# PWRM20-01: IoT Energy Monitoring Module

## High-Accuracy, Rugged, Instrument Class®, Energy Monitoring Module

### DESCRIPTION

The Energy Monitoring Module PWRM20-01 is an IoT universal, high-accuracy, compact, self-powered, electrical energy measurement device that interfaces to three-phase and single-phase systems. Specifically designed for industrial and commercial heavy-duty new and retrofit applications, the module provides a wide range of highly accurate power and energy measurement values over an operating temperature range of -40°C to +85°C.

The DIN-rail mounted enclosures have pluggable terminal blocks for connecting to phase voltages and phase currents which simplifies setup and maintenance, and the small format requires little space in control cabinets. The PWRM20-01 module interfaces to phase voltages of 85–525VAC, 50/60Hz, and is self-powered from any of the lines. Higher voltages can be interfaced to with the use of voltage transformers (VT) and appropriate scaling factors in the module.

Phase current inputs have an industry-standard range of 0.333VAC full-scale. An external shunt, current transformer, or Rogowski Coil is required to measure currents directly or non-contact.


Figure 1: PWRM20-01 Module

### FEATURES

The PWRM20-01 module measures and reports a wide range of electrical energy parameters which include, but are not limited to:

- RMS Voltages and Currents
- Phase Angles
- Line Periods
- Instantaneous Total Active Power
- Instantaneous Total Apparent Power
- Fundamental Active Power
- Power Factors
- Total Active Energy
- Fundamental Active Energy
- Fundamental Reactive Energy
- Total Apparent Energy
- Harmonics
- Power Quality
  - Over-Voltage
  - Over-Current
  - Sag

Real-time data from the module is accessed via an Ethernet TCP/IP port using the HTTP API and a standard web browser on a host computer, smartphone, or tablet. Data logging is user-configurable and once parameters and ranges are selected, the data is automatically downloaded and stored.

### BENEFITS

Measuring power quality, monitoring energy consumption, determining machine health, and performing other powerful data analysis turn into simple and easy operations with this user friendly and feature rich IoT energy monitoring module.

### APPLICATIONS

- Energy Metering Systems
- Power Quality Monitoring
- Solar Monitoring
- Process Monitoring
- Health of Machine
- Predictive Maintenance
- Retrofit Applications in Energy Distribution and Industry

The PWRM20-01 module is designed for installation in harsh industrial environments and has a high-level of noise immunity.

### Ordering Information

| Model | Description |
|---|---|
| PWRM20-01 | 85 – 525VAC, 50/60Hz Input |

## ATTENTION

Read, understand, and follow all instructions in the Quick Start Guide and Hardware User Manual, including all warnings, cautions, and precautions before installing and using.

PWRM20-01 module literature and software is available for download from the PWRM20-01 Software & User Download Center.

MA1069 PWRM10-01 & PWRM20-01 Quick Start Guide

MA1068 PWRM10-01 & PWRM20-01 Hardware User Manual

MA1067 PWRM10-01 & PWRM20-01 HTTP API User Manual

## CAUTION – RISK OF ELECTRICAL SHOCK

When installing and operating the PWRM20-01 module, there is a potential for shock hazard from dangerous high-voltage. Ensure systems are de-energized before installing or removing the terminal blocks.

## Electrical Specifications Typical* at $T_A$ = +25°C

| Module | PWRM20-01 |
|---|---|
| Phase Voltage Range | 85 – 525VAC |
| Phase Frequency | 50/60Hz Input |
| Dimensions (h)(w)(d) | 4.24" x 0.89" x 4.48"<br>107.7mm x 22.6mm x 113.7mm |
| Material | Polyamide |
| Mounting | DIN Rail |
| Weight | 0.4lb (0.18kg) |
| **Electrical System** | |
| Voltage Measurement (Direct Connection or VT) | Single-Phase (2-Wire)<br>Two-Phase (3-Wire)<br>Three-Phase Wye (3-Wire)<br>Three-Phase Delta (3-Wire)<br>Three-Phase Wye (4-Wire)<br>Three-Phase Delta (4-Wire) |
| Current Measurement | Shunt, CT, or Rogowski Coil |
| **Measured Parameters and Accuracy** | |
| RMS Voltage | ±0.1% of Full-Scale Range |
| RMS Current | ±0.1% of Full-Scale Range |
| Active Power | ±0.2% |
| Apparent Power | ±0.2% |
| Reactive Power | ±0.2% |
| Power Factor | ±0.2% |
| Frequency Range | 45 – 65Hz |
| Active Energy | ±0.25% |
| Apparent Energy | ±0.25% |
| Fundamental Active & Reactive Energy | ±0.25% |
| Phase Angles | ±0.1% |
| Line Periods | ±0.1% |
| **Measurement Bandwidth** | |
| RMS Voltage & Current (–3dB) | 3.3kHz |
| Total Active Energy (–3dB) | 3.3kHz |
| Fundamental Reactive Energy (–3dB) | 3.3kHz |
| Harmonic (–3dB) | 3.3kHz (2.8kHz No Attenuation Pass Band) |
| **Temperature Drift** | |
| | ±100ppm/°C |
| **Events** | |
| | Over-Voltage, Over-Current, Sag |
| **Security** | |
| | Password for Access Control |
| **Data Logging** | |
| | Configurable; Automatic Download and Storage |
| **Communications Interface** | |
| Connectivity Type | Ethernet, TCP/IP |
| IP Configuration | DHCP, Static IP |
| Port | Selectable (Default 80) |
| Number of Simultaneous Connections | 6 |
| Protocol | HTTP API |
| **Power Supply** | |
| Source | Self-Powered from Any Line |
| Wide Range Power Supply | 85 – 525VAC |
| Power Consumption | 1.7W |
| Frequency | 50 / 60Hz |
| **Environmental** | |
| Operating Temperature | –40°C to +85°C |
| Storage Temperature | –40°C to +85°C |
| Relative Humidity | 0 to 95%, Non-Condensing |
| **Compliance and Conformity** | |
| **Emissions, EN61000-6-4** | ISM Group 1 |
| Radiated, Conducted | Class A |
| **Immunity EN61000-6-2** | ISM Group 1 |
| RF | Performance A ± 2% Span Error |
| ESD, EFT | Performance B |
| **Certifications & Approvals** | Heavy Industrial CE |

NOTES: * Contact factory for maximum values.