk Q4 var Demand (Capacitive Load)	IEEE 754 32-bit float
52019	CB32	2	pk Q1,Q4 VA (Import)	IEEE 754 32-bit float
52021	CB34	2	pk Q2,Q3 VA (Export)	IEEE 754 32-bit float
52023	CB36	6	pk Timestamp W Forward Demand (Import)	yyyy,mm,dd,hh,mm,ss
52029	CB3C	6	pk Timestamp W Reverse Demand (Export)	yyyy,mm,dd,hh,mm,ss
52035	CB42	6	pk Timestamp Q1 var Demand (Inductive/Motor Load)	yyyy,mm,dd,hh,mm,ss
52041	CB48	6	pk Timestamp Q2 var Demand (Inductive Generator)	yyyy,mm,dd,hh,mm,ss
52047	CB4E	6	pk Timestamp Q3 var Demand (Capacitive Generator)	yyyy,mm,dd,hh,mm,ss
52053	CB54	6	pk Timestamp Q4 var Demand (Capacitive Load)	yyyy,mm,dd,hh,mm,ss
52059	CB5A	6	pk Timestamp Q1,Q4 VA (Import)	yyyy,mm,dd,hh,mm,ss
52065	CB60	6	pk Timestamp Q2,Q3 VA (Export)	yyyy,mm,dd,hh,mm,ss

Table B. 25. Virtual/Tenant Demand Data #1. (Cont.)

Start	Start (Hex)	Regs.	Each Up to 60 Meters	Data Type
52071	CB66	2	Forward 0.1 kWh (Import)	32-bit unsigned integer
52073	CB68	2	Reverse 0.1 kWh (Export)	32-bit unsigned integer
52075	CB6A	2	Q1 0.1 kvarh (Inductive/Motor Load)	32-bit unsigned integer
52077	CB6C	2	Q2 0.1 kvarh (Inductive Generator)	32-bit unsigned integer
52079	CB6E	2	Q3 0.1 kvarh (Capacitive Generator)	32-bit unsigned integer
52081	CB70	2	Q4 0.1 kvarh (Capacitive Load)	32-bit unsigned integer
52083	CB72	2	Q1,Q4 0.1 kVAh (Import)	32-bit unsigned integer
52085	CB74	2	Q2,Q3 0.1 kVAh (Export)	32-bit unsigned integer
52087	CB76	87	Virtual Meter #1	
52174	CBCD	87	Virtual Meter #2	
52245	CC14	87	Virtual Meter #3	
52332	CC6B	87	Virtual Meter #4	
52419	CCC2	87	Virtual Meter #5	
52506	CD19	87	Virtual Meter #6	
52593	CD70	87	Virtual Meter #7	
52680	CDC7	87	Virtual Meter #8	
52767	CE1E	87	Virtual Meter #9	
52854	CE75	87	Virtual Meter #10	
52941	CECC	87	Virtual Meter #11	
53028	CF23	87	Virtual Meter #12	
53115	CF7A	87	Virtual Meter #13	
53202	CFD1	87	Virtual Meter #14	
53289	D028	87	Virtual Meter #15	
53376	D07F	87	Virtual Meter #16	
53463	D0D6	87	Virtual Meter #17	
53550	D12D	87	Virtual Meter #18	
53637	D184	87	Virtual Meter #19	
53724	D1DB	87	Virtual Meter #20	
53811	D232	87	Virtual Meter #21	
53898	D289	87	Virtual Meter #22	
53985	D2E0	87	Virtual Meter #23	
54072	D337	87	Virtual Meter #24	
54159	D38E	87	Virtual Meter #25	
54246	D3E5	87	Virtual Meter #26	
54333	D43C	87	Virtual Meter #27	
54420	D493	87	Virtual Meter #28	
54507	D4EA	87	Virtual Meter #29	
54594	D541	87	Virtual Meter #30	
54681	D598	87	Virtual Meter #31	
54768	D5EF	87	Virtual Meter #32	
54855	D646	87	Virtual Meter #33	
54942	D69D	87	Virtual Meter #34	
55029	D6F4	87	Virtual Meter #35	
55116	D74B	87	Virtual Meter #36	
55203	D7A2	87	Virtual Meter #37	
55290	D7F9	87	Virtual Meter #38	
55377	D850	87	Virtual Meter #39	
55464	D8A7	87	Virtual Meter #40	
55551	D8FE	87	Virtual Meter #41	
55638	D955	87	Virtual Meter #42	

Table B. 25. Virtual/Tenant Demand Data #1. (Cont.)

Start	Start (Hex)	Regs.	Each Up to 60 Meters	Data Type
55725	D9AC	87	Virtual Meter #43	
55812	DA03	87	Virtual Meter #44	
55899	DA5A	87	Virtual Meter #45	
55986	DAB1	87	Virtual Meter #46	
56073	DB08	87	Virtual Meter #47	
56160	DB5F	87	Virtual Meter #48	
56247	DBB6	87	Virtual Meter #49	
56334	DC0D	87	Virtual Meter #50	
56421	DC64	87	Virtual Meter #51	
56508	DCBB	87	Virtual Meter #52	
56595	DD12	87	Virtual Meter #53	
56682	DD69	87	Virtual Meter #54	
56769	DDC0	87	Virtual Meter #55	
56856	DE17	87	Virtual Meter #56	
56943	DE6E	87	Virtual Meter #57	
57030	DEC5	87	Virtual Meter #58	
57117	DF1C	87	Virtual Meter #59	
57220	DF83	87	Virtual Meter #60	

Table B. 26. Virtual Tenant Demand Data #2 (Organized Identically to Data #1).

Start	Start (Hex)	Regs.	Each Up to 60 Meters	Data Type
57500	E09B	87	Main/Aggregate Meter	
57587	E0F2	87	Virtual Meter #1	
57674	E149	87	Virtual Meter #2	
57761	E1A0	87	Virtual Meter #3	
57848	E1F7	87	Virtual Meter #4	
57935	E24E	87	Virtual Meter #5	
58022	E2A5	87	Virtual Meter #6	
58109	E2FC	87	Virtual Meter #7	
58196	E353	87	Virtual Meter #8	
58283	E3AA	87	Virtual Meter #9	
58370	E401	87	Virtual Meter #10	
58457	E458	87	Virtual Meter #11	
58544	E4AF	87	Virtual Meter #12	
58631	E506	87	Virtual Meter #13	
58718	E55D	87	Virtual Meter #14	
58805	E5B4	87	Virtual Meter #15	
58892	E60B	87	Virtual Meter #16	
58979	E662	87	Virtual Meter #17	
59066	E6B9	87	Virtual Meter #18	
59153	E710	87	Virtual Meter #19	
59240	E767	87	Virtual Meter #20	
59327	E7BE	87	Virtual Meter #21	
59414	E815	87	Virtual Meter #22	
59501	E86C	87	Virtual Meter #23	
59588	E8C3	87	Virtual Meter #24	
59675	E91A	87	Virtual Meter #25	
59762	E971	87	Virtual Meter #26	
59849	E9C8	87	Virtual Meter #27	
59936	EA1F	87	Virtual Meter #28	
60023	EA76	87	Virtual Meter #29	
60110	EACD	87	Virtual Meter #30	
60197	EB24	87	Virtual Meter #31	
60284	EB7B	87	Virtual Meter #32	
60371	EBD2	87	Virtual Meter #33	
60458	EC29	87	Virtual Meter #34	
60545	EC80	87	Virtual Meter #35	
60632	ECD7	87	Virtual Meter #36	
60719	ED2E	87	Virtual Meter #37	
60806	ED85	87	Virtual Meter #38	
60893	EDDC	87	Virtual Meter #39	
60980	EE33	87	Virtual Meter #40	
61067	EE8A	87	Virtual Meter #41	
61154	EEE1	87	Virtual Meter #42	
61241	EF38	87	Virtual Meter #43	
61328	EF8F	87	Virtual Meter #44	
61415	EFE6	87	Virtual Meter #45	
61502	F03D	87	Virtual Meter #46	
61589	F094	87	Virtual Meter #47	
61676	F0EB	87	Virtual Meter #48	
61763	F142	87	Virtual Meter #49	
61850	F199	87	Virtual Meter #50	

Table B. 26. Virtual Tenant Demand Data #2 (Organized Identically to Data #1). (Cont.)

Start	Start (Hex)	Regs.	Each Up to 60 Meters	Data Type
61937	F1F0	87	Virtual Meter #51	
62024	F247	87	Virtual Meter #52	
62111	F29E	87	Virtual Meter #53	
62198	F2F5	87	Virtual Meter #54	
62285	F34C	87	Virtual Meter #55	
62372	F3A3	87	Virtual Meter #56	
62459	F3FA	87	Virtual Meter #57	
62546	F451	87	Virtual Meter #58	
62633	F4A8	87	Virtual Meter #59	
62720	F4FF	87	Virtual Meter #60	

Table B. 27. Coincident Peak Demand for Forward Watts.

Start	Start (Hex)	Regs.	Each Up to 60 Meters	Data Type
63000	F617	2	Peak Demand Forward Watts	IEEE 754 32-bit float
63002	F619	6	Peak Demand Forward Watts Timestamp	yyyy,mm,dd,hh,mm,ss
63008	F61F	2	W Forward Demand (Import)	IEEE 754 32-bit float
63010	F621	2	W Reverse Demand (Export)	IEEE 754 32-bit float
63012	F623	2	Q1 var Demand (Inductive/ Motor Load)	IEEE 754 32-bit float
63014	F625	2	Q2 var Demand (Inductive Generator)	IEEE 754 32-bit float
63016	F627	2	Q3 var Demand (Capacitive Generator)	IEEE 754 32-bit float
63018	F629	2	Q4 var Demand (Capacitive Load)	IEEE 754 32-bit float
63020	F62B	2	Q1,Q4 VA Demand (Import)	IEEE 754 32-bit float
63022	F62D	2	Q2,Q3 VA Demand (Export)	IEEE 754 32-bit float
63024	F62F	16	Virtual Meter #2	
63040	F63F	16	Virtual Meter #3	
63056	F64F	16	Virtual Meter #4	
63072	F65F	16	Virtual Meter #5	
63088	F66F	16	Virtual Meter #6	
63104	F67F	16	Virtual Meter #7	
63120	F68F	16	Virtual Meter #8	
63136	F69F	16	Virtual Meter #9	
63152	F6AF	16	Virtual Meter #10	
63168	F6BF	16	Virtual Meter #11	
63184	F6CF	16	Virtual Meter #12	
63200	F6DF	16	Virtual Meter #13	
63216	F6EF	16	Virtual Meter #14	
63232	F6FF	16	Virtual Meter #15	
63248	F70F	16	Virtual Meter #16	
63264	F71F	16	Virtual Meter #17	
63280	F72F	16	Virtual Meter #18	
63296	F73F	16	Virtual Meter #19	
63312	F74F	16	Virtual Meter #20	
63328	F75F	16	Virtual Meter #21	
63344	F76F	16	Virtual Meter #22	
63360	F77F	16	Virtual Meter #23	
63376	F78F	16	Virtual Meter #24	
63392	F79F	16	Virtual Meter #25	
63408	F7AF	16	Virtual Meter #26	
63424	F7BF	16	Virtual Meter #27	
63440	F7CF	16	Virtual Meter #28	
63456	F7DF	16	Virtual Meter #29	
63472	F7EF	16	Virtual Meter #30	
63488	F7FF	16	Virtual Meter #31	
63504	F80F	16	Virtual Meter #32	
63520	F81F	16	Virtual Meter #33	
63536	F82F	16	Virtual Meter #34	
63552	F83F	16	Virtual Meter #35	
63568	F84F	16	Virtual Meter #36	
63584	F85F	16	Virtual Meter #37	
63600	F86F	16	Virtual Meter #38	

Table B. 27. Coincident Peak Demand for Forward Watts. (Cont.)

Start	Start (Hex)	Regs.	Each Up to 60 Meters	Data Type
63616	F87F	16	Virtual Meter #39	
63632	F88F	16	Virtual Meter #40	
63648	F89F	16	Virtual Meter #41	
63664	F8AF	16	Virtual Meter #42	
63680	F8BF	16	Virtual Meter #43	
63696	F8CF	16	Virtual Meter #44	
63712	F8DF	16	Virtual Meter #45	
63728	F8EF	16	Virtual Meter #46	
63744	F8FF	16	Virtual Meter #47	
63760	F90F	16	Virtual Meter #48	
63776	F91F	16	Virtual Meter #49	
63792	F92F	16	Virtual Meter #50	
63808	F93F	16	Virtual Meter #51	
63824	F94F	16	Virtual Meter #52	
63840	F95F	16	Virtual Meter #53	
63856	F96F	16	Virtual Meter #54	
63872	F97F	16	Virtual Meter #55	
63888	F98F		Virtual Meter #56	
63904	F99F	16	Virtual Meter #57	
63920	F9AF	16	Virtual Meter #58	
63936	F9BF	16	Virtual Meter #59	
63952	F9CF	16	Virtual Meter #60	

Table B. 28. Coincident Peak Demand for Reverse Watts.

Start	Start (Hex)	Regs.	Each Up to 60 Meters	Data Type
64000	F9FF	2	Peak Demand Reverse Watts	IEEE 754 32-bit float
64002	FA01	6	Peak Demand Reverse Watts Timestamp	yyyy,mm,dd,hh,mm,ss
64008	FA07	2	W Forward Demand (Import)	IEEE 754 32-bit float
64010	FA09	2	W Reverse Demand (Export)	IEEE 754 32-bit float
64012	FA0B	2	Q1 var Demand (Inductive/ Motor Load)	IEEE 754 32-bit float
64014	FA0D	2	Q2 var Demand (Inductive Generator)	IEEE 754 32-bit float
64016	FA0F	2	Q3 var Demand (Capacitive Generator)	IEEE 754 32-bit float
64018	FA11	2	Q4 var Demand (Capacitive Load)	IEEE 754 32-bit float
64020	FA13	2	Q1,Q4 VA Demand (Import)	IEEE 754 32-bit float
64022	FA15	2	Q2,Q3 VA Demand (Export)	IEEE 754 32-bit float
64024	FA17	16	Virtual Meter #2	
64040	FA27	16	Virtual Meter #3	
64056	FA37	16	Virtual Meter #4	
64072	FA47	16	Virtual Meter #5	
64088	FA57	16	Virtual Meter #6	
64104	FA67	16	Virtual Meter #7	
64120	FA77	16	Virtual Meter #8	
64136	FA87	16	Virtual Meter #9	
64152	FA97	16	Virtual Meter #10	
64168	FAA7	16	Virtual Meter #11	
64184	FAB7	16	Virtual Meter #12	
64200	FAC7	16	Virtual Meter #13	
64216	FAD7	16	Virtual Meter #14	
64232	FAE7	16	Virtual Meter #15	
64248	FAF7	16	Virtual Meter #16	
64264	FB07	16	Virtual Meter #17	
64280	FB17	16	Virtual Meter #18	
64296	FB27	16	Virtual Meter #19	
64312	FB37	16	Virtual Meter #20	
64328	FB47	16	Virtual Meter #21	
64344	FB57	16	Virtual Meter #22	
64360	FB67	16	Virtual Meter #23	
64376	FB77	16	Virtual Meter #24	
64392	FB87	16	Virtual Meter #25	
64408	FB97	16	Virtual Meter #26	
64424	FBA7	16	Virtual Meter #27	
64440	FBB7	16	Virtual Meter #28	
64456	FBC7	16	Virtual Meter #29	
64472	FBD7	16	Virtual Meter #30	
64488	FBE7	16	Virtual Meter #31	
64504	FBF7	16	Virtual Meter #32	
64520	FC07	16	Virtual Meter #33	
64536	FC17	16	Virtual Meter #34	
64552	FC27	16	Virtual Meter #35	
64568	FC37	16	Virtual Meter #36	
64584	FC47	16	Virtual Meter #37	
64600	FC57	16	Virtual Meter #38	
64616	FC67	16	Virtual Meter #39	

Table B. 28. Coincident Peak Demand for Reverse Watts. (Cont.)

Start	Start (Hex)	Regs.	Each Up to 60 Meters	Data Type
64632	FC77	16	Virtual Meter #40	
64648	FC87	16	Virtual Meter #41	
64664	FC97	16	Virtual Meter #42	
64680	FCA7	16	Virtual Meter #43	
64696	FCB7	16	Virtual Meter #44	
64712	FCC7	16	Virtual Meter #45	
64728	FCD7	16	Virtual Meter #46	
64744	FCE7	16	Virtual Meter #47	
64760	FCF7	16	Virtual Meter #48	
64776	FD07	16	Virtual Meter #49	
64792	FD17	16	Virtual Meter #50	
64808	FD27	16	Virtual Meter #51	
64824	FD37	16	Virtual Meter #52	
64840	FD47	16	Virtual Meter #53	
64856	FD57	16	Virtual Meter #54	
64872	FD67	16	Virtual Meter #55	
64888	FD77	16	Virtual Meter #56	
64904	FD87	16	Virtual Meter #57	
64920	FD97	16	Virtual Meter #58	
64936	FDA7	16	Virtual Meter #59	
64952	FDB7	16	Virtual Meter #60	
64968	FDC7	16	Virtual Meter #61	

Table B. 29. Event Push-Down Lists of Most Recent 20 Events.

Start	Start (Hex)	Regs.	Description	Data Type
10010	2719	1	Event Count/Index	32-bit unsigned integer
10020	2723	1	EventID [Most Recent Event]	Uint32
10021	2724	6	EventTime	Date (yyyy,mm,dd,hh,mm,ms)
10027	272A	6	Clear/Reset Time	Date (yyyy,mm,dd,hh,mm,ms)
10033	2730	16	ASCII String (Null terMin. ated)	32 Char
10049	2740	29	2nd Oldest Event	
10078	275D	29	3rd Oldest Event	
10107	277A	29	4th Oldest Event	
10136	2797	29	5th Oldest Event	
10165	27B4	29	6th Oldest Event	
10194	27D1	29	7th Oldest Event	
10223	27EE	29	8th Oldest Event	
10252	280B	29	9th Oldest Event	
10281	2828	29	10th Oldest Event	
10310	2845	29	11th Oldest Event	
10339	2862	29	12th Oldest Event	
10368	287F	29	13th Oldest Event	
10397	289C	29	14th Oldest Event	
10426	28B9	29	15th Oldest Event	
10455	28D6	29	16th Oldest Event	
10484	28F3	29	17th Oldest Event	
10513	2910	29	18th Oldest Event	
10542	292D	29	19th Oldest Event	
10571	294A	29	20th Oldest Event	
10600	2967	1	EventID [Most Recent Event]	Uint16
10601	2968	6	EventTime	Date (yyyy,mm,dd,hh,mm,ms)
10607	296E	6	Clear/Reset Time	Date (yyyy,mm,dd,hh,mm,ms)
10613	2974	1	Cause of Event	Enumeration
10614	2975	2	Value Related to Event Type	IEEE 754 32-bit float or 32-bit integer
10616	2977	16	2nd Event	
10632	2987	16	3rd Event	
10648	2997	16	4th Event	
10664	29A7	16	5th Event	
10680	29B7	16	6th Event	
10696	29C7	16	7th Event	
10712	29D7	16	8th Event	
10728	29E7	16	9th Event	
10744	29F7	16	10th Event	
10760	2A07	16	11th Event	
10776	2A17	16	12th Event	
10792	2A27	16	13th Event	
10808	2A37	16	14th Event	
10824	2A47	16	15th Event	
10840	2A57	16	16th Event	
10856	2A67	16	17th Event	
10872	2A77	16	18th Event	
10888	2A87	16	19th Event	
10904	2A97	16	20th Event	

Appendix C: PXMP DIP Switch Permissions

Table C. 1. PCXMP Mode DIP Switch Hardware Security Mode.

	000	001	010	110	111
Security Setup	Yes	No	No	Reserved	No
Alarm and Meter Configuration	Yes	No	No		No
Communication Port Setup	Yes	No	No		No
Set Date and Time	Yes	No	No		No
Set Default Configuration	Yes	No	No		No
Energy Reset	Yes	No	No		No
Reset Input Counters	Yes	No	No		No
Reset Output Counters	Yes	No	No		No
Reset All Data	Yes	No	No		No
Firmware Upgrade	Yes	No	No		No
Demand Reset	Yes	Yes	No		No
Reboot	Yes	Yes	No		No
Control Relay Output	Yes	Yes	No		No
Synch Demand Window	Yes	Yes	No		No
Begin Real-Time Pricing	Yes	Yes	No		No
End Real-Time Pricing	Yes	Yes	No		No
Relay Control	Yes	Yes	No		No
LED Control	Yes	Yes	No		No
Clear All Events	Yes	Yes	Yes		No
Reset Min./Max. Values	Yes	Yes	Yes		No
Ack. Events	Yes	Yes	Yes		No

Appendix D: Glossary, and Acronyms

D.1 Glossary

D.1.1 Hardware System Components

Module (Plug-in Module): An optional module that can be plugged into the PXMP Meter.

Plug-in Slot: The area on a Meter Base that can house a single plug-in module. This is enumerated from one to ten.

Power Xpert Multi-Point Meter **(PXMP):** The hardware system that includes a Meter Base, Meter Modules, Pulse Input Modules, Digital Output Modules, an Energy Portal Module plus related accessories.

Power Xpert Multi-Point Digital Output Module (Digital Output Module - PXMP-DOM): An optional module that contains up to eight discrete outputs, controlled manually or by alarms.

Power Xpert Multi-Point Energy Portal Module (Energy Portal Module - PXMP-EPM): A plug-in module that hosts web pages via TCP/IP. Optionally, this module can support a modem with –M suffix on catalog number.

Power Xpert Multi-Point Meter Base (Meter Base - PXMP-MB): The base of the PXMP Meter with ten slots for plug-in modules. The base has integral external circuit groups and user interfaces including three discrete inputs and one solid sate relay discrete output, two serial Com. ports, power supply, and mains voltage monitoring. Two versions exist: one is 3-phase the other single-phase with –AB suffix on catalog number (PXMP-MB-AB).

Note: The PXMP-MB can be used on 3-Phase, 2-Phase, and single-phase applications. The PXMP-MB-AB can **ONLY** be used on single-phase applications.

Power Xpert Multi-Point Meter Module (Meter Module - PXMP-MM): A plug-in module that has six current channels and comes in six variants with three versions of CT sensor interface 10 mA, 100 mA, or 333 mV and then modulated into two groups for 3-phase or single-phase applications (–AB catalog suffix).

Power Xpert Multi-Point Pulse Input Module (Pulse Input Module - PXMP-PIM): An optional module that contains up to eight pulse inputs.

D.1.2 Hardware Accessories

CSXXX: Eaton 10 mA Current Sensors with 10 mA max. secondary outputs. These sensors have an internal clamp circuit and ID/tamper circuit and are compatible with the PXMP-MM10MA Meter Modules. These sensors have an integral 48 in. (1.22 m) yellow secondary cable. These current transformer sensors are qualified as double/reinforced insulation, 600V, CAT III.

Display Cable: 72 in. (1.83 m) cable (67A2124H02) included with the PXMP-Display (PXMP-DISP-6-XV) to connect the display to the DB9 of the PXMP Meter Base (PXMP-MB).

Third Party 333 mV Current Sensors: Third party current load sensors with a 333 mV maximum secondary output (burden is internal to sensor) and compatible with PXMP-IM333MV Interface Module and PXMP-MM333MV Meter Modules. These current transformer sensors must provide double/reinforced insulation and be rated for 600V, CATIII.

PSG60E: Eaton PSG series 24 Vdc Output Power Supply. This is an External DIN rail mounted supply rated for 50 W 24 Vdc output and 100-240 Vac (+/-10%) rated input 50/60 Hz to power the PXMP Meter Base and PXMP-PIM/PXMP-DOM or PXMP-MB external circuit groups. Alternate power supplies may be required depending on the mains input rating, the total load, and the ambient temperature. See Eaton PSG family for other wattage output and mains input range/type.

PXMP-CSXXX: Eaton 100 mA Current Sensors with 100 mA max. secondary outputs. These sensors have an internal clamp circuit with an LED alarm indicator, ID/tamper circuit, and sensor LED locator indicator built in. They are compatible with the PXMP-MM100MA Meter Modules and the separate PXMP-SCXX Sensor Cables. These current transformer sensors are qualified as double/reinforced insulation, 600V, CAT III.

PXMP-DISP-6-XV (PXMP-Display): Eaton XV-102 5.7-inch color touch-screen interface (XV-102-H4-57TVRL-10) preloaded and optimized for use with the PXMP-MB.

PXMP-IM100MA: (Interface Module): Generic 100 mA Interface Module for connecting a generic 100 mA current sensor to an Eaton PXMP-SCXX sensor cable and then to a PXMP-MM100MA Meter Module. This module supplies a terminal block for the secondary 100 mA current sensor, Clamp Circuit with Alarm LED indicator, ID/tamper detection circuit, locator LED indicator, 2 x 2 PXMP-SC Sensor Cable connector, and a cover.

PXMP-IM333MV (Interface Module): 333 mV Interface Module for connecting a Third Party 333 mV current sensor to an Eaton PXMP-SCXX sensor cable and then to a PXMP-MM333MV Meter Module. This module supplies a terminal block for the secondary 333 mV current sensor, ID/tamper detection circuit, locator LED indicator, 2 x 2 PXMP-SC Sensor Cable connector, and a cover

PXMP-SCXX/SCEXX: Sensor Cable and Sensor Cables Extension in various lengths. These cables are compatible with PXMP-MM Meter Modules, PXMP-CSXXX current sensors, and PXMP-IM Interface Modules.

D.1.3 Hardware Sub-circuit Level

2 x 2 Plug: 2 x 2 square 4-pin mating plug.

2 x 2 Receptacle: 2 x 2 square 4-pin mating receptacle.

Com, 1 and 2: RS-485 Serial ports on the PXMP-MB for use as Modbus RTU slaves.

Configuration Port: A slave USB 2.0 on the PXMP-MB for use as a Modbus RTU slave

Current Channel: A power load current sensor monitoring channel attached directly to the PXMP-MMs which ultimately forward data to the STM32.

Voltage Channel: A power system mains voltage monitoring channel attached to the PXMP-MB and distributed internally to all PXMP-MMs, which ultimately forwards data to the STM32 MCU.

D.1.4 User Interface Tools

Configuration API: Special Modbus protocol that the PXMP Configuration Software and PXMP-EPM use to talk to the PXMP-MB.

E-Allocation Software: Software that reads from the PXMP-EPM to compile bills.

Energy Portal Web Interface: Web pages on the PXMP-EPM, especially including a Java Applet.

Offline Configuration: The concept of opening and editing a configuration file stored locally.

PXMP Configuration Software: External software that programs the PXMP Meter via Modbus to the PXMP-MB.

D.1.5 Application Constructs

Configuration Constructs

Aggregate Meter: Functions like a Sub-meter. If a Main Meter is selected, this refers to the Main Meter. If not, this refers to the sum of all other Sub-meters.

Alarms: Triggers that can cause events. Created using the PXMP Configuration Software.

Event Details: A list of events caused by alarms. The PXMP Meter Base generates the Event Details and holds 20. The PXMP Energy Portal Module keeps a longer copy of the Event Details.

Event Log: A large list of strings that describe every event that has occurred. It is held on the PXMP Meter Base.

Main Meter: A Sub-meter that is selected to represent the sum of all other Sub-meters. The Main Meter can be disabled if no Sub-meter is selected.

Profile Data: A time-value data set that is generated by and held on the PXMP Meter Base. The PXMP Energy Portal Module reads and keeps a copy.

Pulse Meter: A pulse counter associated with an PXMP Pulse Input Module.

Real-time Data: Values that are updated on the PXMP Meter Base and polled by the PXMP Energy Portal Module to create the Trend Data.

Sub-meter: A group of channels, defined on the PXMP Meter Base.

System Log: A large list strings that describe any system notifications. It is generated and held by the PXMP Meter Base.

Energy Portal Web Interface Constructs

Facility Manager (Admin User): A User of the Energy Portal GUI that has administrative rights to change settings on the PXMP Energy Portal Module.

Tenant Group: A group of Sub-meters and Pulse Meters, defined only on the PXMP Energy Portal Module.

Tenant User: A user of the Energy Portal GUI that has guest access to the PXMP Energy Portal Module. Access only includes one Tenant Group.

Trend Data: A time-value data set that is generated by the PXMP Energy Portal Module from the Real-time Data on the PXMP Meter Base.

D.2 Power Xpert Multi-Point Meter Acronyms

A: amp, ampere

ANSI: American National Standards Institute.

AWG: American Wire Gauge

°C: Degrees Celsius

CAN: Canada, Canadian

CNL: Canadian National Laboratory

COM 1 and COM 2: RS485 Serial Communications Port

°F: Degrees Fahrenheit

ft: Foot

Hz: Hertz

IEC: International Electrotechnical Commission

in.: Inch

K: Kilo

Kohm: Kilo Ohm

kV: Kilo Volt

LED: Light Emitting Diode

M: Mega

m: Meter

mA: Milliamp

mm: Millimeter

Mohm: Mega Ohm

mV: Millivolt

PSG60E: Eaton PSG Series 27 Vdc Output Power Supply

PXMP Meter: Power Xpert Multi-Point Meter.

PXMP: Power Xpert Multi-Point.

PXMP-CSXXX: Eaton 100 mA Current Sensors

PXMP-DISP-6-XV: (PXMP-Display) Eaton XV-102 5.7-inch color touch screen optimized for use with the PXMP-MB

PXMP-DOM: Power Xpert Multi-Point Digital Output Module

PXMP-EPM: Power Xpert Multi-Point Energy Portal Module

PXMP-IM333MV: 333 mV Interface Module

PXMP-MB: Power Xpert Multi-Point Meter Base

PXMP-MM: Power Xpert Multi-Point Meter Module

PXMP-PIM: Power Xpert Multi-Point Pulse Input Module

PXMP-SCEXX: Sensor Cable Extension

PXMP-SCXX: Sensor Cable

UL: Underwriters Laboratories

V: Volt

Vac (VAC): Voltage Alternating Current

Vdc (VDC): Voltage Direct Current

D.3 External Circuit Groups

Com 1: An RS485 serial communications port that supports Slave Modbus RTU protocol and using PXMP Meter Base terminals 7-10.

Com 2: An RS485 serial communications port that supports Slave Modbus RTU protocol and using PXMP Meter Base terminals 11-14.

Configuration Port: A slave USB 2.0 serial port supporting Modbus RTU protocol and located top right of the PXMP Meter Base.

Digital Outputs: Solid State Relay outputs on the PXMP Digital Output Module and tied to application alarms of the PXMP Meter.

Energy Portal Configuration Port: A 10/100 base T, RJ45 Ethernet Local configuration port restricted to address 192.168.1.1 or 10.0.0.1 for direct connection to a notebook computer for configuration purposes and not to be used on a LAN/WAN.

Energy Portal LAN/WAN Port: A 10/100 base T, RJ45 Ethernet Port for direct connection to a notebook computer for LAN/WAN communication purposes.

Energy Portal Modem Port: An RJ11 connection to land line telephone system.

Meter Base Digital Input (MBDI): A group of three Discrete Inputs for reading the status of external dry contacts (externally wetted) for application control purposes, common on Terminal 3, Inputs 1-3 on terminals 4-6.

Meter Base Digital Output (MBDO): A solid-state relay for control of external loads (externally wetted) to represent control or energy pulse output located on terminals 1 or 2 of the PXMP Meter Base.

Meter Current Sensor Input: An external current sensor instrument transformer load monitoring circuit that connects to a PXMP Meter Module through a 2 x 2 receptacle.

Meter Voltage Inputs: The mains metering voltage input associated with all of the current loads being monitored and using PXMP Meter Base terminals 18-21.

Mode Setup Switches: Switches on the PXMP Meter Base. Located at the top right of the Meter Base under a sealable cover, these switches can set the application mode of the PXMP Meter.

Power Source (PS) Input: 24 Vdc input power source for the PXMP Meter Base using terminals 15-17. Not for direct connection to a CAT III power bus. Use a dedicated local 24VDC source for PXMP use only.

Protective Earth Stud: An electrical connection on the PXMP Meter Base to bond the PXMP Meter to the system safety ground.

Pulse 24 Vdc Power: A two position terminal plug on the PXMP Pulse Input Module to source power from an external 24 Vdc supply to drive the status of pulse inputs. Not for direct connection to a CAT III power bus. Use a dedicated local 24VDC source for PXMP use only.

Pulse Input: A pulse input of the PXMP Pulse Input Module used to read dry contact pulses from third party pulse sensors for energy integration purposes.

Slave Address Switches: Rotary Switches on the top right of the PXMP Meter Base. These are used to set the PXMP Meter's Modbus Slave Address for Com 1 & 2.

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