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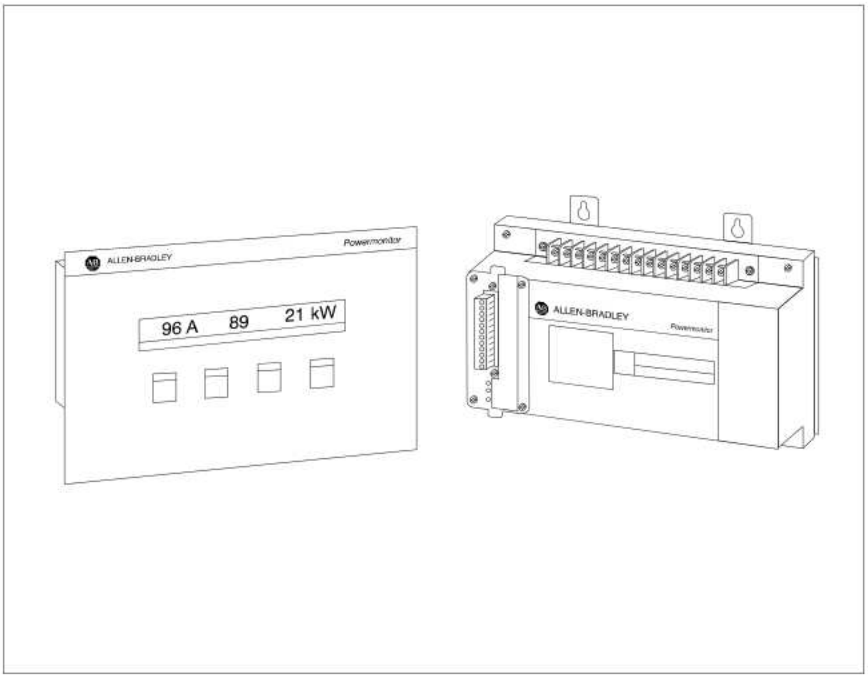
Find the *Rockwell / Allen-Bradley Bulletin 1400-PD51A* at our website: *Click HERE*

ALLEN-BRADLEY

Bulletin 1400
Powermonitor

Catalog Number 1400-PD (Display Module)
Catalog Number 1400-PB (Block Module)

Product Data



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Description

The Bulletin 1400 Powermonitor is a self contained, high performance power management tool with many innovative built–in monitoring, archival, and control features.

Monitoring:

- Four Voltages
- Four Currents
- Power Factor
- kVA, kVAR, kVARH, kW, kWH, demand
- Line frequency
- Demand Metering
- kWH and kVARH in both import and export directions

Archival:

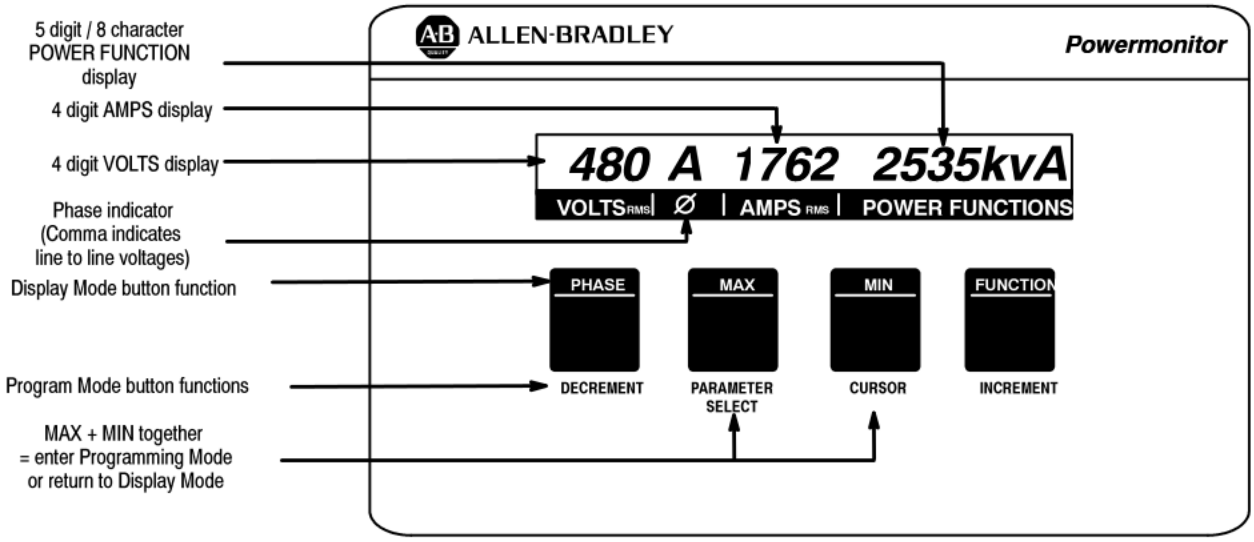
- Minimum / Maximum value log
- Event logging with internal date/time stamping
- Input “snapshot” logging with internal date/time stamping
- Harmonic capture logging
- kVARH, and kWH both in the import and export directions

Control:

- Three sets of Single Pole, Double Throw (form C) contacts, user configurable
- Analog output, user configurable
- Four status inputs
- The Powermonitor Display Module can be enhanced with the plug–in universal communications module. This module facilitates easy system integration by providing both Allen–Bradley Remote I/O and RS-232 or RS-485, simultaneously.

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Figure 1. Bulletin 1400 Powermonitor Display Module Front Panel – Display Mode



General Features and Benefits

1400–PD Only

- Powermonitor Display Module is through panel design for flush mount.
- Face Plate is rated NEMA Type 12 (IP54) for environmental protection.
- Membrane keypad offers durability.
- Alpha numeric readout eliminates memorization of codes.
- Instrumentation has quality vacuum display for high readability.

1400–PD and 1400–PB

- Optional Universal Remote I/O™ RS-485 or RS-232 communications board allows integration and versatility.
- Large barrier strips for #12 cable ring lugs eliminates wire “hair cuts” prior to lugging.
- The Powermonitor Display Module offers a high level of security through a user definable password protection scheme. If the password is not entered all values and tables in the module may be viewed, but no values may be changed. Selecting a new password is simple, involving a two step process in the program mode. Password protected function and electrically erasable non-volatile memory keep information secure.
- Distribution instrumentation in a rugged Allen-Bradley industrial package.
- The microprocessor allows more information to be handled in less time.
- UL Listed and CSA Certified.

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Modes of Operation

The Powermonitor Display Module (1400–PD) can operate as a stand alone multi-function recording meter addressed either by the front panel or the communication link. It can also export and import information and commands over the communication link and become part of an integrated system. The Powermonitor Block Module (1400–PB) is designed for integration into a system. The 1400–PB is configured via the communication port.

Description of Operation

Upon power up from a wide range of AC or DC voltages as provided by option A or 20-60V DC as provided by option B, the Powermonitor Display Module initiates a self test. Upon successful completion of this test it automatically polls its measured input and presents both measured and calculated data. The data selected is displayed on a one line fluorescent tube and stored in memory for export via a communication channel. This process is repeated about every 700 ms. After polling and calculating the measured data, the internal limits are analyzed by comparator functions and output decisions and archiving decisions are made.

If appropriate, output relays are actuated and/or information is stored in one of the memories. If a harmonic capture is requested, the Powermonitor Display Module shifts all of its measurement registers to monitoring a 128 sample set of one cycle of the current or voltage wave form selected. This sample set is then exported over a communication channel for analysis and presentation.

On the display module, a set of four membrane buttons on the front panel may be used to select display information, or to program the unit. All of the functions accomplished in this manner can be accessed via the communications port.

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Inputs

V1, V2, V3, VREF

These are the three phase voltages and the neutral reference point. There are three different models available with respect to the magnitude of voltage anticipated at these terminals. The fourth character after the bulletin number identifies this value:

for example:

1400-PD51A	expects $120V_{L-N}$ or $208V_{L-L}$
1400-PB52A	expects $277V_{L-N}$ or $480V_{L-L}$
1400-PD53A	expects $347V_{L-N}$ or $600V_{L-L}$

All of the above voltages have a range of + 15 % to -75%. It is important to note that the highest possible accuracy is obtained when the full potential range is utilized.

I1+, I1-, I2+, I2-, I3+, I3-, I4+, I4-

These are the three phase currents and one extra current input. Note the polarity of the connections is critical as phase reversals will confuse all measurements with respect to phase angles and import/export of power. There are two different models available with respect to the magnitude of current expected at these terminals. The third character after the bulletin number identifies this value:

for example:

1400-PB11A	expects 1 Amp maximum per input
1400-PD51A	expects 5 Amp maximum per input

V_{AUX}

This is an additional voltage input with a range of up to 1V AC/DC. This voltage can be scaled internally to represent some external value. Typically this is used to represent transformer temperature and is scaled in degrees Celsius or Fahrenheit.

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Inputs (Continued)

S1, S2, S3, S4, SCOM

These are status inputs one through four and the associated electrical common. These are voltage sense inputs which can be used to set alarms, trigger the event logs, and or pass through to the communication port for use in one of the software algorithms. These inputs are typically used to identify status of feeder or load breakers at a distribution node. Their sensitivity is as follows:

0 to 9V AC/DC	LO
greater than 20V AC/DC	HI
277V AC/DC	MAX.

N/-, L/+

These are the internal power supply electrical connections. There are two options for this power supply. The fifth character after the bulletin number identifies which supply is installed:

for example:

1400-PD51A	expects 85 to 264V AC or 110 to 300V DC less than 0.2 Amps. 47 to 440 Hz.
1400-PD51B	expects 20 to 60V DC less than 10 Watt

Outputs

(R14, R11, R12) (R24, R21, R22) (R34, R31, R32)

These are the three sets of Single Pole, Double Throw (form C) output contacts. They can be actuated by software control or via the internal decision making process. These outputs can be configured to provide communication to the real world or they can be set to provide automatic load shedding or line conditioning information to other hardware.

I_{out}

This is an analog 0 to 20mA or 4 to 20mA signal proportional to a user selected input or an internally calculated value.

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Communications Cards

An optional communication card (1400–DCU) can be plugged into the back of the 1400–PD and an optional communication card (1400–BCU) can be plugged into the front of the 1400–PB. These communications cards allow for simultaneous use of an Allen–Bradley Remote I/O port and one of the RS-232 or RS-485 channels. Each communication media is isolated to 500V.

The card connections are as follows:

Ground	GND	Chassis Ground
RS–485	SHLD	RS–485 Shield (electrically connected to chassis ground)
	–	RS–485 Data Minus
	+	RS–485 Data Plus
RS–232C	RXD	RS–232C Receive Data (i.e. data into device)
	TXD	RS–232C Transmit Data (i.e. out of device)
	SG	RS–232C Signal Ground
	RTS	RS–232C Request to Send

Demand Metering and Synchronization

The Powermonitor Display Module can execute floating window user definable period demand measuring. If selected, the module can also coordinate to utility generated pulses or develop its own demand pulses.

Specifications

Table 1
Accuracy, Resolution, and Ranges

PARAMETER	ACCURACY	RESOLUTION	RANGE
Volts (V1, V2, V3)	0.2%	0.1%	0–1,000,000[1]
Amps (I1, I2, I3)	0.2%	0.1%	0–30,000
Neutral Current (I4)	0.2%	0.1%	0–9,999
kW	0.4%	0.1%	0–1,000,000[2]
kVAR	0.4%	0.1%	0–1,000,000[2]
kVA	0.4%	0.1%	0–1,000,000[2]
Power Factor	1.0%	1.0%	1.0 to □ 0.6
Frequency	0.2 Hz	0.1 Hz[3]	40 to 450 Hz
kW Demand	0.4%	0.1%	0–1,000,000
kVA Demand	0.2%	0.1%	0–1,000,000[2]
kWH (–F, –R)	0.4%	1 kWH	0–1,000,000,000
kVARH (–F, –R)	0.4%	1 kVARH	0–1,000,000,000
V_{aux} (1 V AC scale)	0.25%	0.1%	0–1,000,000
I_{out}	2.0%	1.0%	0–20 mA

NOTES: (1) Reads in kV for voltages over 9,999
(2) Reads in mVA, mV, mVAR for readings over 9,999
(3) 1 Hz resolution at 400 Hz range

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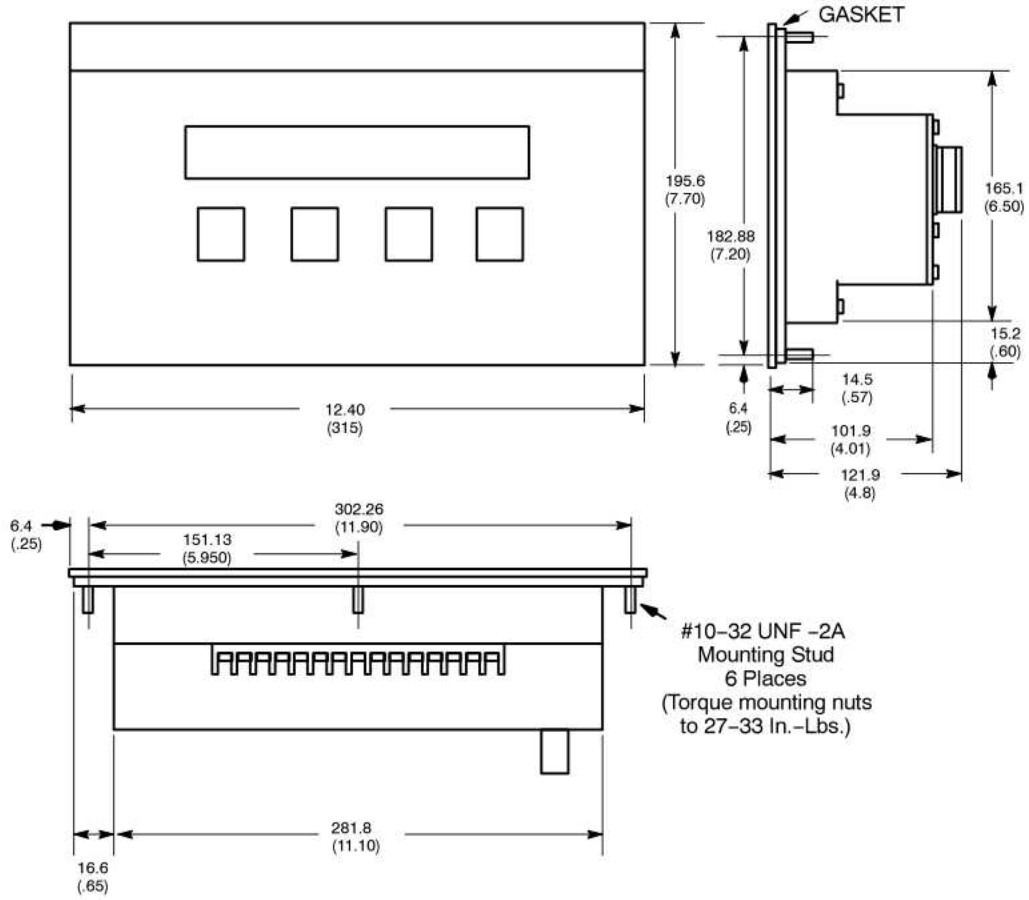
Specifications (continued)

Table 2
Input and Output Ratings

Voltage Inputs:	$120V_{L-N}/208V_{L-L}$	Nominal full scale input (+15%, –75%) Input impedance: 2 Megohm
	$277V_{L-N}/480V_{L-L}$	Nominal full scale input (+15%, –75%) Input impedance: 2 Megohm
	$347V_{L-N}/600V_{L-L}$	Nominal full scale input (+15%, –75%) Input impedance: 2 Megohm
Current Inputs:	5 Amps	AC ONLY nominal full scale input, 25% overrange, 30V maximum Overload withstand: 15 Amps continuous, 300 Amps for 1 second Input impedance: 0.002 ohm, Burden: 0.05 VA
	1 Amp	AC ONLY nominal full scale input, 25% overrange, 30V maximum Overload withstand: 15 Amps continuous, 300 Amps for 1 second Input impedance: 0.002 Ohm, Burden: 0.05 VA
Status Inputs:	>20V AC/ V DC = active, <9V AC/V DC = inactive, Minimum Pulse Width: 1 second Input impedance: 49.2 kOhm, 277V AC/ V DC maximum	
Control Relays Contact Ratings:	Resistive:	10A, 277V AC/30V DC
	Inductive:	240V AC, 3400 VA inrush, 360 VA sealed
Power Supply	AC/DC	85 to 264V AC/.2 Amps/ 47 to 440 Hz or 110 to 300V DC/0.2 Amps
	DC (optional)	20 to 60V DC @ 10W
Auxiliary Voltage Input (V_{aux}):	1.0V AC/V DC nominal full scale input (1.25V AC/V DC maximum) Overload withstand: 120V continuous, 1000V for 1 second Input impedance: 10 kOhm	
Auxiliary Current Output: (I_{OUT})	0 to 20mA output into 250 ohm maximum load	
Terminal Strip:	12 lb–in (1.35Nm) Torque	
Maximum Wire:	12 AWG, 4 mm^2, 75° C CU Wire Only	
Operating Temperature:	0° C to 50° C (32° F to 122° F) ambient air temperature	
Storage Temperature:	–30°C to + 70°C (–22°F to 158°F)	
Humidity	5 to 95 percent, non–condensing	
NOTE:	Voltage, Current, Status, Relay and Power inputs all pass the hipot withstand test of 2000V for 1 minute and pass the ANSI/IEEE C37.90A – 1989 surge withstand and fast transient tests.	

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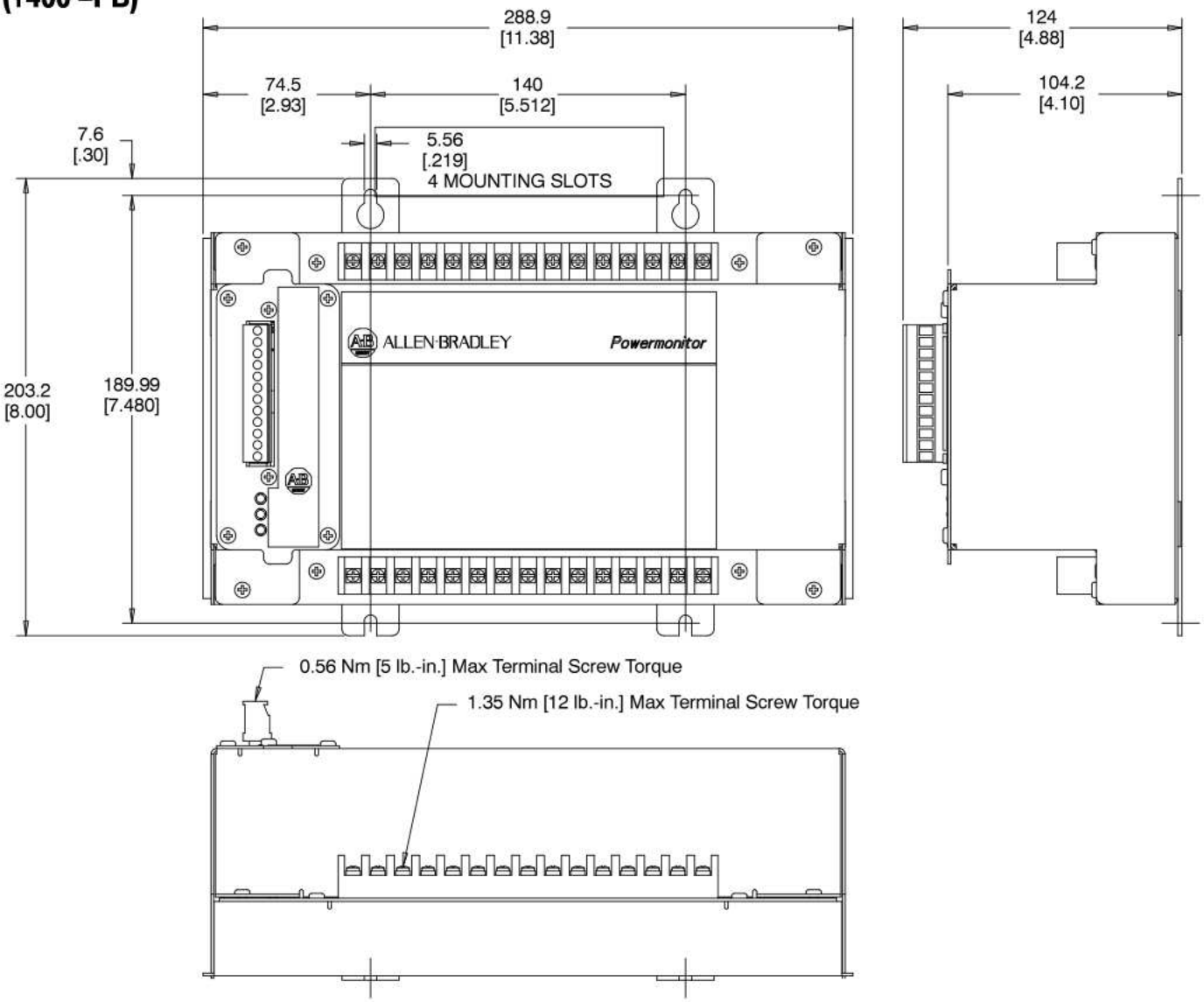
Approximate Dimensions (1400 –PD)



NOTES:
1. Dimensions in millimeters (inches).
2. All dimensions are approximate and not intended to be used for manufacturing purposes.

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Approximate Dimensions (1400 –PB)



NOTES:
1. Dimensions shown in millimeters (inches).
2. All dimensions are approximate and not intended for manufacturing purposes.
3. Weight: 5.6 lbs. (2.5 kg.) without 1400–BCU communication card.

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Product Data
Bulletin 1400
Powermonitor PD/PB

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Justify: The justification and initial planning stage lays the groundwork for future success.

Apply: Attention to detail during the application stage helps ensure that your system fits today's and tomorrow's specific application needs.

Install: Smooth installation and start–up depend not only on careful planning and appropriate design, but also on having key professionals on–site, assisting with start–up coordination and project management.

Operate: In the operation stage, you supply your output to your customer. Incremental performance improvements are vital to maximizing this phase of the life cycle.

Maintain: A critical outgrowth of the operation phase, a well–planned maintenance program facilitates continuous improvement of the process.

Improve: It's important to continually monitor your system and its ability to meet new market demands for increased performance and technological effectiveness. Who can help you better than someone who's been working with you since the very beginning of the process?

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