



WattmonPRO Installation Manual

Rev 1.0

2016

Standard Compliance

WattmonPRO is classified as a device for Industrial use. The device complies with the following standards:

IEC-61000-4-2 – Electrostatic Discharge

IEC-61000-4-4 – EFT Immunity - 1kV

IEC 61000-4-5 – EMC Immunity – 1kV

CISPR-22 Class A – EMC

CISPR-11 Class A – EMC

International Article Number (EAN) - 0640350191555



Device Overview

WattmonPRO is the most recent release of the Wattmon range of embedded data logging and control devices. This version has several I/O lines on-board, making it easier to develop intelligent machine automation applications in addition to performing data logging.

Wattmon is a versatile platform which can be configured for countless applications. The inbuilt web server provides all of the tools necessary to customize the device. No programming is required to set up actions based on various triggers, which can control I/O lines, send emails and more.



Power Requirement

The WattmonPRO can run on a DC power source between 6 and 60V DC. It has a built in high efficiency switching buck regulator that ensures that it consumes less than 2 watts of power without accessory devices. The device can be shipped with an AC

adapter or a DC power cable to be directly connected to your battery bank of up to 48V DC.

Connectivity

The WattmonPRO has two ways of connecting to the Internet. The built-in LAN can be connected directly to a laptop or router, and is used for setup and local monitoring. The USB Host port works with a selected number of USB Cellular dongles, allowing both outbound and inbound data via the Internet.

Hardware Features

Serial (RS-232)

An RS-232 serial port allows you to interface with inverters or other devices that can provide data. Drivers for Delta, Schneider, Studer and Victron inverters are now provided along with the Wattmon, making it simple to remotely monitor your PV panels and energy information from the inverter itself.

Modbus RTU (RS-485)

An RS-485 Modbus RTU interface is built in and Wattmon acts as a Modbus master to collect data from various devices such as power meters, current sensors, etc.

If you are planning to monitor a battery bank with Wattmon, you will require a current sensor device such as the *C252* (25A), *C502* (50A), *C752* (75A) or *C1002* (100A).

Inputs and Outputs

The inputs and outputs and their various applications are described below.

4 Digital inputs

Pins 16-19 are digital inputs. They are opto-isolated and can handle anywhere between 4 and 24V DC between the input pin and the DIGND pin. Pins 16-18 (DI1-DI3) can also be configured as pulse/frequency counters for measuring data from flow meters/anemometers, etc.

4 Digital outputs

Pins 21-24 are digital outputs. These are open collector type (using a ULN2003 chip) and can be directly connected to 12V relays (with external power supply) to control high power loads - they can handle up to 500mA per pin.

Onboard relay

An on-board latching relay can switch DC or AC loads of up to 5A. If higher loads are required, this relay can be used to power a larger one. The latching relay takes very little power to switch state and no power once toggled, so there is no difference in power draw whether the relay is on or off.

3 Analog inputs

The WattmonPRO has three analog input channels, each with a 10-bit ADC on board (1024 possible values for the full scale).

Channel 1 also doubles as the voltage supply for the device. This is done so that when the device is running off a battery it's possible to measure the battery voltage directly from the supply. Max voltage is 60V DC.

Channel 2 is a voltage sense input that can be used to measure up to 330V DC for high voltage battery banks. The negative voltage terminal is shared with the main ground on pin 1.

Channel 3 is used to measure up to 5V DC, perfect for sensor inputs from devices such as the [PYRA300 Solar Irradiation Sensor](#) or pH meters.

1-Wire Bus

The WattmonPRO has a Dallas 1-Wire bus that allows for DS18B20 temperature sensors to be connected. This can be used for ambient temperature or battery temperature measurement. You can connect up to 8 sensors per device.

Modules

The WattmonPRO is compatible with a large variety of modules, ranging from current sensors to shunt modules. They follow the Modbus RTU over R485 connection protocol.

There are four current sensors – *C252*, *C502*, *C752* and *C1002*. Each of them denote the capacity and the number of channels, i.e. *C752* is a 75A current sensor with two channels. All four modules are hall effect sensors.

The *A5S1* (5 Analog Inputs with 0-20mV Shunt Module) can be used for measuring analog voltages. One differential input with 0-20mV can be used for a shunt resistor, while the 5 channels can be used to measure battery voltages or other sensor inputs. There are two varieties, the *A5S1-300* for 300V DC, and the *A5S1-5* for 5V DC.

The *I3O2* (3 Digital Input and 2 Relay Output) has two relay outputs that can handle up to 5A DC or AC, allowing you to switch household loads or control larger relays. The 3 digital inputs can be used with switches or float sensors to monitor tank levels or as triggers for actions.

The *IP1* (PWM Output Module with High Voltage Sense) module can be used in situations where a variable duty cycle pulse width modulated output is required. The output can handle about 20mA of load current and can be used to drive an SSR (solid

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state relay) for higher power control. This device also comes with a high voltage DC input and can be used to control dump loads in small wind turbines automatically based on the voltage.

The *IF1* (Frequency and Pulse Counter Module) module can be used to measure inputs from devices that have a pulsed output such as water flow meters, energy meters, or anemometers. Different registers allow you to see both frequency and total pulses, allowing for both flow rate and volume calculations.

Pinout Diagram

