



EPM 9800

ADVANCED POWER QUALITY METERING SYSTEM

Precision measurement, advanced communication, basic PQ and alarm reporting, economical recording meter.

KEY BENEFITS

- Socket type mounting design with advanced power quality recording with EN50160 Flicker compliance monitoring
- Revenue class .06% Watt/Hr metering with 20 years time of use calendar
- Comprehensive logging & recording capability
- Auto-calibration and temperature change compensation
- Advanced DNP 3.0 implementation
- High speed waveform recording with programmable 16 to 512 samples per cycle resolution
- Extensive harmonics capability provides a real-time harmonic analysis to the 128th order for every channel. Records THD to the 255th order peak
- Real time phasor analyzer monitors phase angles between the voltage and the currents
- Multiple communication option with 10/100BaseT ethernet and web capability that for data viewing over the web
- Upto 256 expandable digital and analog I/O modules for analysis and control

APPLICATIONS

- Advanced power quality monitoring
- Revenue class energy and power billing with .06% accuracy
- Control of external devices using I/Os
- Alarm and event notification over the web, email, pager or telephone

FEATURES

Monitoring and Metering

- True RMS real-time power and energy parameters reporting
- 4 quadrant, high accuracy revenue metering
- Automatic dial-out for remote data downloads. Dial-In during outage notification
- Comprehensive events and alarms recording using GPS synchronized time stamps.
- Historical logs for energy, power events and alarms.
- Flicker and waveform recording
- Real-time PQ monitoring and analysis

User Interface

- RS 485 communication ports
- Optical port
- Internal ethernet TCP/IP
- Built-in dial-in and dial-out telephone modems
- Industry leading DNP 3.0 level 2 plus, Modbus RTU and Modbus ASCII
- Multiple analog, digital and relay inputs/outputs
- Programmable LCD display screen

Eta "Power Monitoring"

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Standard Features

Description

With the socket type mount design EPM 9800 meter is perfect for industrial and utility substation automation applications where both power quality monitoring and revenue accuracy are required. EPM 9800 provides most accurate analysis of electric power and energy. Using advanced DSP technology meter measures instant and stored revenue power data.

Meter includes all the attributes required for highest level of PQ analysis and communication. From today's utility giants to large industrial users to local electrical municipal, an effective energy management and power-monitoring program is critical for success. The EPM 9800 is an advanced monitoring product, providing the total picture of power usage and power quality for any metered point within a power distribution network allowing users to make power related decisions quickly and effectively. With its web server capability, EPM 9800 can be monitored anytime and from anywhere via the Internet. EPM 9800 is simple to use and easy to setup.

Precision Power Quality Measurement

16-bit Waveform and Fault Recorder

EPM 9800 captures up to 512 samples per cycle for an event. Voltage and current are recorded with pre-and-post-event analysis. Hardware and software triggers are available to activate a waveform reading, which can be used for power quality surveys, fault analysis, breaker timing, motor start-up, etc.

Measure and Record Harmonics to the 255th Order

Measures harmonics up to the 255th order for each voltage and current channel. Real-time harmonics are resolved to the 128th order. Percent THD and K-factor are also calculated. Harmonic analysis allows users to conduct power quality analysis at the high end of the harmonic spectrum.

Sub-Cycle Transient Recorder

The unit records sub-cycle transients on voltage and current readings. It monitors switching noise from capacitors, static transfer switches, SCRs and many other "power quality harmful" devices. Transients are often the cause of intermittent and expensive downtime.

Independent CBEMA Log Plotting

The EPM 9800 stores an independent CBEMA log for magnitude and duration of voltage events. In this manner, the user can quickly view total surges, total sags and average duration without having to retrieve waveform information.

Phasor Analysis

The monitor reads a phase angle analysis between the voltage and current channels, allowing for efficiency and system-integrity analysis.

Harmonics Analysis

The EPM 9800 provides users with the ability to view harmonics, the discrete frequencies that lie between the harmonics of the power frequency voltage and current. Frequencies can now be observed which are not an integer multiple of the fundamental.

Flicker

EPM 9800 complies with EN50160 Flicker standard requirements Flicker consists of low frequency (less than 24 Hz) to intermittent line disturbances on the power line. Flicker can effect equipment as well have negative effects on humans. The EPM 9800 fully complies with the Flicker requirements of EN50160 that includes:

- Short term readings - PST-10 Min/Logging & monitoring
- Long Term Reading - PLT-4hour/Logging and monitoring
- Log viewer - Pst and Plt for Va, Vb, and Vc

Revenue Grade Metering

Full 4-quadrant revenue grade metering capability provides 0.06% accuracy for energy and power usage. EPM 9800 provides robust Time of Use (TOU) metering with 8 TOU schedules, 4 Seasons, and 20 year calendar with prior month and prior season data for each TOU schedule.

Other advanced billing features includes:

- kWh delivered and received
- kVAh and kVArh in each quadrant
- Bi-directional consumption and demand
- Transformer Loss Compensation

Demand with Reset switch

EPM 9800 provides lockable demand reset switch that prevents tempering. EPM 9800 provides multiple demand windows and simultaneous monitoring and calculation of 4 demand types -

- Block or Fixed Demand
- Rolling or Sliding Window Demand
- Predictive Demand
- Thermal Demand

Demands can be programmed in variable intervals ranging from 1 second to several hours. With up to 255 subintervals. Demand data is time stamped using the internal clock. To further enhance time stamp accuracy meter clock can be synchronized using an IRIGB signal. Following demand data is time stamped:

- kW Demand Delivered and Received, minimum and maximum
- kVAh Demand Delivered and Received, minimum and maximum
- kVAh coincident with kW Demand
- kVA Demand, minimum and maximum
- Current (Amp) minimum and maximum
- Voltage- minimum and maximum

Auto-calibration and temperature compensation

The Digital Sensing Technology (DSP) provides unmatched accuracy through automatic self calibration and making adjustments based on changes in ambient temperature. This ensure that the meter data integrity even under harsh environments.

Multiple Programmable Memory Logs

The EPM 9800 Series meters utilize two separate logs of historical information. In addition to all power parameters, the historical logs allow users to trend data from remote I/O devices. Furthermore, through the use of I/Os, circuit breaker pressure, transformer temperature or any other analog or digital parameter can be monitored which can help in conducting preventative maintenance on critical equipment and power analysis.

Primary Historical Trending Log File - Log 1

Log any measured parameter from either the main unit or any of the option modules. Up to 64 values can be logged per programmable interval.

Secondary Historical Trending Log File - Log 2

This log can be set up as an additional historical interval log or as an exclusive energy log. Up to 64 values can be logged per interval.

Out Of Limit Log

The units offer an independent out of limit log. This allows a user to download out of limit information to obtain a sequence of events for any occurrence. Utilizing the 1 millisecond clock resolution, the logs can be combined with different metered points through a distribution system to provide an accurate system-wide depiction of a power disturbance.

Event-Triggered Waveform Recording Log

EPM 9800 records waveforms with a resolution of up to 512 samples per cycle. The amount of waveform recording is based on the amount of memory installed. The unit records the waveform when a value goes out of limit and when the value returns to normal. All information is time stamped to the nearest 1 millisecond. The 8 on-board high-speed inputs can be tied to the waveform recording. Record when the breaker tripped as compared to when the relay activated. This is very useful for fault and breaker integrity analysis.

The unit can be programmed to take more than one recording every time an event occurs. Thousands of cycles can be recorded per event.

System Events Log

EPM 9800 records system events for security and anti-tempering for the following:

- Power Up/down
- Password access/modification
- Change in programmable settings
- Change of run time
- Change of clock time through remote communication (Modbus or DNP)
- Testmode usage
- Meter resets (min/max,logs etc)

User Interfaces

Communication

EPM 9800 offers two built-in, isolated high-speed RS485 communication ports. Any of these ports can communicate using standard protocols that includes Modbus RTU/ASCII and DNP 3.0. Logs and waveform events are available in Modbus format.

Industry Leading DNP 3.0 Level 2 Plus Protocols

The EPM9800 provides the industry's most advanced DNP 3.0 protocol implementations. Meter complies with all DNP Level 1 and Level 2 certification requirements and a host of additional features including:

- Up to 136 measurements (64 binary inputs, 8 binary counters, 64 analog inputs) can be mapped to DNP static points in customizable DNP point map.
- Up to 16 relays and 8 resets can be controlled through DNP.
- Report-by-exception processing (DNP Events) dead-bands can be set on a per-point basis.
- 250 events of combinations of four events (Binary Input Change, Frozen Counter, Counter Change, Analog Change.)
- Freeze Commands: Freeze, Freeze/No-Ack, Freeze with Time, Freeze with Time/No-Ack.
- Freeze with time command enables the EPM 9800 meter to have internal time driven frozen counter and frozen counter event data. When the EPM 9800 meter receives the time and interval of when the data is created.

4 KYZ Pulse Outputs

EPM 9800 comes equipped with 4 standard internal KYZ pulse outputs for generating energy and power signal that can be sent to external devices such as PLCs.

8 Digital Inputs for Load Aggregation

Using standard 8 KYZ pulse/status inputs, EPM 9800 can count pulses from external meters and accumulate usage. The pulse inputs can be used to totalize electrical usage and utility values such as water and gas. These pulse inputs can be also used to:

- Accumulate individual registers
- 4 totalized registers that can be added to subtracted
- Totalize with meters kWh readings

Infrared Test Pulse Output

The meter provides an Infra-red test pulse that selects to pulse for the following:

- (+) Watt-hour o (-) Watt-hour
- (+) VAR-hour o (-) VAR-hour
- VA-hour

The pulse uses a time modulated pulse integration allowing the pulse to be accurate during short duration pulse tests using industry accepted reference standards.

IRIG -B Synchronization Pulse Input

EPM 9800 has built-in input for IRIG-B time synchronization using universal GPS signal. Meter clock can be synchronized within 1 millisecond time resolution.

Programmable Graphical Back-Lit LCD Display

EPM 9800 comes standard with built-in user programmable, back-lit graphical display. Meter displays both data and graphical elements, for example, vector diagrams and harmonic plots. The display is comprised of over 400 display screens in three different flexible modes.

- Normal Mode
 - kWh delivered and received
 - kVAh delivered and received
 - kVAh delivered and received
 - Rolling Demands
 - Block Demands

Ia	330.02
Ib	316.09
Ic	297.01
In	1.72
8:50:05 03/08 ABC	

Va-n	120.94
Vb-n	120.33
Vc-n	120.51
8:50:05 03/08 ABC	

- Time-of-use Mode
 - kWh & kW Demand Delivered & Received for each TOU rate
 - kWh & kW Demand Delivered & Received Total
 - kVAh & kVA Demand Delivered & Received for each TOU rate
 - kVAh Delivered & Received for each TOU rate
 - kVAh Delivered & Received Total

