



GE Consumer & Industrial
Multilin

EPM 5100

Electronic Power Meter

INSTRUCTION MANUAL

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Table of Contents

1: OVERVIEW	PRODUCT DESCRIPTION	1-1
	FEATURES	1-3
	METERED FUNCTIONS	1-3
	POWER MANAGEMENT FEATURES	1-4
	PHYSICAL DESCRIPTION	1-6
	FRONT PANEL	1-6
	DISPLAY	1-6
	BACK PANEL	1-6
	PANEL MOUNTING	1-7
	DIMENSIONS, CASE TYPE UNIT	1-8
	DIMENSIONS, PANEL MOUNTING UNIT	1-9
	ORDERING	1-11
	ORDER CODES	1-11
	ACCESSORIES	1-11
	APPLICATIONS	1-12
	TYPICAL APPLICATIONS	1-12
	PT AND CT INPUTS	1-12
	SPECIFICATIONS	1-13
	INPUTS	1-13
	INTERCONNECTIONS	1-13
	ENVIRONMENTAL	1-13

2: INSTALLATION	OVERVIEW	2-1
	INSTALLATION PROCESS	2-1
	MECHANICAL INSTALLATION	2-3
	PANEL MOUNTING FOR NEW INSTALLATION	2-3
	RETROFIT INSTALLATION	2-4
	ELECTRICAL INSTALLATION	2-10
	INSTRUMENT TRANSFORMER CONNECTIONS	2-10
	PULSE INITIATION CONNECTIONS	2-13
	COMMUNICATIONS INSTALLATION	2-15
	MODBUS CONNECTIONS	2-15
	INSTALLATION OF THE COMMUNICATIONS CARD	2-15

3: METERING	METER OPERATIONS	3-1
	METER SELF-TEST	3-1
	INTEGRITY OF METERED VALUES	3-1
	COMMUNICATIONS ERROR	3-2
	DISPLAY OF METERED VALUES	3-2
	KEYPAD FUNCTIONS	3-2
	METERING ACCURACIES	3-3
	WYE CONFIGURATION METERING FUNCTIONS	3-4
	DESCRIPTION	3-4
	CURRENT (RMS)	3-4
	VOLTAGE	3-4
	POWER	3-4

APPARENT POWER	3-5
ENERGY	3-5
FREQUENCY	3-5
DEMAND	3-5
POWER FACTOR	3-6
MISCELLANEOUS FUNCTIONS	3-6
TRANSFORMER RATIOS	3-6
DELTA CONFIGURATION METERING FUNCTIONS	3-7
DESCRIPTION	3-7
CURRENT (RMS)	3-7
LINE-TO-LINE VOLTAGE (RMS)	3-7
POWER	3-7
ENERGY	3-8
FREQUENCY	3-8
DEMAND	3-8
POWER FACTOR	3-8
MISCELLANEOUS FUNCTIONS	3-9
TRANSFORMER RATIOS	3-9

4: PROGRAMMING

PROGRAM MODE	4-1
INTRODUCTION	4-1
ACCESS TO PROGRAM FUNCTIONS	4-2
OVERVIEW	4-2
RESTRICTED ACCESS	4-3
EXITING PROGRAM MODE	4-4
DATA RESETTING	4-5
DESCRIPTION	4-5
DEMAND RESET	4-5
ENERGY RESET	4-5
METER INITIALIZE	4-6
ERRORS CLEAR	4-6
DATA FORMATTING	4-7
OVERVIEW	4-7
NORMAL SCROLL	4-7
ENERGY FORMAT	4-9
DEMAND FORMAT	4-9
VOLTAGE FORMAT	4-10
CURRENT FORMAT	4-10
LEADING ZEROS	4-10
SCROLL TIME	4-10
COMMUNICATIONS VALUES	4-12
COMMUNICATION ADDRESS SETUP	4-12
BAUD RATE SETUP	4-12
EPM COMPATIBILITY SETUP	4-13
PULSE OUTPUTS	4-14
PULSE OUTPUT SETUP	4-14
UPGRADING FROM ELECTROMECHANICAL METERS	4-14
UPGRADE CALCULATION EXAMPLE	4-15
CONFIGURATION	4-16
OPTIONS	4-16
PT RATIO	4-16
CT RATIO	4-16
DEMAND PERIOD SETUP	4-17

METER TYPE	4-17
RESTRICTED ACCESS FUNCTIONS	4-18
ACCESS RESTRICT	4-18
NEW PASSWORD	4-18
DEFAULT SETTINGS	4-19
DESCRIPTION	4-19

5: COMMUNICATIONS

INTRODUCTION	5-1
OVERVIEW	5-1
EVENTS	5-1
MODBUS REGISTER MAPS	5-2
MODBUS FORMAT CODES	5-5

6: MISCELLANEOUS

TROUBLESHOOTING	6-1
TRoubleshooting GUIDE	6-1
REVISION HISTORY	6-4
RELEASE DATES	6-4
WARRANTY	6-5
GE MULTILIN WARRANTY	6-5



EPM 5100 Electronic Power Meter

Chapter 1: Overview

1.1 Product Description

The GE Multilin EPM 5100 Electronic Power Meter is a full-function electronic meter with optional pulse initiation and communications features. The communications option supports the 'open-architecture' Modbus protocol and can be easily installed in the field at a later date. The EPM 5100 is available with the following mounting options:

- An industry-standard SI-compatible case to maintain drawout capability, allowing for easy upgrade or retrofit from existing DS-63, DS-64, or DS-65 electromechanical watt-hour meters (case type unit).
- A light compact plastic enclosure for panel mounting (panel mount unit).

The EPM 5100 continuously monitors specified line characteristics and displays the desired functions and calculated values on a two-line, alphanumeric liquid crystal display (LCD) on the front panel. The meter samples each of the current and voltage inputs 480 times per second, and the display is updated every three seconds.

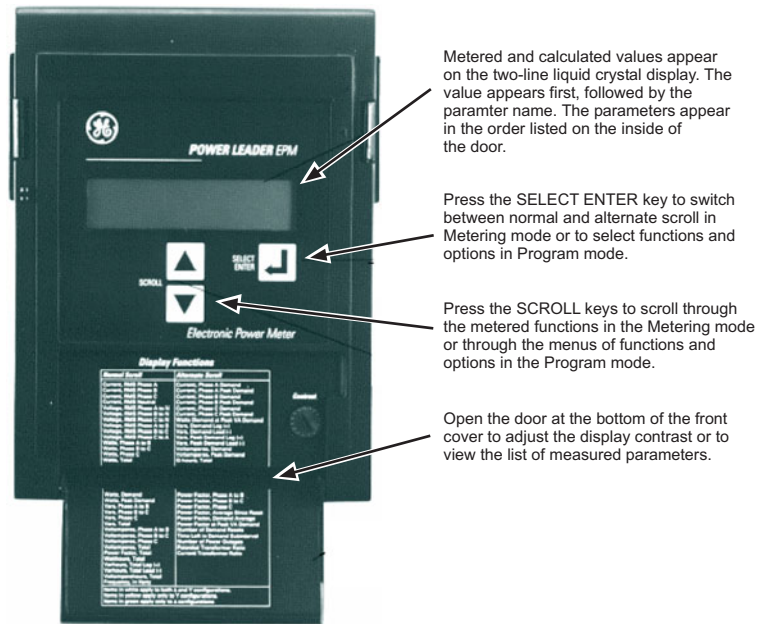


FIGURE 1-1: EPM 5100 Meter

1.2 Features

1.2.1 Metered Functions

The electrical parameters and status information monitored and displayed by the EPM 5100 are shown in the following table. Note that the displayed parameters are dependent on whether the meter is configured as Wye or Delta.

Table 1–1: EPM 5100 Metered Functions

Normal Scroll, Wye	Normal Scroll, Delta
Current (rms) phase A, B, C, and neutral	Current, phase A, B, and C
Voltage (rms) phase A-N, B-N, and C-N	Voltage (rms) phase A-B, B-C, and C-A
Voltage (rms) phase A-B, B-C, and C-A	Watts, phase A-B, B-C, and total
Watts, phase A, B, C, and total	Watts, demand and peak demand
Watts, demand and peak demand	Vars, phase A-B, B-C, and total
Vars, phase A, B, C, and total	VA, phase A-B, B-C, and total
VA, phase A, B, C, and total	Power Factor, Total
Power factor, total	Watthours, Total
Watthours, total	Varhours, total lag (+) and total lead (-)
Varhours, total lag (+) and total lead (-)	VAhours, Total
VAhours, total	Frequency, in hertz
Frequency, in hertz	

Table 1–2: EPM 5100 Metered Functions (ctd.)

Alternate Scroll, Wye	Alternate Scroll, Delta
Current, phase A, B, and C demand	Current, phase A and C demand
Current, phase A, B, and C peak	Current, phase A and C peak
Watts demand at peak VA	Watts demand at peak VA
Vars, demand lag (+) and lead (–)	Vars, demand lag (+) and lead (–)
Vars, peak demand lag (+) and lead (–)	Vars, peak demand lag (+) and lead (–)
VA, demand and peak demand	VA, demand and peak demand
Q-hours, total	Q-hours, Total
Power factor, phase A, B, C, and average	Power factor, phase A-B, B-C, and avg.
Power factor, demand	Power factor, demand
Power factor, at peak VA	Power factor, at peak VA
Number of demand resets	Number of demand resets
Time left in demand	Time left in demand
Number of power outages	Number of power outages
Potential Transformer Ratio	Potential Transformer Ratio
Current Transformer Ratio	Current Transformer Ratio

1.2.2 Power Management Features

The EPM 5100 is available with the Power Leader communications options cards (catalog number PLA3CMAG01 for Modbus RTU). The Modbus option provides the following additional features:

- Remote viewing of all metered functions and configuration data at the host computer.
- Graphical trending of most metered functions.
- User-defined remote alarms.
- Extensive reporting capabilities, including dynamic data exchange (DDE) for exporting data for analysis by external software.

The following figure contains an example of a Power Leader power management system using the EPM 5100 and other Power Leader devices.

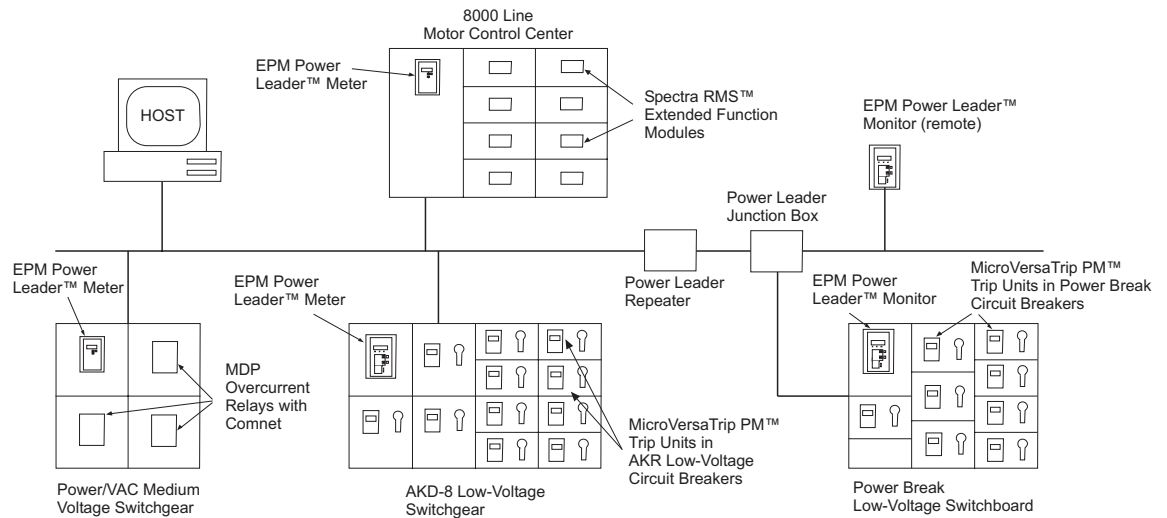


FIGURE 1-2: Example Power Leader System

1.3 Physical Description

1.3.1 Front Panel

The front panel has a two-line, 16-character per line LCD and a three-button keypad for view data and configuring the meter. The communication port and the voltage, current, and pulse initiation terminals are located on the back of the meter.

The front panel contains the following features:

- A 3.8" by 0.9" two-line LCD that can display up to 16 characters per line.
- Three pushbuttons for scroll up, scroll down, and alternate scroll/enter. Operating procedures for these buttons are described in Chapter 3.
- An additional secret button for accessing the Program mode. Operating procedures for the Program mode are described in Chapter 4.
- A complete list of available metering and a display contrast-adjustment knob are located under a flip-down door.

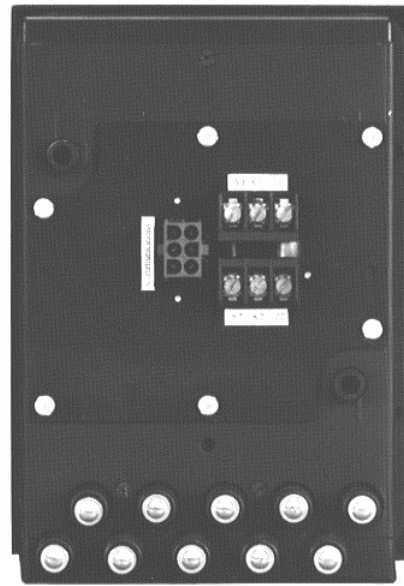
1.3.2 Display

Any of the metered functions can be viewed by pressing the SCROLL buttons or allowing the EPM 5100 to automatically scroll through the parameters. All metered values are updated every three seconds, whether or not they are being displayed at the time. Press the SELECT/ENTER button to toggle between the normal and alternate scrolls.

1.3.3 Back Panel

The meter interconnections are located on the back panel as shown in the following figure. These include:

- Terminal studs for the voltage and current inputs.
- Two terminal blocks for the optional pulse initiation outputs.
- A Power Leader communications port.

**FIGURE 1-3: Back Panel View**

1.3.4 Panel Mounting

The EPM 5100 is designed to mount semi-flush on motor control center, switchboard, or switchgear accessory doors or panels within easy reach of an operator. The cutout for the EPM 5100 is shown below and is identical to the industry-standard SI case for DS-63 and DS-65 electromechanical watt-hour meters. The case has four mounting holes that accept #10-32 $\times$ 3/8" (plus mounting panel thickness) screws. The meter is mounted through the front of the door or panel. The EPM 5100 may be installed on an existing DS-64 cutout using the PLE2ADPG01 adapter plate.

**NOTE**

Do not use screws longer than 3/8" plus the mounting panel thickness. Longer screws may damage or interfere with the front panel retaining tabs.

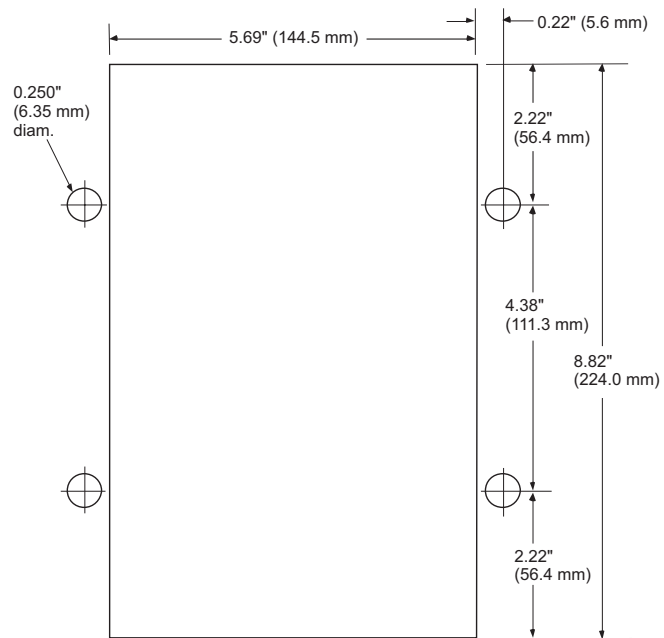


FIGURE 1-4: Panel Mounting Cutout Dimensions

1.3.5 Dimensions, Case Type Unit

The front panel side views of the EPM 5100, case type unit, along with dimensions, are illustrated below

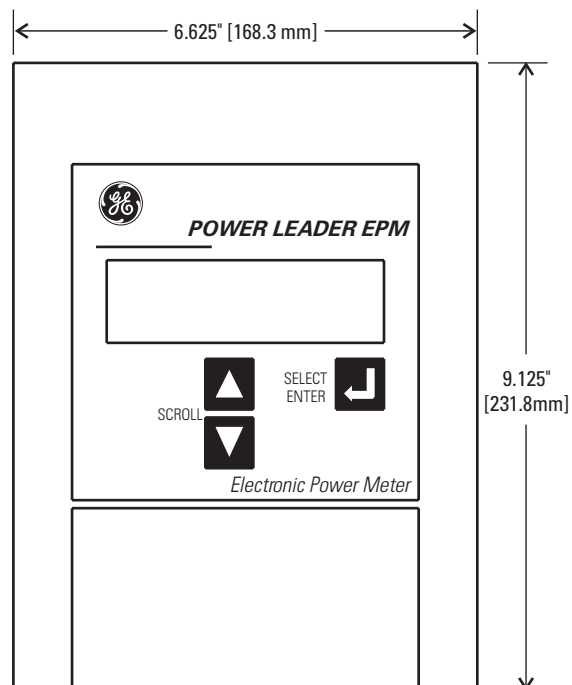


FIGURE 1-5: Front Dimensions, Case Type Unit

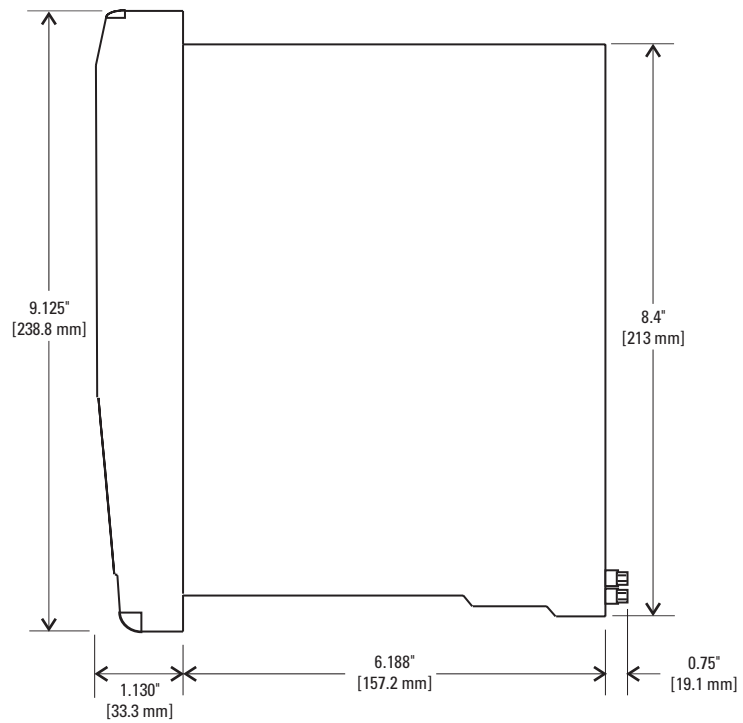


FIGURE 1-6: Side Dimensions, Case Type Unit

1.3.6 Dimensions, Panel Mounting Unit

The front panel side views of the EPM 5100, panel mount unit, along with dimensions, are illustrated below

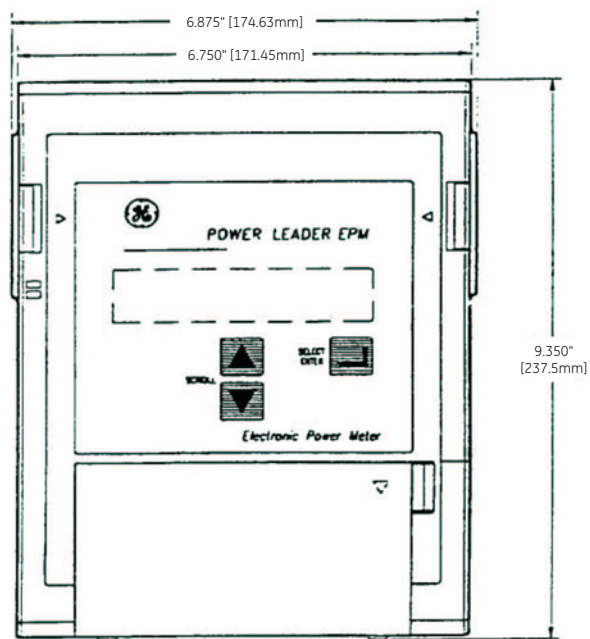
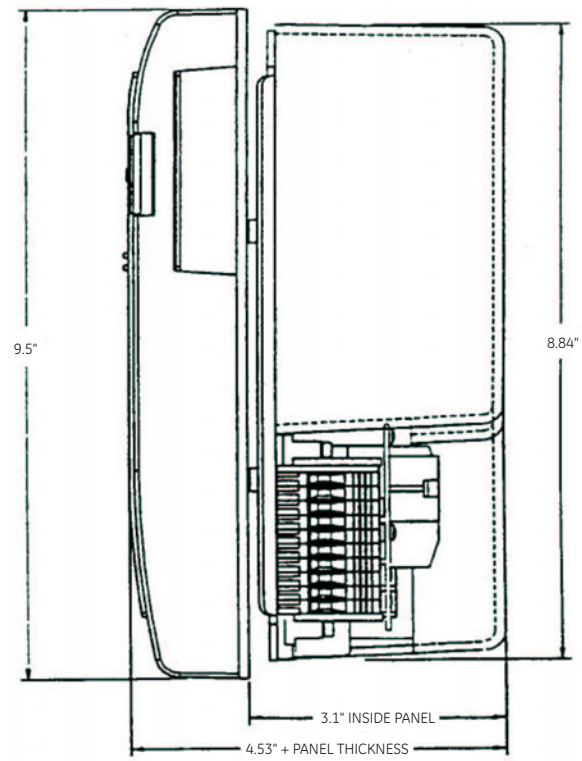


FIGURE 1-7: Front Dimensions, Panel Mount Unit

**FIGURE 1-8: Side Dimensions, Panel Mount Unit**

1.4 Ordering

1.4.1 Order Codes

The order codes for the EPM 5100 Electronic Power Meter are shown below.

Table 1-3: EPM 5100 Order Codes

	PLE3	-	*	-	*	-	*	
Base Unit	PLE3							EPM 5100 Electronic Power Meter
Case/Panel			ES					Case Type
			PNL					Panel Type
Voltage Inputs					A			69 V AC rms
					B			120 V AC rms
					C			240 V AC rms
					D			277 V AC rms
					F			480 V AC rms
					G			600 V AC rms
Pulse Output/ Modbus Card							G01	with pulse output
							G14	with pulse output and Modbus card

1.4.2 Accessories

The following accessories are available separately.

Order Code	Description
PLA3CMAG01	Modbus card
PLE3CSEG01	EPM 5100 Electronic Power Meter case
PLE2RPG01	EPM 5100 Electronic Power Meter cover
PLE2ADPG01	Mounting plate

1.5 Applications

1.5.1 Typical Applications

The EPM 5100 Electronic Power Meter can be used on three- or four-wire, three-phase systems having a nominal frequency of from 45 to 65 hertz. See the order code table above for configurations. The EPM 5100 Electronic Power Meter accepts the following combinations of inputs:

- two voltage inputs and two current inputs for three-phase, three-wire delta systems
- two or three voltage inputs and three current inputs for four-wire wye systems

Potential transformer (PT) primaries may be connected line-to-line or line-to-neutral. Two PTs, connected open delta, can be used for a line-to-line connection.

PT and current transformer (CT) ratios are configured in Program mode. With these ratios configured, the EPM 5100 Electronic Power Meter automatically calculates primary currents, voltages, power, and energy.

1.5.2 PT and CT Inputs

The EPM 5100 Electronic Power Meter can be ordered to accept direct voltage inputs from 69 to 600 volts. For system voltages greater than 600 V, the customer must supply external PTs. The PT turns ratio is configured in Program mode and has a range of 0.5:1 to 9999:1. See *PT Ratio* on page 4–16 for details on setting the PT ratio.

The meter current inputs are rated at 5 A AC, nominal. The customer must supply the external CTs. Fourth-wire neutral CT inputs are not accepted; however, the EPM 5100 Electronic Power Meter calculates and displays the neutral current. The CT turns ratio is configured in the Program mode and has a range of 0.5:1 to 99,999:1. See *CT Ratio* on page 4–16 for details on setting the CT ratio. The meter has a continuous overload capability of 10 A and a CT burden of 0.25 VA.

1.6 Specifications

1.6.1 Inputs

VOLTAGE INPUTS

Range:.....69, 120, 240, 277, 480, and 600 V AC rms at -15/+10%

Phases:three

CURRENT INPUTS

Nominal:5 A rms, full-scale

Continuous overload:10 A rms (2 x)

Phases:three

FREQUENCY

Operating range:45 to 65 Hz

BURDEN

Voltage input:8.5 VA / phase A

Current input:0.25 VA

1.6.2 Interconnections

CONNECTORS

CT and PT terminals:recommend ring terminals to accommodate #10 screw,
up to AWG #10 wire

Pulse initiation port:two form-C contacts available at three-point terminal
blocks; recommend bare, stranded copper wire, AWG
#16-22

Communications port:EPM 5100 Electronic Power Meter standard six-position
connector

1.6.3 Environmental

ENVIRONMENTAL

Operating temperature:-20°C to 70°C

Storage temperature:.....-30°C to 80°C

Relative humidity:.....5 to 90%, non-condensing

TYPE TESTS

Vibration response and endurance:IEC 255-22-1, severity class 1

Surge – fast transient and oscillatory: .ANSI C37.90.1

Radiated EMI withstand capability:ANSI C37.90.2

Electrostatic Discharge:IEC 801-2, severity class 4

APPROVAL STANDARDS

UL:.....508

CSA:.....C22.2 no. 142





EPM 5100 Electronic Power Meter

Chapter 2: Installation

2.1 Overview

2.1.1 Installation Process

For many end users, the installation steps described in this chapter will have been performed by the motor control, switchgear, or switchboard manufacturer. However, if installing the meter, follow the procedure outlined below.

The installation steps are as follows:

- ▷ Mount the EPM 5100 Electronic Power Meter in a switchgear, switchboard, panelboard, or motor control center door or panel.
- ▷ Connect the CTs and voltage inputs. For applications up to 600 V AC, order the EPM 5100 Electronic Power Meter with the required voltage; for applications above 600 V AC, PTs are required.
- ▷ Make connections to the communication port and/or pulse initiation terminals, if appropriate.

The actual installation process depends on whether the EPM 5100 Electronic Power Meter is to be installed in a new or retrofit application and on whether the pulse initiation and communication options are included. Table 6 is a matrix containing directions for the appropriate procedure to follow.

For later field upgrade of a communication option card in an installed EPM 5100 Electronic Power Meter, see *Installation of the Communications Card* on page 2-15.

Table 2–1: Installation Procedure Matrix

Type	Without pulse or communication options	With pulse or communication options
New installation	See <i>Panel Mounting for New Installation</i> on page 2–3 and <i>Instrument Transformer Connections</i> on page 2–10.	See <i>Panel Mounting for New Installation</i> on page 2–3, <i>Instrument Transformer Connections</i> on page 2–10, <i>Pulse Initiation Connections</i> on page 2–13, and <i>Modbus Connections</i> on page 2–15.
Retrofit with replacement of existing electromechanical Wh case (not DS-64)	See <i>Retrofit With Case Replacement</i> on page 2–8 and <i>Instrument Transformer Connections</i> on page 2–10.	See <i>Retrofit With Case Replacement</i> on page 2–8, <i>Instrument Transformer Connections</i> on page 2–10, and <i>Pulse Initiation Connections</i> on page 2–13.
Retrofit with replacement of existing DS-64 electromechanical case	Install adapter plate PLE2ADPG01 prior to the EPM 5100 as described in the GEH-6469 instruction sheet. See <i>Retrofit With Case Replacement</i> on page 2–8 and <i>Instrument Transformer Connections</i> on page 2–10.	See <i>Retrofit With Case Replacement</i> on page 2–8, <i>Instrument Transformer Connections</i> on page 2–10, and <i>Pulse Initiation Connections</i> on page 2–13.
Retrofit with reuse of existing electromechanical Wh case	See <i>Retrofit with Reuse of Existing Case</i> on page 2–4.	To install a EPM 5100 with optional pulse initiation and/or communication without replacing the case of the existing electromechanical Wh meter, order catalog number PLE2PLTG01, which contains a plate with the pulse initiation terminals and communication port for attachment to the rear of the existing electromechanical watt-hour case. The procedure for installing this plate requires 7/8" and 2-25/32" Greenlee hydraulic punches to make the necessary hole on the rear of the case.

2.2 Mechanical Installation

2.2.1 Panel Mounting for New Installation

Case Type Unit

The word 'panel' here refers to panel or door, as appropriate. To make the panel cutout, first create a full-sized template according to the dimensions in FIGURE 1-4: *Panel Mounting Cutout Dimensions* on page 1-8. The procedure for mounting the EPM 5100 Electronic Power Meter is as follows:

- ▷ Cut out the panel and drill the holes as indicated on the template.
- ▷ Insert the EPM 5100 Electronic Power Meter into the cutout from the front of the panel.
- ▷ Line up the four screw holes in the EPM 5100 Electronic Power Meter case with the holes drilled in the panel.
- ▷ Insert four 10-32 $\times$ 3/8 mounting screws with lock and flat washers from the back of the panel.

Panel Mount Unit

The word 'panel' here refers to panel or door, as appropriate. To make the panel cutout, first create a full-sized template according to the dimensions in FIGURE 1-4: *Panel Mounting Cutout Dimensions* on page 1-8. The procedure for mounting the EPM 5100 Electronic Power Meter is as follows:

- ▷ Cut out the panel and drill the holes as indicated on the template.
- ▷ With the meter in the back of the panel and the support plate in the front of the panel, line up the four screw holes with the holes drilled in the panel.
- ▷ Insert four 10-32 $\times$ 5/8 (plus mounting panel thickness) screws into the front of the panel (see...)
- ▷ Insert the four washers on the four studs of the support plate and fix the faceplate mounting frame with the four locknuts supplied.
- ▷ Align the faceplate with the guides at the bottom of the mounting frame (see FIGURE 2-9: *Aligning and Attaching the Faceplate* on page 2-8), then gently press the faceplate up and towards the meter until the remaining tabs click through the guidelines in the faceplate.

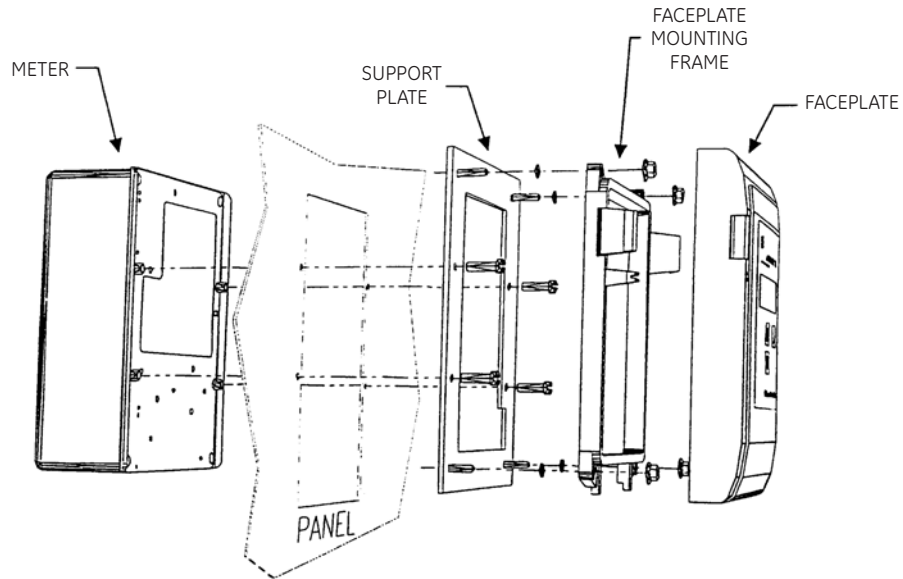


FIGURE 2-1: Mounting of the EPM 5100, Panel Mount Version

2.2.2 Retrofit Installation

Overview

In retrofit applications, the EPM 5100 Electronic Power Meter will work with the existing wiring to the DS-63 or DS-65 meter, even though it may not exactly match the corresponding diagram on pages 2-10 to 2-13. Specifically, meter terminal 2 may already be connected. When the PLEPM is installed in 2-element delta or 2½-element wye, this connection may remain or may be removed.

Retrofit with Reuse of Existing Case

The following procedure describes the process for replacing a DS-63 or DS-65 polyphase meter with an EPM 5100 Electronic Power Meter using the existing S1 case. If the pulse initiation and/or communication options are installed in the EPM 5100 Electronic Power Meter, see the above table for instructions.

- ▷ On the existing watthour meter, loosen the four thumb screws at the corners of the front cover, then remove the cover.

- ▷ Remove the connection plug at the bottom of the case to de-energize the existing electromechanical watt-hour meter, as shown below.

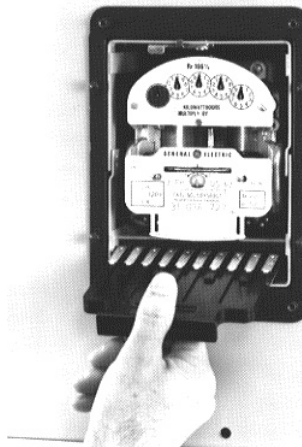


FIGURE 2-2: Removing the Connection Plug

- ▷ Open the locking latches at the top and bottom of the case and pull the existing electromechanical meter cradle part of the way out, as shown below.

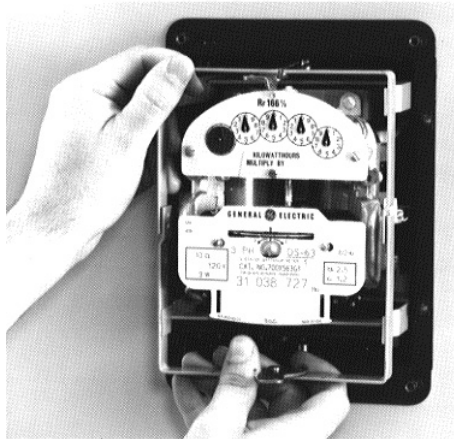


FIGURE 2-3: Opening the Locking Latches

- ▷ Press down the retaining strap on the top as shown below, then pull the cradle the rest of the way out.

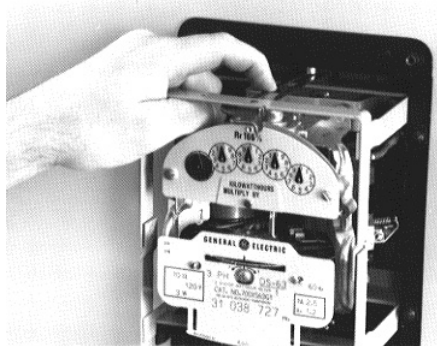


FIGURE 2-4: Releasing the Meter from the Case

- ▷ Remove the EPM 5100 Electronic Power Meter faceplate by pressing the retaining tabs on both sides of the faceplate as shown below, then pull the faceplate away from the meter, then down. Support or hold the faceplate specifically; do not pull the ribbon cable between the EPM 5100 Electronic Power Meter and the faceplate.



FIGURE 2-5: EPM 5100 Retaining Tabs

- ▷ Remove the connection plug at the bottom of the EPM 5100 Electronic Power Meter.
- ▷ Open the locking latches at the top and bottom of the EPM 5100 Electronic Power Meter cradle assembly and pull the cradle part of the way out.
Press down on the retaining strap at the top of the meter cradle, then pull the cradle the rest of the way out. It is not necessary to disconnect the faceplate ribbon cable from the cradle.

- ▷ Unscrew the four mounting screws at the corners of the EPM 5100 Electronic Power Meter faceplate mounting frame and remove the frame, as shown below.

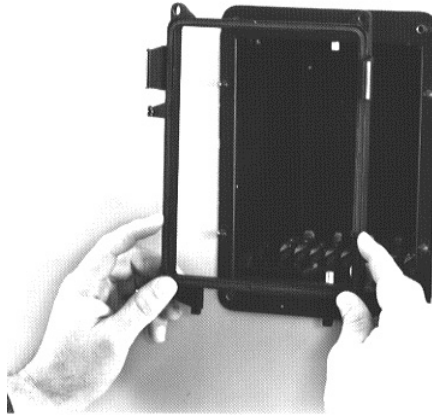


FIGURE 2-6: Removing the Faceplate Mounting Frame

- ▷ Attach the EPM 5100 Electronic Power Meter faceplate mounting frame to the existing watthour meter case, reusing the mounting screws as shown below.

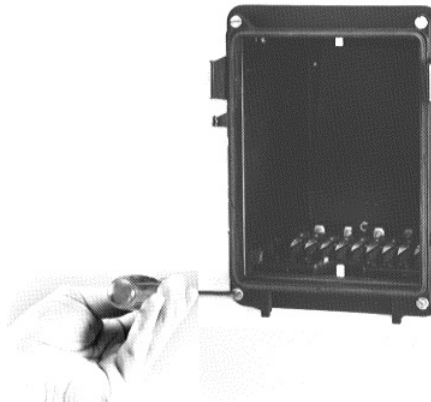


FIGURE 2-7: Attaching the Faceplate

- ▷ Insert the EPM 5100 Electronic Power Meter cradle assembly into the existing meter case as shown below. Do not let the faceplate hang by the ribbon cable. Lock the latches at the top and bottom of the case.

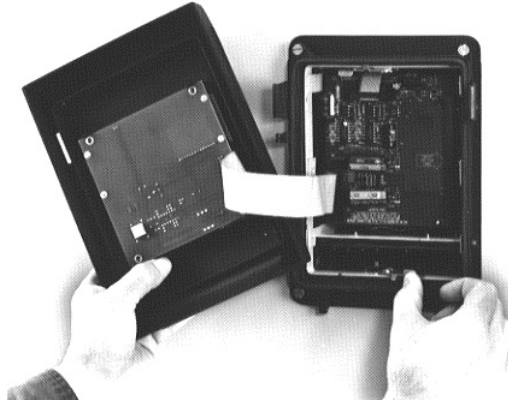


FIGURE 2-8: Locking the Assembly into the Case

- ▷ Insert the connection plug into the slot at the bottom of the cradle to energize the EPM 5100 Electronic Power Meter.
- ▷ Align the faceplate with the guides at the bottom of the mounting frame, then gently press the faceplate up and toward the meter until the retaining tabs click through the guides in the faceplate, as shown in the figures below.



FIGURE 2-9: Aligning and Attaching the Faceplate

Retrofit With Case Replacement

The following procedure describes the retrofit installation with case replacement. In what follows, the word 'panel' refers to panel or door, as appropriate.



All current and voltage inputs (CTs and PTs) must be de-energized before the existing watt-hour meter case is removed and before connections are made to the EPM 5100 Electronic Power Meter.

- ▷ De-energize all current and voltage inputs to the meter and disconnect them from the rear of the old case.

- ▷ Loosen the four thumb screws on the corners of the faceplate, then remove the faceplate.
- ▷ Remove the four mounting screws attaching the meter case to the panel.
- ▷ Remove the existing watthour meter and case from the front of the panel.
- ▷ Insert the EPM 5100 Electronic Power Meter into the panel cutout from the front of the panel.
- ▷ Line up the four screw holes in the meter case with the holes drilled in the panel.
- ▷ Insert four 10-32 x 3/8 mounting screws with lock and flat washers.
- ▷ Connect the current and voltage inputs to the rear of the meter case.
See *Instrument Transformer Connections* on page 2-10 for appropriate connection diagrams.
- ▷ If the pulse initiation option is installed, connect the pulse initiation circuits, as described in *Pulse Initiation Connections* on page 2-13.
- ▷ If the communication option is installed, connect the Power Leader™ communications cable to the communication port on the rear of the case.
- ▷ Energize the current and voltage inputs.

2.3 Electrical Installation

2.3.1 Instrument Transformer Connections

Wiring connections from CTs and voltage sources (up to 600 V AC) or PTs may be made with AWG wire sizes up to #10. Select the wire size according to conventional CT and PT circuit-design guidelines.

The figures in this section illustrate EPM 5100 Electronic Power Meter and instrument transformer connections for various combinations and configurations of PTs and CTs. CT and PT connections must be made using the polarity “dot” conventions shown on these figures for the EPM 5100 Electronic Power Meter to properly interpret power flows.



All current and voltage inputs (CTs and PTs) must be de-energized and the EPM 5100 Electronic Power Meter completely assembled before connections are made to the meter.



All field wiring must be completed before power is applied to the EPM 5100 Electronic Power Meter terminals.

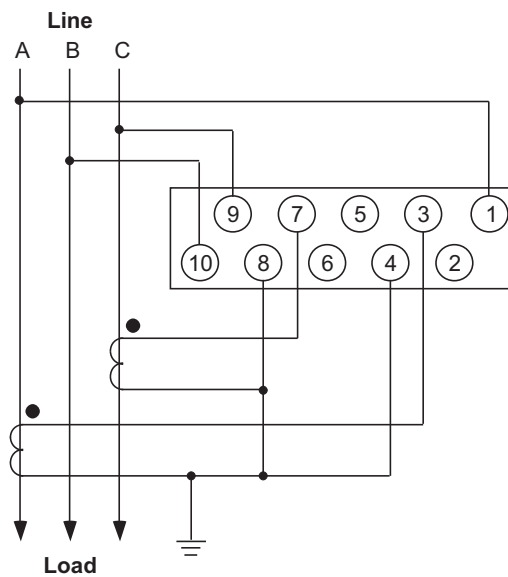


FIGURE 2-10: Typical 2-Element Connection with no PTs

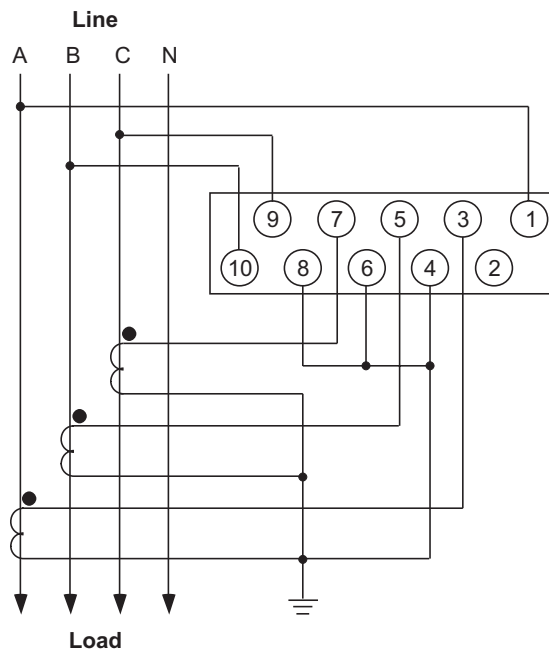


FIGURE 2-11: Typical 2½-Element Connection with no PTs

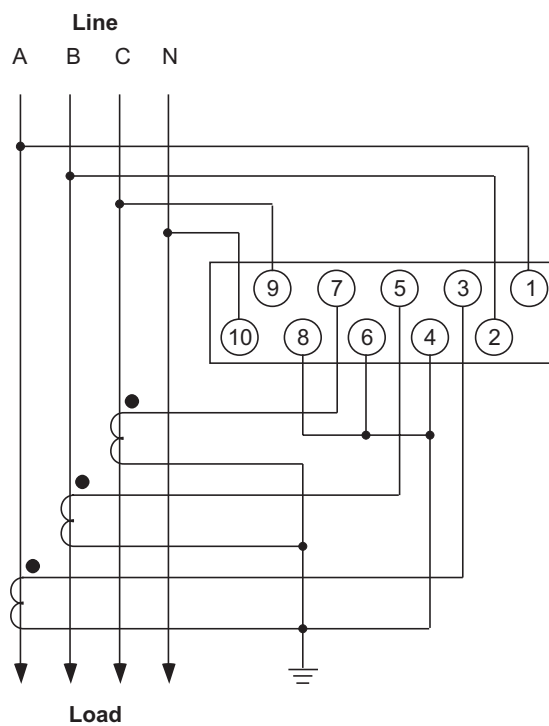


FIGURE 2-12: Typical 3-Element Connections with no PTs

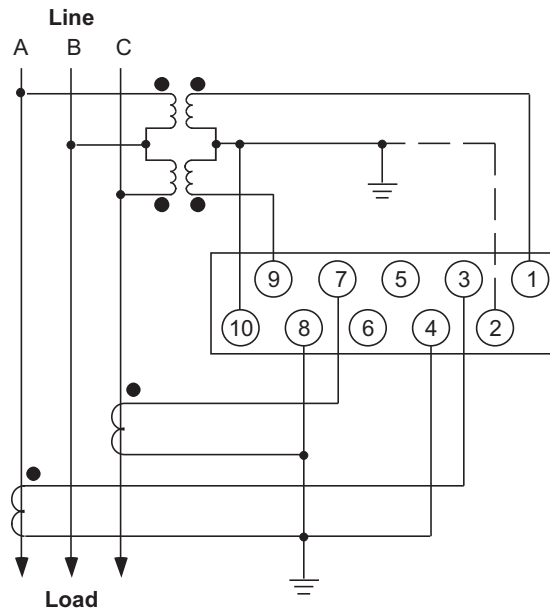


FIGURE 2-13: Typical 2-Element Connections for with Two PTs



Connections shown with a dotted line are optional and do not affect the performance of the meter if installed or removed. This allows use of any existing wiring configuration when retrofitting a GE DS-63 or DS-65 electromechanical watt-hour meter.

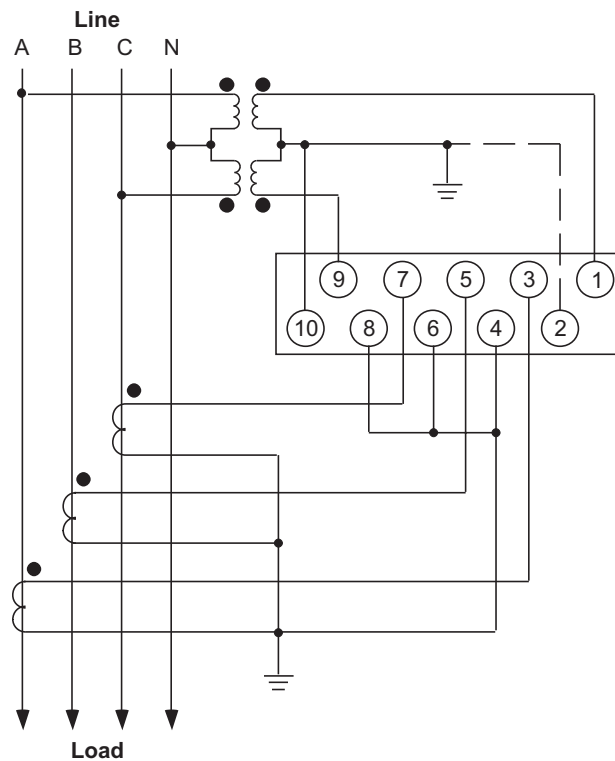


FIGURE 2-14: Typical 2½-Element Connections with Two PTs

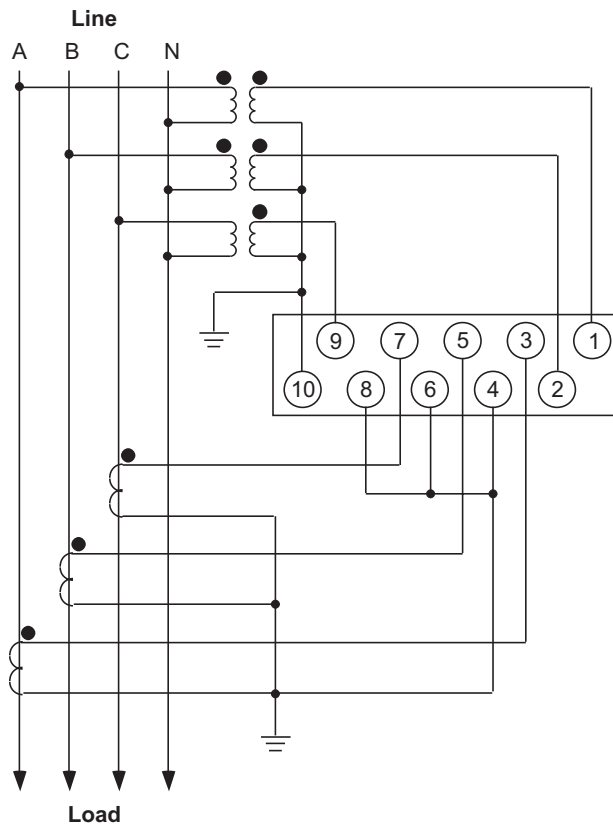


FIGURE 2-15: Typical 3-Element Connections with Three PTs

2.3.2 Pulse Initiation Connections

Connection to the optional pulse initiation circuits of the EPM 5100 is through the two three-point terminal points on the back of the case. The connection to these circuits, shown below, should be made at the same time as the current and voltage input connections.

Connection to the optional communication circuit of the EPM 5100 is through the six-position connector on the back of the case as indicated below.

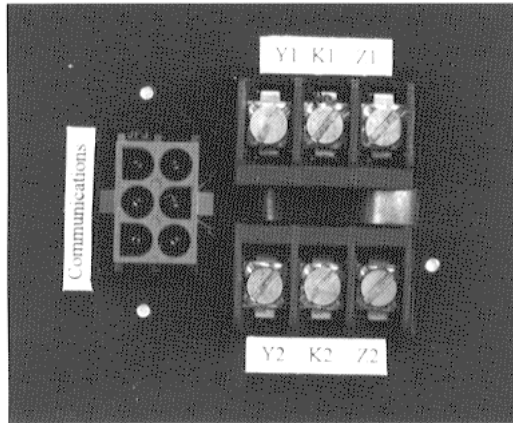


FIGURE 2-16: Three-Point Terminal Blocks for Pulse Initiation Outputs

2.4 Communications Installation

2.4.1 Modbus Connections

The following figure illustrates the connection points for Modbus communications which are made to the six-way connector. Dual connections are provided internal to the connector to assist in the provision of tee-connection capability.

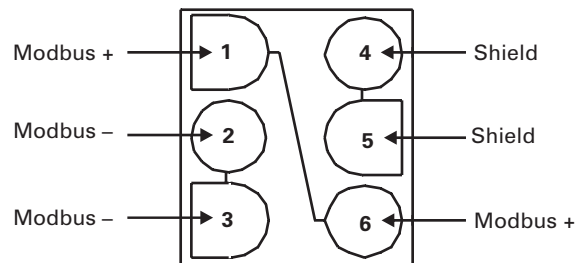


FIGURE 2-17: Modbus Connections on the Six-Way Connector



NOTE

The connection diagram above defines which pins support which network connection. Be very careful when considering Shield connections, since shields may perform several key functions within any given network topology. These functions, may include EMI shielding, ground referencing, and signal return path, when combined with the electrical characteristics of a specific installation, will determine how the shield may be most effectively used.

It should be noted that all pins of the six-way connector are electrically isolated from the EPM 5100 and, consequently, from the equipment in which the meter may be mounted. Also, pins 4 and 5 are connected internally to the communications card isolated ground.

For a comprehensive description of the Modbus communications register protocol implementation in the EPM 5100, refer to Chapter 5: Modbus Communications Features.



WARNING

Do not use the Modbus communications option card with a version 2 EPM 5100 unless a “Modbus Compatible” label is present on the case and/or cradle. If no “Modbus Compatible” label is present, contact GE Multilin for details concerning the upgrade of the EPM 5100 to Modbus compatibility.

If this card is replacing a previous non-Modbus installation, ensure that all previous network wiring is removed before operation.



WARNING

Under NO CIRCUMSTANCES should a Power Leader CNI card interconnection cable (catalog number PLCN12CG01) be connected to the six-way communications connector. SEVERE DAMAGE to the communications option card will result from such a connection.

2.4.2 Installation of the Communications Card

The following procedure describes the field installation of a communications option card into an existing EPM 5100. This procedure is unnecessary for a meter with a factory installed communication card.

- ▷ Remove the grounding wrist strap from the envelope supplied with the communication option card.
- ▷ Attach one end of the strap to a convenient, exposed, ground and the other end to your wrist, following the instructions on the envelope.
Do not handle the communication card or touch any exposed electronics in the meter until the wrist strap is properly connected
- ▷ Press the retaining tabs on both sides of the meter faceplate, illustrated in FIGURE 2-5: *EPM 5100 Retaining Tabs* on page 2-6, then pull the faceplate away from the meter, then down to remove. Support the faceplate specifically; do not pull the ribbon cable between the meter and faceplate. Do not let the faceplate hang by the ribbon cable.
- ▷ Remove the connection plug at the bottom of the cradle to de-energize the EPM 5100.
- ▷ Ensure that the meter is de-energized by verifying that the LCD panel is blank.
Do not insert the communications option card until the meter is confirmed to be de-energized.
- ▷ Remove the communication option card from the antistatic bag and position the card with the notched corner at the bottom right.
- ▷ Insert the communication option card into the option card connector in the EPM 5100 by pressing the card into the connector at about a 300° angle, as illustrated below.

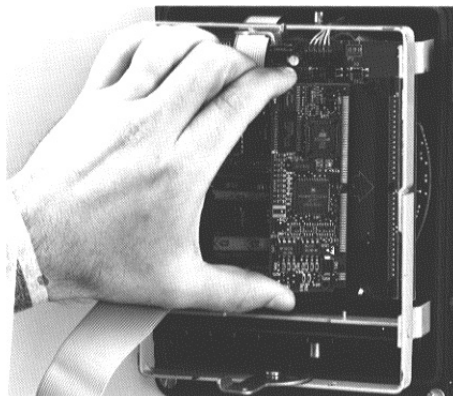


FIGURE 2-18: Positioning the Communications Card

- ▷ When the right edge of the card is evenly seated in the option card connector, press the left edge of the card toward the meter until the retention latches click into place, as illustrated below. If the

card does not appear to be evenly seated or if both retention latches do not click into place, remove the card by spreading the retention latches away from the card, then repeat the installation.

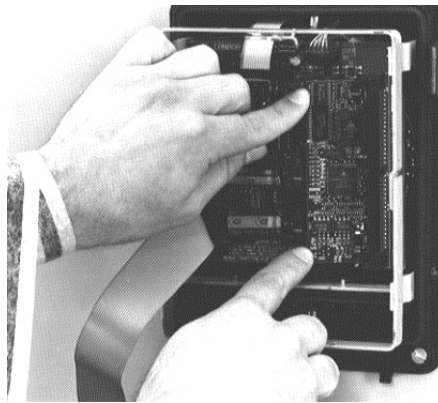


FIGURE 2-19: Pressing the Communications Card into Place

- ▷ Replace the connection plug into the slot at the bottom of the cradle.
- ▷ Align the faceplate with the guides at the bottom of the meter, then gently press the faceplate up and toward the meter until the retaining tabs click through the guides in the faceplate, as illustrated in FIGURE 2-9: *Aligning and Attaching the Faceplate* on page 2-8.
- ▷ Follow the instructions in *Communications Values* on page 4-12 to configure the communication network address.



EPM 5100 Electronic Power Meter

Chapter 3: Metering

3.1 Meter Operations

3.1.1 Meter Self-Test

Each time that power is applied to the EPM 5100, it performs a self-test of its internal electronics. If there are no problems, the EPM 5100 displays the following message before entering into Metering mode:

Self-Test OK
Data OK

If a critical failure is detected at self-test, the following message appears on the display:

POWER LEADER EPM
Self-Test Failed

When this message appears, the EPM 5100 will not continue normal operations.

The self-test can be run again by removing and reapplying power. If the same self-test failure message reappears, contact GE Multilin technical support.

3.1.2 Integrity of Metered Values

The self-test sequence also checks the integrity of the stored accumulated energy and metering values. If this test determines that some or all of the accumulated data are invalid, it displays either:

Energy Data Loss

to indicate that less than 12 hours of energy data are lost, or

All Energy Lost

The EPM 5100 will continue with normal metering, with values displayed only on the second line. The error message remains displayed until the error is cleared (see Section 4-3 for a description of the error-clearing function).

During normal operation, if phase B or phase C voltage inputs are less than 25% of the rated value, the meter displays one of the following three messages:

Phase Loss V B

Phase Loss V C

Phase Loss V BC

The EPM 5100 continues with normal metering, with values displayed only on the second line. Note that Phase B is not applicable in a two-element delta configuration, and a 25% nominal voltage input on Phase A is outside of the EPM 5100 physical specifications, as shown in *Specifications* on page 1-13.

3.1.3 Communications Error

If the optional Modbus card is installed, the EPM 5100 indicates loss of communications by displaying the message

Comm Error

The EPM 5100 continues normal metering using only the second display line. If two or more of these error messages are active at the same time, the messages alternate on the top display line.

3.1.4 Display of Metered Values

After self-test, the EPM 5100 enters metering mode and displays the values of selected line parameters. The EPM 5100 can be configured to either automatically or manually scroll through the metered parameters on the display. In addition, the duration that each parameter is displayed in automatic mode can be programmed. See Chapter 4 for details.

There are two separate lists of parameters that can be viewed, the normal and alternate scrolls. Metered parameter names and values are displayed on the LCD for the normal and alternate scroll in Table 1-2: *EPM 5100 Metered Functions (ctd.)* on page 1-4.

3.1.5 Keypad Functions

Press the $\downarrow$ button to toggle the display between the two lists of parameters, the normal scroll and the alternate scroll.

The two SCROLL keys can be used at any time to scroll up or down the list of metered parameters, in the order given in Table 1-2: *EPM 5100 Metered Functions (ctd.)* on page 1-4, whether the EPM 5100 is in manual or automatic mode. If the meter is configured for automatic scrolling mode, it resumes one minute after the last scroll key press.

The first press of any key while the EPM 5100 is in Metering mode illuminates the backlit display, if it is not already lit. The display remains illuminated for 10 minutes after the last key press.

3.1.6 Metering Accuracies

The EPM 5100 samples each of the voltage and current inputs 480 times per second to calculate the values of the parameters listed in Table 1–2: *EPM 5100 Metered Functions (ctd.)* on page 1–4. The meter automatically scales the units and displays the results on the LCD. The display is updated every three seconds. An example of a metering screen is shown below. The metering accuracies for all functions are listed in the following table.



FIGURE 3–1: Sample Metering Screen

Table 3–1: Metering Accuracies

Function	Accuracy
Current (rms)	±0.25% of reading
Neutral current	±1.50% of reading
L-N voltage (rms)	±0.25% of reading
L-L voltage (rms)	±0.75% of reading
Watts	±0.5% of reading
Volt-amperes	±0.5% of reading
Power factor	±1.0% of reading
Energy	±0.5% of reading
Frequency	±0.5% of reading

3.2 Wye Configuration Metering Functions

3.2.1 Description

Following are descriptions of each of the metered values and status parameters available with the EPM 5100 in a wye configuration. Note that prefixes such as k or M depend on configuration, as described in Chapter 4. The suffixes A, B, C, and N generally refer to phase A, phase B, phase C, and neutral, respectively.

3.2.2 Current (rms)

The EPM 5100 measures the current flowing in each line and determines the rms value. The meter displays the CT primary current, with a dynamic range up to 500 kA, depending on the CT ratio. Neutral current is calculated from the line values. Line and neutral current values are identified on the LCD as "A A", "A B", "A C", and "A N".

3.2.3 Voltage

Line-to-Neutral Voltage (rms)

The EPM 5100 measures either the line-to-neutral voltage inputs directly for inputs up to the rated voltage (69 to 600 V AC, as ordered) or from PTs for voltages above the rated voltage. The dynamic range is up to the rated voltage at the inputs, or 1200 kV of the PT primary voltage, depending on the PT ratio. Line-to-neutral voltages are identified on the LCD as "V AN", "V BN", and "V CN".

Line-to-Line Voltage (rms)

The EPM 5100 measures the line-to-line voltages directly for inputs up to the rated voltage (69 to 600 V AC, as ordered) or from two or three line-to-line or line-to-neutral PTs for voltages above the rated voltage. The dynamic range is up to the rated voltage at the inputs, or 1200 kV of the PT primary voltage, depending on the PT ratio. Voltage line-to-line values are identified on the LCD as "V AB", "V BC", and "V CA".

3.2.4 Power

Real Power

The real power is measured for each phase and for the total. Reverse power readings (load to line) are displayed as zero. Power values are identified on the LCD as "W A", "W B", "W C", and "W".

Reactive Power

The reactive power is calculated for each phase and for the total. Values are identified on the LCD as "Var A", "Var B", "Var C", and "Var".

3.2.5 Apparent Power

Voltamperes are calculated for each phase according to the following formula:

$$\text{Apparent power (VA)} = \sqrt{(\text{Real Power})^2 + (\text{Reactive Power})^2} \quad (\text{EQ 3.1})$$

For total VA, the displayed “W” is equal to “W A” + “W B” + “W C” and the displayed “Var” is equal to “Var A” + “Var B” + “Var C”. Values are identified on the LCD as “VA A”, “VA B”, “VA C”, and “VA”.

3.2.6 Energy

Energy is the summation of power over time and is provided as watthours, voltamperehours, Q-hours and lagging and leading varhours. The values are reset manually in Program mode or automatically when the maximum value that can be displayed on the LCD is exceeded. Values are identified on the LCD as Wh, VAh, Qh, +Varh (lagging), and -Varh (leading).

3.2.7 Frequency

The frequency calculated by the EPM 5100 is identified on the LCD as Hertz.

3.2.8 Demand

Current Demand (Present Ampere Demand)

Current demand is the average rms current metered over the previous demand interval. The demand interval may be set to 15, 20, 30, or 60 minutes, with rolling demand subintervals of 5, 10, 15, 20, and 30 minutes (depending on the main interval length). Values are identified on the LCD as “A ADmd”, “A BDmd”, and “A CDmd”.

Peak Current Demand (Maximum Ampere Demand)

Peak current is the maximum current demand recorded since the demand values were last reset. Values are identified on the LCD as “A APk”, “A BPk”, and “A CPk”.

Present Power Demand

Present power demand is given as watts, voltamperes, and lagging (+) and leading (–) vars metered over the most recently completed demand interval. The demand interval may be set as described under *Current Demand* above. Values are identified on the LCD as “W Dmd”, “VA Dmd”, “+VarDmd”, and “–VarDmd”.

Peak Power Demand

Peak power is given as the maximum watts, voltamperes, and lagging (+) and leading (–) vars demands recorded since the demand values were last reset. Values are identified on the LCD as “W Peak”, “VA Pk”, “+Var Pk”, and “–Var Pk”.

3.2.9 Power Factor

Power Factor

Power factor is calculated for each phase and for the total. With no input voltage or current, power factor values are displayed as 0.00. Values are identified on the LCD as "PF A", "PF B", "PF C", and "PF", with an appropriate indication for lagging (LAG) or leading (LEAD) current with respect to voltage.

Average Power Factor

Average power factor is given for the previous demand interval (DmdAvg) and also for the entire period since the last demand reset (Avg). The demand interval may be set as described under Current Demand above. Values are identified on the LCD as "PF DmdAvg" and "PF Avg".

Power Factor and Watts at Maximum Voltamperes

The power factor and real power demand that occurred at the same time as the maximum recorded voltampere demand value since the last demand reset are displayed. Values are identified on the LCD as "PF@VAPk" and "W@VAPk".

3.2.10 Miscellaneous Functions

The number of times the demand values were reset since the last meter initialization is identified on the LCD as "Dmd Reset". The time left in the present demand subinterval is identified as "Dsub time". The number of power outages encountered since the last meter initialization is identified as "Power Out".

3.2.11 Transformer Ratios

The potential transformer (PT) and current transformer (CT) ratios are identified on the LCD as "PTR" and "CTR", respectively.

3.3 Delta Configuration Metering Functions

3.3.1 Description

Following are descriptions of each of the metered values and status parameters available with the EPM 5100 in a delta configuration. Note that prefixes such as k or M depend on configuration, as described in Chapter 4. The suffixes A, B, and C generally refer to phase A, phase B, and phase C, respectively.

3.3.2 Current (rms)

The EPM 5100 measures the current flowing in each phase and determines the rms value. The meter displays the CT primary current, with a dynamic range up to 500 kA, depending on the CT ratio. Phase currents are calculated from the line values and are identified on the LCD as "A A", "A B", and "A C".

3.3.3 Line-to-Line Voltage (rms)

The EPM 5100 measures phases A and C line-to-line voltages directly for inputs up to the rated voltage (69 to 600 V AC, as ordered) or from two line-to-line PTs for voltages above the rated voltage. The dynamic range is up to the rated voltage at the inputs, or 1200 kV of the PT primary voltage, depending on the PT ratio. Voltage line-to-line values are identified on the LCD as "V AB", "V BC", and "V CA".

3.3.4 Power

Real Power

The real power is measured for phases A and C and for the total. Reverse power readings (load to line) are displayed as zero. Power values are identified on the LCD as "W AB", "W BC", and "W".

Reactive Power

The reactive power is calculated for phases A and C and for the total. Values are identified on the LCD as "Var AB", "Var BC", and "Var".

Apparent Power

Voltamperes are calculated for each phase according to the following formula:

$$\text{Apparent power (VA)} = \sqrt{(\text{Real Power})^2 + (\text{Reactive Power})^2} \quad (\text{EQ 3.2})$$

For total VA on 2-element delta, the displayed "W" is equal to "W AB" + "W BC" and the displayed "Var" is equal to "Var AB" + "Var BC". Values are identified on the LCD as "VA AB", "VA BC", and "VA".

3.3.5 Energy

Energy is the summation of power over time and is provided as watthours, voltamperehours, Q-hours and varhours. The values are reset manually in Program mode or automatically when the maximum value that can be displayed on the LCD is exceeded. Values are identified on the LCD as “Wh”, “VAh”, “Qh”, “+Varh” (lagging) and “-Varh” (leading).

3.3.6 Frequency

The frequency calculated by the EPM 5100 is identified on the LCD as “Hertz”.

3.3.7 Demand

Current Demand (Present Ampere Demand)

Current demand is the average rms current metered over the previous demand interval. The demand interval may be set to 15, 20, 30, or 60 minutes, with rolling demand subintervals of 5, 10, 15, 20, and 30 minutes (depending on the main interval length). Values are identified on the LCD as “A ADmd” and “A CDmd”. Note that this function is not available for phase B current.

Peak Current Demand (Maximum Ampere Demand)

Peak current is the maximum current demand recorded since the demand values were last reset. Values are identified on the LCD as “A APk” and “A CPk”. Note that this function is not available for phase B current.

Present Power Demand

Present power demand is given as watts, voltamperes, and lagging (+) and leading (–) vars metered over the most recently completed demand interval. The demand interval may be set as described under Current Demand above. Values are identified on the LCD as “W Dmd”, “VA Dmd”, “+VarDmd”, and “-VarDmd”.

Peak Power Demand

Peak power is given as the maximum watts, voltamperes, and lagging (+) and leading (–) vars demands recorded since the demand values were last reset. Values are identified on the LCD as “W Peak”, “VA Pk”, “+Var Pk”, and “-Var Pk”.

3.3.8 Power Factor

Power Factor

Power factor is calculated for phases A and C and for the total. With no input voltage or current, power factor values are displayed as 0.00. Values are identified on the LCD as “PF AB”, “PF BC”, and “PF”, with an appropriate indication for lagging (LAG) or leading (LEAD) current with respect to voltage.

Average Power Factor

Average power factor is given for the previous demand interval (DmdAvg) and also for the entire period since the last demand reset (Avg). The demand interval may be set as described under Current Demand above. Values are identified on the LCD as "PF DmdAvg" and "PF Avg".

Power Factor and Watts at Maximum Voltamperes

The power factor and real power demands that occurred in the same demand period as the maximum recorded voltampere demand value since the last demand reset are displayed. Values are identified on the LCD as "PF@VAPk" and "W@VAPk".

3.3.9 Miscellaneous Functions

The number of times the demand values were reset since the last meter initialization is identified on the LCD as "Dmd Reset". The time left in the present demand subinterval is identified as "Dsub time". The number of power outages encountered since the last meter initialization is identified as a "Power Out".

3.3.10 Transformer Ratios

The potential transformer (PT) and current transformer (CT) ratios are identified on the LCD as "PTR" and "CTR", respectively.



EPM 5100 Electronic Power Meter

Chapter 4: Programming

4.1 Program Mode

4.1.1 Introduction

The EPM 5100 is configured to the application requirements in Program mode. This mode is also used to reset stored demand and energy values and to clear errors. Press the GE logo to activate the secret button and enter Program mode.

The EPM 5100 automatically returns to Metering mode from Program mode whenever no keypad entry has been made for five minutes.

4.2 Access to Program Functions

4.2.1 Overview

The top-level main menu in Program mode displays:

PROGRAMMING MENU

The functions available in the Program mode main menu appear on the second line and are:

Data Resetting →
 Data Formatting →
 Comm Addr Setup
 KYZ Pulse Setup →
 Configuration →
 Restricted Area →
 Serial & Rev #s
 Meter Type
 Exit

The figure below shows the display on entry to Program Mode.

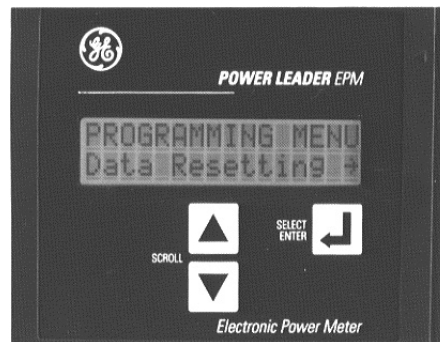


FIGURE 4–1: Example Display on Entry to Program Mode.

Press the ▽ and △ keys to scroll through the list of functions. When the desired function is displayed, press ↵ to access the list of options available for that function. Press the ▽ and △ keys to scroll through the list to the desired option, then press ↵ to select it. Scroll to Exit and press ↵ to return to the main menu from an options list or to Metering Mode from the main menu.

When either of the “Data Formatting”, “Comm Addr Setup”, “KYZ Pulse Setup”, or “Configuration” functions is active, metering stops until control returns to the main menu. In addition, a return to the main menu from these functions automatically resets the demand interval time period. The other functions have no effect on metering.

4.2.2 Restricted Access

Access to any of the Program mode functions, except “Restricted Area”, “Serial & Rev #s”, “Meter Type”, and “Exit”, may be restricted through the Access Restrict menu. If all other functions have been restricted, these four are the only initial choices. Note that the Access Restrict menu provides a way to prevent entry into the Program mode functions that temporarily stop normal metering.

To gain access to restricted functions, scroll to:

Restricted Area→

Pressing ↓ changes the display as follows:

Match password:
00-00-00

Enter the first digit of the password with the ▽ and △ keys, press ↓, enter the second digit, press ↓, and so on until all six digits are entered, as illustrated below (the factory default password is 00-00-00).

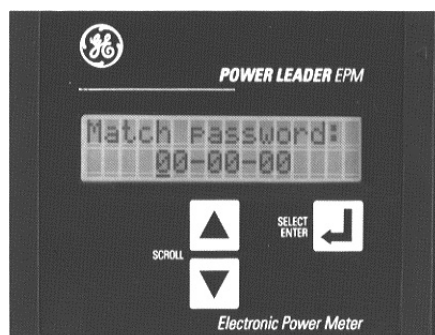


FIGURE 4-2: Entering the Password

After the sixth digit has been entered correctly, the display returns to the main menu, with the sequence:

- Data Resetting →
- Data Formatting →
- Comm Addr Setup
- KYZ Pulse Setup →
- Configuration →
- Access Restrict →
- New Password?
- Serial & Rev #s
- Meter Type
- Exit

The display returns to the previous menu if the password is not entered correctly.

4.2.3 Exiting Program Mode

Each of the functions available in Program mode is described in this chapter. To return at any time to Metering mode, press the secret button (under the GE logo) or scroll to



Exit

and press ↵. Note that the latter method may have to be repeated to completely leave Program mode.

4.3 Data Resetting

4.3.1 Description

Select this series of functions by pressing $\downarrow$ at the first Program mode display. The options available are:

- Demand Reset
- Energy Reset
- Meter Initialize
- Errors Clear
- Exit

Each of these options is described in this section.

4.3.2 Demand Reset

The Demand Reset function resets the stored demand values for A APk, A BPk, A CPk, W Peak, VA Pk, +Var Pk, -Var Pk, W@VAPk, PF Avg, and PF@VAPk. Pressing $\downarrow$ displays the lines:

Demand Reset
Are you sure?

To cancel the operation press either the ∇ and $\triangle$ key. To confirm the reset operation, press $\downarrow$. The EPM 5100 displays the following text.

Demand Reset
Completed

After three seconds, the display returns to:

Data Resetting →
Demand Reset

4.3.3 Energy Reset

The Energy Reset function resets the stored energy values kWh, kVAh, kQh, +kVarh, and -kVarh. Pressing $\downarrow$ displays the lines:

Energy Reset
Are you sure?

To cancel the operation, press either the ∇ and $\triangle$ key. To confirm the reset operation, press $\downarrow$. The EPM 5100 displays the following text:

Energy Reset
Completed

After three seconds, the display returns to:

```

Data Resetting →
Energy Reset

```

4.3.4 Meter Initialize

The Meter Initialize function resets all counters and accumulated energy and starts a new demand period (user-defined configurations and data formatting are not affected). Pressing ↵ displays the lines

```

Meter Initialize
Are you sure?

```

To cancel the operation press either the ▽ and △ key. To confirm the initialize operation, press ↵. The EPM 5100 displays the following text:

```

Meter Initialize
Completed

```

After three seconds, the display returns to:

```

Data Resetting →
Meter Initialize

```

4.3.5 Errors Clear

The Errors Clear function clears any existing error messages. Pressing ↵ displays the lines

```

Errors Clear
Are you sure?

```

To cancel the operation press either the ▽ and △ key. To confirm the clear operation, press ↵. The EPM 5100 displays the following text:

```

Errors Clear
Completed

```

After three seconds, the display returns to:

```

Data Resetting →
Errors Clear

```

4.4 Data Formatting

4.4.1 Overview

The options available under the Data Formatting function are:

- Normal Scroll
- Altrn. Scroll
- Energy Format
- Demand Format
- Volt Format
- Amp Format
- Leading Zeros
- Scroll Time
- Exit

Each of these options is described in this section.

4.4.2 Normal Scroll

Press $\downarrow$, then use the ∇ and $\triangle$ keys to display the list of metered and calculated parameters available with the normal scroll as shown in the following table.

The pound sign (#) in the first display position means that the parameter will be displayed in the normal scroll sequence. To remove a parameter from the default (or to add one that is presently off), press $\downarrow$. A space in the first position means that the parameter will not be displayed in the normal scroll sequence. The figures below illustrate a metering function with the pound sign displayed and the same function with the pound sign removed.

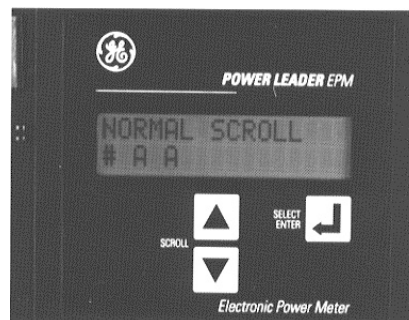


FIGURE 4-3: Typical Scroll Sequence Display

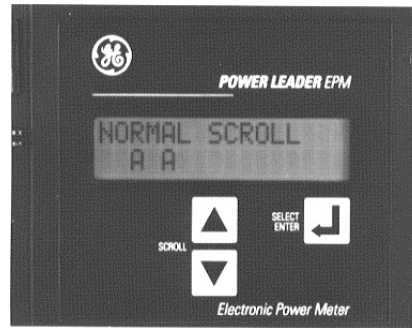


FIGURE 4-4: Typical Non-Scroll Sequence Display

Table 4-1: Parameters Available with Normal Scroll

2½ and 3 element Wye	2 element Delta
# A A	# A A
# A B	# A B
# A C	# A C
# A N	# V AB
# V AN	# V BC
# V BN	# V CA
# V CN	# W AB
# V AB	# W BC
# V BC	# W
# V CA	# W Dmd
# W A	# W Peak
# W B	# Var AB
# W C	# Var BC
# W	# Var
# W Dmd	# VA AB
# W Peak	# VA BC
# Var A	# VA
# Var B	# PF [Lag or Lead]
# Var C	# kWh
# Var	# +kVarh
# VA A	# -kVarh

Table 4–1: Parameters Available with Normal Scroll

2½ and 3 element Wye	2 element Delta
# VA B	# kVAh
# VA C	# Hertz
# VA	
# PF [Lag or Lead]	
# kWh	
# +kVarh	
# -kVarh	
# kVAh	
# Hertz	

4.4.3 Energy Format

Press $\downarrow$ to show the format for displaying energy values. The energy format is displayed as follows:

Energy Format: XXXX_ 'k'

The second line shows the active format and the cursor appears under the fifth position, after the first four X's. Either the ∇ and $\triangle$ key toggles that character among X, period (.), or blank. If X is chosen by pressing $\downarrow$, the cursor moves over one position and the same choices may be made; if period is chosen, only X and blank are available at the next position. Choosing a blank at any position jumps the cursor to the units multiplier, which toggles between 'k' (kilo) or 'M' (mega). Press $\downarrow$ one more time to confirm your choice. The available formatting choices are

```
XXXX
XXXX.X
XXXX.XX
XXXXX
XXXXX.X
XXXXXX
```

4.4.4 Demand Format

Press $\downarrow$ to show the format for displaying demand values:

Demand Format: XXX_ ' '

The second line shows the active format and the cursor appears under the fourth position, after the first three X's. Either the ∇ and $\triangle$ key toggles that character among X, period (.), or blank. If X is chosen by pressing $\downarrow$, the cursor moves over one position and the same

choices may be made; if period is chosen, only X and blank are available at the next position. Choosing a blank at any position jumps the cursor to the units multiplier, which toggles among ' ', 'k' (kilo), or 'M' (mega). Press $\downarrow$ one more time to confirm your choice. The available formatting choices are

```

XXX
XXX.X
XXX.XX
XXX.XXX
XXXX
XXXX.X
XXXX.XX
XXXXX
XXXXX.X
XXXXXX

```

4.4.5 Voltage Format

Press $\downarrow$ to show the format for displaying voltage values:

```

Volt Format:
XXX_ ' '

```

The voltage format is selected in the same way as the demand format, with the same choices available, except that M is not available as a units multiplier.

4.4.6 Current Format

Press $\downarrow$ to show the format for displaying current values:

```

Amp Format:
XXX_ ' '

```

The current format is selected in the same way as the voltage format, with the same choices available.

4.4.7 Leading Zeros

This function determines whether parameter values will be displayed with leading LCD positions filled with zeros. Press $\downarrow$ to display the two choices:

```

Leading Zeros:
WITHOUT ZEROS

```

```

Leading Zeros:
WITH ZEROS

```

Scroll between the two options, then press $\downarrow$ to select your choice.

4.4.8 Scroll Time

Press $\downarrow$ to display the time that each parameter is displayed during automatic scroll in Metering mode:

Scroll Time: 10 second(s)
--

Use the ▽ and △ key to select the desired value, press ↵ to select the units position, scroll to the desired value and press ↵ to confirm. The default is 10 seconds.

Set the scroll time to "00" to set the metering display to manual mode. In this mode, the ▽ and △ keys must be used to change the displayed parameter.

4.5 Communications Values

4.5.1 Communication Address Setup

Use a small screwdriver to set the most significant digit of the Modbus address by setting switch S1 to the required digit in the range 0 to 9, as illustrated in the figure below. Repeat this operation for the middle digit of the address by adjustment of switch S2 and for the least significant digit of the address by adjustment of switch S3.



NOTE

Modbus addresses are valid only in the range 33 to 247. Setting the address outside this range will terminate response of the device to the Modbus network.

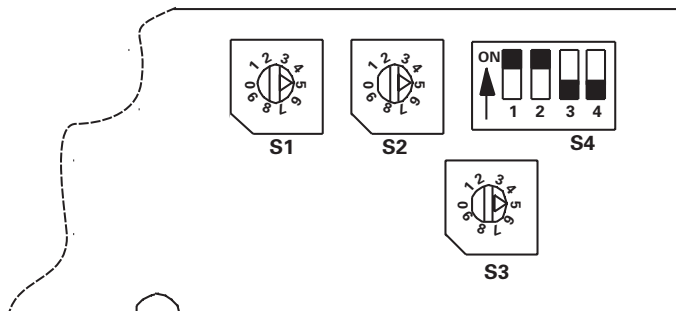


FIGURE 4-5: Modbus Address Setup

4.5.2 Baud Rate Setup

Adjust sliders 3 and 4 (refer to the figure above) as indicated below for compatibility with the operating baud rate of the network:

Table 4-2: Baud Rate Setup

Baud Rate	Slider 3	Slider 4
1200	ON	ON
2400	OFF	ON
9600	ON	OFF
19200	OFF	OFF

4.5.3 EPM Compatibility Setup

The Modbus RTU Option Card, catalog number PLA3CMAG01, is compatible with GE ED&C host products in addition to the EPM 5100. For specific operation with the EPM 5100 it is necessary to select the compatible operating mode by switch settings on the communications option card. Use a small screwdriver adjust sliders 1 and 2 of switch S4 (refer to the figure above) as follows:

Slider 1: ON

Slider 2: ON

4.6 Pulse Outputs

4.6.1 Pulse Output Setup

This function appears only if the pulse initiation option was ordered with the EPM 5100. There are two pulse initiation output channels that are set up with this function. The options available are:

- Output 1
- Output 2
- Exit

Selecting Output 1 with the $\downarrow$ key displays the setting:

KYZ1 Pulseweight:
000.000000 kVAh

Move through the setting positions with $\downarrow$, then set the desired value with the ∇ and $\triangle$ keys. When the weight has been set, press $\downarrow$ to advance to the energy units, then choose among kVAh, kWh, kVarh, and kWh. Confirm your choice by pressing $\downarrow$.

This setting defines the incremental energy usage level at which pulses are transmitted from the output. For instance, if kWh is selected with a pulse weight of 0.15, as illustrated below, then a pulse is sent for each 150 watthours of energy consumed.

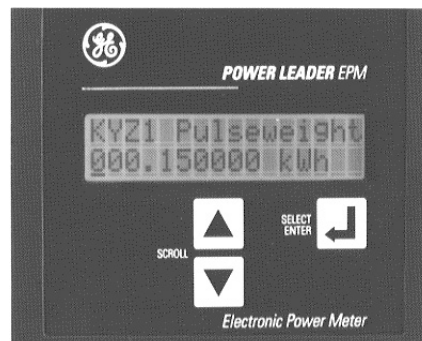


FIGURE 4-6: KYZ Pulse Weight Setup Display

Press $\downarrow$ to return to the KYZ Pulse Setup menu. Follow the same procedure to setup Output 2.

4.6.2 Upgrading from Electromechanical Meters

When upgrading from an electromechanical watthour meter with pulse initiation to the EPM 5100 with pulse initiation, a mathematical conversion is required to obtain the proper value for programming the meter. The formula is:

$$\text{Disk revolution per pulse} = \frac{1000K_e}{(\text{PT ratio})(\text{CT ratio})K_h} \quad (\text{EQ 4.1})$$

To use this equation, insert the known quantities from the present installation and the constant, K_h , from the table below, then solve for K_e to program the EPM 5100. An example follows the table.

Table 4–3: Values of K_h for Pulse Initiation

Voltage	System	K_h
69 V	4Y	1.08
120 V	3 4Y	1.2 1.8
240 V	3 4Y	2.4 3.6
277 V	4Y	3.6
480 V	3	4.8
600 V	3	6.0

4.6.3 Upgrade Calculation Example

For example, a customer has a 480/277 V system (3 phase, 4-wire) with a 1600 A main. The watthour meter with pulse initiation is being replaced with a EPM 5100. The watthour meter was set for one pulse every $\frac{1}{4}$ -disk revolution. The value to be programmed into the meter is calculated as follows:

$$\begin{aligned}
 \text{Disk revolution per pulse} &= \frac{1000K_e}{(\text{PT ratio})(\text{CT ratio})K_h} \\
 \Rightarrow \frac{1/4}{1} &= \frac{1000K_e}{(280/120)(1600/5) \times 3.6} \\
 \Rightarrow \frac{1}{4} &= \frac{1000K_e}{2764.8} \\
 \Rightarrow 1000K_e &= 691.2 \\
 \Rightarrow K_e &= 0.6912 \text{ kWh}
 \end{aligned}
 \tag{EQ 4.2}$$

Therefore, 0.6912 kWh or 6912 watthours should be programmed into the EPM 5100.

4.7 Configuration

4.7.1 Options

The options available with the Configuration function are:

- PT Ratio
- CT Ratio
- Demand Period Setup
- Meter Type
- Exit

Each of these options is described below.

4.7.2 PT Ratio

The potential transformer ratio is obtained by dividing the PT primary voltage by the EPM 5100 input voltage rating:

$$\text{PT Ratio} = \frac{\text{PT Primary Voltage}}{\text{EPM Input Voltage Rating}} \quad (\text{EQ 4.3})$$

For instance, if 480 V AC PTs are installed in a 120 V meter, enter “4.0” in the display. If PTs are not used, the proper ratio is 1.0 (the default setting).

Selecting this option produces the display:

P.T. Ratio: <u>0001.00000</u>

Press $\rightarrow$ to move to the right across the display, entering values in the appropriate positions with the ∇ and $\triangle$ keys. When the desired value is entered, continue pressing $\rightarrow$ to return to the Configuration menu.

4.7.3 CT Ratio

The current transformer ratio is obtained by dividing the CT current rating by 5 A:

$$\text{CT Ratio} = \frac{\text{CT Primary Current Rating}}{5 \text{ A}} \quad (\text{EQ 4.4})$$

For instance, if 1000 A CTs are installed, enter “200.0” in the display.

Selecting this option produces the display

C.T. Ratio: <u>00001.00000</u>
--

Press $\rightarrow$ to move to the right across the display, entering values in the appropriate positions with the ∇ and $\triangle$ keys. When the desired value is entered, continue pressing $\rightarrow$ to return to the Configuration menu.

4.7.4 Demand Period Setup

The demand period is set with the display shown in the following figure.



FIGURE 4-7: Demand Period Setup Display

Set the desired block (Blk=) demand period and the subinterval (Sub=) for rolling demand calculations with the ∇ and $\triangle$ keys. Press $\rightarrow$ to return to the Configuration menu.

The EPM 5100 automatically adjusts the subinterval time choices according to the demand interval chosen. The available choices are listed below.

Table 4-4: Demand Subintervals

Block Interval	Available Subintervals
15 min.	5, 15 min.
20 min.	5, 10, 20 min.
30 min.	5, 10, 15, 30 min.
60 min.	10, 15, 20, 30, 60 min.

4.7.5 Meter Type

The EPM 5100 offers the following meter type configurations:

- 3 Element Wye
- 2.5 Element Wye
- 2 Element Delta

Scroll to the entry corresponding to the correct setup and select it with $\rightarrow$.

The configurations that are actually available depend on the input voltage. See *Order Codes* on page 1-11 for the list of available configurations.

4.8 Restricted Access Functions

4.8.1 Access Restrict

This function only appears if the password has been correctly entered. Each of the functions in the Configuration menu may be restricted so that the function only becomes available after the password has been correctly entered. The options available under the Access Restrict menu are:

- Data Resetting?
- Data Formatting?
- KYZ Pulse Setup?
- Configuration?
- Comm Addr Setup?
- Demand Reset?
- Energy Reset?
- Meter Init?
- Errors Clear?
- Exit

Move through the list with the ∇ and $\triangle$ keys, select any of the options with $\downarrow$, then scroll between

- Unprotected
- Protected

Select the desired choice with $\downarrow$.

4.8.2 New Password

This function is only available after the password has been correctly entered. To change the password, press $\downarrow$ to display:

New Password: 00-00-00

Note that the current active password is displayed in place of the zeros. Use the ∇ and $\triangle$ keys to enter the desired digit in first position, then press $\downarrow$ to move to the second position. Continue until all six digits have been entered, after which the display returns to the New Password menu.

4.9 Default Settings

4.9.1 Description

The following table lists the default settings for the EPM 5100 as shipped.

Table 4–5: EPM 5100 Default Settings

Parameter	Default Setting
Energy Format	XXXXX.X K
Demand Format	XXXXXX
Voltage Format	XXXX.X
Current Format	XXXX.XX
Leading Zeros	WITHOUT ZEROS
KYZ1 Pulseweight	000.000000 kVAh
KYZ2 Pulseweight	000.000000 kVAh
PT Ratio	1.000000
CT Ratio	1.000000
Demand Interval	15 (Minutes)
Demand Subinterval	5 (Minutes)
Scroll Time	10 seconds
Password	00-00-00



EPM 5100 Electronic Power Meter

Chapter 5: Communications

5.1 Introduction

5.1.1 Overview

The tables in this chapter indicate the event codes and register maps of the EPM 5100. This section is intended only as a guide to the functions available with the device.

5.1.2 Events

Events describe specific status conditions within the device and are available to the host computer either through the special DDE item, Events, or by direct read access of the registers containing the event information.

The following table defines the events supported by the EPM 5100.

Table 5-1: EPM 5100 Events

Event code (decimal)	Meaning	Register 1	Register 5
256	Voltage Phase Loss	LSB -Voltage Loss Phase	N/A
512	Internal Communication Error	N/A	B0:Old Data, data from device is not up to date B1:Busy Flag, Previously commanded transaction still in progress B5:Data Not Ready, the first full set of data is not yet acquired by the device Remaining Bits: Unused

Table 5–1: EPM 5100 Events

Event code (decimal)	Meaning	Register 1	Register 5
513	Internal Communication Restored	N/A	B0:Old Data, data from device is not up to date B1:Busy Flag, Previously commanded transaction still in progress B5:Data Not Ready, the first full set of data is not yet acquired by the device Remaining Bits: Unused
520	Configuration Change	N/A	Address of changed Setpoint
522	Address Conflict Detected	N/A	N/A
543	Hardware Failure/ BIT Failure	N/A	B3:A/D Converter Failure B2: NVM FailureB1: ROM FailureB0: RAM Failure
578	Remote SetPoint Change Failed	N/A	N/A
579	Partial Energy Loss Error	N/A	N/A
580	Complete Energy Loss Error	N/A	N/A
581	Meter Errors Cleared Locally	N/A	N/A
582	Meter Initialized Locally	N/A	N/A
583	Demand Reset Locally	N/A	N/A
585	Unspecified General Failure	N/A	N/A

5.1.3 Modbus Register Maps

The register map for the EPM 5100 are illustrated below. These tables list the registers that may be accessed by the host computer over the Modbus network.

The registers are divided into four sections:

1. Fixed value registers (addresses R40000 to R40009)
2. Dynamic values registers (addresses R31000 to R31118)
3. Setpoint registers (addresses R43000 to R43032)
4. Command coils (addresses R00000 to R00003)

The fixed value registers contain information relating to parameters that are either factory set and cannot be changed by the user or can only be changed via the faceplate of the EPM 5100. The contents of these registers do not vary during the operation of the device.

The dynamic value registers contain information relating to variable operating parameters such as phase current and phase voltage. These registers are read-only and their contents cannot be changed by the user.

The setpoint registers contain information that configures the device to operate in a user-defined manner. These registers may be read over the modbus network, but may not be written over the network. Any changes to the setpoint registers can only be made via the faceplate.

The command coils (registers) allow you to cause specific control actions to take place at the device, such as Clear Energy Accumulators.



NOTE

Addresses designated with L suffix return a Long Signed Integer value concatenated from two successive registers. Addresses designated with F suffix return a floating point value concatenated from two successive registers. Addresses designated with Ann suffix return an array read from nn successive registers.

Table 5-2: Modbus Memory Map (Sheet 1 of 3)

Register	Mnemonic	Contents	Range / Units	R/W	Format
Command Coils					
R00000	CLEAR_DMND	Clear power demand (watts)	0 to 1	WO	F17
R00001	MTR_INITIALIZE	Initialize meter	0 to 1	WO	F17
R00002	CLEAR_ENERGY	Clear energy (var-hour)	0 to 1	WO	F17
R00003	CLEAR_ERROR	Clear meter errors	0 to 1	WO	F17
Dynamic Value Registers					
R31000	PENDING_EVENTS	Number of pending event messages	0 to 8	RO	F1
R31002F	KVA_MAX_TOTAL	kVA max, total of all phases	kVA	RO	F4
R31004F	KW_MAX_TOTAL	kW max, total of all phases	kW	RO	F4
R31006F	KVAR_LG_MAX_TOTAL	kvar lag max, total of all phases	kvar	RO	F4
R31008F	KVAR_LD_MAX_TOTAL	kvar lead max, total of all phases	kvar	RO	F4
R31010F	AMPS_MAX_A	Current Max Phase A	amps	RO	F4
R31012F	AMPS_MAX_B	Current Max Phase B	amps	RO	F4
R31014F	AMPS_MAX_C	Current Max Phase C	amps	RO	F4
R31016F	KVARH_LG_TOTAL	kvarh lag, total of all phases	kVARh	RO	F4
R31018F	KVARH_LD_TOTAL	kvarh lead, total of all phases	kVARh	RO	F4
R31020F	KWH_TOTAL	kWh, total of all phases	kWh	RO	F4
R31022F	KQH_TOTAL	kQh, total of all phases	$kqhQ = (\sqrt{3} \times \text{var} + W) / 2$	RO	F4
R31024F	KVAH_TOTAL	kVAh, total of all phases	kVAh	RO	F4
R31026F	PF_AVG	Average power factor since last reset, all phases	---	RO	F4
R31028F	PF_AT_KVA_MAX	Power factor, total of all phases, at maximum kVA	---	RO	F4
R31030F	KVA_DMND_TOTAL	Apparent power demand (kVA), total of all phases	kVA	RO	F4
R31032F	KW_DMND_TOTAL	Real power demand (kW) total of all phases	kW	RO	F4
R31034F	KVAR_LG_DMND_TOTAL	Reactive power demand (kvar lag), total of all phases	kvar	RO	F4
R31036F	KVAR_LD_DMND_TOTAL	Reactive power demand (kvar lead), total of all phases	kvar	RO	F4
R31038F	AMPS_DMND_A	Current demand, phase A	amps	RO	F4
R31040F	AMPS_DMND_B	Current demand, phase B	amps	RO	F4
R31042F	AMPS_DMND_C	Current demand, phase C	amps	RO	F4
R31044F	PF_DMND	Power factor, all phases (over last demand interval)	---	RO	F4
R31046F	KW_A	Real power (kW), phase A	kW	RO	F4
R31048F	KW_B	Real power (kW), phase B	kW	RO	F4
R31050F	KW_C	Real power (kW), phase C	kW	RO	F4
R31052F	KVAR_A	Reactive power (kvar), phase A	kvar	RO	F4
R31054F	KVAR_B	Reactive power (kvar), phase B	kvar	RO	F4
R31056F	KVAR_C	Reactive power (kvar), phase C	kvar	RO	F4
R31058F	KVA_A	Apparent power (kVA), phase A	kVA	RO	F4

Table 5–2: Modbus Memory Map (Sheet 2 of 3)

Register	Mnemonic	Contents	Range / Units	R/W	Format
R31060F	KVA_B	Apparent power (kVA), phase B	kVA	RO	F4
R31062F	KVA_C	Apparent power (kVA), phase C	kVA	RO	F4
R31064F	PF_A	Power factor, Phase A	---	RO	F4
R31066F	PF_B	Power factor, Phase B	---	RO	F4
R31068F	PF_C	Power factor, Phase C	---	RO	F4
R31070F	KVA_TOTAL	Apparent power (kVA), total of all phases	kVA	RO	F4
R31072F	KW_TOTAL	Real power (kW), total of all phases	kW	RO	F4
R31074F	KVAR_TOTAL	Reactive power (kvar), total of all phases	kVAR	RO	F4
R31076F	VOLTS_A	L-N voltage, phase A-N	volts	RO	F4
R31078F	VOLTS_B	L-N voltage, phase B-N	volts	RO	F4
R31080F	VOLTS_C	L-N voltage, phase C-N	volts	RO	F4
R31082F	VOLTS_AB	L-L voltage, phase A-B	volts	RO	F4
R31084F	VOLTS_BC	L-L voltage, phase B-C	volts	RO	F4
R31086F	VOLTS_CA	L-L voltage, phase C-A	volts	RO	F4
R31088F	PF	Total power factor of all phases	---	RO	F4
R31090F	KW_TOTAL_AT_KVA_MAX	Real power (kW), total of all phases at maximum kVA	kW	RO	F4
R31092F	AMPS_A	Current, phase A	amps	RO	F4
R31094F	AMPS_B	Current, phase B	amps	RO	F4
R31096F	AMPS_C	Current, phase C	amps	RO	F4
R31098F	AMPS_N	Neutral current	amps	RO	F4
R31100F	FREQUENCY	Frequency	Hz	RO	F4
R31102	TIME_LEFT	Time left in demand interval	seconds	RO	F1
R31103	NO_OF_RESET	Number of resets	0 to 255	RO	F5
R31104	NO_OF_PWR_FAILS	Number of power failures	0 to 255	RO	F5
R31105	METER_ERROR	Meter error flags	---	RO	F6
R31106	VOLTS_PHASE_ERR	Voltage phase loss errors	---	RO	F7
R31107	LD_LG_PF_TOTAL	Lead/lag qualifier for all phases (instantaneous)	0 to 1	RO	F8
R31108	LD_LG_PF_A	Lead/Lag qualifier for phase A (instantaneous)	0 to 1	RO	F8
R31109	LD_LG_PF_B	Lead/Lag qualifier for phase B (instantaneous)	0 to 1	RO	F8
R31110	LD_LG_PF_C	Lead/Lag qualifier for phase C (instantaneous)	0 to 1	RO	F8
R31111	DATA_RESET_FLAG	Data Resetting flags	---	RO	F9
R31112F	PREV_ACCUM_WH	Previous Accumulated Wh	Wh	RO	F4
R31114F	PREV_ACCUM_VARH_LG	Previous Accumulated varh lagging	varh	RO	F4
R31116F	PREV_ACCUM_VARH_LD	Previous Accumulated varh leading	varh	RO	F4
R31118	DATA_CLR_STATUS	Data Cleared Status	0- Not Cleared1 - Cleared	RO	F10
Fixed Value Registers					
R40000	PRODUCT_ID	Product Id	always 0Eh	RO	F1
R40002	---	Reserved	---	---	---
R40003	MODBUS_ADDR	Modbus Address	33 to 215	RO	F1
R40004L	SERIAL_NUM	Serial Number	---	RO	F2
R40006L	SW_REV	Firmware Revision	00.00 to 99.99	RO	F3
R40008	COC_REV	COC Software Revision	---	RO	F3
R40009	---	---	---	---	---
Setpoint Value Registers					
R43000	HOURL	Hour	0 to 23 hrs.	RW	F1
R43001	MIN	Minute	0 to 59 min.	RW	F1
R43002	SEC	Seconds	0 to 59 sec.	RW	F1
R43003	PASSWORD	Password	always 00h	RO	F1
R43005F	PULSE_VALUE_1	Pulse value interval time for pulse KYZ output 1	0 to 999.999999	RO	F4
R43007F	PULSE_VALUE_2	Pulse value interval time for pulse KYZ output 2	0 to 999.999999	RO	F4
R43009	PULSE_UNIT_1	Pulse units for KYZ output 1	---	RO	F11
R43010	PULSE_UNIT_2	Pulse units for KYZ output 2	---	RO	F11
R43011L	CONFIG_FLAG_1	Programming flags	---	RO	F12

Table 5–2: Modbus Memory Map (Sheet 3 of 3)

Register	Mnemonic	Contents	Range / Units	R/W	Format
R43013	DMND_INTERVAL	Demand interval length (in minutes)	15, 20, 30, or 60	RO	F1
R43014	NO_OF_SUB_INTERVAL	Number of sub-intervals	1 to 6	RO	F1
R43015	DISPLAY_SCROLL_TIME	Display scroll time	0 to 99 sec.	RO	F1
R43016	METER_CONFIG	Meter Configuration	---	RO	F13
R43017F	PT_RATIO	Potential Transformer Ratio	PTR:1	RO	F4
R43019F	CT_RATIO	Current Transformer Ratio	CTR:1	RO	F4
R43021	ENERGY_FORMAT	Energy Display Format	---	RO	F14
R43022	DMND_FORMAT	Demand Display Format	---	RO	F14
R43023	VOLT_FORMAT	Voltage Display Format	---	RO	F14
R43024	AMPS_FORMAT	Amps Display Format	---	RO	F14
R43025	ENERGY_SCALE	Energy Display Scale (kWh, MWh)	---	RO	F15
R43026	DMND_SCALE	Demand Display Scale (W, kW, MW)	---	RO	F15
R43027	VOLT_SCALE	Voltage Display Scale (V, kV)	---	RO	F15
R43028	AMPS_SCALE	Amps Display Scale (A, kA)	---	RO	F15
R43029A03	EPM_PASSWORD	Local faceplate password	00-00-00 to 99-99-99	RO	F16

5.1.4 Modbus Format Codes

The format codes used in the Modbus memory map are shown below:

Table 5–3: Modbus Format Codes (Sheet 1 of 3)

Code	Description
F1	Integer Value
F2	Long Integer Value
F3	Integer: Two Decimal Places
	Integer values with decimal implied between 2nd and 3rd places. For example, 1234 = 12.34
F4	Real Value (floating point)
F5	Integer: Non-volatile Count
	Non-volatile count of demand resets since commissioning. The range is 0 to 255 with wrap to 0 on the 256th demand reset. Cleared when meter initialize is executed.
F6	Bitmask: Error Flags
	B1: All energy lost B4: Internal comm error B7: Energy data loss (<12hr)
F7	Bitmask: Voltage phase error
	B0: A-N voltage lost B1: B-N voltage lost B2: C-N voltage lost
F8	Enumeration: Leading/lagging
	0 = lagging 1 = leading

Table 5–3: Modbus Format Codes (Sheet 2 of 3)

Code	Description
F9	Bitmask: Data Resetting Flags
	Indicates the occurrence of one or more locally or remotely commanded reset operations. May only be cleared remotely B0: Demand reset B1: Energy reset B2: Meter initialize B3: Errors clear
F10	Enumeration: Data cleared
	0 = data not cleared 1 = data cleared
F11	Enumeration: Pulse value units
	0 = VAh 1 = VWh 2 = varh 3 = Qh
F12	Long Integer Bitmask: Programming flags
	B0: Access to data resetting menu restricted B1: Access to data formatting menu restricted B2: Access to KYZ pulse setup menu restricted B3: Access to configuration menu restricted B4 to B7: unused B8: leading zeros enabled B9: Single meter configuration allowed B10: unused B11: Pulse outputs menu disabled (no pulse output option installed) B12: unused B13: Test mode active edge (rising edge if set) B14: reserved B15: unused B16 to B23: reserved B24: Access to demand reset restricted B25: Access to energy reset restricted B26: Access to meter initialize restricted B27: Access to errors clear restricted B28 to B31: unused
F13	Enumeration: Meter configuration
	1 = 2 element delta 120 V 2 = 2.5 element wye 120 V 3 = 3 element wye 120 V 5 = 2 element delta 240 V 6 = 2.5 element wye 240 V 7 = 3 element wye 240 V 11 = 2 element delta 480 V 13 = 2 element delta 600 V 54 = 2.5 element wye 69 V 55 = 3 element wye 69 V 56 = 2.5 element wye 277 V 57 = 3 element wye 277 V
F14	Enumeration: Display format
	48 = XXX 49 = XXX.X 50 = XXX.XX 51 = XXX.XXX 64 = XXXX 65 = XXXX.X 66 = XXXX.XX 80 = XXXXX 81 = XXXXX.X 96 = XXXXXX
F15	Enumeration: Display scale
	32 = unit ($\times 10^0$) 77 = M ($\times 10^6$) 107 = k ($\times 10^3$)

Table 5–3: Modbus Format Codes (Sheet 3 of 3)

Code	Description
F16	Encoded Text: Local password
	This value is an encoded 6-character string representing the password. The password is comprised of 6 digits with the encoding scheme as shown below. 0: D5h 1: D4h 2: D3h 3: D2h 4: D1h 5: D0h 6: CFh 7: CEh 8: CDh 9: CCh For example, 12-34-56 would be encoded as D4D3D2D1D0CFh
F17	Enumeration: Command Coil
	0 ≡ Disable command 1 ≡ Perform command



EPM 5100 Electronic Power Meter

Chapter 6: Miscellaneous

6.1 Troubleshooting

6.1.1 Troubleshooting Guide

The following notes are provided for troubleshooting and isolating common problems. They do not cover every possible situation. Contact GE Multilin if the problem is not resolved by these procedures.



All current and voltage inputs (CTs and PTs) must be de-energized before removing or making connections to the EPM 5100.

1. **Symptom:** The vars reading is erratic and does not reflect a stable value.

Possible Cause: There is no voltage and/or current at the inputs and the EPM 5100 is seeing random noise.

Corrective Action: Apply current or voltage, or lower the PT or CT ratios of the unused input. This will reduce the susceptibility of the input to noise.

2. **Symptom:** Nothing is displayed for current or voltage.

Possible Cause: Current and/or voltage are not present at the input terminals or the EPM 5100 is improperly wired.

Corrective Action: Check the wiring for the proper connections and phasing. Verify the presence of current and voltage.

3. **Symptom:** The current or voltage reading is incorrect.

Possible Cause #1: An incorrect PT or CT ratio was entered.

Corrective Action #1: Enter the Program mode and verify the PT and CT ratios.

Possible Cause #2: An incorrect PT connection was made.

Corrective Action #2: Enter the Program mode and verify the PT connection.

4. **Symptom:** The current demand, peak current, watt demand, and peak watts demand do not change.
Possible Cause: These values are either peak or cumulative values and no higher value has occurred.
Corrective Action: All demand values may be set to zero with the Demand Reset function in Program mode.
5. **Symptom:** The error message, Self-Test Failed, is displayed.
Possible Cause: The self-test detected a critical failure in the meter electronics.
Corrective Action: Run the self-test again by removing and reapplying power. If the same failure message reappears, contact GE Multilin.
6. **Symptom:** The error message, Phase Loss V, is displayed.
Possible Cause #1: Voltage loss on one or more phases.
Corrective Action #1: Check the voltage input of the PLEPM on the indicated phases.
Possible Cause #2: The PT wiring is defective.
Corrective Action #2: Check for defective wiring of the PLEPM to the PTs.
Possible Cause #3: The PT fuse is blown.
Corrective Action #3: Check for a blown PT fuse.
7. **Symptom:** The error message, Energy Data Loss, is displayed.
Possible Cause: Less than 12 hours of energy data was lost.
Corrective Action: Clear the error message with the Errors Clear option under the Data Resetting menu. The meter will continue with normal metering. If the condition recurs, contact GE Multilin.
8. **Symptom:** The error message, All Energy Lost, is displayed.
Possible Cause: All stored energy data was lost.
Corrective Action: Clear the error message with the Errors Clear option under the Data Resetting menu. The meter will continue with normal metering. If the condition recurs, contact GE Multilin.
9. **Symptom:** The error message, Comm Error, is displayed.
Possible Cause #1: Communications connection is defective.
Corrective Action #1: Check connection at communication port on rear of meter.
Possible Cause #2: Meter is not properly addressed.
Corrective Action #2: Check that communications address of meter agrees with address at host.
Possible Cause #3: Communication card is defective.
Corrective Action #3: Contact GE Multilin.
10. **Symptom:** Access to restricted functions is not allowed after password is entered.
Possible Cause #1: An incorrect password was entered.
Corrective Action #1: Reenter the correct password.
Possible Cause #2: The correct password is lost or forgotten.

Corrective Action #2: Contact GE Multilin for the master password.

11. **Symptom:** Faceplate or case has been physically broken or damaged.

Possible Cause: Severe physical trauma to front or case of meter.

Corrective Action: Order replacement case or replacement parts pack from GE Multilin. The catalog number for the replacement case is PLE2CSEG01. The catalog number for the replacement parts pack is PLE2RPG01. The replacement parts pack contains a faceplate with label and display electronics and a frame with gasket and four mounting screws.

6.2 Revision History

6.2.1 Release Dates

Table 6–1: Release Dates

MANUAL	GE PART NO.	REVISION	RELEASE DATE
GEK-106646	1601-0164-A1	1.0x	July 27, 2007

6.3 Warranty

6.3.1 GE Multilin Warranty

General Electric Multilin (GE Multilin) warrants each device it manufactures to be free from defects in material and workmanship under normal use and service for a period of 24 months from date of shipment from factory.

In the event of a failure covered by warranty, GE Multilin will undertake to repair or replace the device providing the warrantor determined that it is defective and it is returned with all transportation charges prepaid to an authorized service centre or the factory. Repairs or replacement under warranty will be made without charge.

Warranty shall not apply to any device which has been subject to misuse, negligence, accident, incorrect installation or use not in accordance with instructions nor any unit that has been altered outside a GE Multilin authorized factory outlet.

GE Multilin is not liable for special, indirect or consequential damages or for loss of profit or for expenses sustained as a result of a device malfunction, incorrect application or adjustment.

For complete text of Warranty (including limitations and disclaimers), refer to GE Multilin Standard Conditions of Sale.

Index

A

ACCESS RESTRICT	4-18
ACCESSORIES	1-11
ALL ENERGY LOST	3-2
ALTERNATE SCROLL	1-4, 3-2
APPLICATIONS	1-12
APPROVALS	1-13

B

BACK PANEL	1-6, 1-7
BAUD RATE	4-12
BURDEN	1-13

C

CLEAR ERRORS	4-6
COMM ERROR	3-2
COMMUNICATIONS	
address	4-12
connections	2-15
error	3-2
Modbus format codes	5-5
Modbus memory map	5-2
overview	5-1
CONFIGURATION MENU	4-16
CSA CERTIFICATION	1-13
CT RATIO	
applications	1-12
metering	3-6
Modbus registers	5-5
setting	4-16
CURRENT	
format	4-10
metering	3-4, 3-7
Modbus registers	5-3, 5-4
specifications	1-13
CURRENT TRANSFORMERS	
connections	2-10
CURRENT TRANSFORMERS	
ratio	4-16

D

DATA FORMATTING	4-7
DEFAULT SETTINGS	4-19
DEMAND	
format	4-9
metering	3-5, 3-8
Modbus registers	5-3
period setup	4-17

reset.....	4-5
subintervals	4-17
DIMENSIONS	1-8, 1-9
DISPLAY	1-6

E

ELECTRICAL INSTALLATION	2-10
ENERGY	
format.....	4-9
metering.....	3-5, 3-8
Modbus registers.....	5-3
reset.....	4-5
ENERGY DATA LOSS.....	3-1
ENVIRONMENTAL SPECIFICATIONS.....	1-13
ERROR CLEAR.....	4-6
EVENTS	5-1

F

FEATURES.....	1-3
FREQUENCY	
metering.....	3-5, 3-8
Modbus registers.....	5-4
specifications.....	1-13
FRONT PANEL.....	1-6

I

INSTALLATION	
communications.....	2-15
electrical.....	2-10
mechanical	2-3
overview	2-1
pulse inputs.....	2-13
retrofit.....	2-4, 2-8
INSTRUMENT TRANSFORMER CONNECTIONS	2-10
INTEGRITY.....	3-1
INTERCONNECTIONS.....	1-13
INTRODUCTION	1-1

K

KEYPAD.....	3-2
KYZ PULSE WEIGHT	4-14

L

LEADING ZEROS	4-10
---------------------	------

M

MECHANICAL INSTALLATION.....	2-3
METER INITIALIZE.....	4-6
METER TYPE.....	4-17
METERED FUNCTIONS	1-3, 1-4

METERING	
accuracy	3-3
current.....	3-4, 3-7
demand	3-5, 3-8
energy	3-5, 3-8
frequency.....	3-5, 3-8
integrity.....	3-1
power	3-4, 3-7
power factor.....	3-6, 3-8
sample screen	3-3
self-test.....	3-1
voltage	3-4, 3-7
wye configuration.....	3-4
MODBUS	
address	4-12
format codes.....	5-5
installation.....	2-15
memory map	5-2
overview.....	1-4
wiring	2-15

N

NORMAL SCROLL	1-3, 3-2, 4-7
---------------------	---------------

O

ORDER CODES.....	1-11
------------------	------

P

PANEL MOUNTING	1-7
PASSWORD.....	4-3, 4-18
PHASE LOSS	3-2
POTENTIAL TRANSFORMERS	
connections.....	2-10
ratio	4-16
POWER	
metering.....	3-4, 3-7
Modbus registers.....	5-3, 5-4
POWER FACTOR	
metering.....	3-6, 3-8
Modbus registers.....	5-3, 5-4
PROGRAM MODE	4-1
PT RATIO	
applications.....	1-12
metering.....	3-6
Modbus registers.....	5-5
setting.....	4-16
PULSE INITIATION	
connections.....	2-13
PULSE OUTPUTS	
Modbus registers.....	5-4
setup	4-14

R

RELEASE DATES	6-4
RESET FUNCTIONS	4-5
RESTRICTED AREA	4-3
RETROFIT INSTALLATION	
case replacement	2-8
overview	2-4
reusing existing case	2-4
REVISION HISTORY	6-4

S

SCROLL TIME	4-10
SELF-TEST	3-1
SPECIFICATIONS	1-13

T

TRANSFORMER CONNECTIONS	2-10
TRANSFORMER RATIOS	3-6, 3-9
TROUBLESHOOTING	6-1
TYPE TESTS	1-13

U

UL LISTING	1-13
UPGRADING FROM ELECTROMECHANICAL METERS	4-14

V

VOLTAGE	
format	4-10
metering	3-4, 3-7
Modbus registers	5-4
specifications	1-13

W

WARRANTY	6-5
WYE CONFIGURATION METERING	3-4
