

ET 332a

Dc Motors, Generators and Energy Conversion Devices

LESSON 1: INTRODUCTORY CONCEPTS

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LEARNING OBJECTIVES

After this presentation you will be able to:

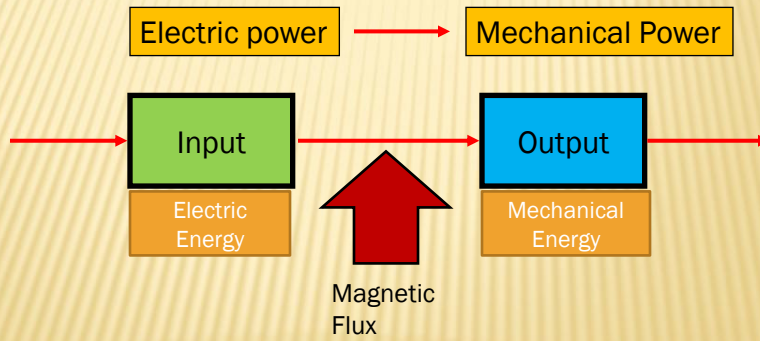
- Explain the energy conversion process that takes place in the motors and generators.
- Explain the difference between conventional and electron current flow
- Identify power sources and loads in an electric circuit

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ENERGY CONVERSION DEVICES

Motors and Generators

Motor Action

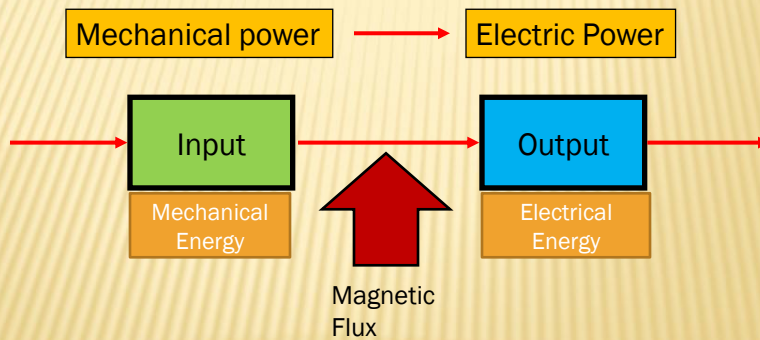


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ENERGY CONVERSION DEVICES

Motors and Generators

Generator Action

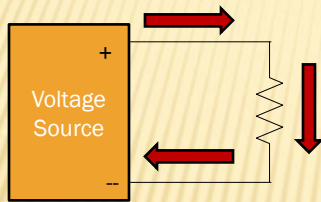


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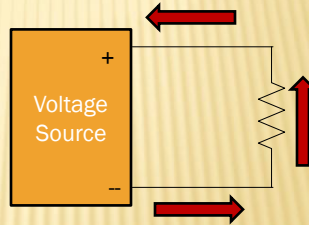
REVIEW OF FUNDAMENTALS

Conventions and Assumptions

Conventional Vs Electron current flow



Conventional current
+ to - flow



Electron current
- to + flow

Either system is correct

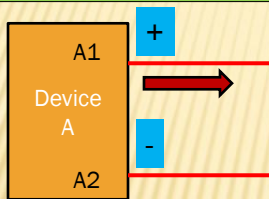
Conventional current standard in power systems and ac analysis

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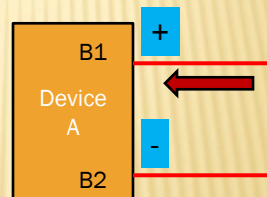
REVIEW OF FUNDAMENTALS

Identifying Sources and Loads

A device is a source when current flows **from** the positive terminal (conventional flow)



Device A: **Source**



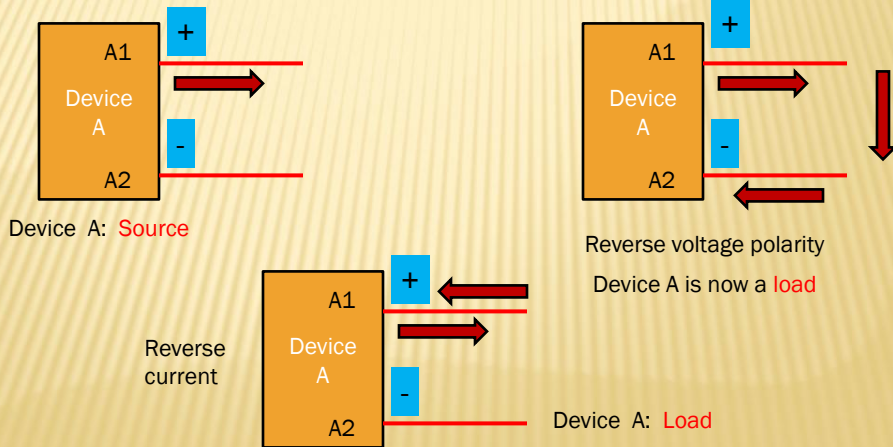
Device B: **Load**

A device is a load when current flows **into** the positive terminal (conventional flow)

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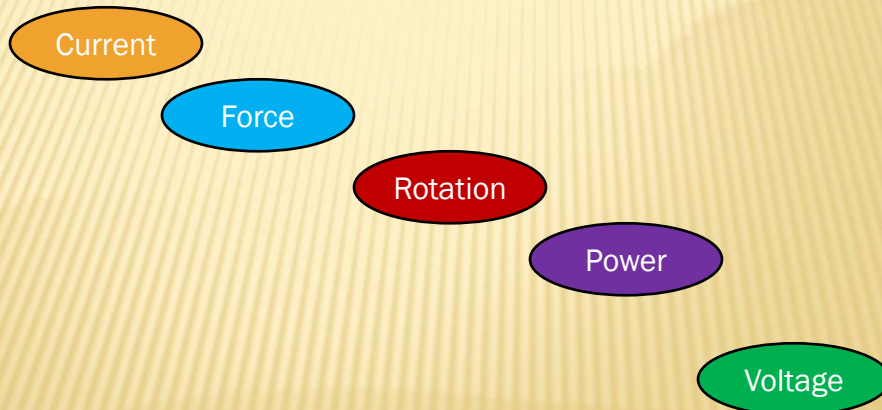
REVIEW OF FUNDAMENTALS

Reversing the direction of current or the voltage polarity changes converts most sources to loads



QUANTITY SIGN CONVENTIONS

The + and - signs used to indicate direction of:



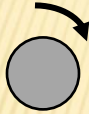
Compared to a reference direction

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SIGN CONVENTION EXAMPLES

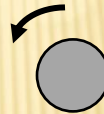
Shaft Rotation

Clockwise CW



Define clockwise as positive (+) rotation

Counter Clockwise CCW



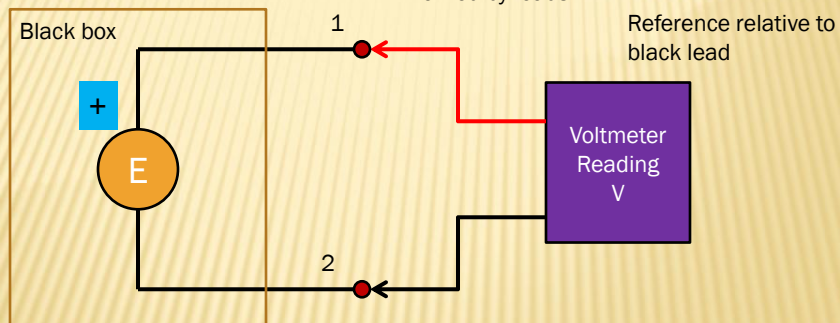
Counter clockwise now becomes negative (-) rotation

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SIGN CONVENTION EXAMPLES

Voltage measurement

Case 1: $V=E = +10\text{ V}$ Real polarity same as Marked by leads

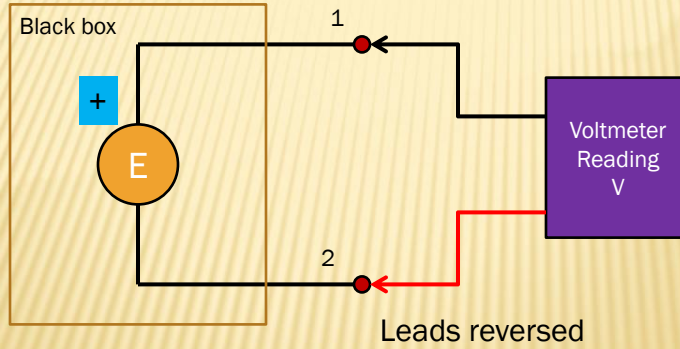


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SIGN CONVENTION EXAMPLES

Voltage measurement

Case 2: $V = E = -10 \text{ V}$ Real polarity opposite of marked by leads



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END LESSON 1

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