

## Parts of a Lighting System:

- Instrument: Light source
- Circuit: where the Instrument is plugged in, carries power from the Dimmer
- Dimmer: provides power to circuit.
- Lighting Board: Provides control information to dimmer
- Channel: label for dimmer in lighting board.

You Plug the (1) \_\_\_\_\_ into the (2) \_\_\_\_\_, which gets power from the (3) \_\_\_\_\_ and is controlled on the light board as a (4) \_\_\_\_\_.

## 3 Parts

- Source
- Load
- Circuit

## Ohm's Law

- As voltage Increases, Current increases.
- As resistance Increases, Current Decreases.

$$I = E/R$$

- I= Current in Amperes
- E= Voltage in Volts
- R= Resistance in Ohms

## The Power formula:

$$A = W/V$$

PIE

W= power in watts

P= IE

V= voltage in volts

A= current in Amperes

E= P/I

I= P/E

P= power in watts

I= current in amperes

E= voltage in volts

## West Virginia

W=VA

V= W/A

## VOLTAGE

Amperes in homes and out put in Dimming Systems 117-120 V  
Input to Lighting Systmes 220 V

## AMPS

Gauge of Wire	10	12	14	16	18
Amps	25	20	15	6	3

Dimmers Carry  
2.4 KW

### PROBLEM 1

If your dimmers have a maximum output of 2.4KW and has 220VAC what gauge wire would you use for the circuits so you can use the most lighting instruments per dimmer?

$$\begin{array}{lcl} W= 2400 & \text{or} & P= 2400 \\ V= 220 & & E= 220 \end{array}$$

Plug into

$$W=VA \quad \text{or} \quad P=IE$$

$$A=2400/220 \quad E= 2400/220$$

$$A=10.909090 \quad E= 10.909090$$

16 gauge wire carries 6 Amps

14 gauge wire carries 15 Amps

14 gauge wire is the smallest wire which would hold the amperage.

---

### PROBLEM 2

You are using 16 gauge wire to circuit 525Watt instruments to a 2.4 KW dimmer on 220VAC. How many instruments can you plug into a single dimmer?

What do you know?

$$W= 2.4K \text{ on dimmer} \quad 525 \text{ for each instrument} \quad ? \text{ for cable}$$

$$V= 220V$$

$$A= 6A$$

If wire carried 2.4K then it could handle 4.57 Instruments or 4 instruments

$$W= 220 \times 6$$

$$W= 1320W$$

$$1320/525 = 2.51 \text{ or } 2 \text{ instruments}$$

---

## Circuits

- Series
  - Old Christmas lights
  - All electricity goes through each lamp.
  - One lamp goes out so does the rest of the lamps
- Parallel
  - Only a portion of electricity goes through each lamp
  - One goes out rest will stay lit.
- Combination
  - Adds Switch or control to Parallel circuit.