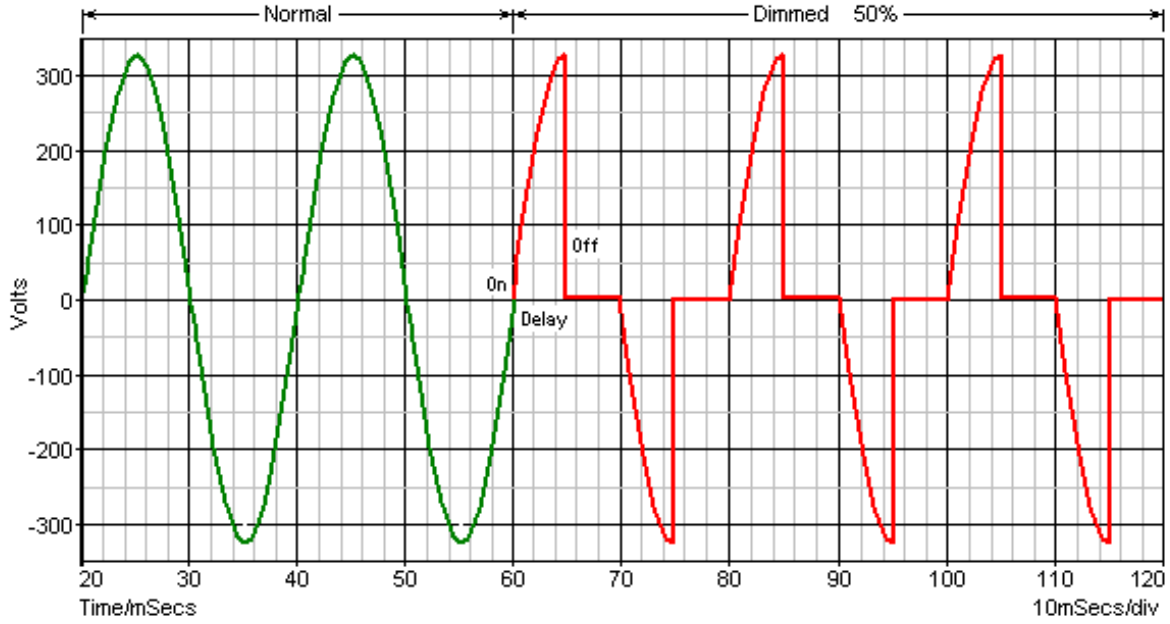
Proportional Controller Technologies

1) Phase Angle Control

Phase Angle control, also known as 'trailing-edge dimmers' – turns off the electrical load at the end, or trailing edge, of the AC sine wave. Designed to modulate power to the resistive load by varying the duty cycle (the ratio of on time to on+off time) of the voltage to the load.

Although an inexpensive method of control, due to the dimming characteristics; this method is prone to create a great deal of electrical noise.

Research shows this method of control is normally used in smaller capacity loads – approximately 700W or less. Electrical loads greater than the prescribed average will have difficulties in containing electrical emissions without adequate filters, due to the generation of harmonic waves greater than the intended power size.



2) Burst Fire

Burst Fire control, also known as ‘on-off control’ or ‘integral-cycle’, works by allowing a number of complete cycles (or half-cycles) through to the load and blanks / misses out cycles periodically in sequence – in basic terms, your power switch is turned on (active) at zero mains voltage.

Taking Diagram 1. as an example, by regulating the wave patterns, loads can be modulated by sending waves with single pauses in between. Or more frequently, sending two waves with pauses in between them as in Diagram 2.

Although the simplest form of control, negating the need for in-depth algorithmic programming, difficulties lie in containing the generation of harmonics – causing abrupt ‘flickering’ in electrical circuitry. Having visual impacts within lighting circuitry for example, and more prevalently prone to causing interference with electric meters – particularly smart meters, due to the higher sampling rates.

Diagram 1.

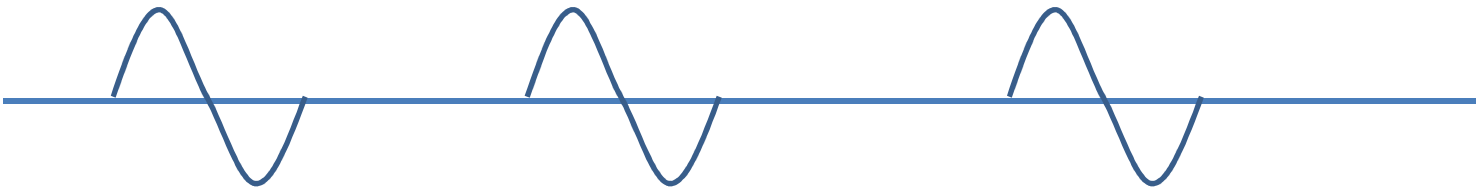
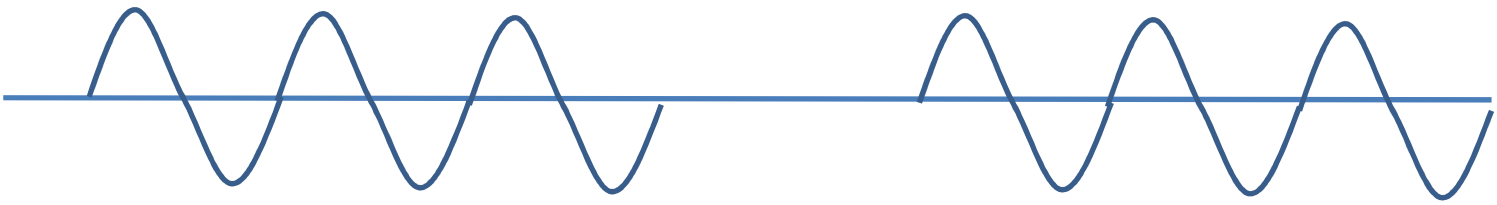


Diagram 2.



3) **Pulse-Width Modulation (PWM)**

PWM control is designed to splice the AC sine wave, in order to modulate the flow of power to an (resistive) electrical load. The key difference in comparison to other technologies is the conformity to the 'pulse duration' (53) i.e. return to origin. The slices (52) represent part of the real wave to form a complete wave-length.

By smoothing over the wave form, this method of control inherently reduces the level of harmonics generated through modulation – inducing little distortion to the overall sine wave. PWM is designed to reduce harmonics in apt wave-forms and enables this by producing a 'quasi-sine wave'.

With precise algorithms and logic, combined with the use of adequate filters, loads can be proportionally controlled; without any cause for concern around household circuitry or interaction with electricity meters – enabling fit installation according to specific CE norms.