WATTSON®-MARK II

PRECISION ENERGY METER

The WattsOn-Mark II Precision Energy Meter uses cutting-edge metering technology to provide unprecedented accuracy, resolution and metering performance for any electrical installation. WattsOn monitors each phase individually and incorporates the functions of single-phase, split-phase, and three-phase meters.

FEATURES:

- ANSI C12.20 Class 0.2 Accuracy Compliant, Four-Quadrant
- California CSI PBI Eligible
- High-Resolution Power and Energy measurements
- Fast update (100ms) for all power readings
- Per phase instantaneous and accumulated data
- Ultra-High Dynamic Range simplifies CT options
- Compatible with mV, mA, 5A and Rogowski Coil Inputs
- Digital communication via RS-485 (Modbus/RTU or BACnet MS/TP)
- Customizable Modbus Register Map
- Compatible with common Solar Industry Modbus Specifications
- Alarm / Pulse Outputs
- DIN and wall-mount enclosure
- Optional Display with Datalogging and Real-Time Clock
- Optional Ethernet with Modbus/TCP, BACnet/IP or web server with user configurable POST capability

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PRODUCT DESCRIPTION:

The WattsOn-Mark II Precision Energy Meter utilizes advanced metering technology to implement a multi-function power and energy meter into a small, cost-effective package. WattsOn-Mark II provides a unique solution for monitoring virtually any wiring installation including single phase, split phase and three phase loads. It accepts up to 600V (line-to-line) directly, without the need for potential transformers. It may be configured for use with industry standard 5A CTs, 333mV CTs, mA CTs (such as Elkor's line of "safe" mA split and solid core CTs) or Rogowski Coil flexible CTs.

The WattsOn-Mark II offers full four-quadrant metering. All parameters are metered and accumulated on a per-phase basis. Instantaneous power (W, VA, VAR) feature a high update rate (100ms), other parameters are updated every 500ms. The high sampling rate, true-RMS inputs may be used even with distorted waveforms, such as those generated by variable frequency drives and SCR loads, up to the 30th harmonic.

The meter provides comprehensive per phase data, including Volts, Amps, Real Power, Reactive Power, Apparent Power, Voltage Angle, Power Factor and Frequency, Quadrant, Import/Export/Net Wh/VAh and per Quadrant VARh.

All models include Ultra-High Resolution and Dynamic Range. This feature allows mA input meters to be user configured and no longer requires the CT model and ratio to be specified at the time of ordering, simplifying meter and CT selection. The wide dynamic range of the current inputs ensures high accuracy and resolution even at very low measurements. Precise CT ratios and phase compensation may be field programmed for ultimate accuracy. Additionally, the meter may be configured with individual CT ratios per-phase, allowing for metering asymmetrical loads such as individual building branch circuits.

Measurements are available via the RS-485 output port (Modbus/RTU or BACnet MS/TP). In addition, two solid-state relay outputs are provided and may be software configured for pulse, status or alarm triggers, on any measured parameter. An on-board graphic LCD display, real-time clock and data logging are available as an option.

The meter may be optionally equipped with an integrated BACnet/IP gateway, or an ETnet (Ethernet module providing Modbus/TCP, web server, as well as HTTP post capability).

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SPECIFICATIONS:

INPUTS			
Power Supply	12-30 VDC or 24 VAC, < 2VA		
Supported Wiring Types	Up to 347/600V Delta, Wye Single-phase installations up to 347V RMS Split-phase (two phase) installations		
Frequency	40-70 Hz nominal (30-300 Hz max)		
Voltage	20Vac - 347Vac L-N (600Vac L-L), (450Vac L-N, 780V L-L absolute max.)		
Current	*-5A Model*	*-mA Model*	*-mV Model*
Input Rating	5A nominal via 5A output CTs (10A max)	200mA via mA CTs (ie: Elkor "Safe" mA output CTs)	333mV output CTs (400mV max)
Input Impedance	0.05Ω max	1.5Ω typ	800kΩ min, 1.2MΩ typical
Wire Size	Voltage: AWG 30-12, (AWG 16-22 recommended) Current: AWG 24-12, (AWG 12-16 recommended for 5A CTs)		
Overload	20% continuous (voltage & current) maintaining full accuracy. 100% momentary current overload.		

OUTPUTS	
Modbus/RTU	RS-485 2-wire, 9600 to 230400 baud (-M1 Models)
BACnet MS/TP	RS-485 2-wire, 9600 to 115200 baud (-M2 Models)
Expansion Bus	RS-485 2-wire, for accessory expansion
Relay	2x Solid-State Relay Outputs (100 mA @ 50V max) User Programmable for alarm, status or pulse output
Indicators	LED indication of: Voltage, Current, Power, Output relay state, Status, Communication
Display (Option)	Back-lit Graphic LCD Display 128x32 (–DL models only)
Ethernet (Option)	ETnet module (integrated) featuring Modbus/TCP, Webserver, HTTP POST, SSL
BACnet/IP (Option)	ETBAC module (integrated) featuring BACnet/IP connectivity

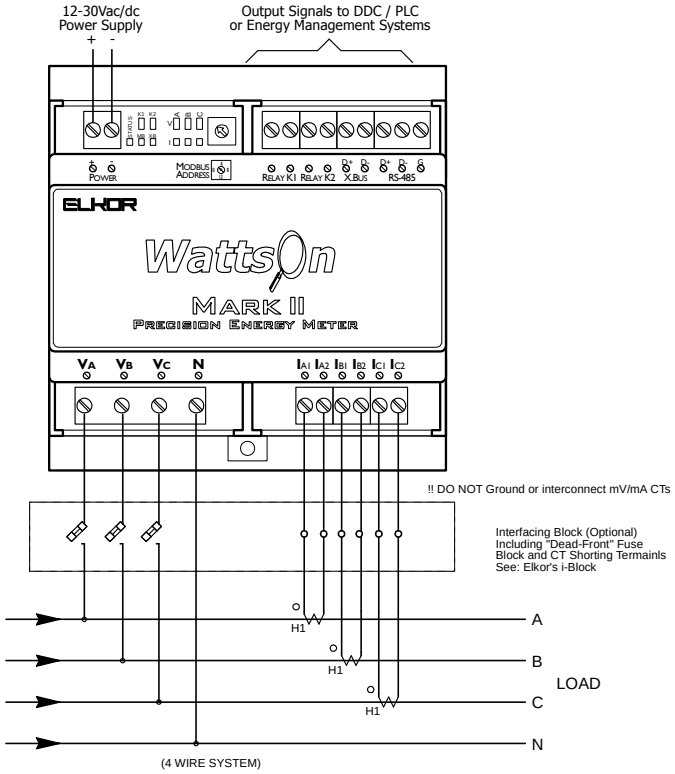
ACCURACY		
Standards	ANSI C12.20 Class 0.2 Accuracy Certified Supports EN 50470-1, EN 50470-3, IEC 62053-21, IEC 62053-22, and IEC 62053-23 standards.	
Current (A)	0.05% typ	0.1% max
Voltage, L-N (V)	0.1% typ	0.2% max
Voltage, L-L (V)	0.2% typ	0.3% max
Power (W, VA, VAR)	0.1% typ	0.2% max
Energy	0.1% typ	0.2% max
Power Factor	0.2% max	
Frequency	0.01% max	
Input Bandwidth	2 kHz (33rd Harmonic @ 60Hz, 40th Harmonic @ 50Hz)	
Data Update Frequency	10Hz (every 100ms) for instantaneous W, VA, VAR 2Hz (every 500ms) for all other parameters	

MECHANICAL	
Dimensions	4.2" x 4.3" x 2.4" W x L x H
Mass	0.15 kg (-mA and –mV models) 0.23 kg (-5A-DL model)
Mounting	DIN Rail Mount 3-point screw wall mount

ENVIRONMENTAL (Protected Installation)	
Operating Temperature	-40°C to +70°C
Storage Temperature	-40°C to +70°C
Humidity	10 to 90% non-condensing

COMPLIANCE	
Safety	UL Listed (#E250395)
Isolation	3,500VAC (min) input-to-output
Electromagnetic Emissions	FCC part 15 Class B

TYPICAL WIRING:



MEASURED PARAMETERS (available via Modbus)

Voltage [V] (A, B, C, Avg, AB, AC, BC, Avg)
Current [A] (A, B, C, Avg)
Active Power [W] (A, B, C, Total) – Bi-directional
Apparent Power [VA] (A, B, C, Total)
Reactive Power [VAR] (A, B, C, Total) — Bi-directional
Power Factor (A, B, C, System) — Bi-directional
Active Quadrant (A, B, C, System)
Voltage Phase Angle [°] (AB, AC, BC)
Frequency [Hz]
Import/Export/Net Real Energy [Wh] (A, B, C, Total)
Import/Export/Net Apparent Energy [VAh] (A, B, C, Total)
Q1/Q2/Q3/Q4 Reactive Energy [VARh] (A, B, C, Total)
Total Demand Power (Sliding Window) [W]

All parameters are accessible as integer and floating point format.

ORDERING INFORMATION

W2-[1]-[2]-[3]

[1] Specifies Model:
- **M1** = RS-485 + 2 x Pulse (Modbus/RTU)
- **M2** = RS-485 + 2 x Pulse (BACnet MS/TP)
- **E2** = BACnet/IP module + 2 x Pulse
- **E3** = Ethernet (ETnet) + 2 x Pulse

[2] Specifies CT Input Type:
- **5A** = Inputs for 5A CTs
- **mA** = Inputs for mA output CTs (up to 200mA)
- **333mV** = Inputs for 333mV output CTs
- RC = Inputs for Rogowski Coil (up to 300mV)

[3] Specifies Display/Logging Module (optional):
- **DL** = Integrated Display AND Logging Module

Examples:

W2-M1-mA: RS-485, mA inputs, no logging or display
W2-E3-mA-DL: Integrated ETnet, mA inputs, Logging/Display module