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Power Systems Display

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Eaton

Daniel Carnovale

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Outline

- Project Description
- Our Visit to Eaton
- Original Proposed Solutions
- Water Circuit Design
- Electrical Circuit Representation
- Materials
- Professional Awareness
- Timeline

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Project Description

- Background
  - Eaton's Power Systems Experience Center located in Pittsburgh
- Goal
  - Create an water system to replicate how an electric circuit works including current, voltage, parallel resistance, series resistance, reactive power and ground.
- Need
  - A demonstration capable of training students and executives alike the concept of electrical properties: resistance, capacitance etc.
- Importance
  - Electricity is not a widely known topic across all ages and its important to teach people how to use it properly and be safe

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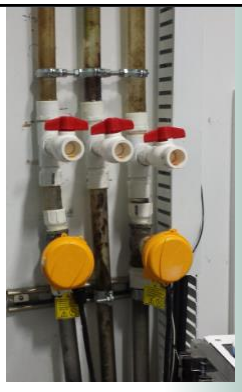
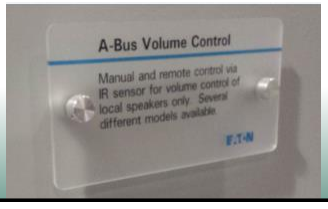
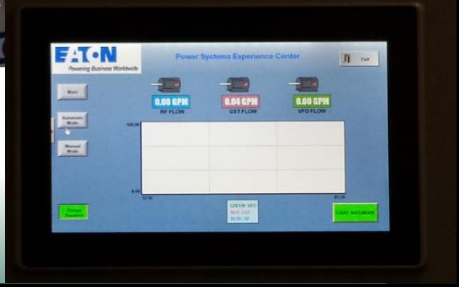
Our Visit to Eaton







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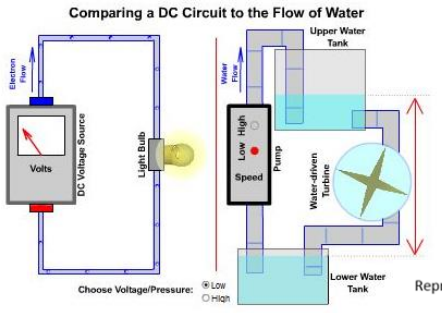
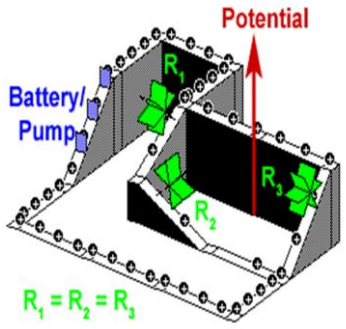
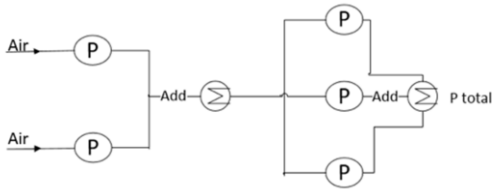
Proposed Solutions





Representation for KCL



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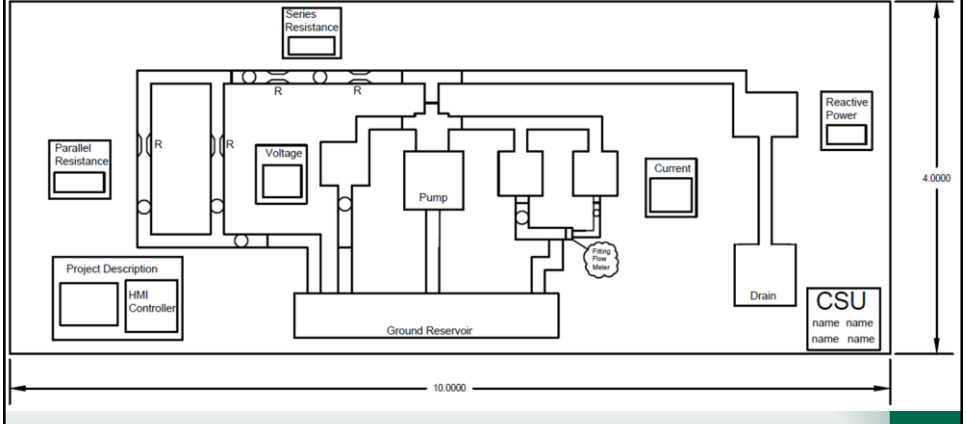
Water Circuit Design



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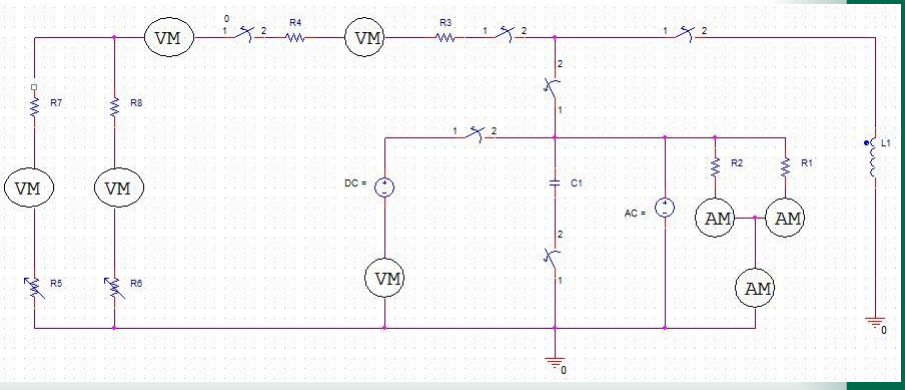
Electrical Circuit Representation



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Materials:

❑ Clear Pipe:
- Length: 20 – 30 feet
- Width: 1 - 2-1/2"
- Cost: $80 - $120 ($8/3feet)

❑ 3-Way Clear Pipe:
- Width: 1 - 2-1/2"
- Cost: 6 – 10 ($9/each)

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Materials

- 4-Way Clear Pipe:
  - Width: 1 – 2-1/2"
  - Cost: 2 – 4 ($10/each)

- 3-Way Clear Pipe:
  - Width: 1 - 2-1/2"
  - Cost: 8 – 12 ($10/each)

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Materials

- Water Foam:
  - Quantity: (36 ounce)
  - Cost: ($15/each)

- Blue Fluid:
  - Quantity: (22 ounce)
  - Cost: ($3/each)

- Six Water Tanks

Total cost:
$300 to $350 (without Eaton products)

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Eatons workshop

- Location:
  - Parma, Cleveland, Ohio.

- Materials provided by Eaton:
  - Water pump.
  - Water/Pressure Meter.
  - Water Valves.
  - Clear color pipe cement.
  - HMI controller.

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Challenges

- Type of fluids to be used in the project.
  - Blue window cleaner.
  - Bubble Bath (Mr. Bubbles).
- Supporting the weight of the tank vertically.
- How to make resistance either smaller piping or valves.
- Using sensors to measure the flow and pressure and transmitting them to the HMI
- Programming the HMI

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Professional Awareness IEEE Code of Ethics

- 1. to accept responsibility in making engineering decisions consistent with the safety, health, and welfare of the public, and to disclose promptly factors that might endanger the public or the environment;
- 5. to improve the understanding of technology; its appropriate application, and potential consequences;
- 10. to assist colleagues and co-workers in their professional development and to support them in following this code of ethics.

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Time Line