

Electrical Circuits And DVOM Usage (ELE01)

Module 1—Electrical Circuits

- A. Parts Of A Circuit
 - 1. Learning Objectives
 - 2. Parts Of A Circuit
 - 3. Battery As Load And Power Source
 - 4. Ground
 - 5. Making Ground Connections
 - 6. Wire Gauge Chart (Metric And AWG)
 - 7. Conductors
 - 8. Circuit Protection/Switch
- B. Circuit Board
 - 1. Circuit Board
 - 2. Making A One-Load Circuit
 - 3. Making A One-Load Circuit (cont'd)
- C. DVOM
 - 1. DVOM
 - 2. DVOM Features
- D. Voltage
 - 1. Electrical Or Electronic Circuits
 - 2. DVOM
 - 3. DC Volts (DCV) Scale
 - 4. Voltage Readings
 - 5. Measuring Voltage
 - 6. DVOM Readings
 - 7. Determining An Unknown Value
 - 8. Circuit Value Measurement #1
 - 9. Voltage Measurement #1
 - 10. Voltage Measurement #1 (cont'd)
 - 11. Voltage Measurement #2
 - 12. Voltage Measurement #2 (cont'd)
 - 13. Voltage Measurement #3
 - 14. Voltage Measurement #4
 - 15. Voltage Measurement #4 (cont'd)
 - 16. Voltage Measurement #5
 - 17. Voltage Measurement #5 (cont'd)
 - 18. Voltage Measurement #6
 - 19. Voltage Measurement #6 (cont'd)
 - 20. Broken Wire
- E. Current
 - 1. Current
 - 2. Direct Current (DC)
 - 3. Measuring Current With A DVOM
 - 4. Steps To Prevent Blowing A Meter Fuse
 - 5. Current Measurement #1

6. Current Measurement #2
7. Video: Parasitic Load Draw
8. Parasitic Load Draw
- F. Resistance
 1. Resistance
 2. Wire Gauge Example
 3. Resistors
 4. Measuring Resistance
 5. Measuring Resistance–Resistor E
 6. DVOM Readings At 15,000 Ohms (15K Ohms)
 7. Measuring Resistance–Resistor F
 8. Measuring Resistance–Resistor G
 9. Measuring Resistance–Resistor H
- G. Circuit Value Relationship
 1. Resistor Circuit
 2. Measuring Total Resistance
 3. Measuring Total Voltage
 4. Measuring Total Current
 5. Continuity Test
 6. Activity: Resistance, Continuity, And Shorts
 7. Ohm's Law
 8. Circuit Value Relationship (Ohm's Law)
- H. Voltage Drop
 1. Voltage Drop
 2. Voltage Drop
 3. Expected Voltage Drops
 4. Performing A Voltage Drop Test
 5. Continuity Flow Chart
 6. Problems Identified Using A Voltage Drop Check
 7. Voltage Drop Test
 8. Voltage Drop Test (cont'd)
 9. Voltage Drop Test (cont'd)
 10. Voltage Drop Test (cont'd)
 11. Video: Voltage Drop Test Part 1
 12. Voltage Drop Test
 13. Video: Voltage Drop Test Part 2
 14. Voltage Drop Test
- I. Series Circuit
 1. Series Circuits
 2. Typical Blower Motor Circuit
 3. Different Blower Motor Circuit Settings
 4. Two-Bulb Series Circuit
 5. Voltage Drop–Bulb A
 6. Voltage Drop–Bulb B
 7. Three-Bulb Series Circuit
 8. Voltage Drop–Bulbs A & B
 9. Measuring Current In Three-Bulb Series
- J. Parallel Circuit
 1. Two-Bulb Parallel Circuit

2. Current In The Two-Bulb Parallel Circuit
 3. Measuring Branch Current
 4. Measuring Branch Voltage
 5. Resistance In Connected Parallel Circuit
 6. Circuit Board Schematic
 7. Three-Bulb Parallel Circuit
 8. Measuring Total Current In A Three-Bulb Parallel Circuit
 9. Making An Unequal Load
 10. Three-Bulb Parallel Circuit With An Unequal Load
 11. Unequal Load Results
 12. Troubleshooting Blown Fuses In A Parallel Circuit
- K. Review
1. Review
 2. Review #2
 3. Review #3
- L. Conclusion
1. Conclusion
 2. Conclusion (cont'd)
 3. Conclusion (cont'd)
 4. Conclusion (cont'd)

Module 2—Electrical Parts And Troubleshooting

- A. Power Supplies
1. Learning Objectives
 2. Automotive Batteries
- B. Circuit Protection
1. Types Of Circuit Protection
 2. Fuse (Fusible) Link And Maxi-Fuses
 3. Fuses And Fusible Links
 4. Video: Fuse Blowing Exercise Part 1
 5. Fuse Blowing Exercise Part 1
 6. Video: Fuse Blowing Exercise Part 2
 7. Fuse Blowing Exercise Part 2
 8. Circuit Breaker
- C. Switches
1. Switches
 2. Switch Problems
 3. Testing A Switch For Continuity
 4. Voltage Drop Test On Circuit Board Switch
- D. Connectors
1. Connectors
 2. Do not Back Probe A Waterproof Connector
 3. Connector Damage
 4. Connector Disassembly
 5. Connector Repair
- E. Wire Repairs
1. Wire Repair
 2. Keeping The Same Wire Length

3. Splice Sleeve
4. Crimping
5. Flameless Torch
6. Soldering
- F. Troubleshooting Steps
 1. Video: Troubleshooting
 2. The I-Car Troubleshooting Flowchart
 3. Define Problem
 4. Know The System
 5. Find Cause
 6. Make Repair
 7. Check System
- G. Types Of Faults
 1. Video: Opens
 2. Types Of Faults–Opens
 3. Bad Grounds
 4. Damaged Tail Lamp Circuit
 5. Making The Tail Lamp Circuit
 6. Making The Tail Lamp Circuit (cont'd)
 7. Making The Tail Lamp Circuit (cont'd)
 8. Repairing the Opens In The Tail Lamp Circuit
 9. Video: Shorts
 10. Short Locations
 11. Short To Ground
 12. Creating A Short To Ground
 13. Part Failure
- H. Conclusion
 1. Conclusion
 2. Conclusion (cont'd)
 3. Conclusion (cont'd)
 4. Conclusion (cont'd)
 5. Post-Test