Àbsolute Process Instruments, Inc.
Manufacturer of Quality Signal Conditioners Transmitters & Isolators

Application Notes

■ **General Info**
❑ **Temperature**
❑ **Pressure**
❑ **Flow**
❑ **Speed**
❑ **Weighing**
❑ **Process**

Ohm's Law

$E = I \times R$

OHM'S LAW is the relationship between current, voltage and resistance. It states that current varies directly with voltage and inversely with resistance.

E (Electromotive Force or Voltage) is the electrical potential that exists between two points and is capable of producing a flow of current when a closed circuit is connected between the two points. The unit of measure for voltage is the volt (V). One volt will send one ampere of current through a resistance of one ohm.

I (current) is the flow of electrons past a point in a specified period of time, usually one second. The unit of measure for current is the ampere (A). One ampere of current is 6.24×10^{18} electrons passing a point in one second. Ampere is often shortened to amp.
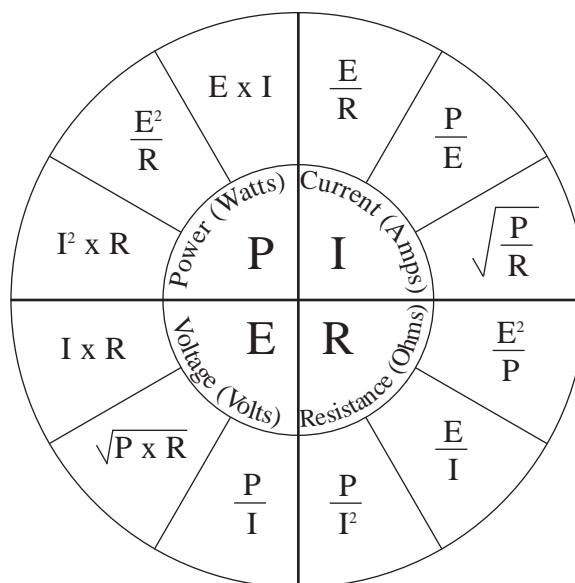
R (resistance) is the opposition to current flow offered by a resistive component. The unit of measure for resistance is the ohm. One ohm is the resistance through which a current of one ampere will flow when a voltage of one volt is applied.

Typical Solid Copper Wire Resistance
Ohms per 1000ft

AWG	0°C	20°C	50°C
10	0.92	0.99	1.12
12	1.46	1.59	1.78
14	2.33	2.53	2.82
16	3.70	4.02	4.49
18	5.88	6.39	7.14
20	9.36	10.15	11.35
22	14.87	16.14	18.05
24	23.65	25.67	28.70
26	37.61	40.81	45.63
28	59.80	64.90	72.55
30	95.10	103.20	115.40
32	151.20	164.10	183.40

Resistance may vary ±10% or more depending on impurities, alloys, coatings, state of annealing, etc. Always check wire manufacturer's specifications.

Ohm's and Watt's Laws