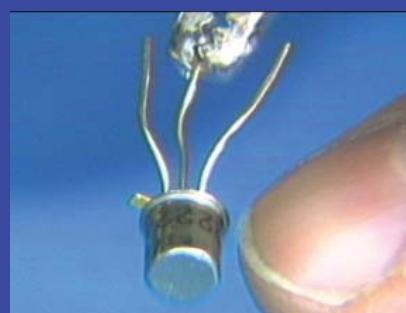
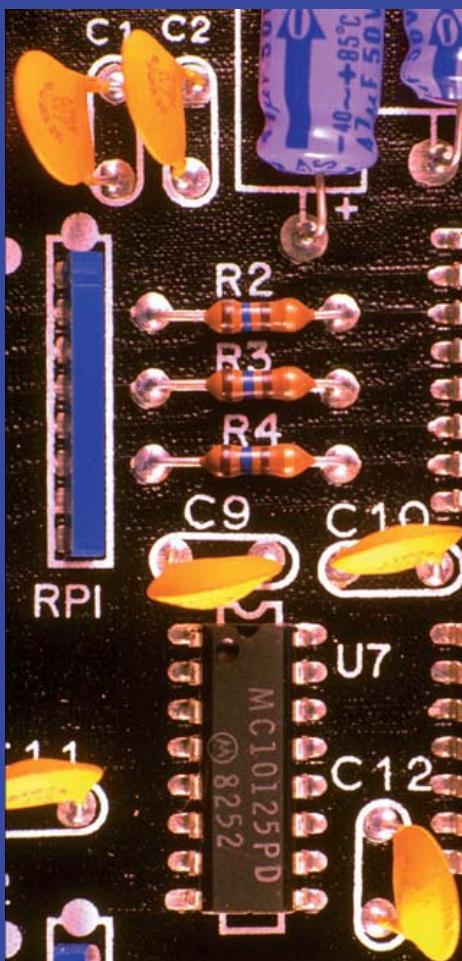
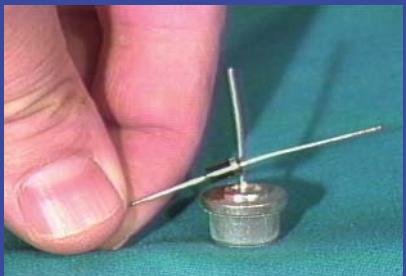


Electrical Components Part II: Capacitors, Fuses, Flashers, and Coils



Introduction

This program continues the study of basic electrical components. Live-action video and computer animation make learning about these devices seem easy. *Electrical Components Part I* introduced students to electrical devices such as fixed resistors, variable resistors, and other devices. In *Electrical Components Part II*, students learn about capacitors, fuses, fusible links, circuit breakers, flashers, coils, and other electrical components. The program allows viewers to observe how these devices are constructed and how they actually operate. Understanding the operating principles of electrical components enables students to grasp the techniques of testing and repair.

The program is organized into major sections or topics. Each section covers one major segment of the subject. Graphic breaks are given between each section so that you can stop the video for class discussion, demonstrations, to answer questions, or to ask questions. This allows you to watch only a portion of the program each day, or to present it in its entirety.

This program is part of the ten-part series *Electricity and Electronics*, which includes the following titles:

- Electrical Principles
- Electrical Circuits: Ohm's Law
- Electrical Components Part I: Resistors, Batteries, and Switches
- Electrical Components Part II: Capacitors, Fuses, Flashers, and Coils
- Electrical Components Part III: Transformers, Relays, and Motors
- Electronic Components Part I: Semiconductors, Transistors, and Diodes
- Electronic Components Part II: Operation—Transistors and Diodes
- Electronic Components Part III: Thyristors, Piezo Crystals, Solar Cells, and Fiber Optics
- Electrical Troubleshooting
- Electronic Circuit Repair

To order additional titles please see **Additional Resources** at www.filmsmediagroup.com at the end of this guide.

Student Objectives

After viewing this program, the student will be able to:

- Explain the function of a capacitor
- Describe the basic construction of a capacitor
- Explain the applications of a variable capacitor
- Identify various types of fuses used in electrical circuits
- Describe the purpose of a slow blow fuse
- Define fuse link
- Explain the function of a circuit breaker
- Describe the basic operation of a circuit breaker

- Explain the automotive applications of a flasher
- Describe the industrial applications of a coil

Discussion Topics

1. What is the function of a condenser in a breaker-point automotive ignition system?
2. Are capacitors used on today's automotive ignition systems?
3. What is the advantage of using circuit breakers in your home instead of fuses?
4. What will happen if you replace a blown fuse with a lower rate fuse?
5. If you were designing an automobile, where would you mount the fuse box?
6. How can circuit breakers be used to protect the drive motor on an electric car?
7. Think of a home appliance which utilizes an electric coil for operation.
8. How many electric coils are used on a modern-day automobile?

Short Answers

Briefly answer the following questions in your own words:

1. Draw the symbol for a capacitor and explain how a capacitor works.
2. Describe the construction of a capacitor.
3. How can a variable capacitor be used in a radio?
4. Explain the purpose of a fuse and draw its symbol.
5. How does a flasher regulate an automobile's turning signal operation?
6. How does a fusible link operate?
7. Describe the operation of a circuit breaker.
8. Explain some of the applications of a circuit breaker.
9. Describe the basic construction of a coil.
10. Name some of the functions of a coil.

Technical Terms

Write definitions for the following terms. Use a textbook or review the video if needed.

capacitor

dielectric

variable capacitor

fuse

slow blow fuse

fuse box

fusible link

circuit breaker

flasher

coil

ignition coil

pickup coil

choke

Quiz

12. What is the letter designation for a fusible link? _____

- a. "F"
- b. "FL"
- c. "L"
- d. "LF"

13. A _____ is simply insulated wire wrapped in a circular motion around a hollow or metal core.

- a. capacitor
- b. flasher
- c. coil
- d. fuse

14. A _____ is kind of a shock absorber for electronic flow.

- a. flasher
- b. choke
- c. capacitor
- d. fuse

15. Which of the following utilizes a coil for operation? _____

- a. automotive ignition systems
- b. fuel injectors
- c. some four wheel drive mechanisms
- d. all of the above

Answer Key

Use your own judgment to evaluate the Discussion Topics, Short Answers, and Technical Terms.

Quiz Answer Key:

1. c 2. b 3. c 4. b 5. c
6. d 7. b 8. b 9. a 10. d
11. d 12. b 13. c 14. b 15. d

Useful Web Sites

IEEE Virtual Museum—The History of Electricity, Electronics, and Computers

www.ieee-virtual-museum.org

Community Learning Network

Click on "Technology Education" for educational resources in Electronics and Electricity
http://www.cln.org/subject_index.html

Greatest Engineering Achievements of the 20th Century

Click on "Electrification," "Electronics," and more
<http://www.greatachievements.org>

Superconductor Information for Beginners

<http://superconductors.org>

Additional Resources at www.filmsmediagroup.com

Available from Films Media Group • www.filmsmediagroup.com • 1-800-257-5126

Electricity and Electronics

- VHS/DVD
- Preview clip online
- Viewable/printable teacher's guide online
- Item # 34798

The program you have just viewed is part of the ten-part series *Electricity and Electronics*. The series provides a comprehensive guide to the study of electronics, ranging from the fundamental laws and principles of electricity at the atomic level to troubleshooting and repair of electronic components. Lively computer animation and hands-on demonstrations make these videos an ideal resource for the classroom. A Shopware Production. (18-24 minutes each)

The series includes: *Electrical Principles*; *Electrical Circuits: Ohm's Law*; *Electrical Components Part I: Resistors, Batteries, and Switches*; *Electrical Components Part II: Capacitors, Fuses, Flashers, and Coils*; *Electrical Components Part III: Transformers, Relays*,

and Motors; Electronic Components Part I: Semiconductors, Transistors, and Diodes; Electronic Components Part II: Operation—Transistors and Diodes; Electronic Components Part III: Thyristors, Piezo Crystals, Solar Cells, and Fiber Optics; Electrical Troubleshooting; Electronic Circuit Repair

Electric Power on the Move

- VHS/DVD-R
- Viewable/printable teacher's guide online
- Produced in association with the Accreditation Board for Engineering and Technology and the Junior Engineering Technical Society
- Item # 34288

This Science Screen Report looks at the production, transportation, and consumption of electricity. Using the Hoover Dam as an example of efficient hydroelectric power generation, the video illustrates how transformers raise or lower voltage and how electricity is channeled to illuminate buildings, power devices, and propel vehicles. The difference between alternating and direct current is discussed, as well as advantages of neon over filament bulbs. Animated segments help students with vital electrical concepts, including ohms, volts, and amperes. © 2004. (18 minutes)

Residential Electrical Wiring

- VHS/DVD
- Preview clip online
- Viewable/printable teacher's guide online
- Correlates to the National Center for Construction Education and Research standards.
- Item # 32070

This eight-part series is filled with information on installing, upgrading, and updating residential electrical service, walking students through all the major processes they'll need to know. A Shopware Production. © 2004. (16-21 minutes each)

The series includes: *The Service Entrance; Panelboards; Wiring Methods; Grounding; GFCIs and AFCIs; Receptacles and Switches; Wiring Light Fixtures; Wiring for Appliances*

Electricity

- VHS/DVD-R
- Viewable/printable teacher's guide online
- Item # 3548

This six-part series covers many of the fundamental concepts in the study of electricity. It explores the mystery of electricity's causes and effects, and enable students to visualize—and thereby understand—abstract and sometimes difficult concepts in physics. (10 minutes each)

The series includes: *Conductors and Insulators; Charging and Discharging; Charging by Induction; Current Electricity; Potential Difference; Resistance*

Electricity and Magnetism

- CD-ROM (Windows/Macintosh)
- Activity sheets
- Preview clip online
- Correlates to the National Science Education Standards developed by the National Academies of Science and Project 2061 Benchmarks for Science Literacy from the American Association for the Advancement of Science.
- Item # 10267

This program examines the principles of electricity and magnetism and gives students insight into this fascinating topic, covering such subjects as: static electricity; attraction/repulsion; current electricity and electrical circuits; measuring electricity—current, voltage, meters; electrical calculations; magnetism—materials, fields, rules, Earth's field; field around a current-carrying wire; the link between electricity and magnetism—induction. A Cambridge Educational Production.

The Generation of Electricity

- VHS/DVD-R
- Recommended by *Science Books & Films*
- Item # 2621

The basic principle of electromagnetic generation of electric current is demonstrated in the laboratory; the principles behind the rather complicated construction of AC and DC generators is elucidated by means of a single coil; the use of slip rings and commutators is demonstrated; and a demonstration shows the relationship between the amounts of mechanical energy input in a generator and the electrical energy output. Sequences at a 2,000-megawatt coal-fired generator demonstrate that the same basic principles are operative, but the processes in a large industrial electricity generator are far more complex. Part of the series *Physics in Action*. (19 minutes)

Understanding Electricity

- VHS/DVD-R
- Preview clip online
- Item # 11937

From the lighting of homes to the beating of a heart, electricity is an integral and fundamental force in human life. In this program, a variety of experts discuss the study and wide-ranging uses of this pervasive phenomenon, from the physics of motors and neon lights to the output of the Hoover Dam. Engaging computer graphics are used to explain voltage, amps, and watts. Dr. Martin Uman of the University of Florida Lightning Research Lab conducts modern versions of the experiment Ben Franklin made famous. Dr. Hugh Calkins, Director of Electrophysiology at Johns Hopkins Hospital, discusses innovations in defibrillators that can now be installed in the patient. A Discovery Channel Production. © 1997. (53 minutes)



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