

Advanced Pulse WattNode - Option PW (Pulse Width)

Normally (without Option PW), at constant power, a Pulse WattNode generates pulses with a 50% duty cycle, i.e. the ratio of the on (closed or conducting) and off (open) times is approximately equal. If the power is quickly changing, the duty cycle can also vary as the on and off periods get longer or shorter. The following diagram shows a sample pulse output waveform with increasing power from a WattNode without Option PW. As the power ramps up, the pulse periods get shorter. This diagram uses the low level to indicate when the optoisolator is conducting, because that is typical if you use a pullup resistor.

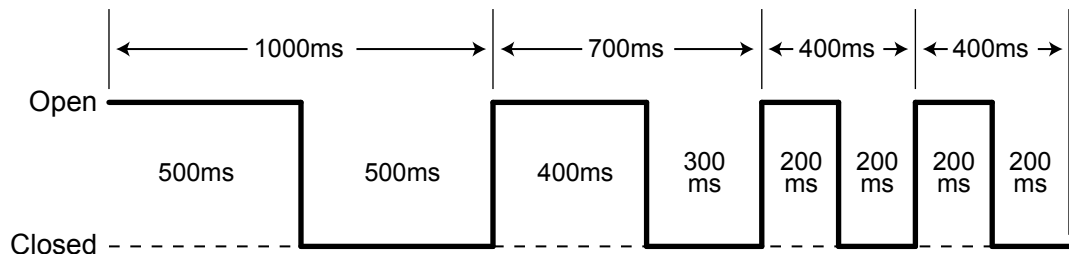


Figure 1: Sample Pulse Waveform

Option PW uses constant pulse widths specified in milliseconds instead of a 50% duty cycle. For example, if you wanted 100 millisecond pulses, you would order:

Opt PW=100

This would change the above waveform into a pulse waveform like the following:

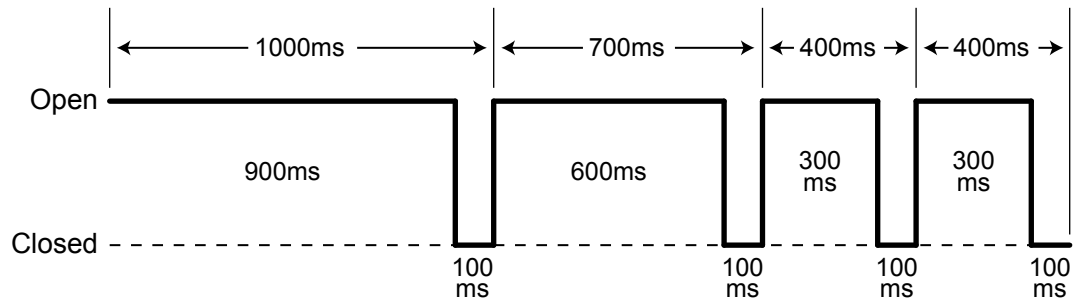


Figure 2: Sample Pulse Waveform with Option PW=100

This is useful for the following applications:

- Your pulse counting equipment cannot handle long pulses and so requires that the pulse width be limited.
- You are driving an electromechanical counter and don't want to drive current into the counter for an extended period and or have the counter display a half step.
- You are using a battery powered datalogger that consumes more power when the pulse output is conducting. By limiting the pulse width, you can extend battery life.
- Without option PW, if your load turns off while the pulse output is conducting, it will continue conducting until the load turns back on and the output starts pulsing again. With option PW, the pulse output will always turn off (stop conducting) if the load turns off.

Limitations

There are currently a few limitations with Option PW:

- Only the period when the optoisolator or solid-state relay is on (closed or conducting) can be specified by the pulse width.
- The shortest Option PW pulse width is one millisecond.
- The pulse width can only be specified as an integer millisecond value, so values like 2.5 milliseconds will be converted to 2 milliseconds.
- The pulse width will be limited to 50% of the total pulse period at the nominal full-scale frequency. For example, if you are using the standard 4.0 Hz full-scale frequency, then the total pulse period at full-scale is 250 milliseconds, so the pulse width can be set to any value between 1 millisecond and 125 milliseconds.
- Option PW can only be used with custom frequencies up to 500Hz (Option Hz=500).
- The maximum pulse width can be as large as 65 seconds if the full-scale frequency is low enough.

Guidelines

The WattNode normally generates pulses with optoisolators instead of actual relays; solid-state relays (SSR) are also an option if higher current switching is required. Optoisolators switch quickly, but not instantly. The WattNode optoisolators turn on (start conducting) in 2-3 microseconds, but may take anywhere from 10 microsecond to 10 milliseconds (or longer) to turn off (stop conducting), depending on the load current or pullup resistor selected. Smaller resistor values result in faster turn off times. Generally these switching times are not an issue, but they can affect the pulse width.

Solid-state relays are slower than optoisolators and typically take 1.0 to 5.0 milliseconds to switch on or off, independent of the load current.

When selecting a pulse width, allow for the actual time to vary somewhat due to the switching times for the optoisolator or SSR.