Technician License Course
Chapter 3

Lesson Plan Module 5 –

Ohm's Law, Power, and the Metric System

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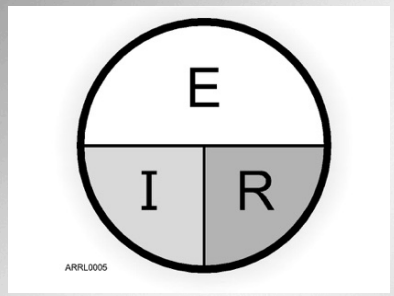
Ohm's Law



- E represents voltage
  - Units – volts (V)
- I represents current
  - Units – amperes (A)
- R represents resistance
  - Units – ohms (Ω)

$R = E / I$

$I = E / R$

$E = I \times R$

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Power - Electrons Doing Work and Expending Energy

- Any time energy is expended, power is consumed.
- Electrons moving through resistance expend electrical energy and consume power.
- Power is the rate at which energy is consumed.
- Power is measured in units of watts (W).

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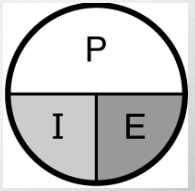
Power Equation

- Power is calculated as the product of voltage and current

  $P = E \times I$

  $E = P / I$

  $I = P / E$



- Like Ohm's Law, if you know two of the values, you can calculate the third.

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Metric Prefixes

Table 2-1
International System of Units (SI)—Metric Units

Prefix	*Symbol*	*Multiplication Factor*
Tera	T	10^{12} = 1,000,000,000,000
Giga	G	10^{9} = 1,000,000,000
Mega	M	10^{6} = 1,000,000
Kilo	k	10^{3} = 1000
Hecto	h	10^{2} = 100
Deca	da	10^{1} = 10
Deci	d	10^{-1} = 0.1
Centi	c	10^{-2} = 0.01
Milli	m	10^{-3} = 0.001
Micro	μ	10^{-6} = 0.000001
Nano	n	10^{-9} = 0.000000001
Pico	p	10^{-12} = 0.000000000001

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Electrical Units

Electrical Units and Their Namesakes		
Unit	*Measures*	*Named for*
Ampere	current	Andree Marie Ampere (1775 – 1836)
Coulomb	charge	Charles Augustin Coulomb (1736 – 1806)
Farad	capacitance	Michael Faraday (1791 – 1867)
Henry	inductance	Joseph Henry (1797 – 1878)
Hertz	frequency	Heinrich Hertz (1857 – 1894)
Ohm	resistance	George Simon Ohm (1787 – 1854)
Watt	power	James Watt (1736 – 1819)
Volt	voltage	Alessandro Giuseppe Antonio Anastasio Volta (1745 – 1827)

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