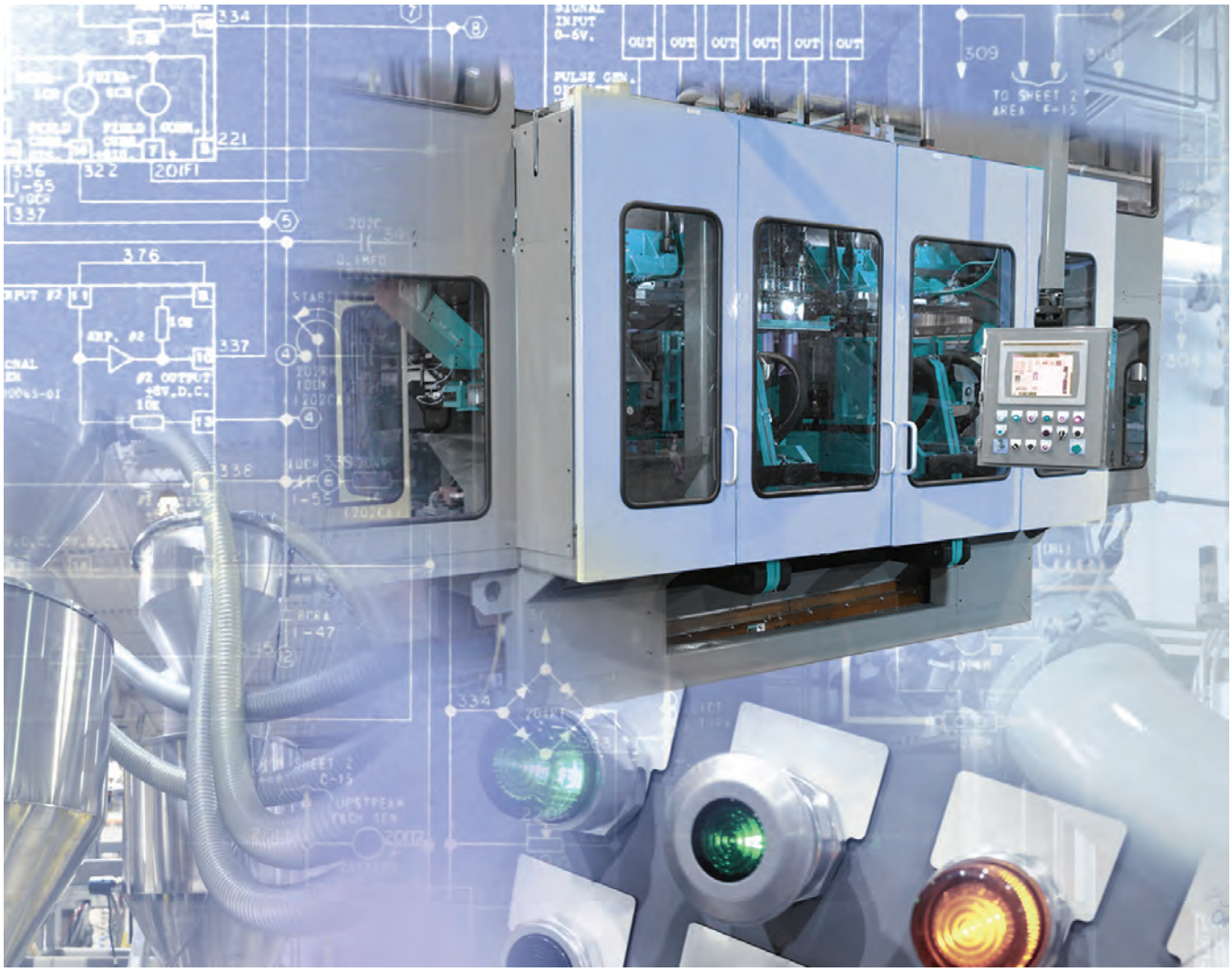
Selection Guide

Allen-Bradley

Power Quality and Energy Management

Bulletin Numbers 1400, 1407, 1408, 1411, 1420, 1426, 1608S, 9307



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Rockwell Automation

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Additional Resources

Resource	Description
PowerMonitor 500 Unit User Manual, publication 1420-UM001	Provides installation instructions, wiring diagrams, configuration, and specifications for PowerMonitor 500 units.
PowerMonitor 1000 Unit User Manual, publication 1408-UM002	Provides installation instructions, wiring diagrams, configuration, and specifications for PowerMonitor 1000 units with catalog numbers 1408-BC3A-485, 1408-BC3A-ENT, 1408-TS3A-485, 1408-TS3A-ENT, 1408-EM3A-485, 1408-EM3A-ENT.
PowerMonitor 1000 Legacy Unit Installation Instructions, publication 1408-UM001	Provides installation configuration and specifications for PowerMonitor 1000 legacy units with catalog numbers 1408-TR1A-485, 1408-TR2A-485, 1408-EM1A-485, 1408-EM2A-485, 1408-EM3A-485, 1408-TR1A-ENT, 1408-TR2A-ENT, 1408-EM1A-ENT, 1408-EM2A-ENT, 1408-EM3A-ENT.
PowerMonitor 5000 Unit User Manual, publication 1426-UM001	Provides installation instructions, wiring diagrams, configuration, and specifications for PowerMonitor 5000 units.
PowerMonitor 5000 Optional Communication Modules Installation Instructions, publication 1426-IN002	Provides instructions for installing and removing optional communication modules.
PowerMonitor Accessory Kit Installation Instructions, publication 1400-IN004	Provides instructions for installing and description of contents of kit for PowerMonitor units.
i-Sense Voltage Monitor User Manual, publication 1608S-UM001	Provides installation instructions for installing, configuration, and specifications for i-Sense voltage monitor.
Combination Generator Control Module User Manual, publication 1407-UM001	Provides installation, configuration, start-up, and operation instructions for the CGCM unit.
Combination Generator Control Module User Manual (1407-CGCM-DLR) publication 1407-UM002	Provides installation, configuration, start-up, and operation instructions for the CGCM-DLR unit.
Current Transformers Selection Matrix, publication 1411-SG001	Provides selection information for choosing your current transformers.
Current Transformers Technical Data, publication 1411-TD001	Provides dimension and accuracy information for the current transformers.
FactoryTalk® EnergyMetrix™ Software User Manual, publication FTEM-UM003	Provides installation, configuration, and usage information for the software.

Power Quality and Energy Management Overview

Which PowerMonitor product suits your application?
Are you interested in energy management, power quality management, or both?

Energy Management

- Do you have an energy savings initiative within your company?
- Do your utility bills currently exceed $100,000 a month?
- Is energy more than 15% of your operating costs?
- Do you plan to buy electricity in the competitive market?
- Do you want to understand where your energy is consumed?

Power Quality Management

- Do you have unplanned downtime?
- How much are you spending on downtime?
- Are you able to identify the cause of downtime?
- Are there electronics failing in your facility with no known cause?
- Do you have a good understanding of the power quality in your plant?

If you answered yes to any of these questions, we can provide a solution.

Energy Management Metering

The PowerMonitor 500 unit and the PowerMonitor 1000 unit provide a power management metering option. These meter options provide a solution for customers who are in these situations:

- You are beginning an energy savings initiative.
- You notice a spike in utility bills.
- You need demand and consumption measured.
- You have meters implemented currently and are looking for a sub-metering option.
- You want to monitor individual processes and subprocesses.
- You want to communicate this metered data back to your network via optional communication (EtherNet/IP or Serial).

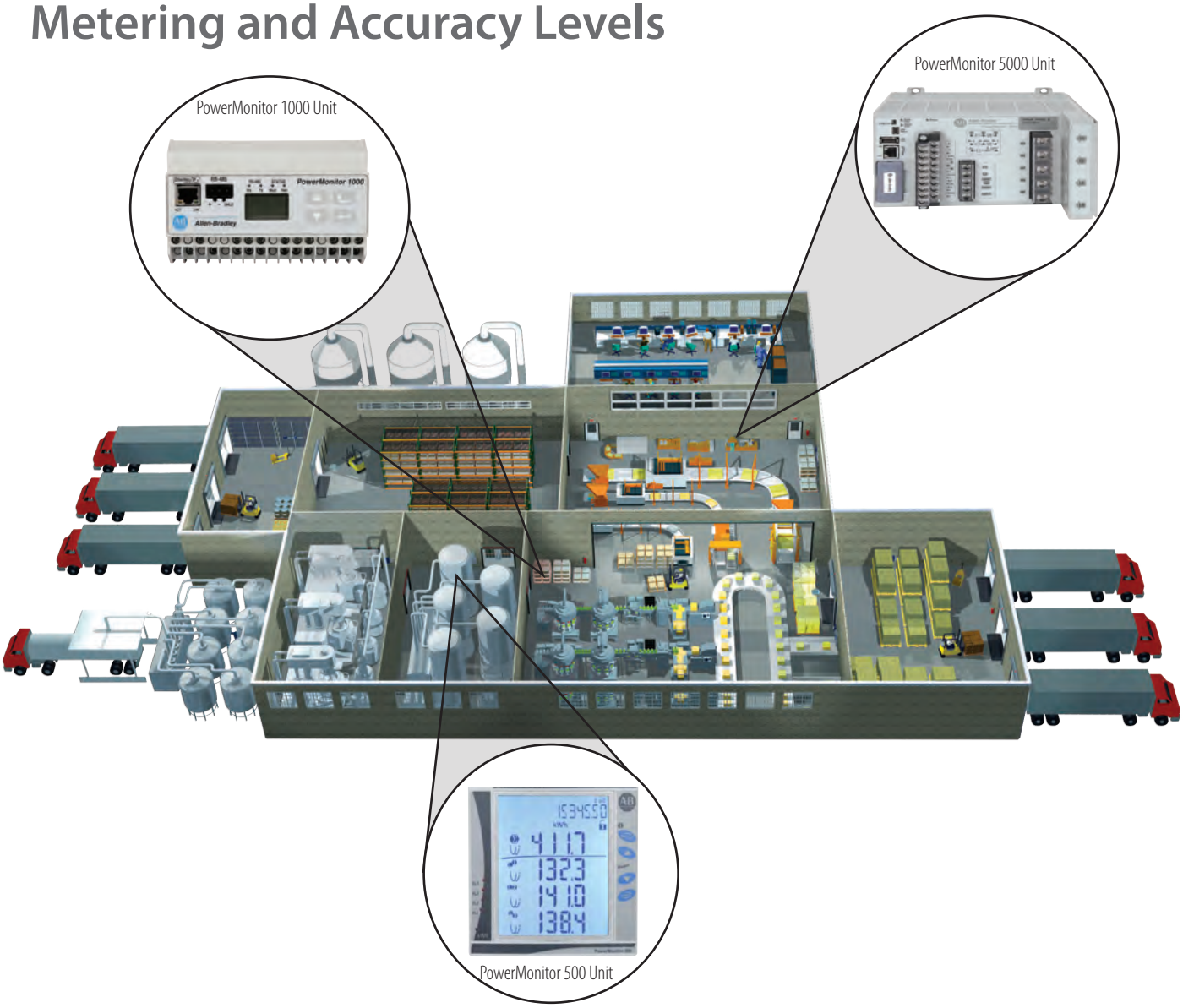
Power Quality and Energy Management

Do you need a more advanced metering option with power quality features?
Do you require Class 0.2 Revenue Grade Accuracy?
Do you have compliance initiatives within your organization?
Do you require waveform capture or advanced power quality measurements?

Choose the PowerMonitor 5000 unit if you are in one or more of these areas:

- Systems integrators focusing on a power quality and/or total system energy projects
- Semi-conductor industry
- Customers with power quality issues
- Lighting industry
- Monitoring main incoming power to the facility

Metering and Accuracy Levels



Metering Levels	PowerMonitor 500	PowerMonitor 1000	PowerMonitor 5000
Energy (Consumption) (kWh)	X	X	X
Demand (kW)	X	X	X
Power factor	X	X	X
Power quality aspects (sag/swell detection, harmonics, and transients)			X
Waveform capture			X
Door-mounted display	X	Optional	Optional
Ethernet/IP Network Communication	X	X	X
Configurable by using webpage		X	X
Accuracy levels (per standard EN62053-22)			
Class 1, 1% energy accuracy	X	X	
Class 0.2, 0.2% energy accuracy			X

The PowerMonitor 5000 unit can include a door-mounted display module as an accessory, which is catalog number 1426-DM. The PowerMonitor 1000 unit has an LCD display option and can be used with any Rockwell Automation operator interface.

Power Quality and Energy Management Portfolio

PowerMonitor 500

(page 6)

COMMUNICATION

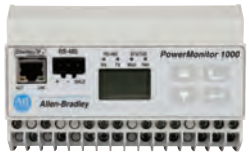
EtherNet/IP
Modbus RTU
Modbus TCP/IP

OUTPUTS:

Digital signal
Analog signal (0. . .20 mA)

PowerMonitor 1000

(page 10)



COMMUNICATION

EtherNet/IP
Modbus RTU
Modbus TCP/IP
Serial DF1, DH485

OUTPUTS:

KYZ signal

INPUTS:

Digital signal

PowerMonitor 5000

(page 14)

COMMUNICATION

EtherNet/IP
DeviceNet
ControlNet

OUTPUTS:

Digital signal
KYZ signal

INPUTS:

Digital signal

i-Sense Voltage Monitor

(page 20)

The i-Sense voltage monitor captures and records voltage disturbances on the electric power service, as well as long-term voltage trends.

The monitor is an integral part of the i-Grid voltage monitoring network that enables the reporting and alerting service.

COMMUNICATION:

EtherNet/IP
Modem

PowerMonitor Accessory Kit

(page 19)

All PowerMonitor units should be wired with an accessory kit to safely and correctly wire to the electrical system. The accessory kit includes a 1-pole fuse block, 3-pole fuse block, and a shorting block.

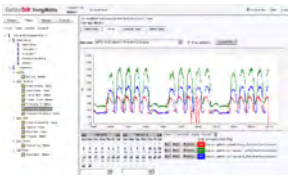
Current Transformers (CTs)

(page 27)

Low voltage current transformers for various power measurement devices and applications, including protective relays, analog devices, transducers, and PowerMonitor products.

FactoryTalk EnergyMetrix Software

(page 31)



FactoryTalk EnergyMetrix is a web-enabled management software package that gives you access to critical energy information from virtually any location.

Combination Generator Control Module

(page 23)

COMMUNICATION:

EtherNet/IP DLR
ControlNet

Overview

The PowerMonitor 500 unit is an AC power monitor with a built-in advanced configuration system and LCD data display. The unit is designed for measurement of electrical parameters in a variety of three-phase and single-phase circuits. The unit is enclosed in a modular housing for panel mounting, with IP65 degree of protection in front of the panel. The power monitor can be provided with analog or digital outputs. These outputs can be selected to output a pulse proportional to the real and reactive energy measured, or to annunciate alarms. The instrument can also be equipped with a serial RS-485/RS-232 port and an EtherNet/IP port.

Equipped with an optional communication port, the unit communicates power and energy parameters to applications, such as FactoryTalk EnergyMetrix software. The power monitor works with these software applications to address these key customer applications:

- **Load profiling** - log power parameters, such as real energy, apparent power, and demand, for analysis of power usage by loads over time
- **Cost allocation** - reporting actual energy cost by department or process to integrate energy information into management decisions
- **Billing and sub-billing** - charging users of energy the actual usage cost rather than allocating by square footage or other arbitrary methods
- **Power system monitoring and control** - display and control power flow and energy utilization

Features

PowerMonitor 500 Unit Features

Feature	Availability[1]
Electrical Parameters	
Voltage (V)	X
Current (A)	X
Frequency (Hz)	X
Energy Management	
Power	
Power (kW)	X
Reactive power (kVAR)	X
Apparent power (kVA)	X
True Power Factor	X
Consumption	
Real power consumption (kWh)	X
Reactive power consumption (kVARh)	X
Apparent power consumption (kVAh)	X

PowerMonitor 500 Unit Features

Feature	Availability[1]
Demand	
Demand (kW)	X
Demand (kVAR)	X
Demand (kVA)	X
Demand Power Factor	X
Communication	
EtherNet/IP and Modbus TCP/IP	O
RS-485 (Modbus RTU)	O
Input/Outputs	
Analog Output (0. . . 20 mA)	O
Pulse (digital) Output	O
Other Features	
Configurable via software tool	X
Configurable Alarms	X
Voltage rotation (phase sequence)	X

(1) An 'O' indicates that these features are optional.

Product Selection

Available Product

Cat. No.	Description
1420-V1	PowerMonitor 500 power meter indicator, 240V AC V-LL 120V AC V-LN/240V AC V-LL
1420-V1A	PowerMonitor 500 power meter, 240V AC V-LL 120V AC V-LN/240V AC V-LL, analog output
1420-V1P	PowerMonitor 500 power meter, 240V AC V-LL 120V AC V-LN/240V AC V-LL, pulse (digital) output
1420-V1-485	PowerMonitor 500 serial power meter, 240V AC V-LL 120V AC V-LN/240V AC V-LL
1420-V1A-485	PowerMonitor 500 serial power meter, 240V AC V-LL 120V AC V-LN/240V AC V-LL, analog output
1420-V1P-485	PowerMonitor 500 serial power meter, 240V AC V-LL 120V AC V-LN/240V AC V-LL, pulse (digital) output
1420-V1-ENT	PowerMonitor 500 EtherNet/IP power meter, 240V AC V-LL 120V AC V-LN/240V AC V-LL
1420-V1A-ENT	PowerMonitor 500 EtherNet/IP power meter, 240V AC V-LL 120V AC V-LN/240V AC V-LL, analog output
1420-V1P-ENT	PowerMonitor 500 EtherNet/IP power meter, 240V AC V-LL 120V AC V-LN/240V AC V-LL, pulse (digital) output
1420-V2	PowerMonitor 500 power meter indicator, 400V AC V-LN and 600V AC V-LL
1420-V2A	PowerMonitor 500 power meter, 400V AC V-LN and 600V AC V-LL, analog output
1420-V2P	PowerMonitor 500 power meter, 400V AC V-LN and 600V AC V-LL, pulse (digital) output
1420-V2-485	PowerMonitor 500 serial power meter, 400V AC V-LN and 600V AC V-LL
1420-V2A-485	PowerMonitor 500 serial power meter, 400V AC V-LN and 600V AC V-LL, analog output
1420-V2P-485	PowerMonitor 500 Serial power meter, 400V AC V-LN and 600V AC V-LL, pulse (digital) output
1420-V2-ENT	PowerMonitor 500 EtherNet/IP power meter, 400V AC V-LN and 600V AC V-LL
1420-V2A-ENT	PowerMonitor 500 EtherNet/IP power meter, 400V AC V-LN and 600V AC V-LL, analog output
1420-V2P-ENT	PowerMonitor 500 EtherNet/IP power meter, 400V AC V-LN and 600V AC V-LL, pulse (digital) output

Specifications

General Specifications - 1420-V*x*, 1420-V*xx*, 1420-V*xx-xxx*

Attribute	Accuracy (Display and RS-485) (at 25 °C ±5 °C, R.H. ≤ 60%, 48…62 Hz)
V1 model	I_{nom}: 5 A, Imax: 6A Line-neutral RMS: 40…144V AC Line-Line RMS: 70…250V AC
V2 model	I_{nom}: 5 A, Imax: 6 A Line-neutral RMS: 160…480V AC Line-line RMS: 277…830V AC
Current all models	From 0.01…0.25 A: ±(1.0% of reading (RDG) + 2 digits From 0.25…6 A: ±(0.5% RDG +2 digits)
Line-neutral voltage	In the range V_{nom}: ±(0.5% RDG +1 digit)
Line-line voltage	In the range V_{nom}: ±(1.0% RDG +1 digit)
Frequency	±0.1 Hz (45…65 Hz)
Real and apparent power	From 0.05… 0.25 A, PF 1: ±(2% RDG +1 digit) From 0.25…6A, PF 0.5L, PF1, PF 0.8C: ±(1.0% RDG+1 digit)
Power factor (PF)	±[0.001+0.5% (1.000 - 'PF RDG')]
Reactive power	From 0.5… 6 A, sinφ 0.5L/C: ±(2.0% RDG +1 digit) From 0.25… 0.5 A, sinφ 0.5L/C: ±(2.5% RDG +1 digit) From 0.25…6 A, sinφ 1.0: ±(2.0% RDG+1 digit) From 0.1… 0.25 A, sinφ 1: ±(2.5% RDG+1 digit) TIP: sinφ = VAR/VA
Real energy	Class 1 according to EN62053-21, ANSI C12.1 Class B according to EN50470-3
Reactive energy	Class 2 according to EN62053-23, ANSI C12.1
Start up current	5 mA

Input/Output Specifications - 1420-V*x*, 1420-V*xx*, 1420-V*xx-xxx*

Attribute	Value
Voltage Sensing	V1 model: Nominal: 120V AC LN, 208V AC LL Range: 40…144V AC LN RMS, 70…250V AC LL RMS V2 model: Nominal: 400V AC LN, 600V AC LL Range: 160…480V AC LN RMS, 277…830V AC LL RMS
Current Sensing	Nominal: 5 A Range: 0.01…6 A
Control Power	Nominal: 120/240V AC (50/60 Hz) or 120/240V DC Range: 100…240V AC (48…62 Hz)
Sampling Rate	3840 samples/second at 60 Hz, 3200 samples/second at 50 Hz
Rated inputs	System type: 1, 2, or 3-phase
Current range (by CT)	5 A nom (6 A max)
Voltage (by direct connection or VT/PT)	V1: 120/208V LL; V2: 400/600V LL
Crest factor	≤3 (15 A max peak)

Environmental Specifications - 1420-V*x*, 1420-V*xx*, 1420-V*xx-xxx*

Attribute	Value
Temperature, operating	-25…+40 °C (-13…+104 °F) (R.H. from 0…90% noncondensing @ 40 °C) according to EN62053-21, EN50470-1 and EN62053- 23
Temperature, storage	-30…+70 °C (-22…+158 °F) (R.H. < 90% noncondensing @ 40 °C) according to EN62053-21, EN50470-1 and EN62053- 23
Installation category	Cat. III (IEC60664, EN60664)
Dielectric strength	4 kV AC rms for 1 minute
Noise rejection CMRR	100 dB, 48…62 Hz
EMC	According to EN62052-11
Electrostatic discharge	15 kV air discharge
Immunity to radiated electromagnetic fields	Test with current: 10V/m from 80…2000 MHz
	Test without any current: 30V/m from 80…2000 MHz
Burst	On current and voltage measuring inputs circuit: 4 kV
Immunity to conducted disturbances	10V/m from 150 KHz…80 MHz
Surge	On current and voltage measuring inputs circuit: 4 kV; on 'L' auxiliary power supply input: 1 kV
Radio frequency suppression	According to CISPR 22

Standard Compliance - 1420-V*x*, 1420-V*xx*, 1420-V*xx-xxx*

Attribute	Value
Safety	IEC60664, IEC61010-1 EN60664, EN61010-1
Metrology	EN62052-11, EN62053-21, EN62053-23, EN50470-3
Pulse output	DIN43864, IEC62053-31
Approvals	CE, cULus (E56639)
Connections	Screw-type
Cable cross-section area	2.5 mm^2 (14 AWG) max Screw tightening torque: 0.4 N•m min/0.8 N•m max Suggested screw tightening torque: 0.5 N•m

Housing DIN - 1420-V*x*, 1420-V*xx*, 1420-V*xx-xxx*

Attribute	Value
Dimensions (WxHxD), approx	Module holder: 96 x 96 x 50 mm (3.78 x 3.78 x 1.97 in.) Digital and analog output type modules: 89.5 x 63 x 16 mm (3.52 x 2.48 x 0.63 in.) Serial and Ethernet Communication type modules: 89.5 x 63 x 20 mm (3.52 x 2.48 x 0.79 in.)
Depth behind panel, max	81.7 mm (3.2 in.)
Material	ABS, self-extinguishing: UL 94 V-0
Mounting	Panel mounting
Pollution degree	2
Front	IP65, NEMA4x, NEMA12
Screw terminals	IP20
Weight, approx	400 g (0.88 lb) (packing included)

Certifications - 1420-V*x*, 1420-V*xx*, 1420-V*xx-xxx*

Attribute	Description
UL/CUL	cULus (E56639)
CE Certification	CE Certifications apply when product is marked. See our Product Certification site for Declarations of Conformity, certificates and other certification details.

Overview

The PowerMonitor 1000 unit is a compact, cost-effective, electric power and energy metering device intended for use in industrial control applications, such as distribution centers, industrial control panels, and motor control centers. The power monitor measures voltage and current in an electrical circuit, meeting revenue accuracy standards. The power monitor communicates power and energy parameters to applications, such as FactoryTalk EnergyMetrix, over Ethernet or serial networks. The power monitor works with these software applications to address the following key customer applications:

- **Load profiling** – log power parameters, such as real power, apparent power, and demand, for analysis of power usage by loads over time
- **Cost allocation** – reporting actual energy cost by department or process to integrate energy information into management decisions
- **Billing and sub-billing** – charging users of energy the actual usage cost rather than allocating by square footage or other arbitrary methods
- **Power system monitoring and control** – display and control power flow and energy utilization

Features

Feature	1408-BC3A-*xxx*	1408-TS3A-*xxx*	1408-EM3A-*xxx*
Electrical Parameters			
Voltage (V)		X	X
Current (A)		X	X
Frequency (Hz)		X	X
Energy Management			
Power			
Power (kW)	X	X	X
Reactive power (kVAR)	X	X	X
Apparent power (kVA)	X	X	X
True Power Factor	X	X	X
Consumption			
Real power consumption (kWh)	X	X	X
Reactive power consumption (kVARh)	X	X	X
Apparent power consumption (kVAh)	X	X	X
Demand			
Demand (kW)			X
Demand (kVAR)			X
Demand (kVA)			X
Demand Power Factor			X
Projected kW Demand			X
Projected kVAR Demand			X
Projected kVA Demand			X
Power Quality			
Voltage Unbalance		X	X
Current Unbalance		X	X
Communication (1)			
EtherNet/IP	O	O	O
RS-485 (Modbus RTU, DF1, DH485)	X	X	X
Modbus TCP/IP	O	O	O
Logs			
Time of Use Log	X	X	X
Energy Log	X	X	X
Minimum/Maximum Log	X	X	X
Load Factor Log			X
Unit Status Log	X	X	X
Alarm Log			X
Input/Outputs			
Digital Output		X	X
Digital Accuracy(2)	Class1	Class1	Class1
Status Input		X	X
Other Features			
Configurable via webpage	X	X	X
Display (integrated LCD)		X	X
Alarms			X
CIP Energy Object	X	X	X

(1) An 'O' indicates that these features are optional.

(2) Indicates the revenue metering accuracy class of the power monitor as it is shipped from the factory.

Product Selection

Available Product

Cat. No.	Description
1408-BC3A-485	PowerMonitor 1000 basic consumption metering with Serial communication
1408-BC3A-ENT	PowerMonitor 1000 basic consumption metering with EtherNet/IP network communication
1408-TS3A-485	PowerMonitor 1000 consumption, voltage, and current with Serial communication
1408-TS3A-ENT	PowerMonitor 1000 consumption, voltage, and current with EtherNet/IP network communication
1408-EM3A-485	PowerMonitor 1000 energy, demand, and power monitor with Serial network communication
1408-EM3A-ENT	PowerMonitor 1000 energy, demand, and power monitor with Ethernet network communication

Accessories

Cat. No.	Description
1408-UP485-ENT	485 to ENT firmware upgrade for any PowerMonitor 1000 unit ending in 485

Specifications

General Specifications - 1408-BC3A-*xxx*, 1408-TS3A-*xxx*, 1408-EM3A-*xxx*

Attribute	Accuracy in % of Reading at 25 °C (77 °F) 50/60 Hz Unity Power Factor				Nominal / Range
		Applies to			
		BC3	TS3	EM3	
Voltage sense inputs: V1, V2, V3	±0.5%		X	X	Line-neutral rms: 347V / 15…399V Line-line rms 600V / 26…691V
Current sense input: I1, I2, I3	±0.5%		X	X	5A / 0.05…10.0A rms
Frequency	±0.05 Hz		X	X	50 or 60 Hz / 40…75 Hz
Power functions: kW, kVA, kVAR	EN62053-21:2003 Accuracy Requirement Class 1	X	X	X	
Demand functions: kW, kVA, kVAR				X	
Energy functions: kWH, kVAH, kVARH		X	X	X	
Metering update rates	100 mS V, I, Hz 200 mS Power	X	X	X	

Input and Output Specifications 1408-BC3A-*xxx*, 1408-TS3A-*xxx*, 1408-EM3A-*xxx*

Attribute	Value
Control power	85…264V AC, 47…63 Hz 125…250V DC 4VA max
Voltage sense inputs: V1, V2, V3	Input impedance: 5 MΩ min Input current: 2 mA max
Current sense inputs: I1, I2, I3	Overload withstand: 15 A continuous, 200 A for 1/2 s Burden: 0.05V A Impedance: 0.002 Ω Max crest factor at 5 A is 3.0 Starting current: 5 mA
Status inputs	Contact closure (internal 24V DC) (except BC3)
KYZ output	80 mA at 240V AC / 300V DC (except BC3)

Environmental Specifications 1408-BC3A-*xxx*, 1408-TS3A-*xxx*, 1408-EM3A-*xxx*

Attribute	Value
Temperature, operating	-10…+60 °C (14…140 °F)
Temperature, storage	-40…+85 °C (-40…+185 °F)
Humidity, noncondensing	5…95%
Dielectric withstand	UL61010, EN61010 Pollution Degree 2
Terminal blocks	0.34…2.5 mm^2 (22…14 AWG), 75 °C (167 °F) min copper wire only Recommended torque 0.8 N•m (7 lb•in)
Vibration	2.0 g 10…500 Hz
Shock, operating	30 g peak each axis
Shock, nonoperating	50 g peak each axis

Certifications 1408-BC3A-*xxx*, 1408-TS3A-*xxx*, 1408-EM3A-*xxx*

Attribute	Description
UL/CUL	UL 508 listed, File E56639, for Industrial Control Equipment and CUL Certified.
CE Certification	If this product bears the CE marking, it is approved for installation within the European Union and EEA regions. It has been designed to meet the following directives. **EMC Directive** This product is tested to meet Council Directive 2004/108/EC Electromagnetic Compatibility (EMC) and the following standards, in whole, documented in a technical construction file. EN55011 – Radiated Electromagnetic Emissions EN55011 – Conducted Emissions EN 61326-1 Electrical Equipment for Measurement – EMC Requirements EN61000 – Immunity

Bulletin 1426 - PowerMonitor 5000 Unit

Overview

Do you need a more advanced metering option with power quality features?

Do you have compliance initiatives within your organization?

The PowerMonitor 5000 unit is the next generation of high-end electric metering products from Rockwell Automation. This new family of meters provides advanced technology, new functionality, faster response, and superior accuracy. The M5 model is the base version and provides an extensive range of metering functionality. The PowerMonitor 5000 unit communicates power and energy parameters to controllers, HMI software, and applications such as FactoryTalk EnergyMetrix software over the Ethernet network or other optional networks. The PowerMonitor 5000 unit works with controllers or software applications to address key customer applications including the following:

- Load profiling
- Cost allocation
- Billing and sub-billing
- Power system monitoring and control
- Demand management
- Demand response
- Power Quality Event Identification
- Power Reliability
- Power Quality Analysis

Features

The following features are available on PowerMonitor 5000 units. X = Available; O = Optional; Blank = Not Available

PowerMonitor 5000 Unit Features

Feature	1426-M5E-*xxx*	1426-M6E-*xxx*	1426-M8E-*xxx*
Electrical Parameters			
Voltage (V)	X	X	X
Current (A)	X	X	X
Frequency (Hz)	X	X	X
Energy Management			
Power			
Power (kW)	X	X	X
Reactive power (kVAR)	X	X	X
Apparent power (kVA)	X	X	X
True Power Factor	X	X	X

PowerMonitor 5000 Unit Features

Feature	1426-M5E-*xxx*	1426-M6E-*xxx*	1426-M8E-*xxx*
Consumption			
Real power consumption (kWh)	X	X	X
Reactive power consumption (kVARh)	X	X	X
Apparent power consumption (kVAh)	X	X	X
Current consumption (kAh)	X	X	X
Demand			
Demand (kW)	X	X	X
Demand (kVA)	X	X	X
Demand (kVAR)	X	X	X
Demand Power Factor	X	X	X
Demand (Amps)	X	X	X
Projected kW Demand	X	X	X
Projected kVAR Demand	X	X	X
Projected kVA Demand	X	X	X
Projected Amps Demand	X	X	X
Power Quality Management			
Voltage Unbalance	X	X	X
Current Unbalance	X	X	X
Crest factor	X	X	X
K-Factor	X	X	X
Voltage sag and swell detection	X	X	X
Individual Harmonics (DC-63rd)		X	X
Individual Harmonics (DC-127th)			X
Total Harmonic Distortion (THD)	X	X	X
Interharmonics			X
Transient Detect			X
Flicker			X
Waveform capture		X	X
Communication			
EtherNet/IP	X	X	X
ControlNet	O	O	O
DeviceNet	O	O	O
Input/Outputs			
Status Input	X	X	X
Pulse (digital) Output (Relay and KYZ)	X	X	X
Logs			
Waveform Log		X	X
Energy Log	X	X	X
Minimum/Maximum Log	X	X	X
Load Factor Log	X	X	X

PowerMonitor 5000 Unit Features

Feature	1426-M5E-*xxx*	1426-M6E-*xxx*	1426-M8E-*xxx*
Time of Use Log	X	X	X
Alarm Log	X	X	X
Event Log	X	X	X
Setpoint Log	X	X	X
Data Log	X	X	X
Power Quality Log		X	X
Trigger Data Log		X	X
Snapshot Log		X	X
EN 50160 Weekly and Yearly Logs			X
Other Features			
Configurable via webpage	X	X	X
Revenue Accuracy	X	X	X
Virtual wiring correction	X	X	X
Setpoint programming	X	X	X
Time Sync	X	X	X
Event Sync		X	X
CIP Energy Object	X	X	X

Product Selection

Cat. No.	Description
1426-M5E	PowerMonitor 5000 M5 unit with native Ethernet communication network
1426-M5E-CNT	PowerMonitor 5000 M5 unit with native Ethernet and optional ControlNet network communication
1426-M5E-DNT	PowerMonitor 5000 M5 unit with native Ethernet and optional DeviceNet network communication
1426-M6E	PowerMonitor 5000 M6 unit with native Ethernet communication network
1426-M6E-CNT	PowerMonitor 5000 M6 unit with native Ethernet and optional ControlNet network communication
1426-M6E-DNT	PowerMonitor 5000 M6 unit with native Ethernet and optional DeviceNet network communication
1426-M8E	PowerMonitor 5000 M8 unit with native Ethernet communication network
1426-M8E-CNT	PowerMonitor 5000 M8 unit with native Ethernet and optional ControlNet network communication
1426-M8E-DNT	PowerMonitor 5000 M8 unit with native Ethernet and optional DeviceNet network communication

Accessories

Cat. No.	Description
1426-COMM-DNT	DeviceNet optional communication module
1426-COMM-CNT	ControlNet optional communication module
1426-UPGR-56(1)	M5 to M6 firmware upgrade
1426-UPGR-58(1)	M5 to M8 firmware upgrade
1426-UPGR-68(1)	M6 to M8 firmware upgrade
1426-DM	PanelView™ 800 terminal with factory-installed applications

(1) You can purchase firmware upgrades to add capabilities to your power monitor (for example, promoting an M5 unit to an M6 or M8 unit). Firmware upgrades use the ControlFLASH™ utility. To purchase model upgrades, contact your local Rockwell Automation representative or Allen-Bradley distributor.

Specifications

General Specifications - 1426-M*x*E, 1426-M*x*E-*xxx*

Attribute	Accuracy in % of Reading at 25 °C (77 °F) 50/60 Hz Unity Power Factor	Rating, nom/Metering Range, max
Voltage sense inputs: V1, V2, V3, VN	±0.1%	Line-neutral rms: 398V AC/15…660V AC Line-line rms: 690V AC /26…1144V AC
VG	-	Connect to power system earth ground only. This is a functional ground
Current sense input: I1, I2, I3, I4	±0.1%	5 A / 0.05 - 15.6 A rms
Frequency	±0.05 Hz	50 or 60 Hz / 40…70 Hz
Power functions: kW, kVA, kVAR Demand functions: kW, kVA, kVAR Energy functions: kWh, kVAh, kVARh	• ANSI C12.20 -2010 Class 0.2 (1) Clause 5.5.4 • EN 62053-22 -2003 Class 0.2 (1) Accuracy Clause 8	
Metering update rates	One update per line cycle; 1024 samples per cycle per channel	

(1) For catalog number 1426-M5E (PN-54351) units manufactured from July 2012…January 2013, the accuracy is Class 0.5 not Class 0.2. All other characteristics and products are not impacted. The impacted units are those with manufacturing date codes of 0712, 0812, 0912, 1012, 1112, 1212, 0113.

Input/Output Specifications - 1426-M*x*E, 1426-M*x*E-*xxx*

Attribute	Maximum Rating
Control Power (L1, L2)	85…264V AC 47…63 Hz Or 106…275V DC
Control Power (24V DC)	22.8…25.2V DC
Voltage Sense Inputs: V1, V2, V3, VN	Input Impedance: 5M ohm min Input current: 1 mA max
Current Sense Inputs: I1, I2, I3, I4	Overload Withstand: 22 A Continuous, 200 A for one second Burden: Negligible Impedance: Negligible Maximum Crest Factor at 5 A is 4.0 Starting Current: 5 mA
Status Inputs	Contact Closure (Internal 24V DC)
KYZ Output	Solid State KYZ: 80 mA at 240V AC/V DC
Control Relay	ANSI C37.90 trip duty: 2005

Environmental Specifications - 1426-M*x*E, 1426-M*x*E-*xxx*

Attribute	Maximum Rating
Temperature, operating	-20…+70 °C (4…158 °F)
Temperature, storage	-40…+85 °C (-40…+185 °F)
Humidity, noncondensing	5…95%
Vibration	2 g
Shock, operating	30 g
Shock, nonoperating	50 g
Dielectric withstand	UL61010, EN61010
Installation location	Indoor use only
Altitude	2000 m (6560 ft) max

Certifications - 1426-M*x*E, 1426-M*x*E-*xxx*

Attribute	Description
UL/CUL	UL 61010 listed, File E345550, for Measuring, Testing and Signal-generation Equipment and CUL Certified.
CE Certification	If this product bears the CE marking, it is approved for installation within the European Union and EEA regions. It has been designed to meet the following directives. **EMC Directive** This product is tested to meet Council Directive 2004/108/EC Electromagnetic Compatibility (EMC) and the following standards, in whole, documented in a technical construction file.

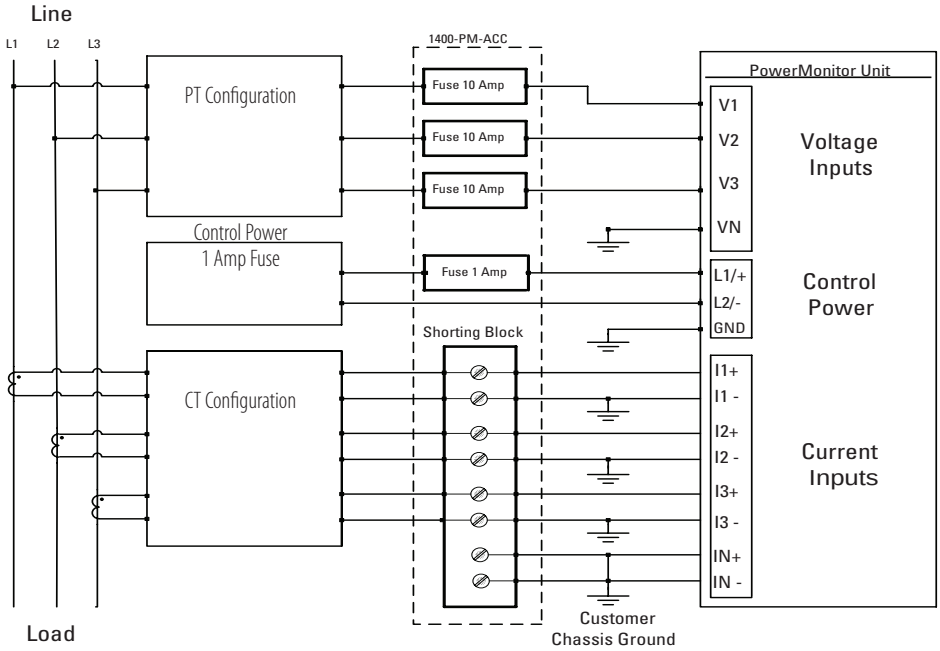
Overview

The 1400-PM-ACC is an accessory kit built for power monitoring wiring. It contains an 8 position shorting block, 3 fuses, and fuse holders for the voltage inputs of the power monitors and 1 fuse and fuse holder for the incoming control voltage to the product.

Current transformers (CT) require shorting blocks to be used when the CTs are being installed or serviced. If CTs are open circuited on the secondary side, extremely high voltage can be generated that can cause fire, severe injury, or fatal injury. Consequently, before removing a load, such as a power monitor, short circuit the CT. An easy and efficient way of providing a short circuit is through the use of a shorting terminal block, which short circuits the CT if the load is removed.

Wire all PowerMonitor units with an accessory kit to safely and correctly wire to the electrical system.

The shorting block and grounding the secondary of the CT is required to limit the maximum voltage to ground for safety purposes. Ground CT secondary circuits at either the CT or the shorting terminal block.



To find your specific wiring mode (Delta, WYE, Open Delta, Direct Connect) for PT configuration and CT configuration, refer to the following publications:

- PowerMonitor 500 Unit - 1420-UM001
- PowerMonitor 1000 Unit - 1408-UM002
- PowerMonitor 5000 Unit - 1426-UM001

We recommend that Control Power is from a separate source than the Voltage Inputs.

Product Selection

In ProposalWorks™ software, this kit is listed as an option named PowerMonitor Protective Connection Kit (catalog number 1400-PM-ACC) under Accessories for the respective PowerMonitor units.

The contents of the PowerMonitor accessory kit include the following items:

Item	Quantity
10 A fuses (for the voltage sensing inputs)	3
1492-FB3C30 fuse holder, 3 pole, 30 A, Class CC fuse	1
1 A fuse (for the control power)	1
1492-FB1C30 fuse holder, 1 pole, 30 A, Class CC fuse	1
8-pole Shorting Block	1

Bulletin 1608S - i-Sense Voltage Quality Monitor / i-Grid Subscription

Overview of i-Sense Voltage Quality Monitor

Voltage sags are responsible for a significant amount of unplanned downtime. i-Sense® technology provides the vital data that pinpoints voltage-based power events, reveals the relationship between voltage sags and downtime situations, and gives you the certainty of knowing the cause, so you can take fast, appropriate and targeted action to get your operations up and running with minimal MTTR (mean time to repair). i-Sense is cost-effective, easy to use, easy to install and virtually maintenance-free. Once installed, the i-Sense transmits your incoming power quality event data to our i-Grid® servers via an Ethernet or modem connection. The event data is collected, analyzed and sent to subscribers in the form of event notifications – giving you the ability to view detailed power quality event data and reports anytime, anywhere, using any computer with an Internet connection, or even a cell phone.

Overview of i-Grid Intelligent Network

Voltage events captured by the i-Sense voltage monitor are transmitted to the i-Grid servers, where valuable power data is collected, analyzed, correlated and distributed back to i-Grid subscribers – all within minutes.

Features

i-Grid lets you quickly understand the impact of power quality events on your facility and determine mitigation strategies.

- Diagnose Downtime Quickly
  - Power quality issues are a frequent cause of downtime and are difficult to diagnose without monitoring in place
  - Instant notification via text or email when an event occurs
- Cost-effective, Permanent Monitoring Solution
  - Permanent monitoring is more effective than temporary solutions at diagnosing random power quality events
- Easy-to-use Web-based Application
  - Access complete event information and history from any internet-connected browser
  - No software to install, configure or maintain
- Voltage Event Tracking
  - Documents the most common source of disruptive dirty power events in utility feeds
- Multiple Configurations Within Single Unit
  - 26 voltages between 100…480V AC
  - Modem or Ethernet network connectivity
  - 50/60 Hz Auto-sensing

i-Sense Voltage Monitor Product Selection

Cat. No.	Description
1608S-3V480K	I-Sense 3-Channel Voltage Sag Detector
1608S-3V480E	I-Sense 3-Channel Voltage Sag Detector Ethernet Only
1608S-6V480K	I-Sense 6-Channel Voltage Sag Detector

i-Grid Subscription Selection

Cat. No.	Description
9300-DVC-3CIS	i-Grid Subscription with 3 Channel i-Sense Monitor
9300-DVC-6CIS	i-Grid Subscription with 6 Channel i-Sense Monitor

Specifications

General Specifications

Attribute	Value
Nominal Voltage	User-selectable, 100V-480V rms, 1-Phase or 3-Phase Immune to voltage fluctuation up to ±10% of nominal and transient over voltages typically present on mains supply (impulse withstand Category II of IEC 60364-4-443)
Frequency	45 . . .65 Hz, auto-sensing
Measurement inputs	1 to 3 channels, Cat. No.: 1068S-3V480K (3-channel) Up to 6 channels, Cat. No.: 1068S-6V480K (6-channel)
RMS voltage measurement accuracy	0.2% typical, ± 2% maximum (of full-scale) True rms
Sample rate	5760 sample/second
Waveform capture rate	32 samples/cycle
Time Stamp	±0.1 seconds typical accuracy
	Real-time clock synchronized to UTC (NIST standard) daily, via i-Grid and SNTP protocol
Data Storage	Non-volatile event storage > 300 events Memory cleared after automatic up load to i-Grid servers
Voltage Deviation Event detection trigger	1/2-cycle rms voltage ≤ 87% or ≥115% of set nominal Adaptive waveform deviation detection of transient events
Voltage Deviation Event Storage	8 cycles waveform data (-1...+3 cycles at event start and -3...+1 cycles at the event end) Continuous rms voltage trend, up to 2 minutes
Periodic (PRMS) Data Logging	Minimum, Maximum and Average rms voltage recorded for each 10-minute period. Min./Max. are lowest/highest sliding 1/2 -cycle rms period
Power supply and battery backup	Powered from Channel 1 (L1-L2 or L1-N), < 25VA load 9V DC external power supply (not provided - for configuration only) Rechargeable batteries enable measurement & communication during power interruptions for up to 2 minutes

Input/Output Specifications

Attribute	Value
Internet Communication	Over port 80 via HTTP protocol. Outgoing only.
Ethernet Network	IEEE 802.3 10 Base-T (10 Mb/s), 8P8C (RJ45) modular connector
Modem (optional)	PSTN (analog telephone) RJ11 modular connector, Most global phone systems supported
Indicators	Red and green front-panel status indicators
i-Sense Management Console	On-board web server for configuration and status, password protected.

Environmental Specifications

Attribute	Value
Operating Temperature	0. . . 40 °C (32...104 °F)
Storage Temperature	-40. . . +75 °C (-40. . . +167 °F)
Relative Humidity	0...95%, non-condensing
Altitude 2000 m	6,562 ft at 40 °C (104 °F)

Housing DIN

Attribute	Value
Enclosure	NEMA 1 (IP20). Indoor use only. Only non-conducting pollution (degree II)
Dimensions (HxWxD)	11.4 x 9.7 x 3.0 in. (291 x 247 x 75 mm)
Weight	8.5 lb (3.6 kg)

Certifications

Attribute	Value
TUV	cTUVus (OSHA NRTL) listed
UL	Tested to UL and CSA safety standards
CE	CE mark (Safety and EMC)
RoHS	RoHS compliant

Bulletin 1407 - Combination Generator Control Module

Overview

The Combination Generator Control Module (catalog number 1407-CGCM) is a programmable automatic generator controller that maintains the generator output voltage within specific limits by controlling the current applied to the exciter field of the generator. The controller consists of a single design to regulate brush-less permanent magnet excited generators and brush-less self excited generators.

The CGCM performs voltage regulation via control of exciter field current provided to the generator stator.

Product Selection

The Combination Generator Control Module is a product specifically designed to protect and synchronize generators in control applications. This includes generator protection, excitation control, synchronization control, and full-function metering.

Cat. No.	Description
1407-CGCM	Combination Generator Control Module with ControlNet Communication
1407-CGCM-DLR	Combination Generator Control Module with Ethernet/DLR Communication

Features

The CGCM has the following features:

Generator Regulation and Control Functions

- Four excitation control modes
  - Automatic voltage regulation (AVR)
  - Manual or field current regulation (FCR)
  - Power factor (PF)
  - Reactive power (VAR)
- Soft start voltage buildup with an adjustable ramp in AVR and FCR control modes
- Overexcitation (OEL) and underexcitation (UEL) limiting in AVR, VAR, and PF control modes
- Underfrequency compensation (Volts/Hertz)
- Line Drop Compensation
- Auto-tracking between operating modes and between redundant CGCM units
- Automatic transfer to a backup CGCM unit in redundant systems
- Generator paralleling with reactive droop compensation or crosscurrent (reactive differential) compensation
- Generator paralleling with real power load sharing
- Synchronizing for 1 or 2 circuit breakers

Generator Protection Functions

- Loss of excitation current (40)
- Overexcitation voltage (59F)
- Generator overvoltage (59)
- Generator undervoltage (27)
- Loss of sensing (60FL)
- Loss of permanent magnet generator (PMG/Excitation power) (27)
- Reverse VAR (40Q)
- Over-frequency (81O)
- Under-frequency (81U)
- Reverse power (32R)
- Rotating diode monitor
- Phase rotation error (47)
- Generator over-current (51)

Metering Functions

- Voltage (V)
- Current (A)
- Frequency (Hz)
- Real power (kW)
- Apparent power (kVA)
- Reactive power (kVAR)
- Power factor
- Real energy (kWh)
- Apparent energy (kVAh)
- Reactive energy (kVARh)
- Controller excitation current and voltage
- Diode monitor ripple level
- Load share error
- Synchronization parameters

Inputs and Outputs

Inputs

- Single-phase or three-phase true rms generator voltage sensing
- Single-phase dual bus or three-phase single bus voltage sensing
- Three-phase generator current sensing (1 or 5 A nominal)
- Single-phase cross current loop 1 or 5 A current transformer (CT) input
- Auxiliary ±10V DC input providing remote control of the setpoints
- DC power input

Outputs

- Pulse-width modulated output power stage rated at 15 A
- Discrete redundancy relay output
- Discrete fault output driver
- Load sharing connection for use with Allen-Bradley® 1402-LSM Line Synchronization Module or compatible hardware

Communication Interfaces

The CGCM has three communication ports:

- Redundant ControlNet connector
- RS-232 port for dedicated communication with a redundant CGCM
- RS-232 port for factory configuration and test (not for customer use)

The CGCM-DLR has three communication ports:

- Redundant EtherNet/IP DLR connector
- RS-232 port for dedicated communication with a redundant CGCM
- RS-232 port for factory configuration and test (not for customer use)

Specifications

Control Power - 1407-CGCM, 1407-CGCM-DLR

Supply	Burden
18…32V DC (24V DC nom)	30 W
AC ripple, max	50%, 50…120 Hz

Excitation Power Requirements - 1407-CGCM, 1407-CGCM-DLR

Source	Phases	Wiring Configuration	Voltage	Frequency	VA (max)
PMG(1)	1-phase	PMG-A and PMG-C	Min 56 Vrms Max 300 Vrms	Min 50 Hz Max 342 Hz	3070
PMG	3-phase	Floating Wye	Min 56 Vrms L-L Max 300 Vrms L-L	Min 50 Hz Max 342 Hz	3070
SE(2)	1-phase	PMG-A and PMG-C	Min 56 Vrms Max 300 Vrms	Min 50 Hz Max 342 Hz	3070
SE	3-phase	Floating Wye	Min 56 Vrms Max 300 Vrms	Min 50 Hz Max 342 Hz	3070
SE	3-phase	Grounded Wye (grounded neutral)	Min 56 Vrms Max 300 Vrms	Min 50 Hz Max 342 Hz	3070
SE	3-phase	Floating delta	Min 56 Vrms Max 300 Vrms	Min 50 Hz Max 342 Hz	3070
SE	3-phase	Open delta, floating	Min 56 Vrms Max 300 Vrmsx	Min 50 Hz Max 342 Hz	3070

(1) PMG = Permanent Magnet Generator

(2) SE = Separately Excited

Generator Voltage Sensing Values - 1407-CGCM, 1407-CGCM-DLR

Phase	Wiring Configurations	Grounded Connection Available	Voltage	Frequency
1-phase	V Gen A and V Gen C	No	57V rms, min 150V rms, max	20 Hz, min 90 Hz, max
3-phase	Floating wye	No	99V rms L-L , min 208V rms L-L, max	20 Hz, min 90 Hz, max
3-phase	Grounded wye (grounded neutral)	Yes	99V rms L-L , min 208V rms L-L, max	20 Hz, min 90 Hz, max
3-phase	Open delta, grounded 'B' phase	Yes	99V rms L-L , min 150V rms L-L, max	20 Hz, min 90 Hz, max

Generator Current Sensing - 1407-CGCM, 1407-CGCM-DLR

Attribute	Value
Type	3-phase plus cross current compensation input
Frequency	50/60 Hz
Range	1 A or 5 A max continuous
Burden	<0.1VA per phase for metering CTs <2.5VA per phase for cross current inputs

Bus Voltage Sensing Values- 1407-CGCM, 1407-CGCM-DLR

Phase	Wiring Configurations	Grounded Connection Available	Voltage	Frequency
1-phase	V Bus A and V Bus C	No	Min 57V rms Max 150V rms	Min 20 Hz Max 90 Hz
3-phase	Floating wye	No	Min 99V rms L-L Max 208V rms L-L	Min 20 Hz Max 90 Hz
3-phase	Grounded wye (Grounded neutral)	Yes	Min 99V rms L-L Max 208V rms L-L	Min 20 Hz Max 90 Hz
3-phase	Open delta, grounded 'B' phase	Yes	Min 99V rms L-L Max 150V rms L-L	Min 20 Hz Max 90 Hz

Auxiliary Voltage Input - 1407-CGCM, 1407-CGCM-DLR

Attribute	Value
Range	-10. . . 10V DC
Input impedance	20k Ω

Field Output

Attribute	Value
Continuous voltage	32, 63, 125V DC (1)
Continuous current	15 A DC
10-second forcing voltage	50, 100, or 200V DC
10-second forcing current	30 A DC
Field resistance, min 32V DC 63V DC 125V DC	 2.13 Ω 4.2 Ω 8.3 Ω

(1) Available output voltage is dependent on magnitude of excitation power input voltage.

Overview

All applications require the installation of current transformers (CTs) for proper power and energy. For ease of procurement and application, we provide a range of current transformers that are most typically applied in conjunction with our PowerMonitor energy monitors.
Proper current transformer selection is required, based on customer application.

Features

The current transformers have the following features:

Low Voltage (600V AC)

Suitable for energy management applications at manufacturing and production facilities and compatible with Allen-Bradley® energy-monitoring product. The offering provides a 5A secondary output for integration with the current terminations of the Allen-Bradley PowerMonitor™ 500, PowerMonitor 1000, and PowerMonitor 5000 product.

Metering Grade

Provides enough resolution to enable comprehensive analysis of energy consumption and identify nuanced usage trends.

Variety of Types

Able to be used around a wide range of conductor sizes with the option of rectangular-shaped or round-shaped CTs. Split-core models are two piece CTs that can be installed without removing conductors and are better for installation in an existing facility. A solid-core or single piece CT is better for installation in a new facility.

Selection Considerations

When selecting the appropriate catalog number for CTs, consider these questions:

- **Are the CTs for an existing or new facility?**

  When selecting the CT, consider whether the installation is a new or existing installation. Generally, split-core CTs are used for retrofit or existing installations (known as Brownfield) because they can be installed without disconnecting the conductor. Solid-core CTs are best suited for new wiring installations (known as Greenfield) because the conductor can be threaded through the CT during the circuit installation process.

- **What is the Current Ratio?**

  It is suggested to select the CTs per the Circuit Breaker Protection Current. We size CTs based on the breaker current so that we can measure a high current or fault current condition. As an example, if the circuit breaker is rated for 600 Amps, use 600 Amp CTs. CTs have a typical 5 Amp output that is scaled on the basis of proportion primary current. The current ratio for this example would then be 600:5. Current Transfers are sized to the circuit breaker's protection current to be able to measure over-current and not just the nominal current.

- **What is the required CT Window Size?**

  Within the Current Transformers Selection Table with the appropriate core type, choose a Window Size slightly bigger than the size of the busbar.

- **What is the desired CT shape (rectangular or round, if specified)?**

  Other criteria includes physical shape (round, square, rectangle). Generally, rectangular-shaped CTs fit better around busbars and round-shaped CTs fit better around conductors.

- **How many CTs are needed?**

  The rule of thumb for determining the minimum number of CTs needed is that wye systems typically require 3 CTs, whereas delta systems can use 2 CTs.

- **What is the catalog number?**

  Use the Current Transformers Selection Table to build the catalog string for the CT.

  For example, if you are selecting a solid-core CT with a 3000 Amp Circuit Breaker Protection Current and 4 inch busbar, then you will use the top portion of the selection table for solid-core CTs. You would go down the column for Current Ratio and find 3000:5. Follow that row across to see the available options. Go up the column and pick the Window Size that will accommodate the 4 inch busbar size. We see that the catalog number for this example is "1411-125-302", where 125 corresponds to the Module Designation code and 302 is the Ratio Designation code.

Product Selection

An existing facility would use a split-core CT (Brownfield), while a new facility would use a solid-core CT (Greenfield).

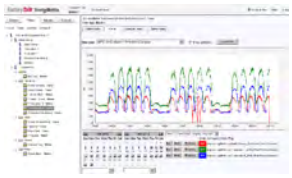
Catalog Number = 1411 + Module Designation + Ratio Designation (example: 1411-8RL-401)

Core Type	**Solid-core (single piece)**									
Module Designation	**-AL**	**-2DRL**	**-2SFT**	**-2SHT**	**-180RL**	**-180SHT**	**-8RL**	**-8SHT**	**-125**	**-126**
Window Size	1.05 in.	1 in.	1.13 in.	1.13 in.	2.5 in.	2.5 in.	3.25 in.	3.25 in.	6.31 in.	8.25 in.
OD Shape	Round	Round	Rectangular	Rectangular	Round	Rectangular	Round	Rectangular	Rectangular	Rectangular
Mounting Included	None	None	Built-in	None	None	None	None	None	None	None
Current Ratio	**Ratio Designation**									
50:5	-500	-500	-500	-500	-500	-500				
80:5	-800	-800	-800	-800						
100:5	-101	-101	-101	-101	-101	-101				
150:5	-151	-151	-151	-151	-151	-151				
200:5	-201	-201	-201	-201	-201	-201	-201	-201		
300:5	-301	-301	-301	-301	-301	-301	-301	-301		
400:5	-401				-401	-401	-401	-401		-401
600:5					-601	-601	-601	-601		-601
1000:5					-102	-102	-102	-102	-102	-102
1600:5					-162	-162	-162	-162	-162	-162
2000:5					-202	-202	-202	-202	-202	-202
3000:5							-302	-302	-302	-302
4000:5							-402	-402	-402	-402
6000:5										-602

Core Type	Split-core (two piece)							
Module Designation	**-600**	**-601**	**-604**	**-606**	**-608**	**-615**	**-616**	**-617**
Window Size	2 x 5.5 in.	4.5 x 4.5 in.	1.42 x 1.53 in.	2.75 x 2.7 in.	2.6 x 6.25 in.	1.3 x 1.6 in.	1.3 x 2.15 in.	2 x 3.5 in.
OD Shape	Rectangular	Rectangular	Rectangular	Rectangular	Rectangular	Rectangular	Rectangular	Rectangular
Mounting Included	None	None	None	None	None	None	None	None
Current Ratio	**Ratio Designation**							
100:5			-101			-101		
150:5			-151					
200:5			-201	-201		-201	-201	
300:5	-301	-301	-301	-301		-301		
400:5	-401	-401	-401	-401		-401	-401	-401
600:5	-601	-601		-601	-601			
800:5					-801		-801	-801
1000:5	-102	-102		-102	-102			-102
1200:5				-122				-122
1600:5	-162	-162			-162			
2000:5	-202	-202			-202			
3000:5					-302			
3200:5					-322			

Bulletin 9307 - Power Management Software

Overview



Power Quality and Energy Management software is available for simple and complex systems. This software helps you configure our products and access energy data in real time.

Our software also lets you capture, analyze, store, and share energy data across your entire enterprise through standard web browsers. This makes it easy for you to acquire and distribute the knowledge you need to optimize energy consumption and improve productivity while lowering energy costs.

FactoryTalk EnergyMetrix Software

FactoryTalk EnergyMetrix software is sophisticated, web-enabled energy management software that puts critical energy information at your desktop. The FactoryTalk EnergyMetrix software suite combines data communication, client-server applications, and the Microsoft advanced .Net web technology to provide you with a complete energy management solution. FactoryTalk EnergyMetrix software captures, analyzes, stores, and shares energy data across your entire enterprise. By using a web browser, your energy information is now available on your company's LAN or WAN, presenting you with the knowledge necessary to optimize your energy consumption. The net result is improved productivity and lower energy costs.

FactoryTalk EnergyMetrix includes the following:

- Load profiling
- Cost allocation
- Power quality monitoring
- Destribution system monitoring
- Demand management
- Energy load shedding
- Power system control

Product Selection

FactoryTalk EnergyMetrix Availability

Description	Cat. No.
FactoryTalk EnergyMetrix Manager with standard reports and charting capability. Includes 10 meters that can be used in any combination of Allen-Bradley meters and OPC. No SQL license.	9307-FTEMMENE
FactoryTalk EnergyMetrix OPC license. Allows for use of OPC with manager above 10 meters. OPC meters are unlimited with this license but require purchase of additional meter bundles.	9307-FTEMOPC
FactoryTalk EnergyMetrix Real Time lets you view data real time	9307-FTEMRT
FactoryTalk EnergyMetrix Charts Plus provides enhanced charting capability	9307-FTEMCHT
FactoryTalk EnergyMetrix Reports Plus provides enhanced reports	9307-FTEMRPT
FactoryTalk EnergyMetrix Bundle of 10 meters, requires Manager	9307-FTEM10
FactoryTalk EnergyMetrix Bundle of 50 meters, requires Manager	9307-FTEM50
FactoryTalk EnergyMetrix Bundle of 100 meters, requires Manager	9307-FTEM100
FactoryTalk EnergyMetrix Bundle of 500 meters, requires Manager	9307-FTEM500

Features

Base Package: FactoryTalk EnergyMetrix Manager

- Set up groups, domains, roles, users, devices, meters
- Log data from Allen-Bradley devices
- Basic reports and charts
- Rate schedules and billing reports
- 10, 50, 100, or 500 meter licensing

Ships with Microsoft SQL 2012 Express.

Optional Packages

FactoryTalk EnergyMetrix ReportsPlus	FactoryTalk EnergyMetrix ChartsPlus	FactoryTalk EnergyMetrix OPC Client	FactoryTalk EnergyMetrix RT
Optional package	Optional package	Optional package	Optional package
Enhanced reports	Enhanced charts	Enables OPC Client in Manager	Configure Allen-Bradley power monitors
	Flexible formatting tools for customizing	Requires customer provided OPC server	View real-time data from Allen-Bradley power monitors

Scalability

FactoryTalk EnergyMetrix software interfaces to your existing systems through standard protocols and has the scalability to add additional components while maintaining your original investments:

- FactoryTalk EnergyMetrix Manager: The core data logging, reporting, charting, and billing package. Manager is a server-based, web-enabled application that runs on a Windows Server 2012 R2 or workstation. Microsoft Internet Explorer accesses and configures Manager. FactoryTalk EnergyMetrix Manager is available with 10, 50, 100, or 500 meters licenses.
- FactoryTalk EnergyMetrix RT: The real-time communication, configuration, and data display package of FactoryTalk EnergyMetrix software. RT is available with FactoryTalk EnergyMetrix Manager or as a standalone package.
- FactoryTalk EnergyMetrix OPC Client: Provides connectivity to meters other than Allen-Bradley power monitors. Like Manager, the 3PX package is offered in 10, 50, 100, and 500 meter licenses.
- FactoryTalk EnergyMetrix ReportsPlus: Creates custom reports beyond the standard reports included with Manager.
- FactoryTalk EnergyMetrix ChartsPlus: Creates custom charting capabilities above the standard charts included with Manager.

Connectivity

Connect to metering points right from your desktop PC:

- Connectivity through RSLinx™ software: RS-232, RS-485, Ethernet, DeviceNet, remote I/O pass-thru, optical, and modem (RSLinx Lite software is included with the Manager package)
- Third-party connectivity - OPC

Configuration

FactoryTalk EnergyMetrix software provides easy and flexible configuration:

- Configure electricity, gas, water, and steam meters or any energy or production related inputs
- Configure manual meters as placeholders in the database for manual data entry
- Configure user-defined data sources, such as standard PLC-5® or SLC™ hardware types or Generic OPC
- Flexible configuration lets you do the following:
  - Name your devices
  - Name your groups
  - Create sub-groups
  - Put meters in multiple groupings for cost allocation
- Set and change meter configuration values remotely
- Multi-level password protection and privileges

Monitoring and Analysis

FactoryTalk EnergyMetrix software is a powerful load profiling, cost allocation, and billing analysis tool

- Log usage, cost, and power quality data
- View any parameter in real time
- Create historical trend reports and charts
- View historical trending of individual meters and groups and save tabular data for further processing and analysis
- Establish consumption baseline and user-defined time of use periods
- Create custom rate plans by using the rate plan menu and line item scripting
- Assign rate plans to meters or groups of meters
- Import and export rate schedules in XML format
- Create and print daily or monthly cost and billing reports by the following:
  - Meter
  - Business group
  - Department
  - Site
- Create energy budgets and forecasts
- Compare and contrast alternative utility rates; do 'what-if' for other rate structures
- Print and store all reports and charts

Guidelines for Server

- Windows Server 2008 R2 or Windows Server 2012 R2. RSLinx Classic software version 3.60.
- Microsoft SQL Server 2008 R2 and Microsoft SQL 2012, installed with mixed-mode authentication (Windows and SQL). TCP/IP access must be enabled. A system administrator SQL login must be used for the FactoryTalk EnergyMetrix software installation.
- You must have machine administrator privileges to install FactoryTalk EnergyMetrix software.

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Rockwell Automation Support

Use the following resources to access support information.

Technical Support Center	Knowledgebase Articles, How-to Videos, FAQs, Chat, User Forums, and Product Notification Updates.	www.rockwellautomation.com/knowledgebase
Local Technical Support Phone Numbers	Locate the phone number for your country.	www.rockwellautomation.com/global/support/get-support-now.page
Direct Dial Codes	Find the Direct Dial Code for your product. Use the code to route your call directly to a technical support engineer.	www.rockwellautomation.com/global/support/direct-dial.page
Literature Library	Installation Instructions, Manuals, Brochures, and Technical Data.	www.rockwellautomation.com/literature
Product Compatibility and Download Center (PCDC)	Get help determining how products interact, check features and capabilities, and find associated firmware.	www.rockwellautomation.com/global/support/pcdc.page

Documentation Feedback

Your comments will help us serve your documentation needs better. If you have any suggestions on how to improve this document, complete the How Are We Doing? form at http://literature.rockwellautomation.com/idc/groups/literature/documents/du/ra-du002_-en-e.pdf.

Rockwell Automation maintains current product environmental information on its website at http://www.rockwellautomation.com/rockwellautomation/about-us/sustainability-ethics/product-environmental-compliance.page.

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