

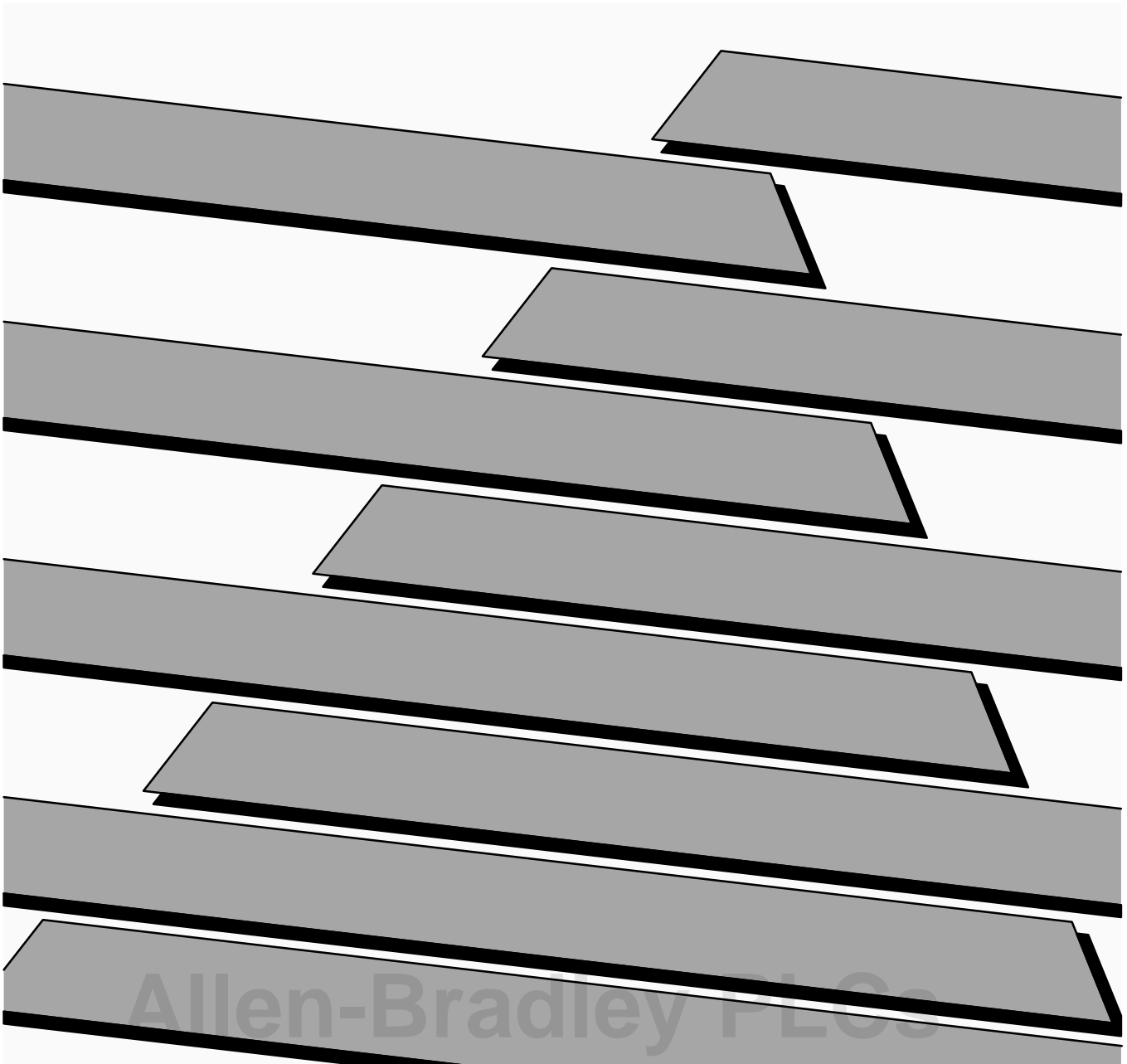


ALLEN-BRADLEY

Bulletin 1400 Powermonitor Software

(Catalog Number 1400-SP)

Installation and Operation Manual



Important User Information

Solid state equipment has operational characteristics differing from those of electromechanical equipment. "Safety Guidelines for the Application, Installation and Maintenance of Solid State Controls" (Publication SGI-1.1) describes some important differences between solid state equipment and hard-wired electromechanical devices. Because of this difference, and also because of the wide variety of uses for solid state equipment, all persons responsible for applying this equipment must satisfy themselves that each intended application of this equipment is acceptable.

This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instructions manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.



ATTENTION: Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss.

Attentions help you:

- identify a hazard
- avoid the hazard
- recognize the consequences

Important: Identifies information that is especially important for successful application and understanding of the product.

Using This Manual

What This Manual Contains

Review the table below to familiarize yourself with the topics contained in this manual.

For information about:	Refer to chapter:
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For More Information

For this information:	Refer to:
Catalog Number 1400-PD Installation and Operation Manual	Publication 1400-800
Installing the Communications Card Instructions Catalog Number 1400-DCU	Publication 1400-5.0
RS-232C and RS-485 Converter Instructions Catalog Number 1400-CC	Publication 1400-5.1
Catalog Number 6190-PMO ControlView Software	A-B Highland Heights

Terms and Conventions

In this manual, the following terms and conventions are used:

Abbreviation	Term	Abbreviation	Term
CTS	Clear To Send	RTU	Remote Terminal Unit
DCE	Data Communications Equipment	RXD	RS-232C Receive Data
DTE	Data Terminal Equipment	SG	RS-232C Signal Ground
GND	Chassis Ground	SHLD	RS-485 Shield
LAN	Local Area Network	TXD	RS-232C Signal Ground
RI/O	Remote I/O	6190-PMO	Bulletin 6190-Powermonitor Option ControlView Software
RTS	Request to Send		

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Overview

Chapter Objectives

This chapter is an overview of Powermonitor Software system components and capabilities. Detailed information regarding system requirements can be found in Chapter 2.

Introduction

Powermonitor Software is a software package designed to remotely display the data measured by the Powermonitor. The Powermonitor Software is capable of configuring and controlling all aspects of remote devices. In addition, the Software can up load and store the Event and Snapshot Logs of the devices onto disk files for database analysis or printout.

System Components

The Powermonitor Software system is comprised of a personal computer that is connected via communication links to a Powermonitor through a Bulletin 1400-DCU communications card.

Computer Station

The Powermonitor Software requires an IBM Personal Computer AT, 286, or 386, or a true compatible with a monochrome or color monitor. The computer must have a minimum 256K of RAM, an 80 column monochrome or color monitor, and either a 5-1/4" (360KB or 1.2MB) or 3-1/2" (720KB or 1.44MB) floppy disk drive. A hard disk drive is optional.

The computer set at a minimum should be equipped with one (RS-232C) serial interface (port). With two serial (RS-232C) interface ports the computer could be connected to a Powermonitor via one port and at the same time be connected to another Powermonitor via the other port.

For remote connection, one port could have an internal modem or one of the serial ports could be connected to an external modem. Modem connection allows communication via the telephone network, radio links, fiber optic links, and microwave data links.

The computer running the Powermonitor Software provides the system operator interface to perform the following functions:

- Remote device programming.
- Data display from each device in the system.
- Communication of manual relay control commands to Powermonitors.
- Access to logs (Min./Max., etc.) setpoint control

The Powermonitor Software data files format allows the user to apply standard database application programs such as Lotus™ or others to produce system reports such as:

- a. load trending
- b. trouble analysis
- c. cost analysis
- d. cost allocation
- e. demand scheduling
- f. performance analysis and reporting
- g. shadow billing
- h. engine/generator efficiency studies

Powermonitor Display Module

The Powermonitor provides electrical monitoring and control functions in a wide variety of applications. The Powermonitor can be operated independently in stand-alone applications, or used with a computer running Powermonitor Software for local or remote device programming, setpoint control, viewing of data, and manual relay operation. All functions of each Powermonitor may be accessed from the Powermonitor Software computer station. The Powermonitor Software also provides access to features that are not accessible when the Powermonitor is used in strictly stand-alone applications.

The Powermonitor performs high accuracy measurement of Volts (L-L, L-N), Amps, kW, kVA, kVAR, kW Demand, Amps Demand, Power Factor, Frequency, kWh, kVARh, kVAh, and Neutral Current. Dependent on the range, connections can be made directly to potential transformers and current transformers without the need for intermediate transducers.

An auxiliary voltage input can be used to measure parameters, such as, transformer temperature or battery voltage. Four status inputs can be used to monitor circuit breaker status, ground fault relay status, or any other voltage input within the status input range.

The Powermonitor has an extensive user-programmable setpoint system. Three on-board relay outputs can be used for fully automated demand, power factor, or load control, or to trip a critical breaker or activate an alarm in the event of under/over voltage, voltage or current unbalance, phase reversal, etc. The three relays can be programmed for multiple setpoints.

On-board data logging capabilities provide Event/Alarm, Min/Max, and Snapshot data which can be accessed and displayed through Powermonitor Software.

Communication Links

Many forms of communication can be used to transfer power data on a local data bus to the computer running the Powermonitor Software. The local data buses presently used by the Catalog Number 1400-DCU communications card are either the electrical standards RS-232C or RS-485 and Allen-Bradley Remote I/O link for PLC® (programmable logic controllers) processors.

The RS-232C electrical standard is commonly used for point-to-point communications and is excellent when only one Powermonitor is to be installed at a site.

For sites requiring more than one Powermonitor device, the RS-485 electrical standard is used. This standard utilizes a shielded two-wire twisted pair cable as the communications media and can operate at distances up to 4000 feet.



ATTENTION: Special high level isolation is required between units when the possibility of high ground potential differences exist. This may occur when separate grounds are used, or when communicating to a unit off of the power ground matt. Failure to do so can lead to personal injury or death, property damage, or economic loss.

The Powermonitor Software uses a non-proprietary packet protocol to transfer information and data between the computer running the Powermonitor Software and remote devices connected on the RS-485 bus. The packet protocol features unit addressing and error checking capability. Generally, a Catalog Number 1400-CC communications converter will be needed to convert the computer RS-232C to RS-485 communications.

The Powermonitor Software does not support Allen-Bradley's Remote I/O network.

System Features

Control Features

The Powermonitor is equipped with on-board control relays. The relays may be manually controlled by the system operator, or placed under automatic control of the device itself in accordance with user defined parameters.

Only computer system operators with the appropriate password have access to the relay control functions. The Powermonitor Software forced relay requests require confirmation. This minimizes unintentional relay activity. All forced relays return to normal operation if power to the unit is lost.

Data Acquisition Features

A Powermonitor has on-board Snapshot logging capability which allows each device to store instantaneous measured values (ex. Volts, Amps, kW, kVAR, etc.) at user-defined intervals ranging from 1 second to 400 days.

A computer running the Powermonitor Software can up load and display Snapshot Logs, and save an entire log to a disk file for analysis at a later date. The Powermonitor Software disk files are stored in format that is easily converted to a LOTUS 1-2-3™ compatible format allowing users to apply their own database application programs to generate any desired type of report or graph. The use of this standard database file format also allows the user to apply presently existing database application macros that have already been developed.

Data Display Features

All real-time measured data, relay and status input conditions, and on-board data logs can be accessed from a Powermonitor.

Operator Support

The Powermonitor Software provides an on-screen HELP utility which provides information regarding communications, modem usage, and how to obtain technical assistance should a user experience difficulties.

System Requirements

Computer Requirements

The Powermonitor Software software package is designed to run on a Personal Computer AT, 286, 386, or a true IBM compatible. The computer must have a minimum 256K of RAM, an 80 column monochrome or color monitor, and either a 5-1/4" (360KB or 1.2MB) or 3-1/2" (720KB or 1.44MB) floppy disk drive. A hard disk drive is optional. The computer must also have a communications interface capable of supporting the required number of sites. See the paragraph on communications system hardware requirements.

The specific computer hardware required depends upon the size of the system, the number of substation sites, and the number of Powermonitors. For large systems, an IBM-PC/AT or PC/286 class computer or better is recommended.

Printer

A dot matrix printer is optional. A wide carriage model dot matrix printer capable of compressed mode is recommended to retain the proper page formatting of the Powermonitor Software output. A standard width dot matrix printer may be used; however, proper page formatting will not be retained in some cases.

Version Of DOS Required

DOS versions 2.0 or greater can be used with the Powermonitor Software.

Communications System Hardware Requirements

The computer running the Powermonitor Software utilizes one serial port to communicate with the Powermonitors at each site in the system. Each computer serial port can be connected to one or more Powermonitors via a wide array of communications interface hardware options. Examples of communications options supported by Powermonitor Software include direct connection to single Powermonitors or telephone modem links via RS-232C, and direct connection to multiple device sites via RS-485 local area networks.

Number Of Serial Ports Required

The Powermonitor Software supports dual RS-232C or RS-485 serial ports (COM1 and COM2). COM1 must be set to IRQ4 and COM2 to IRQ3.

The number of serial ports required by the computer varies from system to system and will depend on the size of the system to be monitored.

RS-232C vs RS-485 Communications

The Powermonitor Software can communicate to all Powermonitors in the system either via the RS-232C electrical standard or via the RS-485 standard. The type of communication hardware required at each site is dependant on which of these electrical standards is used by the Powermonitors located at that site.

If there is only one Powermonitor installed at a site, then the optional port can be set for either the RS-232C standard or the RS-485 standard. If more than one Powermonitor is installed at a site, then the RS-485 electrical standard must be used and all Powermonitors located at that site must have their optional RS-232C/RS-485 port set for RS-485 communications.



ATTENTION: Special high level isolation is required between units when the possibility of high ground potential differences exist. This may occur when separate grounds are used, or when communicating to a unit off of the power ground matt. Failure to do so can lead to personal injury or death, property damage, or economic loss.

To determine the setting of optional RS-232C/RS-485 port refer to Publication 1400-5.0, “Catalog Number 1400-DCU Communications Card Instructions Sheet.”

Connection To Remote Sites Via Telephone Lines and Modems

The Powermonitor Software supports Hayes compatible internal and external modems at 300, 1200, 2400, 4800, 9600 and 19.2K baud. Before selecting a particular baud rate, verify that all equipment used supports that particular baud rate.

Installations using modems require individual RS-232C and telephone cables at each modem location.

Configuration of external modems is described in Chapter 3, “Installation.” Internal modems should be useable with their factory-configured settings. If necessary, please contact Allen-Bradley.

Chapter 3, “Installation” contains detailed instructions regarding the installation of telephone modem data links.

Installation

Chapter Objectives

This chapter discusses the installation of the Powermonitor Software.

The installation procedure is divided into two phases. The first phase covers installation of the hardware used to implement the Powermonitor Software communications system between the computer running the Powermonitor Software and the Powermonitors. The second phase covers installation of the Powermonitor Software software on the computer.

Installation Of The Communications Hardware

Prior to reading the information given below, it is recommended that the reader become familiar with the information contained in Appendix B. Appendix B contains an Engineering Application Note that gives an overview of the RS-232C and RS-485 electrical standards and their bearing on the communication links between the computer running Powermonitor Software and each Powermonitor site. In addition, this note explains the benefits and limitations of the RS-232C and RS-485 standards.

The following sections cover the most common methods of connection between the Powermonitor Software computer and the devices at each site. These methods are:

1. Connection to a single Powermonitor via RS-232C.
2. Connection to multiple Powermonitors via RS-485.
3. Connection to single Powermonitor sites via MODEMs.
4. Connection to multiple Powermonitor sites via MODEMs.
5. Connection to remote sites using other methods (fiber optic, radio, microwave, etc.)

Connection To A Single Powermonitor Via RS-232C

This section provides the information necessary to connect the computer to a single Powermonitor via an RS-232C communications link.

To install an RS-232C communications link, both the computer running the Powermonitor Software and the Powermonitor must be configured for RS-232C communications.



ATTENTION: Before attempting to connect any communications cables, confirm that each device is equipped with a Catalog Number 1400 – DCU communication card, and the port has been configured for RS-232C operation. For jumper configuration, refer to Publication 1400-5.0 Instruction Sheet.

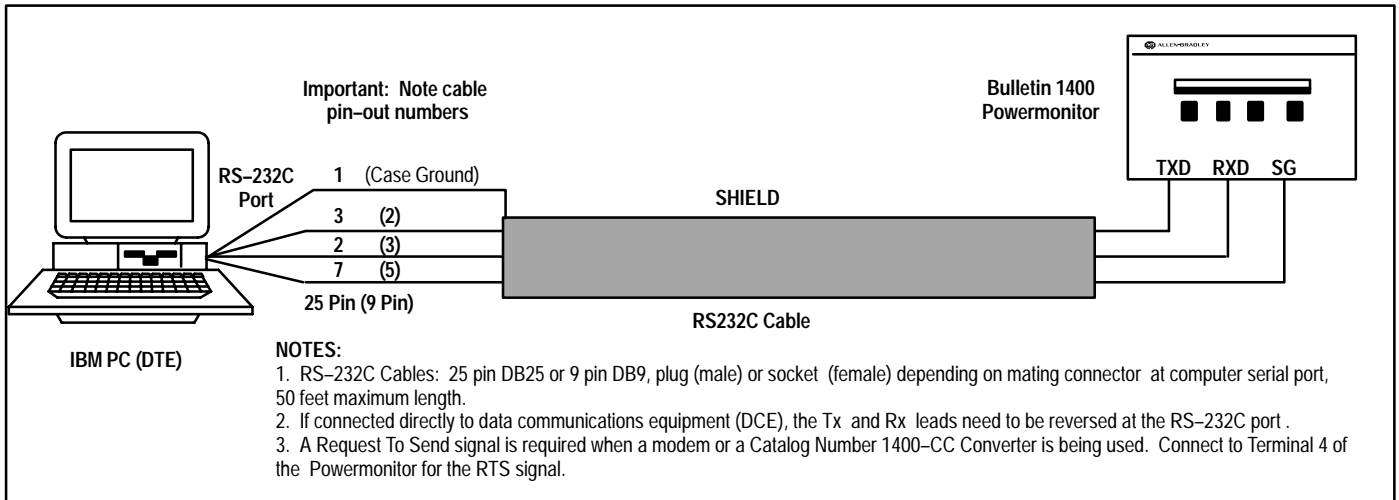
To implement an RS-232C communications link, a three conductor RS-232C cable is required between the RS-232C serial port of the computer and the serial port of the Powermonitor. If you wish to assemble the RS-232C cable yourself, the cable pin assignments are given below. Alternatively, pre-assembled RS-232C cables can be ordered from Allen-Bradley.

To install the RS-232C cable, connect one end of the RS-232C cable to the desired serial port at the back of the computer running Powermonitor Software. The three conductors at the other end of the cable are then inserted into the appropriate communications connection points located on the Powermonitor. The three connection lines are as follows (refer to Figure 3.1 on Page 3-3.):

1. Computer DB-25P pin 2 (computer Tx) connect to the RXD of the communications card.
2. Computer DB-25P pin 3 (computer Rx) connect to the TXD of the communications card.
3. Computer DB-25P pin 7 (computer signal GND) connect to the SG of the communications card.

Important: The RS-232C communications link described above allows only one device to be connected to each computer serial port.

Figure 3.1
Connection to a Single Powermonitor via RS-232C



Connection To Multiple Powermonitors Via RS-485

This section provides the information necessary to connect the computer running Powermonitor Software to multiple Powermonitors via an RS-485 communications link.

An RS-485 communications link permits many Powermonitors to be networked together on a two-wire twisted-pair local area network or LAN. The computer can access information from any one of and up to 32 devices connected to the RS-485 LAN.

To implement an RS-485 communications link, the computer running the Powermonitor Software must be equipped with either an internal RS-485 communications card or an RS-232C serial port and an external RS-232C to RS-485 converter. The Catalog Number 1400-CC converter can be used for this purpose. Each Powermonitor to be connected to the RS-485 LAN must be equipped with a Catalog Number 1400-DCU communications card configured for RS-485. The communications cable required to connect the computer to each of the Powermonitors consists of a shielded two conductor twisted pair cable.



ATTENTION: Before connecting any communications cables, confirm that every Powermonitor is equipped with a RS-485 communications port, and the port has been configured for RS-485 operation. Refer to Publication 1400-800, "Bulletin 1400 Powermonitor Installation and Operation Manual," for the device to determine correct configuration of the port.



ATTENTION: Never connect an RS-232C equipped device to the DATA+ or DATA- lines of an RS-485 equipped communication system. Doing so will damage the RS-485 driver circuits of every device within the site.

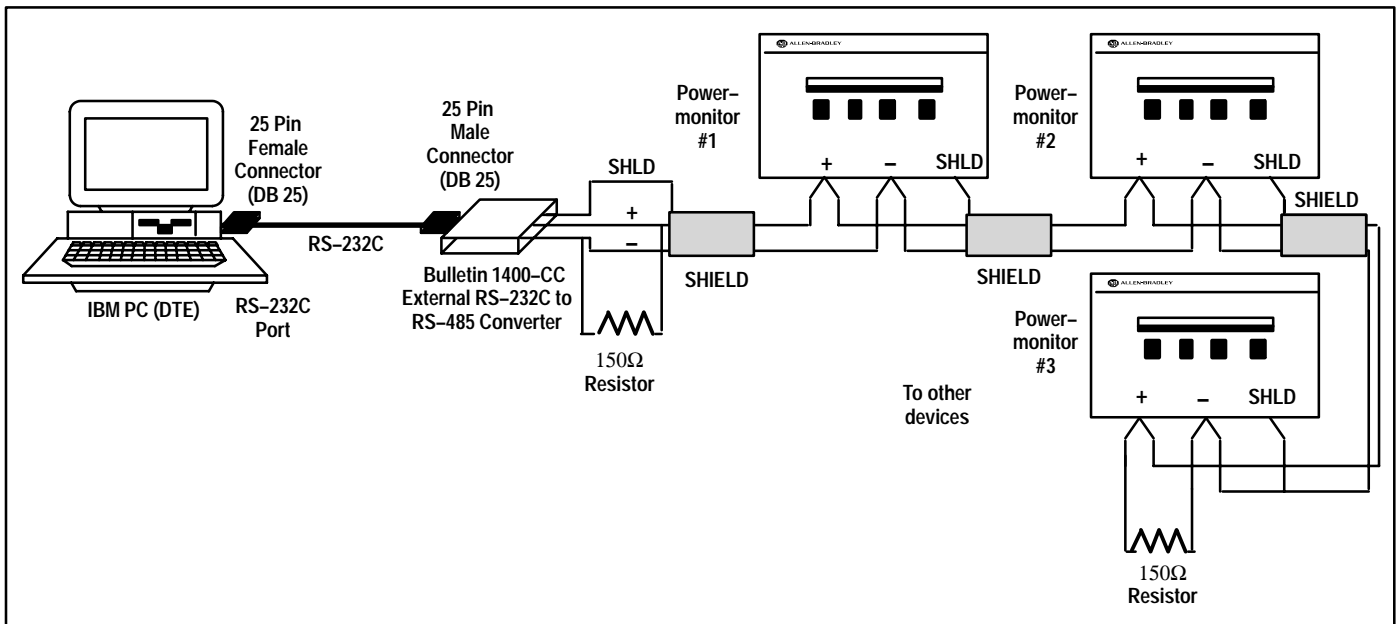


ATTENTION: Converters such as the Catalog Number 1400-CC converter must always be used between devices that use RS232C/RS-485 communications standards.

If the computer running the Powermonitor Software uses an RS-232C serial port in conjunction with an external Catalog Number 1400-CC RS-232C to RS-485 converter, then install a straight 25-conductor RS-232C cable or a cable configured with (3) wires to pins 2, 3, and 7 from the desired serial port at the back of the computer to the RS-232C input on a Catalog Number 1400-CC converter. The DATA+ and DATA- lines on the RS-485 side of the converter are then connected to the DATA+ and DATA- on each Powermonitor via a shielded two-wire twisted pair cable as shown in Figure 3.2.

Important: Be sure to connect both ends of the shield between devices.

Figure 3.2
RS-485 Communications Connections - External Converter



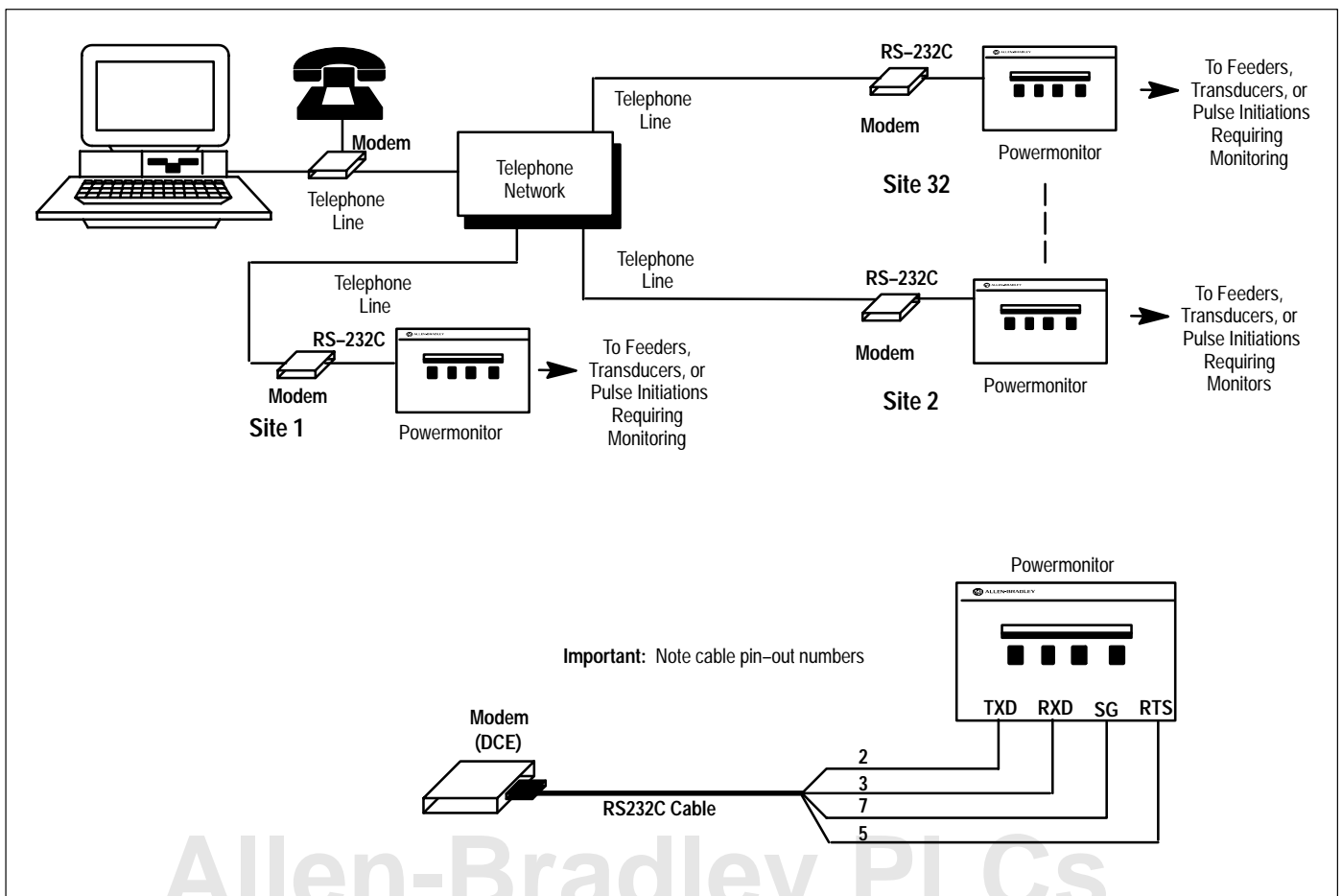
Connection To Single Powermonitor Sites Via The Telephone Network

This section provides the information necessary to implement a telephone modem link between the computer and sites with only single remote Powermonitors.

Important: The multi-device remote site configuration outlined on page 3-8 should be used if more than one Powermonitor is to be installed at the remote site in the future, or if a single device at a remote site is located more than 50 feet from the telephone modem.

To implement a telephone modem link, two telephone modems are required. One modem must be located at the computer and one located at each remote site requiring a Powermonitor. The single device port at the remote site must be configured for an RS-232C communications port. The connection diagram for the modem at the remote site is shown in Figure 3.3. Note that this configuration (RS-232C) permits only one Powermonitor to be connected to each modem.

Figure 3.3
Modem Connection to Sites with One Powermonitor





ATTENTION: Before connecting any communications cables, confirm that the Powermonitor is configured for RS-232C communications and the computer port has been configured for RS-232C operation. Refer to Publication 1400-800, “Bulletin 1400 Powermonitor Installation and Operation Manual,” to determine correct configuration of the port.

The remote site requires a RS-232C cable between the modem and the serial port of the Powermonitor. If you wish to assemble the RS-232C cable yourself, the cable pin assignments are given below. Alternatively, pre-assembled RS-232C cables can be ordered from Allen-Bradley.

Modem Connector DB-25, pin		DCU Card Labeled
2 (Rx)	wire to	TXD
3 (Tx)	wire to	RXD
7 (signal ground)	wire to	SG
5 (RTS)	wire to	RTS

1. Modem DB-25S pin 3 (modem Tx) goes to device RXD.
2. Modem DB-25S pin 7 (modem GND) goes to device GND.
3. Modem DB-25S pin 4 is jumpered to modem DB-25S pin 5.
4. Modem DB-25S pin 6 is jumpered to modem DB-25S pin 20.

To install the RS-232C cable, connect the DB25 connector end of the RS-232C cable to the serial port at the back of the modem. The four conductors at the other end of the cable are then connected to the appropriate communications points located on the Catalog Number 1400-DCU communications card. The connections are shown in Figure 3.3 on page 3-5.

Modem Configuration Information

Modems used with computers running the Powermonitor Software must be fully Hayes compatible.

If the modems are configured via their communications ports, the Powermonitor Software will configure them automatically using a set of default commands. These commands assume that a standard Hayes modem is being used. If you are using a modem which requires a unique command set to configure it, refer to Appendix B for instructions on creating a special MODEM.CFG file for Powermonitor Software to use.

If the modems are configured via hardware DIP switches or a similar method, configure them to the specifications on next page.

Modems should be configured as follows:

The modem located at the destination site must be configured for “auto-answer” mode. The modem connected to the computer running the Powermonitor Software must be configured for “originate” mode.

Both modems must also be configured as follows:

1. Force the RS-232C Data Terminal Ready lead true.
2. Result codes must be sent as numbers.
3. Result codes must be sent by the modem.
4. Echo characters while in command state.
5. Do not force Carrier Detect lead true.
6. Single line connection.
7. Enable modem command recognition.
8. 8 data bits per byte.
9. No parity.
10. 1 stop bit.

The modem must be Hayes compatible. If you are using a sophisticated or high speed modem, some of the advanced features need to be disabled. To use a Telebit 3000 modem, disable flow control, disable data compression and specify CTS operation and delay. Re-configure modem command register as shown below: (This is an example only.)

AT	Z	Reset Modem
AT	&RO	CTS follows RTS
AT	S26=1	RTS to CTS Delay Interval
AT	S50=6	9600 Baud per second (V.32)
AT	S58=0	Disable Flow Control
AT	S190=0	Disable Data Compression

Modem Configuration Information Continued

You will need to check the modem's user's guide for the codes applicable to, and appropriate for your modem.

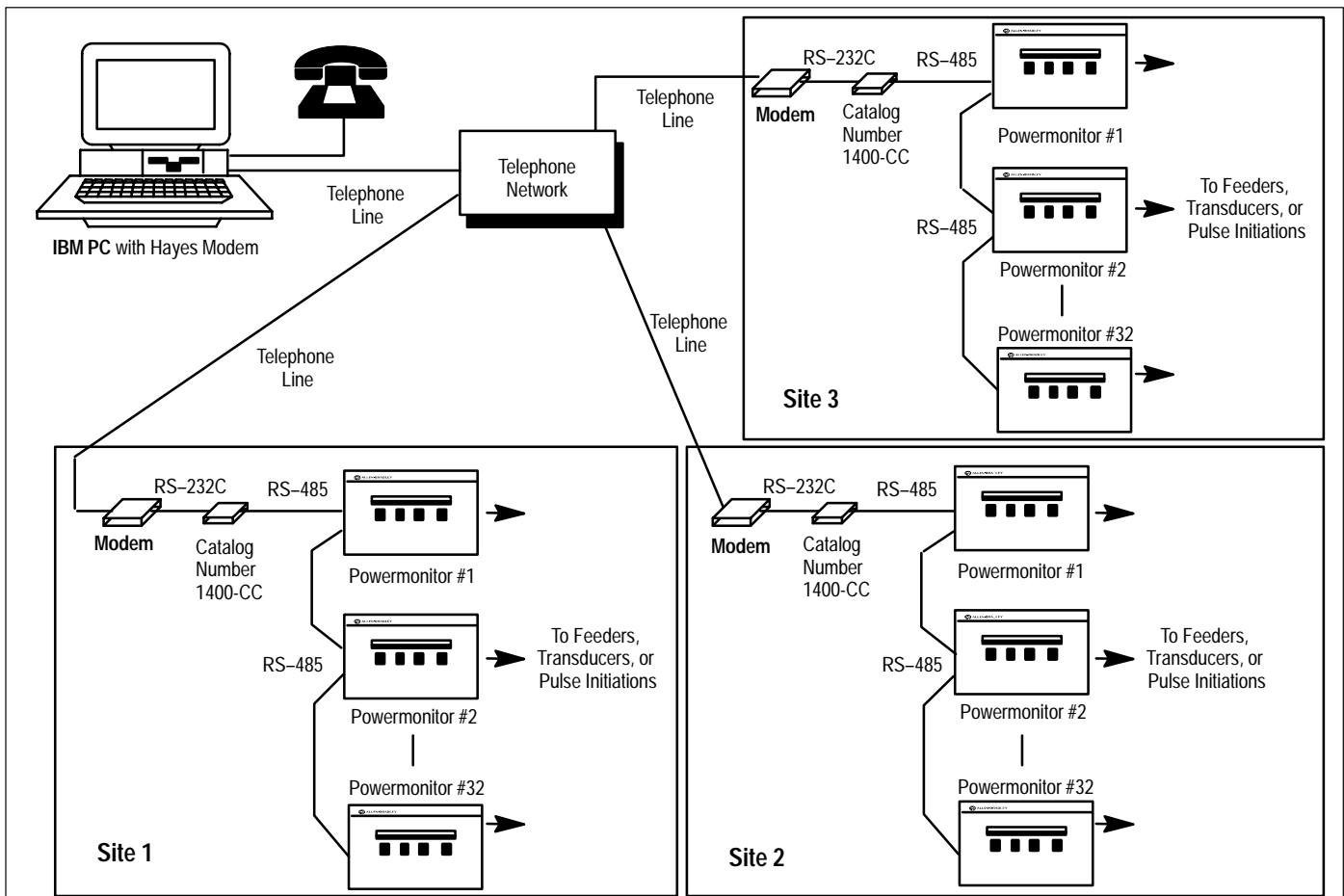
Connection To Multiple Powermonitor Sites Via The Telephone Network

Modem sites having more than one device are similar to sites with one device except that a Catalog Number 1400-CC RS-232C to RS-485 converter must be used and the Powermonitor communications card must be configured for RS-485 communications.

The connection diagram for this configuration is shown in Figure 3.4.

Telephone modems must be configured in the manner described on Page 3-7.

Figure 3.4
Modem Connection to Sites with One or More Powermonitors





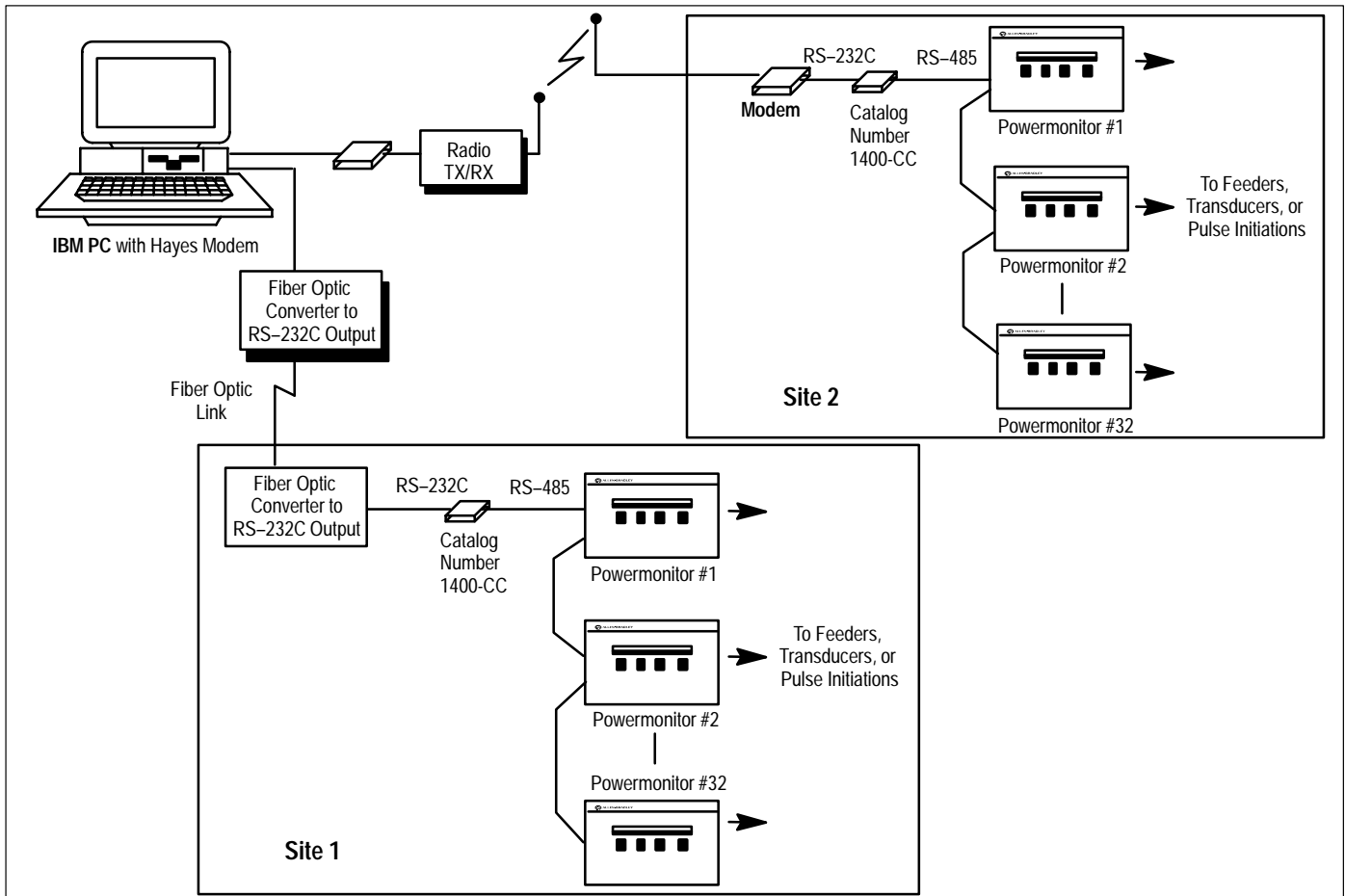
ATTENTION: Special high level isolation is required between units when the possibility of high ground potential differences exist. This may occur when separate grounds are used, or when communicating to a unit off of the power ground matt. Failure to do so can lead to personal injury or death, property damage, or economic loss.

Important: For each site, total RS-485 cable length (Maximum 4,000-ft.) between all devices in the RS-485 network when using 22 gauge shielded twisted pair.

Connection To Remote Sites Using Other Methods of Communications

Additional methods of connecting the computer running Powermonitor Software to Powermonitor sites include fiber optic, radio, and microwave links. See Figure 3.5.

Figure 3.5
Connection to Remote Sites using Other Methods of Communications



Allen-Bradley
Contact the Allen-Bradley Support Division for information regarding remote links using any of the above methods or any methods not shown.

Installation Of The System Software

Contents of the Powermonitor Software Package

Upon receipt of the Powermonitor Software software package, it is important to check its contents to ensure that you have received the necessary items. Your package should contain:

1. Publication 1400–801 “Powermonitor Software Installation and Operation Manual.”
2. The Powermonitor Software diskettes(Double Sided, Double Density in sizes 3–1/2 and 5–1/4 inches)

Should any of the above items be missing, contact Allen–Bradley immediately and report the missing items.

Creating A Backup Copy of the Powermonitor Software

Before using the Powermonitor Software, create a backup of the software by copying the entire contents of the Powermonitor Software diskette onto backup diskette. Store the original diskette in a safe place and use only the backup copy to run the Powermonitor Software.

Installing The Software Onto A Hard Drive

The Powermonitor Software is designed to run either from the floppy disk it comes on, or from a hard disk drive, onto which it can be copied.

If you wish to run the Powermonitor Software from the floppy disk, proceed to Chapter 4 for instructions on starting and running the Powermonitor Software.

If you wish to run the Powermonitor Software from the hard drive of your computer, first perform the following steps to install the Powermonitor Software onto the hard drive:

1. Create a directory called SP on your hard disk. You may select any drive to create the directory on (C:, D:, etc.). The following instruction set creates the directory on the C: drive:

```
C:          <Enter>
MD SP      <Enter>
```

2. Insert the Powermonitor Software program diskette into the A: drive of your computer and copy the entire contents of the disk into the SP directory on your hard disk. The following instruction assumes that the SP directory was created on your C: drive. If this is not the case, replace C: with the appropriate drive designation.

```
COPY A:*. * C:\SP <Enter>
```

3. Check that the SP directory on your hard disk contains the following files:

SP.EXE

SP.EXE is the Powermonitor Software program.

PASSWORD.CFG

Password.CFG is the Powermonitor Software password and setup file. This file must be present to allow any protected functions to be performed such as: changes to Powermonitor parameters, or relay control commands. This file also allows communications setups to be saved. Chapter 4 describes this in more detail.

The Powermonitor Software has now been installed on your hard disk. Refer to Chapter 4 for instructions on starting up and using the Powermonitor Software program.

Using The Software

Chapter Objectives

This chapter provides general instructions on starting the Powermonitor Software, establishing communications with a remote device, using the Powermonitor Software menu system, and using the on-screen help feature.

Startup

To Run The Software From The Hard Drive

If the user has performed the hard drive installation procedure given in Chapter 3, the Powermonitor Software may be run from the hard drive by entering the following commands:

```
CD \SP      <Enter>
SP          <Enter>
```

After a moment, the Powermonitor Software TITLE screen will appear on the monitor (see Figure 4.1 on Page 4-2), followed by the Powermonitor Software CONNECTION SCREEN.

To Run The Software From The Floppy Diskette



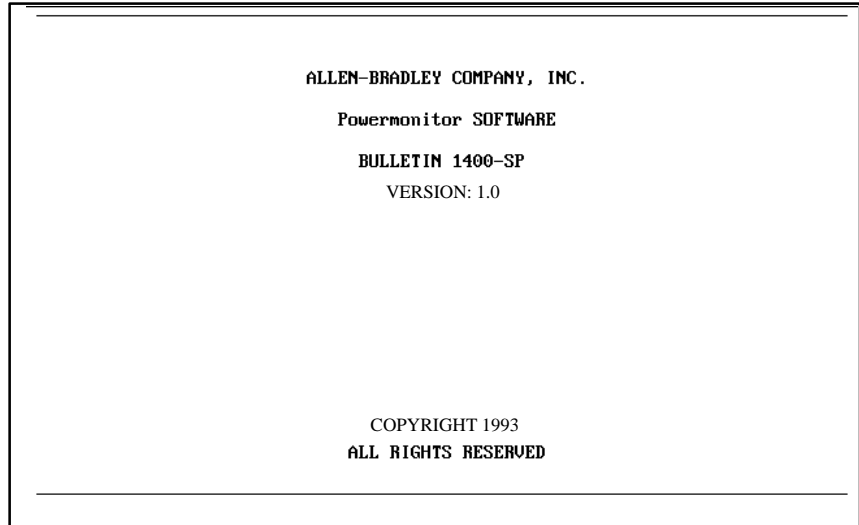
ATTENTION: The floppy diskette used to run the Powermonitor Software must not be write protected, since the Powermonitor Software saves the last CONNECTION screen data entered by the user, and the Powermonitor Software PASSWORD to the currently selected drive when the user exits to DOS.

If the user wishes to run the Powermonitor Software from the floppy diskette, enter the following commands:

```
A:          <Enter>
SP          <Enter>
```

After a moment, the TITLE screen will appear on the computer monitor (see Figure 4.1 on Page 4-2), followed by the CONNECTION SCREEN.

Figure 4.1
Powermonitor Software Title Screen



Possible Errors On Startup

If difficulty is experienced when starting the Powermonitor Software program, re-check each of the steps on Page 3-8 through 3-10 and Page 4-1 to ensure they have been performed correctly. Check the help screen for other suggestions. If difficulties persist, contact Allen-Bradley for assistance.

Establishing Connection With A Remote Device

Connection Screen

The CONNECTION SCREEN (See Figure 4.2 on Page 4-3), which appears following the TITLE screen on power-up, is used to establish communications between the computer and a Powermonitor.

Figure 4.2
Connection Screen

CONNECTION SCREEN	
SITE ID :	BUL1400PD
UNIT ID :	3810
COMM PORT :	1
BAUD RATE :	9600
DIAL (PHONE #) :	ALLEN-BRADLEY
LINE TYPE :	DIRECT CONNECTION
CONNECT OPTION :	DISCONNECT
PRESENT CONNECTION STATUS = DIRECT CONNECTION ESTABLISHED	
▲ ▼ - MOVE CURSOR ENTER - EXECUTE CONNECTION COMMAND	
F1 REAL F2 EVENT F3 SNAP F4 STAT F5 MINMAX F6 CONNECT ESC MENU	

At any time the CONNECT STATUS may be verified by pressing F6, which presents the CONNECTION SCREEN. This CONNECTION SCREEN may be displayed at any time by returning to the MAIN MENU (by pressing the Esc key), positioning the cursor onto the CONNECT option and pressing the <Enter> key. The user may, alternately, press F6 to directly display this screen.

Establishing Communications

The user is required to enter information into six data fields prior to establishing communications (ie. connecting) to a Powermonitor.

The flashing data field indicates the present cursor position. The arrow keys are used to move the cursor to the data entry fields on the CONNECTION screen. A help line at the bottom of the screen indicates the options available for each field.

The following fields on the CONNECTION screen require information to be entered by the operator prior to connecting with the device.

- a. **SITE ID.** This field is used to assign a name to the location of the Powermonitor which is to be accessed. The name used here will appear on each data screen accessed.
To change the SITE ID field, position the cursor onto the field, type any alphanumeric site name (up to 10 characters) and press the <Enter> key. This field now becomes a label used on other screens.
- b. **UNIT ID.** This field specifies which Powermonitor to address and establish communications with.

Each Powermonitor has its own unique 4 digit UNIT ID (Address) that can be viewed or changed from the device's front panel. Each Powermonitor should initially have an address. Enter the number into the UNIT ID field of the device whose data you wish to display. The UNIT ID must be set before communications can be established with that device.

To change the UNIT ID field, position the cursor, enter a four digit number and press the <ENTER> key. The devices' default number is assigned at the factory and inked on the back of the device.

- c. **COMM PORT.** This field identifies which of the computer's serial ports is connected to the remote device. Position the cursor onto the PORT field and press the plus or minus ("+" or "-") keys to select the serial port which will be used for communication to that site (COM1 or COM2).
- d. **BAUD RATE.** Position the cursor onto the BAUD field and press the plus or minus keys to select the baud rate of the serial port. The Powermonitor Software supports 300, 1200, 2400, 4800, 9600, and 19.2K baud rates.

Important: When setting the BAUD RATE parameter, the system operator must ensure that all modems and devices connected to the assigned serial port have also been configured to operate at the same baud rate.

- e. **DIAL (PHONE #).** This field is used only when the Powermonitor Software is communicating with a remote device via telephone modems. To change this parameter field, type the telephone number of the destination site and press <Enter>.

Examples of valid formats for telephone number are:

123-4567	Regular seven digit number.
1-414-382-2000	Number with long distance prefix and area code.
14143822000	Numbers can be entered without dashes (using no spaces).
9,382-2000	Commas can be used to insert a time delay (approx. 3 sec.) between the dialing of digits.

- f. **LINE TYPE.** This field determines the type of connection to be established between the Powermonitor Software and the remote device. Pressing the plus (+) or minus (-) keys will select the LINE TYPE. There are three valid line types:
 - **DIRECT CONNECT.** If the site is connected to the computer via a dedicated RS-232C or RS-485 communication link, then choose the DIRECT CONNECT option.

If the site is only accessible via the telephone network using a modem, then choose either the TOUCH (touch-tone) or PULSE line type option, depending on the type of phone line dialing system being used.

- **MODEM (TOUCH TONE).** Used when the computer is connected to a remote device via a TOUCH TONE telephone modem.
- **MODEM (PULSE).** Used when the computer is connected to a remote device via a PULSE telephone modem.

Important: If either MODEM option is selected, the Powermonitor Software will configure the connected modem using a set of default commands. These commands assume that a standard Hayes modem is being used.

If you are using a modem which requires a different command set to configure it, refer to Appendix B for instructions on creating a special MODEM.CFG file for the Powermonitor Software to use.

Connecting With The Remote Device

Once the six data fields described above have been configured, the CONNECT OPTION field is used to invoke the connection procedure. When invoked, the Powermonitor Software will attempt to establish communications with the remote device specified in the UNIT ID field.

To initiate the connection procedure, position the cursor over the CONNECT OPTION field and press the <Enter> key.

The present CONNECT STATUS field will indicate if a connection to the device was successful. The following status messages will be indicated in the present CONNECT STATUS field, depending on the present status of communications:

1. **Connecting Directly.** When using the DIRECT CONNECT line type, the Powermonitor Software will display the message:

ATTEMPTING CONNECTION . . .

When the Powermonitor Software establishes communication with the specified unit, the CONNECT STATUS field will display:

DIRECT CONNECTION ESTABLISHED

and the entry in the CONNECT OPTION field will change to:

DISCONNECT

to allow disconnection, if desired.

When connection cannot be made, the Powermonitor Software will display:

UNIT NOT RESPONDING

If this occurs, there is a problem that is preventing communications from being established. Determine and correct the problem and retry connection by pressing the <Enter> key again while on the flashing CONNECT OPTION field. Chapter 8 provides troubleshooting information in case of difficulty.

2. **Connecting via Telephone Modem.** When using either of the two modem line types, the Powermonitor Software will display the message:

DIALING

while dialing the telephone number entered in the DIAL (PHONE #) field.

When the Powermonitor Software establishes communication with the destination site, the Powermonitor Software will display:

MODEM CONNECTED ... Unit responding.

and the CONNECT OPTION will change to:

DISCONNECT

to allow disconnection, if desired.

If a connection cannot be made, then one of the following messages will be displayed:

MODEM CONNECTED ... Unit not
responding.
MODEM NOT RESPONDING
NO CARRIER PRESENT
LINE BUSY
COMMAND ABORTED
MODEM ERROR

Pressing the ESC key will abort the dialing process and the following message will be displayed:

CONNECTION ABORTED

Chapter 8 lists possible causes for the above difficulties.

The Menu System

The Powermonitor Software is an easy-to-learn and simple-to-use software package incorporating a very powerful menu-driven operator interface. The MAIN MENU is illustrated in Figure 4.3. This menu can be displayed at any time by pressing the <Esc> key.

Figure 4.3
Main Menu Screen

MAIN MENU		
REAL-TIME	DEVICE SETUP	CHANGE SP PASSWORD
EVENT LOG	SNAPSHOT LOG	MIN/MAX LOG
STATUS	SETPOINT/RELAY SETUP	RELAY CONTROL
CLEAR HOURS	CLEAR S1 COUNTER	CLEAR MIN/MAX
CONNECT	HELP	EXIT TO DOS
▲ ▼ ◀ ▶ - MOVE CURSOR F8 - UPDATE UNIT DATE/TIME ENTER - SELECT OPTION		
F1 REAL F2 EVENT F3 SNAP F4 STAT F5 MINMAX F6 CONNECT ESC MENU		

Important: The Powermonitor Software MAIN MENU will not be made available to the operator if the PASSWORD.CFG file is missing from the SP directory on disk. Instead, the operator may only use the function keys F1 to F6 to connect with Powermonitors and view device data. The <Esc> key, in this case, is used to escape to DOS.

Any screen or function option can be accessed by using the arrow (cursor) keys. To select the option, position the highlighted cursor over the desired name, then press the <Enter> key. Each time a menu item is selected, the information requested will be displayed or the selected function will be performed.

After selecting a menu option, the system operator can always return to the MAIN MENU by pressing the <Esc> key.



ATTENTION: Device time and date must be set when communication is first established and whenever the device loses power.

Help/Message Line

The Powermonitor Software system provides a HELP/MESSAGE line at the bottom of every screen, which serves two important purposes:

- a. While any menu or screen is being displayed, a HELP line is shown at the bottom indicating which keyboard keys are active on the present screen. (Note: A quick keyboard reference for the Powermonitor Software system is also given in Appendix D).
- b. A MESSAGE line is used to display system status messages to the operator. Examples of system status messages include password prompts, modem connection status messages and system error messages.

Screens And Functions

The Powermonitor Software automatically determines which type of remote device it is communicating with, and configures the MAIN MENU accordingly to provide the options specific to that device.

The MAIN MENU screen provides access to all of the Powermonitor Software's remote device data display and configuration screens and functions, as well as the on-line HELP and the Powermonitor Software PASSWORD screens.

Remote device data screens include:

- a. REAL-TIME. Displays the real-time data being measured or monitored by the remote device.
- b. EVENT LOG. Up load and display the remote device's Event Log.
- c. SNAPSHOT LOG. Up load and display the remote device's on-board Snapshot Log.
- d. STATUS LOG. Displays the present condition of the remote device's three on-board control relays and four status inputs.
- e. MIN/MAX LOG. Up load and display the remote device's on-board Min/Max Log.

Remote device configuration screens include:

- a. DEVICE SETUP. Allows the operator to remotely configure the operating parameters of the device.
- b. SETPOINT/RELAY SETUP. Allows the operator to configure the setpoint parameters of the remote device.
- c. CLEAR FUNCTIONS. A number of different functions are provided for the purpose of clearing or resetting Min/Max Log values, kWH, kVARH and kVAH totals, status input counters, etc.

Screens And Functions Continued

Other device functions include:

- a. OPERATE RELAY. Allows the operate to manually control the on-board relays of the remote device.
- b. CONNECT. Selects the CONNECTION screen to enable the operator to select another Powermonitor to communicate with.
- c. MAIN MENU, CLEAR HOURS: After entering this menu selection and successfully entering the SP software password, the prompt“CLEAR ALL HRS,kWH,kVARH, OR kVAH-(0/1/2/3)?” will be displayed. By entering the value of 0, this will clear the kWH, kVARH and kVAH counters simultaneously. NOTE: The kVAH option is displayed and cleared for those powermonitor units with firmware version 0.7. or later.

Shortcut Keys

The Powermonitor Software provides a shortcut method for directly selecting any of the five frequently used primary data screens, and the CONNECTION screen. The following function keys can be used to quickly select screens:

- F1** REAL-TIME screen
- F2** EVENT screen
- F3** SNAPSHOT LOG screen
- F4** STATUS screen
- F5** MIN/MAX LOG screen
- F6** CONNECTION screen

Screen Descriptions

Detailed descriptions of each remote device data and configuration screen can be found in Chapter 5, “Powermonitor Data Display and Configuration.”

Password

The Powermonitor Software provides a security system to protect Powermonitors from inadvertently:

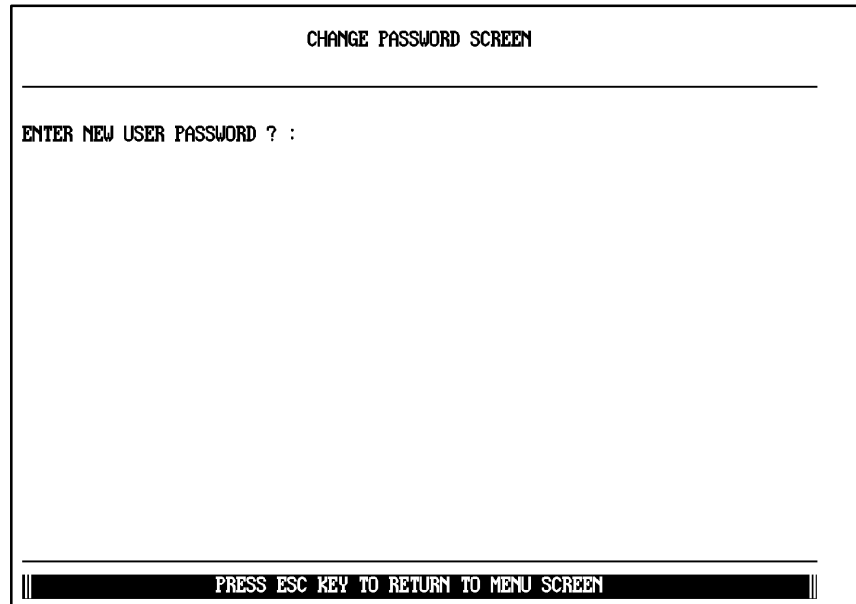
- a. having their relays manually operated/released.
- b. having their kWH, kVARH or kVAH totals cleared, or Min/Max Logs reset.
- c. having any of their user-programmable operating parameters reset from the computer.

The Powermonitor Software password is used for this purpose. Prior to any of the above listed operations, the Powermonitor Software will prompt the user for the required password. If the password entered by the operator is incorrect, the Powermonitor Software will abort the operation.

When the Powermonitor Software is run for the first time, the Powermonitor Software password is set to the single digit zero (“0”). It is recommended that the user change this default password as soon as possible, using the Powermonitor Software PASSWORD screen (see Figure 4.4 on Page 4-10).

Important: The Powermonitor Software password is not the unit password.

Figure 4.4
Powermonitor Software Software Password Screen



To change the Powermonitor Software password, return to the MAIN MENU by pressing the <Esc> key, position the cursor onto the CHANGE PASSWORD option and press the <Enter> key.

The Powermonitor Software prompts the user to enter the present password. When this password has been correctly entered, the user is asked to enter the new password and then asked to re-enter the new password again for confirmation. The password can be any alphanumeric string up to 20 characters in length. Blanks are not permitted.

If the attempt to change the Powermonitor Software password is successful, the following message will be displayed:

```
PASSWORD
HAS BEEN UPDATED
```

If the attempt to change the Powermonitor Software password is not successful, the following message will be displayed:

```
PASSWORD
HAS NOT CHANGED
```

On completion of the CHANGE PASSWORD function, the MAIN MENU will be displayed.

On-Line Help

The Powermonitor Software provides an on-screen HELP feature which can provide the operator with information about communication, modem usage, and technical support, without having to refer back to Publication 1400-800, "Bulletin 1400 Powermonitor Installation and Operation." Help is also available from the connection screen, when not connected by pressing H.

To access the HELP INFORMATION SCREEN, select the HELP option from the MAIN MENU.

Update Unit Time

The MAIN MENU provides a utility to update the time of a Powermonitor. This function sets the on-board clock of the remote device to the value of the computer's internal clock. A remote device's present time setting can be viewed by simply displaying the REAL-TIME or STATUS screen for that device. Time is displayed in the bottom right-hand corner for each of these screens. While the Main Menu is displayed, press the F8 key to change the unit time to the computers present system time. F8 - Update Unit Time. This function is now password protected and displays the current PC Time to allow the user to see what would be sent to each unit prior to sending the time.

Exit To DOS

To exit from the Powermonitor Software program and return to DOS, the operator must use the EXIT TO DOS option on the MAIN MENU screen:

1. Return to the MAIN MENU from any other screen by pressing the <Esc> key.
2. Position the cursor over the EXIT TO DOS option using the arrow keys, or by pressing the <Esc> key again.
3. Press the <Enter> key.

The operator will be immediately returned to DOS.

Connection Configuration Save Feature

Immediately prior to the operator being returned to DOS, the Powermonitor Software will save the last information entered in the CONNECTION screen (SITE ID, UNIT ID, COMM PORT, etc.) to a disk file.

When the Powermonitor Software is started again later, the previous connection configuration will be loaded into the CONNECTION screen automatically. This means the operator will not be required to re-enter data in the CONNECTION screen fields, if connection to the same remote device is desired. The operator need only position the cursor on the CONNECT OPTION field and press <Enter> to reconnect to that device.

Important: The Powermonitor Software saves the connection setup to the file in the SP disk directory named PASSWORD.CFG, which is the same file containing the Powermonitor Software password. If this file is missing from the SP directory, the Powermonitor Software will always display the default communications options in the CONNECTION screen when the program is first started.

Powermonitor Data Display And Configuration

Chapter Objectives

This chapter describes the steps necessary to display real-time and logged data from a Powermonitor, and how to configure the operating parameters of the device.

Displaying Single Device Data

Data Display Formats

Following connection to a Powermonitor (as described in Chapter 4) the system operator can display data from that device by selecting the desired data screen from the MAIN MENU. These include:

- a. REAL-TIME
- b. EVENT LOG
- c. SNAPSHOT
- d. STATUS (incl. Relay Status, Status Inputs, and Setpoint Status)
- e. MIN/MAX

Displaying Device Data

To display data from a particular device:

1. Connect with the Powermonitor as described in Chapter 4 (if not previously performed).
2. Return to the MAIN MENU by pressing <Esc>, select the desired data screen using the cursor keys, and press <Enter>.

Alternately, the operator can use the shortcut keys to view data screens directly, rather than using the MAIN MENU. Shortcut key functions are listed in the HELP line at the bottom of the screen.

The most recent data for the selected device screen should appear almost immediately.

Important: If the site is accessed via a modem that is not presently connected, a series of messages will appear at the bottom of the screen indicating modem connection status. It may take 30 seconds to establish connection with the site before updated data will appear on the Powermonitor.

Important: An audible alarm (beep) will be encountered if a communications failure occurs when attempting to display any device screen. In this case, the operator should verify communication with the device by entering the CONNECTION screen and checking that the CONNECT STATUS field is reading CONNECTED. If this is not the case, attempt to reconnect with the device as described in Chapter 4, “Using The Software.” If connection cannot be accomplished, refer to Chapter 8, “Troubleshooting.”

An example of a typical device data screen is provided in Figure 5.1.

Figure 5.1
Example of Powermonitor Data Screen

REAL-TIME SCREEN				
	TOTAL	PHASE A (AB)	PHASE B (BC)	PHASE C (CA)
VOLTS L-N	114	113	115	114
VOLTS L-L	197	197	198	197
AMPS	25	27	25	25
KW	7	2	2	2
KVA	8	3	2	2
KVAR	5	1	1	1
POWER FACTOR	LAG 88	LAG 67	100	100
KW DEMAND	8			
AMP DEMAND	28			
FREQUENCY	60.0			
VAUX	5			
AMPS I4	5			
	TOTAL	IMPORT	EXPORT	
KWH	7033	6057	976	
KVARH	2260	2260	0	
SITE ID: BUL1400-PD UNIT ID: 3834 DATE: 92/10/21 TIME: 20:08:25				
F1 REAL F2 EVENT F3 SNAP F4 STAT F5 MINMAX F6 CONNECT ESC MENU				

At the bottom of each data screen the UNIT ID indicates from which unit data is presently being monitored. The DATE and TIME shown at the bottom of some screens (ex. REAL-TIME and STATUS screens) indicates the time at which the data was last updated.

The data shown on each screen will be continually updated as long as the device is connected. The rate at which data is refreshed will depend upon the baud rate of the communications link.

Displaying Additional Data

In the case of screens which contain too much information to be shown at once, such as the SNAPSHOT LOG, the up/down arrow or PgUp/PgDn keys can be used to scroll or page up/down through the data, respectively. The left/right arrow keys can also be used to select any available adjacent screens (ex. SNAPSHOT Left, Center, Right).

If additional data is available, a message line at the bottom of the data screen will tell the operator which key functions to use to view the data.

To Exit From Any Data Display Screen

To exit from any screen, the operator can either press the <Esc> key to return to the MAIN MENU, or press one of the shortcut keys to display another data screen directly.

Configuring Powermonitors

The Powermonitor Software gives the system operator the ability to remotely view or reconfigure the DEVICE SETUP and SETPOINT/RELAY SETUP parameters of a Powermonitor from the Master Display Station.

Displaying The Setup Or Setpoint Parameters Of Any Devices

All device configuration functions are accessed from the MAIN MENU. To display data from a particular device:

1. Connect with the desired Powermonitor as described in Chapter 4.
2. Return to the MAIN MENU.
3. Place the cursor onto the DEVICE SETUP or SETPOINT/RELAY SETUP field for the desired device (depending on which set of parameters you wish to view and/or configure) and press the <Enter> key.

An example of a Powermonitor configuration screen is provided in Figure 5.2.

Figure 5.2
Example of Powermonitor Configuration Screen

DEVICE SETUP SCREEN			
UNIT ID	3834	UNIT PASSWORD	
BAUD RATE	9600	COMM MODE	RS232
VOLTS SCALE	120	VAUX SCALE	5
AMPS SCALE	50	AMPS I4 SCALE	5
VOLTAGE MODE	3 (DEMO)	I OUT KEY	25 (AMPS I4)
PHASE ROTATION	ABC	I OUT SCALE	5
NOMINAL FREQUENCY	60	I OUT RANGE	0 (0-20 mA)
LOG CHANGES FOR STATUS #1?	NO	SNAPSHOT PERIOD - DAYS	0
STATUS #2?	NO	HOURS	0
STATUS #3?	NO	MINUTES	1
STATUS #4?	NO	SECONDS	0
NUMBER OF DEMAND PERIODS	2	DEMAND PERIOD (MINUTES)	2
RELAY #1 MODE	SETPOINT	RELAY #1 VALUE	0
RELAY #2 MODE	SETPOINT	RELAY #2 VALUE	0
RELAY #3 MODE	SETPOINT	RELAY #3 VALUE	0
ENTER USER PASSWORD		ESC - ABORT AND EXIT	
PASSWORD :			

Important: Communication alarm conditions that were described for displaying device data screens also apply to displaying configuration screens.

Important: Device configuration screens are not available to the operator if the PASSWORD.CFG file is missing from the SP directory on disk.

Modifying Parameter Values

In the device configuration screens, the Powermonitor Software will prompt the operator to enter the Powermonitor Software password. This is necessary before any device parameters may be modified.

When working in the device configuration screens, the arrow keys are used to position the cursor onto the desired parameter field. The cursor position is indicated by a flashing parameter value.

Some parameter fields are changed by entering a numerical value. If an attempt is made to set a parameter to a value outside its allowable limits, the value is rejected. Should a value be rejected, the user must re-enter with a proper value. The operator may also cancel the entry of any value by pressing the <Esc> key.

Some parameter fields are changed by pressing the plus or minus keys which cause the field to increment/decrement through a pre-defined range of values, or number of parameter selections. This is indicated by +/- toggle UP/DN appearing in the lower right hand portion of the screen.

Reconfiguring The Device With The New Parameter Values

The Powermonitor will be reconfigured using the new values entered into the screen when the operator presses the <Esc> key to return to the MAIN MENU. The <Esc> key, in this case, is used as a SAVE & EXIT command.

After transmitting the changes and returning to the MAIN MENU, it is recommended that the operator redisplay the setup screen for that device to verify that the new parameter values have, in fact, been implemented.

Data Display and Configuration Screens

Data display screens for the Powermonitor include:

**REAL-TIME
EVENT LOG
SNAPSHOT
STATUS
MIN/MAX**

Configuration screens for the Powermonitor Software include:

**DEVICE SETUP
SETPOINT/RELAY SETUP**

Additional device functions include:

**CLEAR kWH
CLEAR kVAH
CLEAR kVARH
CLEAR S1 COUNTER
CLEAR MIN/MAX
CHANGE PASSWORD**

All device data display screens, configuration screens and functions can be accessed via the MAIN MENU.

Main Menu

For the Powermonitor, the operator must first select the CLEAR HOURS option to access the CLEAR kWH, CLEAR kVARH, or kVAH functions for the Powermonitor (Refer to Figure 5.3 on Page 5–5). The Powermonitor Software will then prompt the operator for the password and then to specify which total is to be cleared. After entering this menu selection and successfully entering the SP software password, the prompt “CLEAR ALL HRS, kWH, kVARH, OR kVAH– (0/1/2/3) ?” will be displayed. By entering the value of 0, this will clear the kWH, kVARH, and kVAH counters simultaneously. NOTE: The kVAH option is displayed and cleared for only those powermonitor units with firmware version 0.7 or later. The Main Menu screen also provides an additional CLEAR S1 COUNTER function.

The RELAY CONTROL option of the MAIN MENU is described in Chapter 6, “Manual Control of Powermonitor Internal Relays.”

Figure 5.3
Main Menu Screen

MAIN MENU		
REAL-TIME	DEVICE SETUP	CHANGE SP PASSWORD
EVENT LOG	SNAPSHOT LOG	MIN/MAX LOG
STATUS	SETPOINT/RELAY SETUP	RELAY CONTROL
CLEAR HOURS	CLEAR S1 COUNTER	CLEAR MIN/MAX
CONNECT	HELP	EXIT TO DOS
▲ ▼ ◀ ▶ - MOVE CURSOR F8 - UPDATE UNIT DATE/TIME ENTER - SELECT OPTION		
F1 REAL F2 EVENT F3 SNAP F4 STAT F5 MINMAX F6 CONNECT ESC MENU		

Real Time Data

The REAL-TIME screen for the Powermonitor displays the present real-time readings of all values monitored by the device (see Figure 5.4). A complete description of the parameters shown on the REAL-TIME screen is given in Publication 1400-800, “Bulletin 1400 Powermonitor Installation and Operation Manual.”

Figure 5.4
Real-Time Data Screen

REAL-TIME SCREEN				
	TOTAL	PHASE A (AB)	PHASE B (BC)	PHASE C (CA)
VOLTS L-N	124	124	125	124
VOLTS L-L	215	215	215	215
AMPS	52	52	53	53
KW	18	6	6	6
KVA	19	6	6	6
KVAR	7	2	2	2
POWER FACTOR	LAG 95	100	100	100
KW DEMAND	16			
AMP DEMAND	48			
FREQUENCY	60.0			
VAUX	5			
AMPS I4	5			
	TOTAL	IMPORT	EXPORT	
KWH	7061	6085	976	
KVARH	2273	2273	0	
SITE ID: BUL1400-PD UNIT ID: 3834 DATE: 92/10/21 TIME: 22:42:55				
F1 REAL F2 EVENT F3 SNAP F4 STAT F5 MINMAX F6 CONNECT ESC MENU				

The DATE and TIME at the bottom of the screen indicate the time at which the displayed data was last updated.

Event Log

The Powermonitor contains a record of events that is stored within its internal nonvolatile memory. An event is defined as any alarm condition, over/under limit condition, status input change, or relay operation. Also included as events are changes in the device setup parameters and device power-ups.

Figure 5.5
Event Log Screen

EVENT LOG					
EVENT	STATE	VALUE	RELAY 1/2/3	YY/MM/DD	HH:MM:SS
SETUP CHANGED	COMM PACKET		OFF/OFF/OFF	92/10/21	14:37:09
SETUP CHANGED	COMM PACKET		OFF/OFF/OFF	92/10/21	14:11:32
SETUP CHANGED	COMM PACKET		OFF/OFF/OFF	92/10/21	13:59:48
OVER VOLTAGE PH C	NORMAL R3	120	OFF/OFF/OFF	92/10/21	13:58:40
OVER VOLTAGE PH C	NORMAL R2	120	OFF/OFF/ON	92/10/21	13:58:40
OVER VOLTAGE PH C	NORMAL R1	120	OFF/ON/ON	92/10/21	13:58:40
SETUP CHANGED	COMM PACKET		ON/ON/ON	92/10/21	13:58:39
SETUP CHANGED	FRONT PANEL		ON/ON/ON	92/10/21	13:57:19
OVER VOLTAGE PH C	ACTIVE R3	1202	ON/ON/ON	92/10/21	13:56:30
OVER VOLTAGE PH C	ACTIVE R2	1202	ON/ON/OFF	92/10/21	13:56:30
OVER VOLTAGE PH C	ACTIVE R1	1202	ON/OFF/OFF	92/10/21	13:56:30
POWER UP/RESET			OFF/OFF/OFF	92/10/21	13:56:26
OVER VOLTAGE PH C	ACTIVE R3	1202	ON/ON/ON	92/10/21	13:45:25
OVER VOLTAGE PH C	ACTIVE R2	1202	ON/ON/OFF	92/10/21	13:45:25
OVER VOLTAGE PH C	ACTIVE R1	1202	ON/OFF/OFF	92/10/21	13:45:25
POWER UP/RESET			OFF/OFF/OFF	92/10/21	13:45:21
OVER VOLTAGE PH C	ACTIVE R3	1202	ON/ON/ON	92/10/21	13:21:03

▲ ▼ - MOVE CURSOR HOME END PGUP PGDN F7 - SAVE LOG TO DISK FILE
 F1 REAL F2 EVENT F3 SNAP F4 STAT F5 MINMAX F6 CONNECT ESC MENU

The EVENT LOG screen displays the record of device events that has been up loaded by the Powermonitor Software system (see Figure 5.5). Information is divided into six columns:

1. **EVENT.** This column describes the type of event that has occurred. Examples of typical events include the occurrence of a device power-up, a change in the device set-up parameters, setpoint alarms, a change in any of the device's four status inputs, and events that cause changes in any of the three control output relays.
2. **STATE.** This column gives the current state of any alarms resulting from the occurrence of an event. Examples of typical state messages include the state of the alarm (ACTIVE or NORMAL) along with a relay number if one is associated with the setpoint alarm. The manual operation and release of relays is also indicated here.
3. **VALUE.** This column is reserved for numerical information that is related to the event. Examples include parameter values that are associated with the triggering of any setpoint alarm event.
4. **RELAY.** This column shows the state of the three on-board device relays (R1, R2, and R3, respectively) immediately following the event (ON = operated, OFF = released). Please note that the state of the relays may not be associated with the occurrence of every event.
5. **DATE.** This column gives the date that the event occurred.
6. **TIME.** This column gives the date and time that the event occurred.

Viewing of the entire log is accomplished by moving the highlight bar with the arrow keys, the Page Up or Page Down keys, or the Home or End keys.

Save Disk

Pressing the F7 key while displaying the EVENT LOG will save the present contents of the log to a disk file in the present directory. The log file can then be printed out as described in Chapter 7.

Snapshot Log

The Powermonitor implements a snapshot log that allows the device to store the historic values of Volts, Amps, kW, kVAR, kW Demand, Amp Demand, Power Factor, Vaux, Frequency, kWh, kVARH, and kWh Reverse at user-defined intervals ranging from 1 second to 400 days.

The SNAPSHOT LOG screen displays a record of device snapshots that have been up loaded by the Powermonitor Software. Since there is a large amount of information to display, the snapshot information is divided and displayed on three screens: left, center, and right. Examples of the three SNAPSHOT LOG screens are shown in Figure 5.6 through Figure 5.8.

Figure 5.6
Snapshot Log (Left) Screen

SNAPSHOT LOG				
MM/DD HH:MM:SS	VOLTS AVG	AMPS AVG	KW	KUAR
10/21 14:50:26	112	46	15	4
10/21 14:49:26	110	47	15	4
10/21 14:48:26	110	48	15	3
10/21 14:47:26	112	49	16	2
10/21 14:46:26	114	50	17	1
10/21 14:45:26	116	51	17	2
10/21 14:44:26	118	52	18	3
10/21 14:43:26	119	53	19	4
10/21 14:42:26	121	54	19	5
10/21 14:41:26	123	54	19	6
10/21 14:40:26	125	53	19	6
10/21 14:39:26	124	52	18	7
10/21 14:38:26	122	51	18	7
10/21 14:37:26	120	50	17	7
10/21 14:36:26	120	33	10	6
10/21 14:35:26	122	35	11	6
10/21 14:34:26	123	36	12	6

▲ ▼ - MOVE CURSOR || HOME || END || PGUP || PGDN || F7 - SAVE || ► CENTER PAGE

|| F1 REAL || F2 EVENT || F3 SNAP || F4 STAT || F5 MINMAX || F6 CONNECT || ESC MENU ||

Figure 5.7
Snapshot Log (Center) Screen

SNAPSHOT LOG				
MM/DD HH:MM:SS	KW DEMAND	AMP DEMAND	POWER FACTOR	UAUX
10/21 14:50:26	16	48	100	5
10/21 14:49:26	17	50	100	5
10/21 14:48:26	17	50	100	5
10/21 14:47:26	18	52	100	5
10/21 14:46:26	18	52	100	5
10/21 14:45:26	19	54	100	5
10/21 14:44:26	19	54	100	5
10/21 14:43:26	19	53	100	5
10/21 14:42:26	19	53	100	5
10/21 14:41:26	16	48	-95	5
10/21 14:40:26	16	48	-95	5
10/21 14:39:26	13	39	-95	5
10/21 14:38:26	13	39	100	5
10/21 14:37:26	12	36	-94	5
10/21 14:36:26	12	36	-83	5
10/21 14:35:26	13	38	-92	5
10/21 14:34:26	13	38	-92	5

▲ ▼ - MOVE CURSOR || HOME || END || PGUP || PGDN || F7 - SAVE || ◀ ▶ SIDE PAGES ||

|| F1 REAL || F2 EVENT || F3 SNAP || F4 STAT || F5 MINMAX || F6 CONNECT || ESC MENU ||

Figure 5.8
Snapshot Log (Right) Screen

SNAPSHOT LOG				
MM/DD HH:MM:SS	FREQUENCY	KWH	KVARH	KWH REVERSE
10/21 14:50:26	60.0	5998	2234	976
10/21 14:49:26	60.0	5998	2234	976
10/21 14:48:26	60.0	5997	2234	976
10/21 14:47:26	60.0	5997	2234	976
10/21 14:46:26	60.0	5997	2234	976
10/21 14:45:26	60.0	5997	2234	976
10/21 14:44:26	60.0	5996	2233	976
10/21 14:43:26	60.0	5996	2233	976
10/21 14:42:26	60.0	5996	2233	976
10/21 14:41:26	60.0	5995	2233	976
10/21 14:40:26	60.0	5995	2233	976
10/21 14:39:26	60.0	5995	2233	976
10/21 14:38:26	60.0	5995	2233	976
10/21 14:37:26	60.0	5994	2233	976
10/21 14:36:26	60.0	5994	2233	976
10/21 14:35:26	60.0	5994	2233	976
10/21 14:34:26	60.0	5994	2232	976

▲ ▼ - MOVE CURSOR || HOME || END || PGUP || PGDN || F7 - SAVE || ◀ CENTER PAGE ||

|| F1 REAL || F2 EVENT || F3 SNAP || F4 STAT || F5 MINMAX || F6 CONNECT || ESC MENU ||

Save

Pressing the F7 key while displaying the SNAPSHOT LOG will save the present contents of the log to a disk file in the present directory. The log file can then be printed out as described in Chapter 7, "Printing Log Disk Files."

Important: Power Factor leading is represented as an unsigned value. Power Factor lagging is represented as a negative value. The kWh and kVARH values represent TOTAL values (sum of import and export). The kWh REVERSE value represents kW exported.

Status Data

The STATUS screen (Figure 5.9) displays and monitors the present state of the three Powermonitor control relays, four status inputs, and any of setpoints or alarms that are in an active condition. A description of the data shown on the STATUS screen is given below.

Figure 5.9
Status Screen

STATUS SCREEN			
	RELAY	STATUS INPUT	- COUNT
1	OFF	1	OFF - 88
2	OFF	2	OFF
3	OFF	3	OFF
		4	OFF
ACTIVE ALARMS			
SITE ID: BUL1400-PD UNIT ID: 3834 DATE: 92/10/21 TIME: 20:11:56			
F1 REAL F2 EVENT F3 SNAP F4 STAT F5 MINMAX F6 CONNECT ESC MENU			

Relay

This portion of the STATUS screen shows the present condition of the three relays.

1. **OFF.** A relay is considered to be **OFF** when its **normally-open** contacts are open (for Relay #1 this is R14/R11) and **normally-closed** contacts are closed (R11/R12). This state occurs when the relay is not assigned to any setpoint, or when the assigned setpoint is not in an active condition.
2. **ON.** A relay is considered to be **ON** when it has been activated by a setpoint. In this state, the **normally-open** contacts have been closed and the **normally-closed** contacts have been opened. This state occurs when a relay has been assigned to a setpoint and the setpoint parameter value is outside the bounds of its low or high limits.

3. **FORCED OFF.** A relay is considered to be **forced off** when it has been manually released by the operator from the keyboard. All device relays can be manually released from the RELAY CONTROL section of the STATUS screen.
4. **FORCED ON.** A relay is considered to be **forced on** when it has been manually operated by the operator from the Main Menu. All relays can be manually operated from the RELAY CONTROL section of the STATUS screen.

Status Input

This portion of the STATUS screen displays the condition of the Powermonitor's four status inputs.

1. **OFF.** This state indicates that the voltage present at the Status Input terminal is less than the INACTIVE voltage as specified in the Publication 1400–800 “Bulletin 1400 Powermonitor Installation and Operation Manual.”
2. **ON.** This state indicates that the voltage present at the Status Input terminal is greater than the ACTIVE voltage as specified in the Publication 1400–800 “Bulletin 1400 Powermonitor Installation and Operation Manual.”

Count

This parameter displays the number of pulses (contact transfers) that have been accumulated on the device's Status Input #1 since the last time the counter was cleared.

Active Alarms

This portion of the STATUS screen displays:

1. All of the user specified setpoints that are presently active. All 17 setpoints (if active) will be displayed in this area of the STATUS screen.
2. All other alarm conditions detected by the Powermonitor (self-diagnostics failures, etc.).

Date and Time

The DATE and TIME at the bottom of the screen indicate the time at which the displayed data was last updated. This is the time as read from the device.

MIN/MAX Log

The MIN/MAX LOG screen displays the contents of the Powermonitor internal Min/Max Log that has been up loaded. This log contains the recorded extreme values for the power parameters (see Figure 5.10). Pressing F7 function key will save the displayed MIN/MAX data to the disk, even though F7 SAVE does not appear on the screen.

Figure 5.10
Min/Max Log Screen

BUL1400-PD UNIT ID:3834		VALUE	MINIMUM M/D/H/M/S	VALUE	MAXIMUM M/D/H/M/S
VOLTS	PH A	0	00/01 15:13:44	1260	10/21 12:37:17
	PH B	0	00/01 15:13:44	1260	10/21 12:37:18
	PH C	0	00/01 15:13:44	1260	10/21 10:33:08
VOLTS	PH AB	0	00/01 15:13:44	2181	10/21 12:37:17
	PH BC	0	00/01 15:13:44	2178	10/21 12:37:17
	PH CA	0	00/01 15:13:44	2179	10/21 10:33:07
AMPS	PH A	0	00/01 15:13:44	5529	00/01 15:14:07
	PH B	0	00/01 15:13:44	5531	00/01 15:14:07
	PH C	0	00/01 15:13:44	5525	00/01 15:14:14
KW		-18790	00/01 15:14:07	1953	10/21 12:38:32
KVA		0	00/01 15:13:44	19923	00/01 15:14:07
KVAR		0	00/01 15:13:44	6653	00/01 15:16:37
POWER FACTOR		-75	10/21 18:48:44	94	00/01 15:14:07
KW DEMAND		-9126	00/01 15:16:02	1909	10/21 12:40:37
AMP DEMAND		14	10/21 16:04:47	2748	00/01 15:16:02
FREQUENCY		0.0	00/01 15:13:43	60.0	00/01 15:14:15
VAUX		0	00/01 15:13:44	1398	00/01 15:16:41
AMPS I4		0	00/01 15:13:44	5524	00/01 15:14:07

|| F1 REAL || F2 EVENT || F3 SNAP || F4 STAT || F5 MINMAX || F6 CONNECT || ESC MENU ||

Device Setup

The screen shown in Figure 5.11 is displayed when the operator selects DEVICE SETUP for a Powermonitor. To modify any parameter values, the Powermonitor Software password must be entered, followed by <Enter>. Pressing <Esc> will return to the MAIN MENU.

Figure 5.11
Device Setup Screen

DEVICE SETUP SCREEN			
UNIT ID	3834	UNIT PASSWORD	
BAUD RATE	9600	COMM MODE	RS232
VOLTS SCALE	120	V AUX SCALE	5
AMPS SCALE	50	AMPS I4 SCALE	5
VOLTAGE MODE	3 (DEMO)	I OUT KEY	25 (AMPS I4)
PHASE ROTATION	ABC	I OUT SCALE	5
NOMINAL FREQUENCY	60	I OUT RANGE	0 (0-20 mA)
LOG CHANGES FOR STATUS #1?	NO	SNAPSHOT PERIOD - DAYS	0
STATUS #2?	NO	HOURS	0
STATUS #3?	NO	MINUTES	1
STATUS #4?	NO	SECONDS	0
NUMBER OF DEMAND PERIODS	2	DEMAND PERIOD (MINUTES)	2
RELAY #1 MODE	SETPOINT	RELAY #1 VALUE	0
RELAY #2 MODE	SETPOINT	RELAY #2 VALUE	0
RELAY #3 MODE	SETPOINT	RELAY #3 VALUE	0
ENTER USER PASSWORD		ESC - ABORT AND EXIT	
PASSWORD :			

Setup Parameter Descriptions

A brief description of each parameter accessible from the DEVICE SETUP screen is given below. For more information, refer to Publication 1400-800 “Bulletin 1400 Powermonitor Installation and Operation Manual.”

- a. **UNIT I.D.** This is the device's 4-digit identification number, used for communications with the Powermonitor Software. Range of possible values is 1 to 9999.
- b. **BAUD RATE.** This is the baud rate for the RS232/485 communications with the device.
- c. **VOLTS SCALE, AMPS SCALE, Vaux SCALE, and I4 SCALE.** Refer to the Publication 1400-800, "Bulletin 1400 Powermonitor Installation and Operation Manual," for the device for explanation and range of values for these parameters.
- d. **VOLTAGE MODE (or VOLTS MODE).** Specifies the type of system being monitored and the wiring configuration of the meter. Refer to Publication 1400-800 "Bulletin 1400 Powermonitor Installation and Operation Manual" for wiring diagrams. 0 = 4W-WYE (STAR), 1 = 3W-DELTA, 2 = SINGLE PHASE (3 Wire), 3 = DEMO (generate test data), 4 = 3W-WYE (2- element). Use the plus or minus keys to toggle through choices.
- e. **PHASE ROTATION.** Specifies the normal phase sequence of the power system being monitored. Used for detection of power factor polarity in DELTA mode, and for the phase reversal detection setpoint. Use plus or minus keys to toggle between ABC and ACB phase sequence.
- f. **NOMINAL FREQUENCY.** Indicates the nominal frequency of the power system being monitored. Under normal applications, this field will be set to either 50 , 60, or 400 Hz. If the nominal frequency of the power system is different than the value indicated in this field, use the (+) or (-) keys to toggle the value to the correct frequency in Hertz.
- g. **LOG STATUS ACTIVITY.** Specifies whether the device will log the activity of all four Status Inputs into its internal EVENT LOG. For a Powermonitor, use the plus or minus keys to toggle between YES and NO for each input.
- h. **UNIT PASSWORD.** This parameter is the 4-digit password of the device which limits access to programming via its front panel. Range of possible values is 0 to 9999
- i. **COMM MODE.** Displays the jumper placement on the COMM card. It is RS-232 or RS-485.
- j. **IOUT KEY, IOUT SCALE, IOUT RANGE.** Specifies the parameter that the device's I_{out} (auxiliary current) output will be proportional to, and the scaling and range of that output. Refer to Publication 1400-800, "Bulletin 1400 Powermonitor Installation and Operation Manual," for possible settings. Use the plus or minus keys to toggle the IOUT KEY or IOUT RANGE parameters, and enter a number from 0 to 999,999 for the IOUT SCALE.

- k. **SNAPSHOT PERIOD.** Each Powermonitor provides a SNAPSHOT log, allowing the device to store Average Volts, Average Amps, kW, kVAR, kW Demand, Amp/kVA Demand, Power Factor, Auxiliary Voltage Input, Frequency, kWh, kVARH, and kWh Reverse readings at user defined intervals ranging from 1 sec. to 400 days. Position the cursor onto each of the four fields provided and enter the desired total interval value.
- l. **DEMAND PERIOD and NUMBER OF DEMAND PERIODS.** The Powermonitor uses a “sliding window method” to calculate kW Demand and Amps Demand. Both the DEMAND PERIOD (1 to 99 minutes) and NUMBER OF DEMAND PERIODS to be averaged (1 to 15) are user programmable. This allows for matching virtually any utility demand measurement method. Refer to Publication 1400–800, “Bulletin 1400 Powermonitor Installation and Operation Manual,” for additional information.

RELAY SETUP PARAMETERS. These parameters determine the operation of the on-board relays.

- m. **RELAY MODE.** This parameter is used only by the Powermonitor to set the function of each relay. Each of the three relays may be used for SETPOINT, kWh PULSE or kVAH PULSE functions.



ATTENTION: When enabling the kWh and/or kVARH pulse outputs, first check the device’s setpoint configuration to ensure there will be no conflicts between the setpoint and pulse output relay assignments.

- n. **RELAY # VALUE.** The purpose of this parameter depends on the relay mode set.

If the relay mode is SETPOINT, this parameter sets the duration of the pulse output by the relay when the setpoint assigned to that relay becomes active. Range of values is 1 to 65535 seconds. A value of 0 will set the relay to latched operation, which provides a transition rather than a pulse output.

If the relay mode is kWh or kVARH PULSE, this parameter sets the number of kWh or kVARH between pulses. This is the number of kW Hours or kVAR hours that must accumulate before a pulse is generated on the indicated device relay. Range of values is 1 to 65535. A value of zero will disable the pulses.

Save & Exit

The Powermonitor will be reconfigured using the new values entered into the screen when the operator presses the <Esc> key to return to the MAIN MENU. The <Esc> key, in this case, is used as a SAVE & EXIT command.

Setpoint/Relay Setup

The SETPOINT/RELAY SETUP screen (shown in Figure 5.12) is displayed when the operator selects SETPOINT/RELAY SETUP for the Powermonitor. It allows the operator to display or change the programmable setpoint/relay parameters of any Powermonitor.

Figure 5.12
Setpoint Screen

SETPOINT/RELAY SETUP					
SETPOINT TYPE	HIGH LIMIT	LOW LIMIT	TIME DLY. OPERATE	TIME DLY. RELEASE	RELAY #
1. OVER VOLTAGE	1050	1000	0	0	1
2. OVER VOLTAGE	1050	1000	0	0	2
3. OVER VOLTAGE	1050	1000	0	0	3
4. NOT USED	0	0	0	0	0
5. NOT USED	0	0	0	0	0
6. NOT USED	0	0	0	0	0
7. NOT USED	0	0	0	0	0
8. NOT USED	0	0	0	0	0
9. NOT USED	0	0	0	0	0
10. NOT USED	0	0	0	0	0
11. NOT USED	0	0	0	0	0
12. NOT USED	0	0	0	0	0
13. NOT USED	0	0	0	0	0
14. NOT USED	0	0	0	0	0
15. NOT USED	0	0	0	0	0
16. NOT USED	0	0	0	0	0
17. NOT USED	0	0	0	0	0

ENTER USER PASSWORD ESC - ABORT AND EXIT
PASSWORD :

Setpoint Parameter Descriptions

Brief notes on modifying each parameter are provided below. Refer to Publication 1400–800, “Bulletin 1400 Powermonitor Installation and Operation Manual,” for detailed descriptions of all setpoint parameters.

- SETPOINT TYPE.** Press the plus or minus keys to advance through the available setpoint types.
- HIGH AND LOW LIMITS.** Numbers entered into these fields must lie within the range from 0 to 999999. Values outside this range will be rejected.

Important: High/Low limits for Under/Over Frequency must be entered as the value x 10. For example, 60.5 Hz would be entered as 605.

- TIME DELAY OPERATE AND TIME DELAY RELEASE.** Valid time delay values for both parameters range from 0 to 32000.
- RELAY NUM.** Press the plus or minus keys to toggle between the valid relay numbers. A relay number of 0 indicates that no relay is to be assigned to the setpoint.

Refer to Publication 1400–800, “Bulletin 1400 Powermonitor Installation and Operation Manual,” for additional information pertaining to the operation of the setpoint functions.

Save And Exit

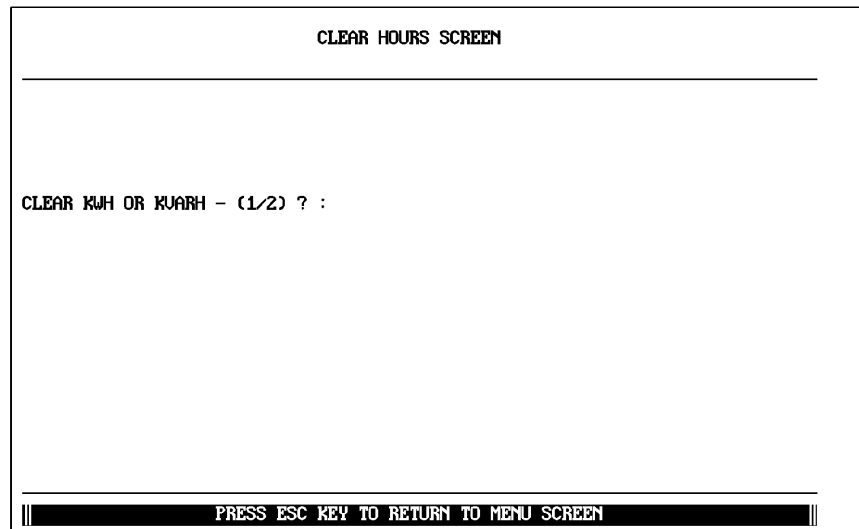
The Powermonitor will be reconfigured using the new values entered into the screen when the operator presses the <Esc> key to return to the MAIN MENU.

Clear Functions

There are three CLEAR functions supported by the Powermonitor Software for the Powermonitor. These include CLEAR HOURS, CLEAR S1 COUNTER, and CLEAR MIN/MAX.

The CLEAR HOURS option encompasses, CLEAR kWH, CLEAR kVAH and CLEAR kVARH for the Powermonitor (see Figure 5.13).

Figure 5.13
Clear Hours Screen



The CLEAR kWH, CLEAR kVAH and CLEAR kVARH options are used to clear the kWH, kVAH, and kVARH totals of each meter. The CLEAR MIN/MAX function clears the device's Min/Max Log. The CLEAR S1 COUNTER function resets the S1 counter total of the Powermonitor to zero.

To invoke any CLEAR function, return to the MAIN MENU by pressing the <Esc> key, place the cursor onto the desired CLEAR option and press the <Enter> key. The appropriate CLEAR screen will be displayed.

Upon entering a screen, the user is requested to enter the Powermonitor Software password. Failure to enter the correct password will cause Powermonitor Software to exit the CLEAR screen and return to the MAIN MENU screen. If the password is correct, the operator is asked to confirm the selection of the parameter to be cleared. The Powermonitor Software displays a prompt similar to the following:

CONFIRMING CLEARING
OF kWH – (Y/N)?

If the user responds with a “Y”, then the Powermonitor Software will display an appropriate message. If the user responds with an “N”, then Powermonitor Software will display the message:

CLEARING OPERATION ABORTED

Upon completion of the CLEAR function, the Powermonitor Software will return to the MAIN MENU screen.

The option CLEAR HOURS provides three sub-options to choose from, following the entry of the correct password. The operator must then enter the number “1” to clear kWH or “2” to clear the kVARH, or “3” to clear kVAH. As above, the Powermonitor Software asks for confirmation to complete the operation.

After entering this menu selection and successfully entering the SP software password, the prompt “CLEAR ALL HRS, kWH, kVARH, OR kVAH – (0/1/2/3) ?” will be displayed. By entering the value of 0, this will clear the kWH, kVARH, and kVAH counters simultaneously.

NOTE: The kVAH option is displayed and cleared for only those powermonitor units with firmware version 0.7 or later.

Manual Control Of Powermonitor Internal Relays

Chapter Objectives

This chapter describes how relay modes affect manual control operations, and the steps required to perform manual control using the Powermonitor Software.

The Powermonitor Software gives any system operator with the appropriate software password the ability to manually control the on-board relays of any Powermonitor directly from the computer running the Powermonitor Software.

Operations include operate (or pulse), release, and return control to unit. Refer to Publication 1400-800, “Bulletin 1400 Powermonitor Installation and Operation Manual,” for detailed descriptions of relay operation.

The Effect Of Relay Mode On Manual Control

The type of manual control possible for any Powermonitor relay will be dependent on the RELAY MODE that has been defined for that relay.

Performing a manual OPERATE relay command may produce one of two different conditions depending on the relay mode. A contact closure will be produced if the relay is set for latch type operation (ie. OPERATED or RELEASED) . A pulse output will be produced if the relay has been set for pulse operation.

For the Powermonitor, the following rules apply. Relays assigned to kVA, kWh, kVAH or kVARH PULSE mode will ignore all manual control commands. Relays assigned to SETPOINT functions in latch mode will respond to manual OPERATE, and RELEASE commands.

Important: During the duration of a relay pulse output, all other commands to that relay will be ignored. This includes commands generated manually by the Powermonitor Software operator or generated internally by the Powermonitor as a result of an active setpoint condition.

Logging Of Relay Control Commands

The Event Logs of Powermonitors will log only commands which they respond to. Powermonitors will not log relay commands which are ignored due to the conditions outlined above.

Manual Relay Operations

To manually operate a Powermonitor relay, select the OPERATE RELAY function by selecting the RELAY CONTROL option from the MAIN MENU. This will display the RELAY CONTROL SCREEN as shown in Figure 6.1.

Figure 6.1
Relay Control Screen

OPERATE RELAY SCREEN	
ENTER RELAY NUMBER (1, 2 OR 3) ? :	1
STATUS (1 = NORMAL 2 = OPERATED 3 = RELEASED) ? :	2
CONFIRMING OPERATION OF RELAY 1 - (Y/N) ? :	y
RELAY 1 STATUS - FORCED ON	
ASSIGN ANOTHER OPERATION TO A RELAY - (Y/N) ? :	
PRESS ESC KEY TO RETURN TO MENU SCREEN	

Upon entry to this screen, the user is required to enter the Powermonitor Software password. Failure to enter the correct password will cause Powermonitor Software to exit the RELAY CONTROL SCREEN and return to the MENU screen.

After pressing <Enter>, the user is asked what operation to perform on the selected relay. Valid operations are:

- a. **1 – NORMAL.** This operation will cause the control of the indicated relay to return to the device setpoints if the relay is in latch mode.
This command has no effect if the relay is in any pulse mode.
- b. **2 – FORCED ON.** This operation will cause the indicated relay number to operate. if the relay is in latch mode, or pulse if the relay is in pulse mode.

An operate operation causes normally open contacts (RX4 / RX1) to close, and normally closed contacts (RX1 / RX2) to open.

A pulse operation will cause normally open contacts (RX4 / RX1) to close, and normally closed contacts (RX1 / RX2) to open for a duration specified by the VALUE parameter for the device, after which the relay will return to its previous state.

This command will override the setpoint control functions.

- c. **3 – FORCED OFF.** This operation will cause the indicated relay number to release if the relay is in latch mode. This causes normally open contacts (RX4 / RX1) to open, and normally closed contacts (RX1 / RX2) to close.

This command has no effect if the relay is in pulse mode.

This command also overrides the setpoint control functions.

After the type of relay operation has been selected, the operator is prompted with:

CONFIRMING OPERATION OF RELAY (Y/N)?

This provides an added level of security by forcing the operator to confirm the intention to execute the command.

If “Y” is selected, the Powermonitor responds to the Powermonitor Software with the outcome of the operation. A relay successfully operated or released manually by the operator will be shown as having been FORCED ON or FORCED OFF. If control is returned to the Powermonitor, the relay status will be shown as either ON or OFF.

If “N” is selected, Powermonitor Software will display the message:

RELAY OPERATION ABORTED



ATTENTION: 1) Manual operation or release of a relay overrides the normal setpoint operation of that relay.
2) In the event of a power interruption to the device, all relays revert to the normal state, with all setpoint functions re-enabled.

Chapter 6

Manual Control of Powermonitor Relays

Printing Log Disk Files

Chapter Objectives

This chapter discusses the printing of log disk files. Instructions will indicate how to save, locate, and name your log files.

Description

An important feature of the EVENT, MIN/MAX or SNAPSHOT LOG screens is the ability to store the contents of the logs into disk files. These files can later be displayed on the computer screen or printed to a connected dot-matrix printer using the standard DOS commands TYPE or PRINT, respectively.

Saving A Log To Disk

Saving the contents of the EVENT, MIN/MAX or SNAPSHOT LOG to a disk file is performed by depressing the F7 function key (SAVE DISK) while viewing any of the three screens.

Location And Filenames Of Log Files

Log files will be stored on the current directory from which the Powermonitor Software was invoked and will be labelled in the following way:

- a. An EVENT LOG file will be labelled as EVNTxxxx.LOG, where xxxx is the UNIT ID of the remote device currently being viewed.
- b. A SNAPSHOT LOG file will be labelled as SNAPxxxx.LOG, where xxxx is the UNIT ID of the remote device currently being viewed.
- c. A MIN/MAX log file is labelled as MNMXxxxx.LOG where xxxx is the UNIT I.D. of the Powermonitor currently being used.

Contents Of Log Files

Headers displayed in the log screens in the Powermonitor Software are saved to disk with the data log. This means log files printed via DOS include the column labels describing the data listed in each column.

Data entries in log disk files are organized with the oldest data at the beginning of the file, and the most recent data at the end of the file. Note that this is opposite to the order in which log data is displayed on the screen in the Powermonitor Software.

If an EVENT, MIN/MAX or SNAPSHOT LOG for a selected device has previously been saved to a disk file, the Powermonitor Software will append the new log data for that device to the end of the file. However, the Powermonitor Software will first determine if there are any duplications of events or snapshots between the current log and the previously stored log. The Powermonitor Software will not store duplicates of the same event or snapshot.

The Powermonitor Software will continue to append data to the end of existing log files on disk each time the operator uses the SAVE DISK function. For this reason, the operator may be required to occasionally remove large log files from the hard disk to free up disk space.

Printing Log Disk Files

Logs saved to disk can be displayed on the screen or printed to a printer through DOS using standard TYPE or PRINT commands. For example, to print an EVENT LOG file for a remote device with a UNIT ID of 3099, go to the directory from which the Powermonitor Software was originally invoked, then use the command:

```
PRINT EVNT3099.LOG
```

Printer Considerations

SNAPSHOT parameter data normally displayed by the Powermonitor Software using three separate screens (ie. SNAPSHOT LOG Left, Center, and Right) is saved to disk in one 14 parameter wide print format.

To allow SNAPSHOT LOG disk files to be printed in their intended full 14 parameter width, a 132 column printer set to COMPRESSED mode must be used. If any other printer configuration is used, the printer will be forced to wrap-around line segments, causing headers to be misaligned with data columns, as rows of data become interleaved.

EVENT LOG and MIN/MAX disk files may be printed using a standard 80-column printer.

Troubleshooting

The Powermonitor Software will alert the system operator to conditions that will cause incorrect operation of the software. This is accomplished by displaying messages at the bottom of the computer screen and, in some cases, annunciating an audible alarm.

Provided below are detailed descriptions of possible the Powermonitor Software error conditions, their potential sources, and recommended steps to rectify each problem.

ERROR MESSAGE	POSSIBLE CAUSE	SOLUTION
Password Not Correct	Operator incorrectly entered password. Operator forgot password. Disk file in which the Powermonitor Software saves the password may have been corrupted.	Re-enter the password. Re-install the software to reset the password to the default value of 0 OR Contact the Allen-Bradley Technical Support Division.
Serial Port Setup Error	One or both of the computer's communication ports is configured incorrectly.	Refer to the operation manual for the computer.
REMOTE COMMUNICATION ERRORS	Perform a systematic check of each possible cause.	If you are using the Powermonitor Software for the first time, there is a high probability the difficulty is caused by one of the first three possible causes. If you are a seasoned user, the difficulty is likely to be the first, fourth, or fifth possible cause.
Remote Device Errors UNIT NOT RESPONDING MODEM CONNECTED...UNIT NOT RESPONDING	1. Fault with the communications link between the computer and the Powermonitor (including communications wiring, modem configuration or correct operation, etc.) See Page 8-2 for continued possible cause listings.	RS-232. Perform the following checks: Check that the cable to the computer is inserted in the correct communication port. Check that the cable is not faulty. Make sure the RS-232C transmit and receive wires are connected to correct locations on the Powermonitor(s). Verify that the correct communications mode (RS-232C) is selected at the Powermonitor(s). RS-485. Perform the following checks: Make sure a 25 pin conductor cable is installed between computer and RS-232C to RS-485 converter. Check that the supply power is applied to RS-232C to RS-485 converter device. Make sure DATA+ line on the converter is connected to DATA+ line on each Powermonitor and DATA - line on converter is connected to DATA- line on each Powermonitor(s). Verify that the correct communications mode (RS-485) is selected at the Powermonitor(s).
Transmit Modem Errors (ie. modem at computer end) MODEM NOT RESPONDING NO DIAL TONE UNDEFINED MODEM CODE #### (modem error code)		
Receive Modem Errors (ie modem at remote site) MODEM CARRIER LOST = #### NO CARRIER PRESENT ERROR LINE BUSY NO ANSWER		

ERROR MESSAGE	POSSIBLE CAUSE	SOLUTION
<p>(CONTINUED)</p> <p>Remote Device Errors UNIT NOT RESPONDING MODEM CONNECTED...UNIT NOT RESPONDING</p> <p>Transmit Modem Errors (ie. modem at computer end) MODEM NOT RESPONDING NO DIAL TONE UNDEFINED MODEM CODE #### (modem error code)</p> <p>Receive Modem Errors (ie modem at remote site) MODEM CARRIER LOST = #### NO CARRIER PRESENT ERROR LINE BUSY NO ANSWER</p>	<p>2. Fault with the communications link between the computer and the Powermonitor (including communications wiring, modem configuration or correct operation, etc.)</p> <p>3. Incorrect baud rate at the Powermonitor</p> <p>4. Incorrect baud rate at the computer</p> <p>5. Baud rate for Powermonitor is greater than modem range. When using a modem interface between the computer and Powermonitor sites, the operator must ensure that the Powermonitor Software is not used to set the BAUD RATE parameter of any Powermonitor to a value outside the working range of the modem being used. Doing so will cause unit to cease communicating.</p> <p>6. Fault with the computer hardware</p> <p>7. Fault with the Powermonitor hardware</p>	<p>Modem Connection, Configuration, or Operation. Perform the following checks:</p> <p>Make sure a 25 pin conductor cable is installed between the computer and the modem.</p> <p>Make sure a 25 pin conductor cable is installed between the modem and the RS-232C to RS-485 converter device at the remote site(s)</p> <p>Check that the supply power is applied to the modem at the computer, the modem at remote site, and RS-232C to RS-485 converter at remote site(s)</p> <p>Make sure DATA+ and DATA- lines on the converter are connected to DATA+ and DATA- lines on each Powermonitor.</p> <p>Verify that the correct Communications Mode (RS-485) is selected at Powermonitor(s).</p> <p>Check configuration of modem</p> <p>Verify that the modem at remote site has not been interrupted for any reason (ex. disconnected, power failure, etc.)</p> <p>Check baud rate of Powermonitor from its front panel. Confirm baud rate of device is the same as that set in the Powermonitor Software CONNECTION screen.</p> <p>Check baud rate in the Powermonitor Software CONNECTION screen is the same as baud rate of the Powermonitor.</p> <p>Re-establish communications with the Powermonitor:</p> <p>Reset the BAUD RATE parameter of the Powermonitor from its front panel to a value within the working range of the modem.</p> <p>Set the Powermonitor Software to communicate at the same baud rate by setting the BAUD RATE parameter in the CONNECTION menu.</p> <p>Test the functionality of the computer's serial ports. This is usually sufficient to confirm computer operation, but may be difficult to determine.</p> <p>Connect Powermonitor directly to a portable computer which is known to work with other devices. Check that the baud rate and the UNIT ID set at the computer is the same as the meter.</p>
<p>INVALID VALUE – RE-ENTER</p>	<p>Operator attempted to enter a number in a device configuration screen which is outside the allowable range of values for the selected parameter.</p>	<p>Re-enter a valid number at the prompt, or press <Esc> to leave the parameter at its present value.</p>

Warranty

Hardware

Unless otherwise provided in writing and approved by A–B Headquarters, A–B warrants for a period of one (1) year from the date of A–B invoice that all hardware furnished under the order will be of merchantable quality free from defects in material, workmanship and design each as determined, at the date of shipment by A–B, by generally recognized, applicable and accepted practices and procedures in the industry – to include any specifications as specifically agreed to in writing by A–B prior to the date of shipment. A–B will not be liable for any design furnished by Customer and incorporated into hardware. Hardware includes products purchased by A–B for sale with the hardware manufactured by A–B when the decision to include such products is solely that of A–B. Otherwise, any warranty applicable to such products shall be limited solely to the warranty extended to A–B by the original manufacturer. Repaired or replaced hardware is warranted for a period of six (6) months from the date of invoice, or the remainder of the original warranty term, whichever is longer.

Software and Firmware

Unless otherwise provided in an A–B or third party license agreement, A–B warrants for a period of one (1) year from the date of invoice that the software or firmware furnished under this order will perform in accordance with published or other written specifications prepared, approved, and issued by A–B Headquarters, when used with specifically identified hardware. In any event, A–B makes no representation or warranty, express or implied, that the operation of the software or firmware will be uninterrupted or error free, or that the functions contained in the software or firmware will meet or satisfy the Customer’s intended use or requirements. Any software or firmware support is limited to the terms and conditions of the A–B license agreement or A–B extended support agreement. Software and firmware corrections are warranted for a period of three (3) months from the date shipped by A–B, or the remainder of the original warranty term, whichever is longer.

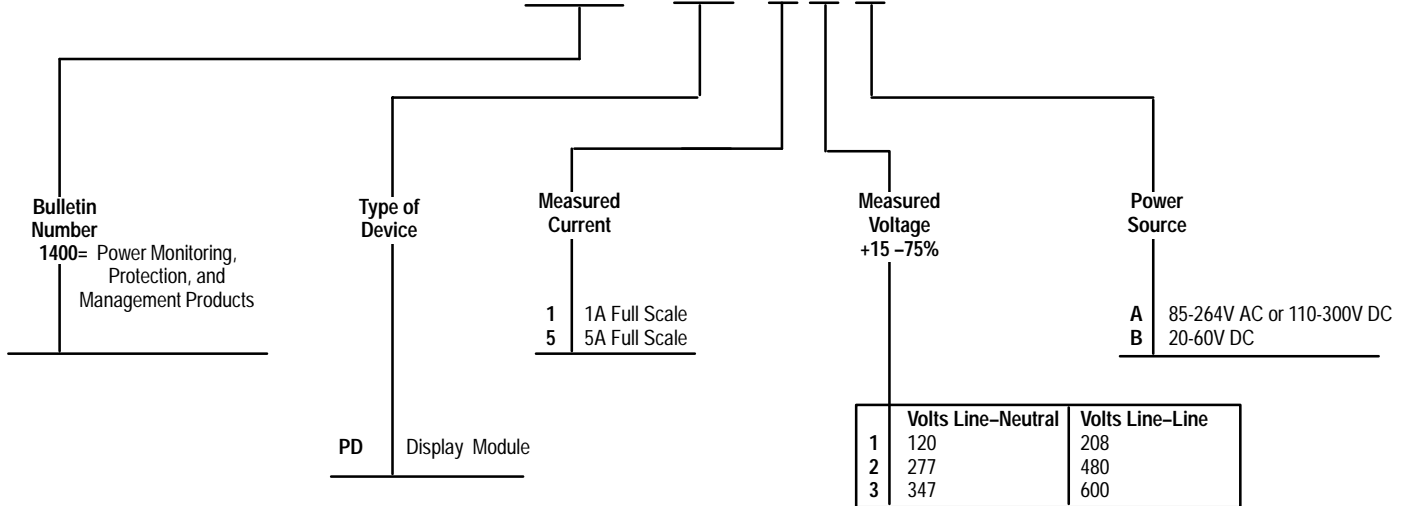
Satisfaction of this warranty, consistent with other provisions herein, will be limited to the replacement, or repair or modification of, or issuance of a credit for the Goods involved, at A–B’s option, only after the return of such Goods with A–B’s consent in accordance with RETURN OF EQUIPMENT. Any warranty service (consisting of time, travel and expenses related to such services) performed other than at A–B’s factory, shall be at Customer’s expense.

Such warranty satisfaction is available only if (a) A–B is promptly notified in writing upon discovery of an alleged defect and (b) A–B’s examination of the subject Goods discloses, to its satisfaction, that any alleged defect has not been caused by misuse; neglect; improper installation; improper operation; improper maintenance, repair, alteration or modification; accident; or unusual deterioration or degradation of the Goods or parts thereof due to physical environment or due to electrical or electromagnetic noise environment. THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES WHETHER EXPRESSED, IMPLIED OR STATUTORY INCLUDING IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS and thereby excluded certifications or the like for product performance, use or design with respect to any standard, regulation or the like (unless and to the extent independently approved in writing at A–B Headquarters) AND EXTENDS ONLY TO CUSTOMER PURCHASING FROM A–B OR AUTHORIZED A–B RESELLER.

Catalog Number Explanation

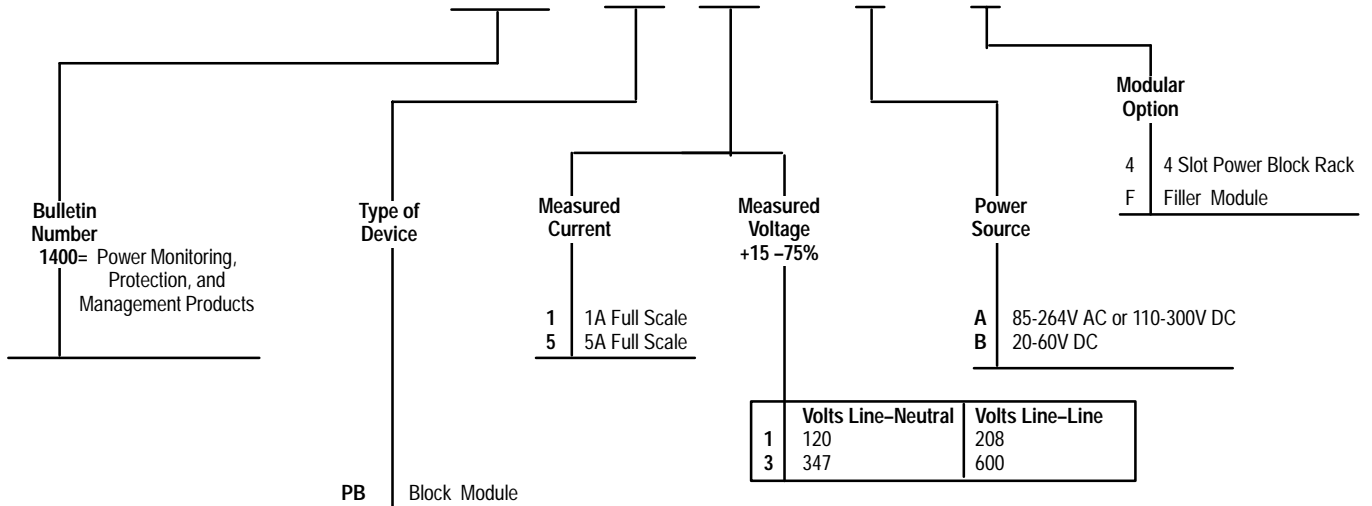
POWERMONITOR DISPLAY MODULE

1400 - PD 1 1 A



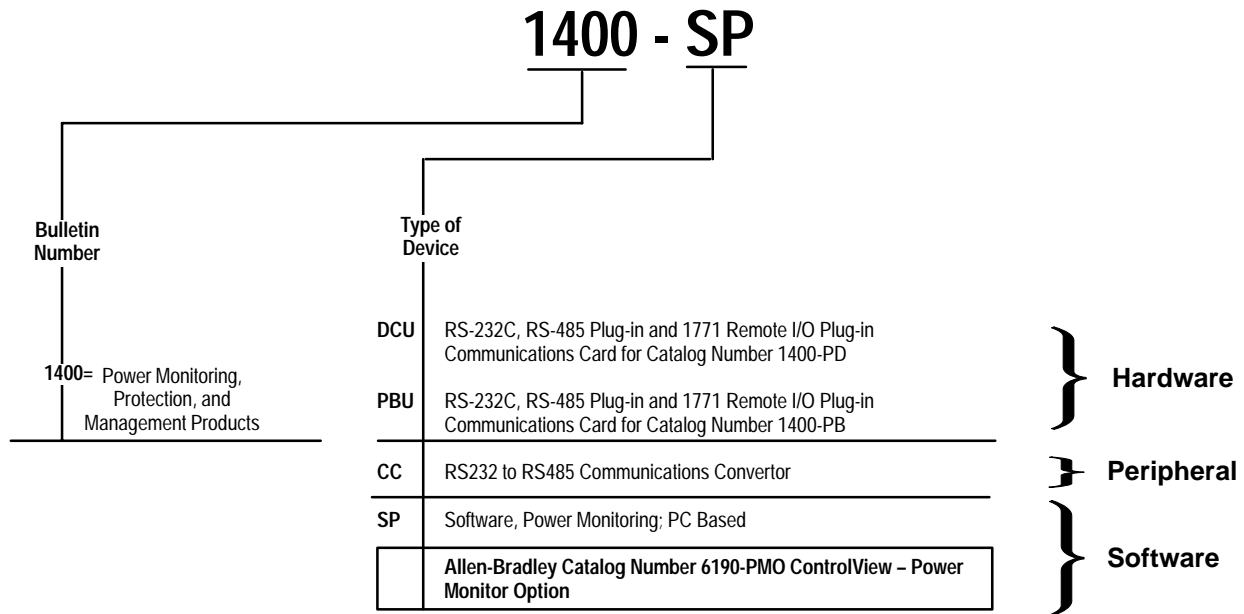
POWERMONITOR BLOCK MODULE

1400 - PB 1 1 or A or 4



Appendix A
Catalog Number Explanation

COMMUNICATIONS CARDS / PERIPHERALS / SOFTWARE



Communications Application Note

Introduction

This document gives a brief overview and comparison of the RS-232C and RS-485 communication standards, along with a list of factors to consider when deciding which of the standards is best suited to your metering application.

Also included is an application note covering using modems with the Powermonitor Software.



ATTENTION: Special high level isolation is required between units when the possibility of high ground potential differences exist. This may occur when separate grounds are used, or when communicating to a unit off of the power ground matt. Failure to do so can lead to personal injury or death, property damage, or economic loss.

What Is RS-232C?

RS-232C is an electrical standard used to provide serial communications between electronic devices.

IBM PC-AT/286/386 or compatible computers have the ability to communicate via RS-232C when a serial communications card or “PORT” is installed into one of its internal PC expansion slots. The connector for this port is usually located at the back of the computer.

When two electronic devices are equipped with an RS-232C port, they can be connected together via an RS-232C cable over which information is transferred. The minimum cable requirements for RS-232C is a 22 AWG shielded three conductor cable.

Normally, the maximum length of cable used to connect two electronic devices via RS-232C is 50 feet.

What Is RS-485?

RS-485, like RS-232C, is also an electrical standard used to provide serial communications between electronic devices.

IBM PC-AT/286/386 or compatible computers can also communicate via RS-485. This requires the installation of an RS-485 communications card or "PORT" into one of the internal PC expansion slots. Alternatively, if the computer is already equipped with an RS-232C serial port, an external RS-232C to RS-485 converter device can be used to convert the existing RS-232C port to RS-485.

When two electronic devices are equipped to communicate via RS-485, they can be connected together via an RS-485 cable over which information is transferred. This RS-485 cable consists of a 22 AWG shielded two conductor twisted pair cable.

One of the advantages of RS-485 over RS-232C is that RS-485 can communicate over much greater cable distances. The maximum length of an RS-485 cable used to connect electronic devices is 4000 feet.

The most important feature of RS-485 communications is that it allows up to 32 devices to be connected anywhere along the length of the two conductor cable. This feature has important benefits for customers who wish to connect a large number of Powermonitors to a single computer and to display the data from any of the devices. RS-232C does not have this ability as it allows only the connection of one device to each RS-232C serial port.

Summary Of Advantages And Disadvantages Of RS-232C vs RS-485

Advantages Of RS-232C:

1. Very easy to install.
2. Allows single cable connection from the computer to the Powermonitor.

Disadvantages Of RS-232C

1. Only one device can be connected to each computer RS-232C port.
2. Maximum cable length limitation = 50 feet.
3. RS-232C is more susceptible to electrical noise than RS-485.

Advantages Of RS-485

1. Very easy to install.
2. Up to 32 devices can be connected to a single computer serial port.
3. RS-485 can communicate over very large distances, up to 4000 feet.
4. RS-485 has greater immunity to electrical noise than RS-232C.

Disadvantages Of RS-485

1. Requires an RS-485 communications card to be installed into an empty slot in the computer or an external RS-232C to RS-485 converter device.

Considerations When Choosing Powermonitors With Communications Capability

1. If you wish to display the data measured by a Powermonitor on your computer, you have three options:
 - a. Use the purchased copy of the Powermonitor Software.
 - b. You can write your own program to up load and display the data measured by the device.
 - c. You can purchase the Bulletin 6190–PMO ControlView Option package. It requires a PLC–5 and the Bulletin 6200 PLC software package.

2. If you wish to connect your computer to a single device, then you have the option of communicating via RS–232C or RS–485.

If the computer is located less than 50 feet from the device you wish to communicate with, then RS–232C will be suitable.

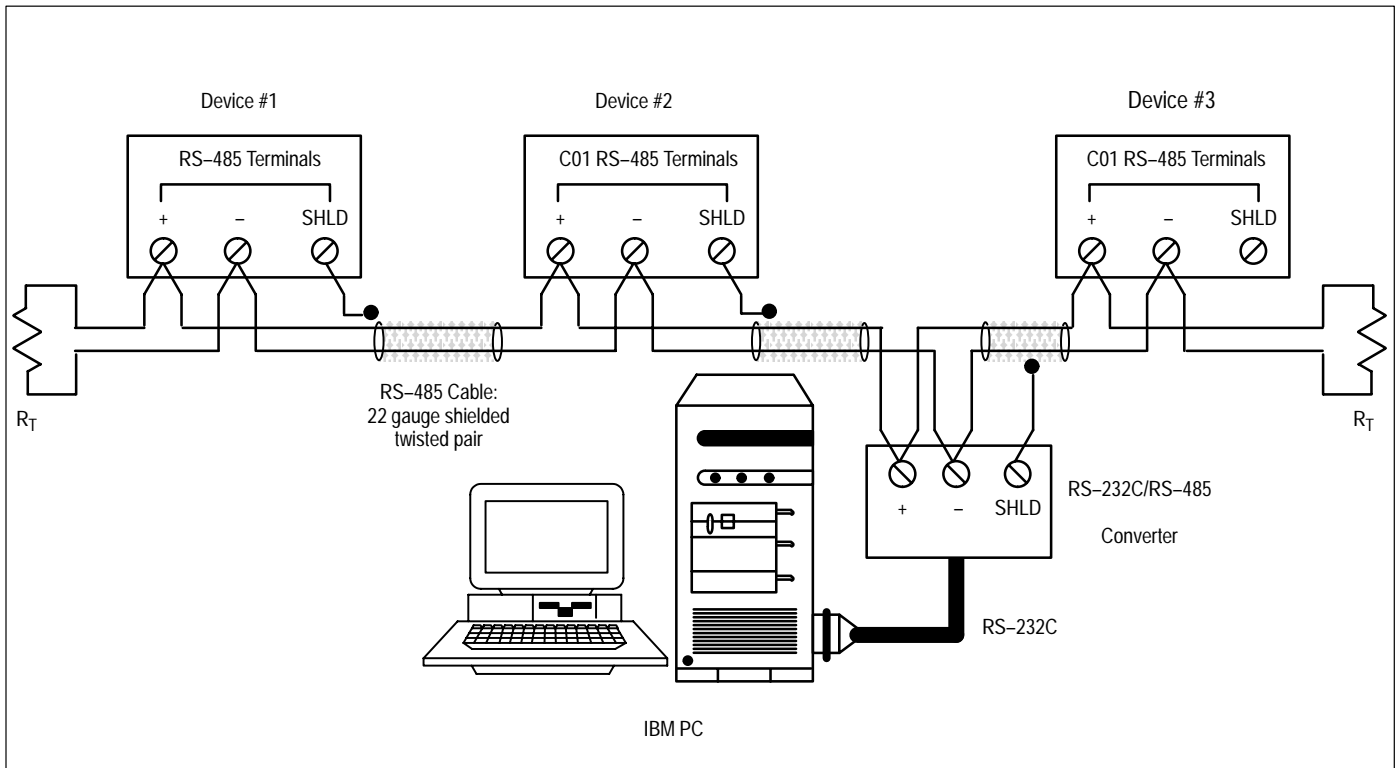
If the computer is located more than 50 feet from the device (but less than 4000 feet) then it is best to use RS–485 communications. In this case, you will be required to purchase either:

- a. an RS–485 communications port for the computer
or
 - b. an RS–232C to RS–485 converter device (if the computer is already equipped with an RS–232C port).
3. If you wish to connect your computer to more than one device, then only RS–485 will permit this.



ATTENTION: Powermonitors that communicate via the RS–232C standard should never be connected to devices that communicate via RS–485. If this is attempted, damage to the RS–485 devices will occur

Figure B-1
RS-485 Straight Line Topology



Common RS-485 Topologies

There are many topologies that can be used to connect Powermonitors to a computer using an RS-485 communications path. The two most common are the straight-line and loop topologies.

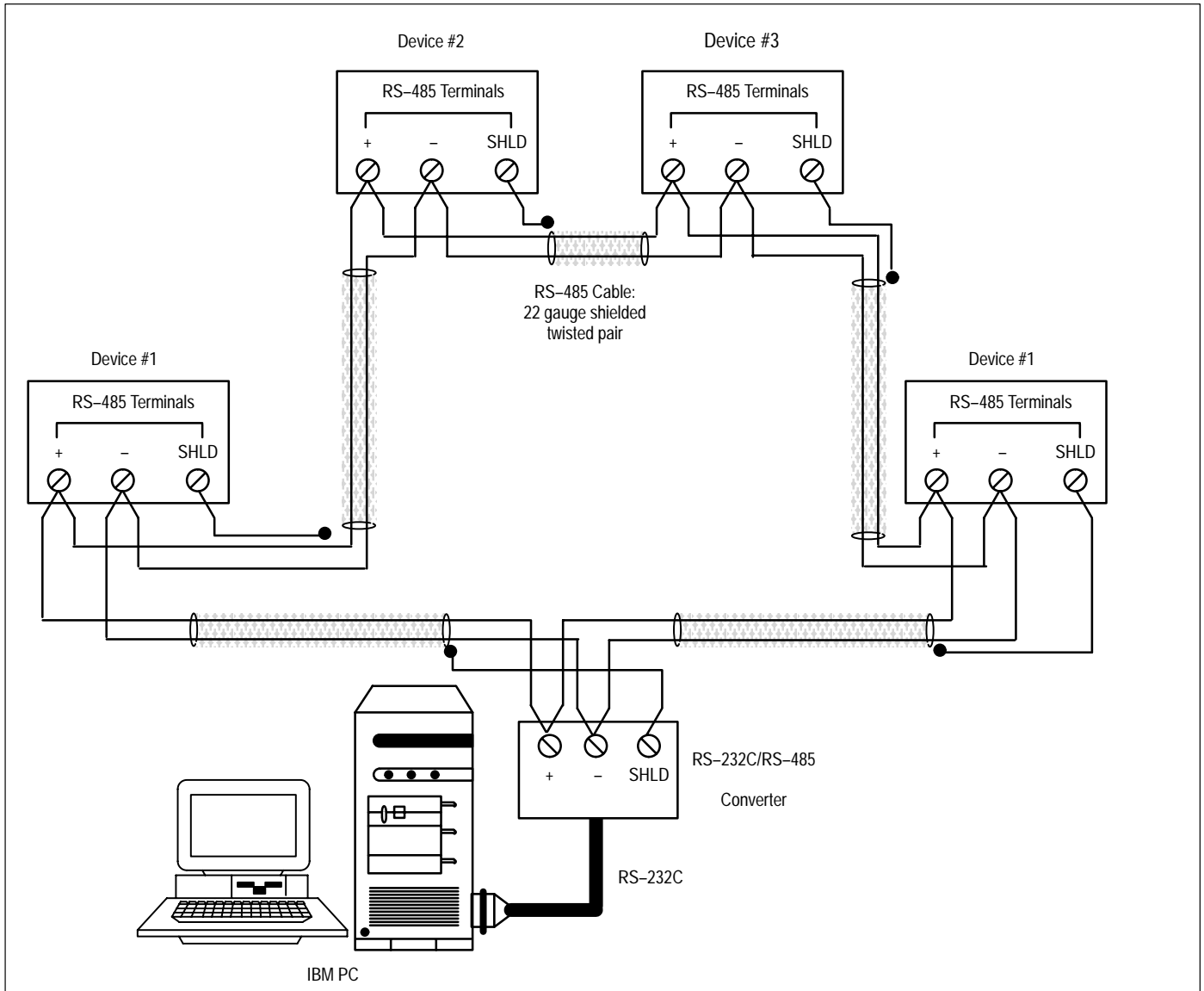
Straight-Line Topology

For straight-line topology, the maximum length of the RS-485 cable is 4000 feet. A maximum of 32 devices can be connected at any location along the length of the communications cable (see Figure B-1).

The computer used to display the data can be located anywhere along the 4000 foot length of the cable.

R_T is a 1/4 watt termination resistor having an impedance equal to the characteristic impedance of the RS-485 cable. Typical values for R_T range from 130 ohms to 180 ohms and depend on the gauge of the wire used, the diameter of the insulation and the insulation material. The characteristic impedance of a two-wire twisted pair cable is normally included with the electrical specification for the cable.

Figure B-2
RS-485 Loop Topology

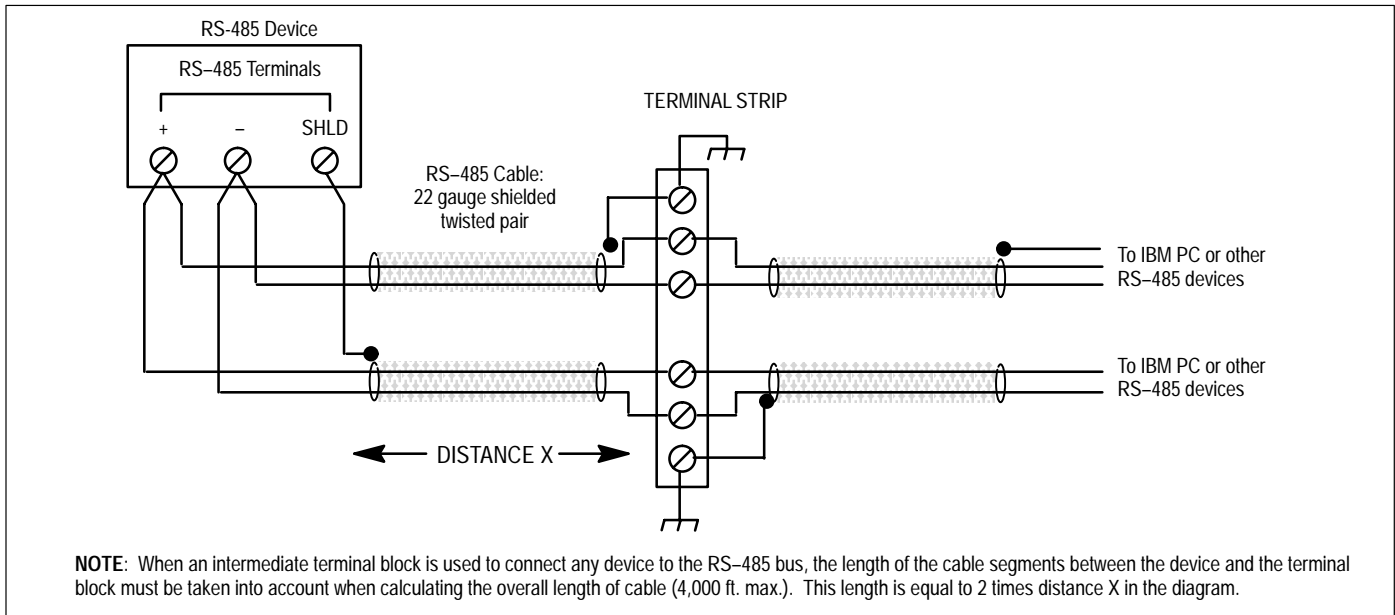


Loop Topology

Loop topology also allows up to 32 devices to be connected along the 4000 foot length of the cable.

One advantage of the loop topology is that a single open circuit fault condition on the main loop will not result in the loss of communication between the computer station and any of the Powermonitors (see Figure B-2).

Figure B-3
RS-485 Intermediate Terminal Strip Connection



Calculating Overall Cable Length

When determining the overall length of an RS-485 communication straight line or loop connection, it is important to account for all cable segments. For example, when RS-485 connections to the device are made via an intermediate terminal block, the lengths of cable between the device and the terminal block must be added to the total cable distance (see Figure B-3).

Using Modems

If communications over a telephone network is used with modems, each modem will require configuration.

DIP Switch Configuration

If the modems used are configured using hardware DIP switches or a similar method, set the DIP switches to provide the functionality outlined in Chapter 3, Section 3.1.3.

Configuration Via Communications – Standard Modem Setup

For modems that are configured via their communications port, the Powermonitor Software automatically executes a predefined procedure at the time that the operator selects the MODEM (TOUCH TONE) or MODEM (PULSE) option in the CONNECTION screen.

This procedure automatically transmits two sets of commands to the modem(s) which will configure both a Hayes-compatible 2400 baud modem and a Hayes-compatible 9600 baud modem.

Configuration Via Communications – Custom Modem Setup

If the modem you are using requires a unique set of configuration commands, a modem configuration file with the name MODEM.CFG must be created and placed in the SP directory. This file may be created using any ASCII text editor; however, a quick way to create the file is to use a simple DOS line editor. This can be run by using the following DOS command:

```
TYPE CON MODEM.CFG <Enter>
```

The operator should then type in the sequence of modem commands necessary to configure the device. The device must be configured to provide the functionality outlined in Chapter 3, “Installation.” Refer to the manual for the modem to determine the communications commands necessary to perform the configuration.



ATTENTION: It is extremely important that information is entered correctly into the MODEM.CFG file. Any errors may incorrectly configure a modem, which may cause malfunctions when running the Powermonitor Software.

When the complete string has been entered, press:

Ctrl + Z

to escape from the DOS line editor.

Save the MODEM.CFG file in the SP directory. When the Powermonitor Software is run, and either of the MODEM options is selected in the CONNECTION screen, the Powermonitor Software will use the data found in the MODEM.CFG file to configure the connected modem(s).

Setpoint Parameter Form

SETPOINT	FUNCTION	HIGHLIMIT	TDOPERATE	LOWLIMIT	TDRELEASE	RELAY/FUNCITON
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						

Allen-Bradley PLCs

Appendix C
Setpoint Parameter Form

Keyboard Reference

Table 1.A

FUNCTION	KEY(S)	DESCRIPTION
Move Cursor Available on most screens	Arrows Home End PgUp PgDn	Moves cursor one field in direction of arrow. Moves the cursor to the field at the top of the list. Moves the cursor to the field at the bottom of the list. Moves the cursor up the list by one page Moves the cursor down the list by one page.
Toggle or Modify Value Help Line at bottom of each screen indicates which key functions available to modify selected field.	Plus <+> Minus <-> Digits Text	Toggles the field value to the next selection. Toggles the field value to the previous selection. Field can contain only a numerical value. Field can contain any combination of letters & digits.
Select or Display Available on most screens.	Enter	Selects the desired function or sub-menu.
Exit	Esc	Returns to MAIN MENU.
Save & Exit Available on Device Setup, Setpoint/Relay setup and Label Setup screens.	Esc	Sends Device Setup, Setpoint, or Label changes to remote device then returns to MAIN MENU.
Select Data Screen	F1 to F6	Shortcut keys for selecting one of 6 possible remote device data screens.
Save to Disk File	F7	Saves the present contents of the remote device Event, Min/Max or Snapshot Log to a disk file which may be printed out later.
Update Unit Time	F8	Sets internal clock of remote device to time read from computer internal clock.

Appendix D
Keyboard Reference

Loading Event, MIN/MAX, or Snapshot Log Files Into Lotus

Spreadsheet programs such as Lotus 123 can be used to analyze, sort, perform calculations, and graph the data contained in the snapshot, MIN/MAX, and event log files. To use the Snapshot logs with Lotus 123, boot up Lotus, then import the SNAPxxxx.log file using the following procedure:

1. Import the file by using the following Lotus command:
`/file import text (filename = snapxxxx.log)`

This will result in the snapshot file being loaded into the spreadsheet as a text file. It now has to be converted into a standard Lotus work sheet by using the “parse” command.

2. Put the cursor on cell A2; the first cell below the counter line and perform the following commands:
 - a. Create a format line: `/data parse format_line create`
 - b. Edit the format line to define the first column as a date column:
`(/data parse format_line) edit and change the first V>>> to D>>>.`
 - c. Define the top left and bottom right corners of the data which you wish to parse: `(/data parse) input-column`
 - d. Define the output location where the parsed data will be located (normally a column A cell a few lines below the text data):
`(/data parse) output-column`
 - e. Do the parse: `(/data parse) go`

The original test format data should now be reproduced in a WKS format just below the original data.

3. The text data should now be deleted:
`/work sheet delete rows 1 to the beginning of the parsed data`
4. The first two data and time columns need to be formatted to display correctly. Format the entire first column to display dates:
`/range format date 5-short-intnl`
5. Increase the width and change the format of the second column to display the time:
`/work sheet global column-width 10/range format date time 3-long intnl`
6. Save the data as a standard Lotus file.

Appendix E

Loading Logs into Lotus

The snapshot log is now in a standard Lotus format. Standard Lotus commands can now be used to sort, perform calculations, and graph the data.

If you are going to be using this procedure frequently, a Lotus Macro should be written to automate the process.

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