

Technical
Training
Series

WATTS # 5



Electrical Power

Electrical power is defined as the rate at which electrical energy is transferred by an electric circuit.

Electricity has several components, which can be expressed in three basic types of measurements:

- **Volts:** Force (strength / pressure) of electrical flow in a circuit
- **Amps:** Amount of electricity (current / volume) flowing through a circuit
- **Watts:** Quantity of electricity a device uses during operation
- **Volts X Amps = Watts**

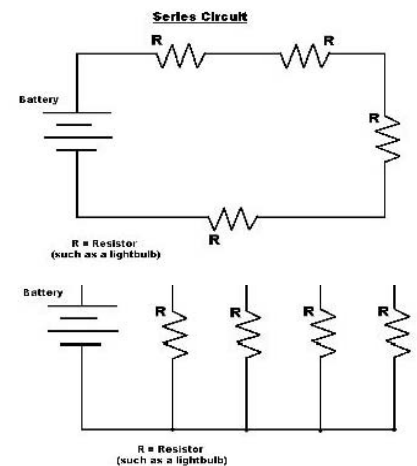
Water Flow (Hydraulic) Analogy

Consider a hose with water flowing through it – **Amperage** is the volume of water flowing through the hose. The speed (rate) at which that water flows is similar to **Voltage** in a circuit. If the hose were supplying a sprinkler with water, the amount of water used by the sprinkler would be similar to **Watts**.

Wiring in Parallel vs. Series

Devices are connected to a power source in 2 basic ways: **Series** and **Parallel**

- In a **Series** circuit, current (amps) must flow through one device to get to the next. Voltage across the circuit will remain constant. Adding devices to the series will reduce the current flow (amperage), providing the voltage remains constant.
- In a **Parallel** circuit, each device is directly connected to the power source. Voltage across each device will remain constant. Adding devices to the parallel circuit will increase the current (amperage) drawn from the power source.



Practical Example:

- **Problem:** Consider a typical residence, fed by a 150 amp panel with only eight 110V breakers @ 15 amps each – total available current across all 110V circuits is 120 amps. A water loss has occurred, and drying requires 21 air movers (4.7 amps EA) and 4 dehu's (7.5 amps EA) – Total requirement of 128.7 amps, which exceeds the available power.
- **Solution:** A) Utilize more efficient equipment (less amp draw); B) Utilize fewer pieces equipment for longer duration; C) Increase available amperage.
- **NOTE:** Increasing amperage would require a licensed electrician to add circuitry, or draw power from an available 220V circuit.
- **Reverse-Engineering the Problem:** In reviewing an emergency service contractor's invoice, determine whether the home's electrical service provided adequate power for the amount of equipment listed on the invoice by calculating the amperage required to operate equipment vs. the size of the electrical panel*.

**Some power must be available to provide heat, A/C, lighting, etc.*