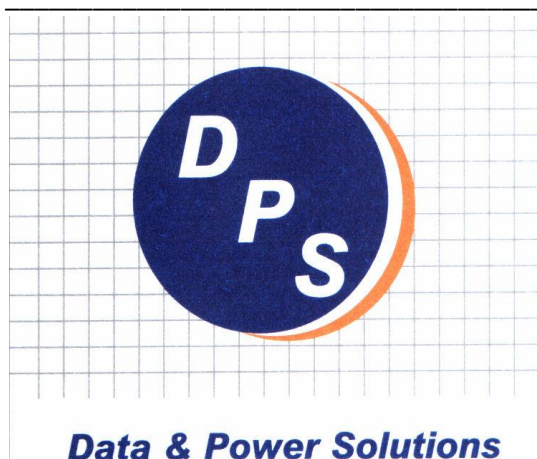


# TECHNICAL 'KNOW-HOW' SHEET FROM DPS



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## What is the relationship between Amps, Volts & Watts, and what are they?

**This is a very brief guide describing Amps, Volts and Watts and how they are related in order to describe some basic electrical dependencies:**

**Amperes** (often shortened to Amps) is the standard measure of electrical current. Amps measure how much electricity is moving through a wire at any given time. The Amp draw of a circuit is dependent on the needs of the devices plugged into it, but is always limited by a branch circuit breaker.

**Volts** are the standard measure of electrical potential and are a fixed value for every circuit. Volts are measured with respect to a reference point (usually between the two respective legs of the circuit). As one increases the electrical potential between two points, the amount of potential energy available also increases. For example, consider a stone dropped from 10 feet versus one released from 100 feet. The stone dropped from 100 feet will be going much faster when it hits the ground than one released from 10 feet and therefore will exert more energy on the ground as it hits. Until the stones are actually dropped, that energy exists only as potential. Similarly, a 208V circuit has about 1.73 times the potential energy of a 120V circuit, when drawing the same amount of current.

**Watts** are a measure of the total power being consumed by a system. The simplest calculation is:  $\text{Watts} = \text{Volts} \times \text{Amps}$ . This is the measurement that power companies use for billing their customers and is also known as Volt-Amps.

A true RMS calculation of Watts takes into account the shape and phases of the voltage and current wave forms being delivered to a circuit to provide a reading of the power being used by a circuit. Any difference between the RMS (Root-Mean-Squared) value of Watts and the Volt-Amps value indicates inefficiencies in the way power is being used by the equipment on the circuit.



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## **What does RMS mean?**

RMS stands for Root-Mean-Squared. It refers to a complex calculation involving the volts and amps over a period of time determining how power is being consumed by the devices on a circuit.

## **What is Apparent Power?**

Apparent Power is the instantaneous calculation of Volts x Amps and is the measurement by which the power companies bill.

## **What is Real Power?**

Real Power is the RMS value of Watts. When divided by Apparent Power, it is a measurement of the efficiency of power usage on a circuit.

## **What is Power Factor?**

Power Factor is the ratio of Real Power to Apparent Power. 100% is perfect power. Lower values of Power Factor indicate that the circuit is wasting energy. Power Factors below 60% can cause significant damage to electronic equipment. Circuits with Power Factors below 40% need power conditioning.