International Temperature Control, Inc.

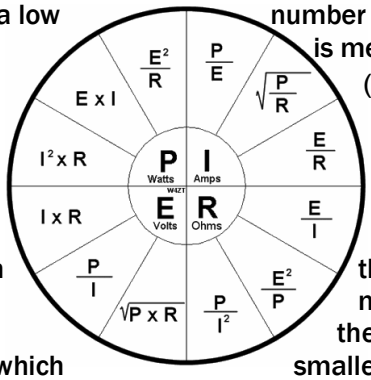
The Value Leader In Hot Runner Temperature Control Systems

DATA SHEET

Ohm's Law

This is meant to be a basic explanation of the concept of Ohm's Law.
To help you better understand this principal, we are using the analogy of water flowing from a tank, thru a hose to turn a waterwheel.

POWER - WATTS (P) = The rate at which electrical energy is delivered and consumed. The water analogy is the work performed by the waterwheel as determined by the flow rate (Amps) and the pressure (Volts) of the water as it is delivered to the waterwheel. High pressure at a low flow rate will spin the waterwheel at the same speed as low water pressure at a higher flow rate. You may consider the speed of the water wheel as watts. Watts is the ability to perform Work. Example light output of a 60 watt bulb.



ENERGY - VOLTAGE (E) = The water analogy would be the PRESSURE from a tank filled with water. The larger the tank the grater the pressure on the water which is being pushed through the hose. This is the potential energy which can be applied to the task of turning the waterwheel. In electrical circuits, Voltage can be though of as the pressure which pushes electrons through the circuit. Potential electrical energy is measured in VOLTS.
(Voltage is Force or Pressure)

CURRENT - AMPS (I) = Can be though of as the amount of water flowing through the hose, which is determined by the amount of pressure (voltage) of the water introduced into the hose. In an electrical circuit this indicates the number of electrons passing through the wire and is measured in AMPS.
(Current is Intensity or Volume)

RESISTANCE - OHM'S (R) = Can be thought of as friction impeding the movement of water through the hose. The larger the hose, the less the Resistance. Just as a smaller diameter hose has greater resistance, also a thin copper wire will have greater resistance than a larger diameter wire. This resistance which impedes the movement of electrons is measured in Ohm's. It should also be noted, as resistance (friction) increases so does the heat generated by that friction.

In this metaphor of a waterwheel; Volts is the pressure by which the water pushes with. Amps are like the amount of water flowing through the hose. Ohm's is the amount of resistance the water encounters as it travels through the hose, but mostly from the waterwheel. Watts is the measure of actual power applied to the waterwheel.

By this analogy you can see how Volts, Amps & Resistance are all interwoven in determining the total amount of work which can be performed.

For your benefit we are providing the most use Ohm's law formulas:

You want to determine Wattage	Multiply VOLTS by AMPS	P = E x I
You want to determine Amperage	Divide WATTS by VOLTS	I = P / E
You want to determine Voltage	Divide Watts by Amps	E = P / I

By using the formulas in the pie chart above you will be able to derive an answer from various other scenarios.

International Temperature Control, Inc. manufactures the most complete line of Hot Runner Control Systems & Accessories in the industry.
Service, Quality, and Value is the solemn pledge ITC makes too all our customers.

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