1046211500 Basic Electrical Circuits

Course Outcome Summary

Course Information

Description:
Students will learn how to measure voltage, current and resistance in an electrical circuit.

Total Credits: 1
Total Hours: 27

Course History

Status: Active
Active Date: 1/6/2021
Last Revision Date: 10/19/2023
Revised By: Steven Boogren (SBoogren)
Last Approval Date: 10/19/2023
Approved By: Aaron Panke (APanke)

Textbooks

AC DC Electrical Student Reference VB227, Amatrol

Course Competencies

1. Introduction to Basic Electrical Circuits

Assessment Strategies
Skill Demonstration

Criteria

Use an AC Tester to Check a Wall Outlet for Electricity
Connect and Operate a Power Supply
Connect and Operate a Circuit Using Three Types of Manual Switches
Connect and Operate an Electrical Circuit with a Resistor
Connect and Operate an Electrical Circuit with a Buzzer
Connect and Operate an Electrical Circuit with a Solenoid

Learning Objectives

Define Electricity and Give an Application
Describe the Two Types of Electrical Current and Give an Application of Each
Describe the Function and Operation of a Circuit Tester
Describe the Function of the Four Basic Components of an Electrical Circuit
Describe the Operation of Two Types of Power Supplies and Give Their Schematic Symbols
Describe the Function of an Electrical Schematic
Describe the Operation of a Manual Switch
Describe the Operation of N.O. and N.C. Contacts and Give Their Schematic Symbols
Describe the Function of Three Types of Manual Switch Operators and Give an Application of Each
Describe the Operation of Three Types of Manual Switch Operators and Give Their Schematic Symbols
Describe the Function of Five Types of Electrical Output Devices and Give an Application of Each
Describe the Operation of Five Types of Electrical Output Devices and Give Their Schematic Symbols

2. Demonstrate Electrical Measurements

Assessment Strategies
Skill Demonstration

Criteria

Use an Analog Voltmeter to Measure the Voltage at a Point Referenced to Ground
Identification of Digital Multimeter Components
Use a DMM to Measure the Voltage of a Point Referenced to Ground
Voltage Characteristics of Series and Parallel Circuits
Use a DMM to Measure Voltage Drops in Series and Parallel Circuits
Use a DMM to Measure the Electrical Current
Use a DMM to Measure Current in Series and Parallel Circuits
Characteristics in Series and Parallel Circuits
Use a DMM to Measure the Resistance of a Component
Measure the Resistance in Series and Parallel Circuits
Test the Continuity of Wires Using a DMM

Learning Objectives

Define Voltage and Give Its Units of Measurement
Describe the Function of a Voltmeter and Give Its Schematic Symbol
Describe How to Use a Voltmeter to Measure Voltage
Describe the Function of Two Multimeters: Analog and Digital
Define Series and Parallel Circuits
Define Current and Give Its Units of Measurement
Describe the Function of Two Types of Ammeters and Give Their Schematic Symbol
Describe How to Use an Ammeter to Measure Current
Describe the Current Characteristics in Series and Parallel Circuits
Define Resistance and Give Its Units of Measurement
Describe the Function of Two Types of Ohmmeters and Give Their Schematic Symbol
Describe How to Use an Ohmmeter to Measure Resistance
Describe the Resistance Characteristics in Series and Parallel Circuits

Describe Two Methods of Measuring Continuity

3. Explore Circuit Analysis

Assessment Strategies

Skill Demonstration

Criteria

Calculate Series Resistance Given Each Load's Resistance

Use Ohm's Law to Calculate Voltage, Current, and Resistance in a Series Circuit

Verification of Kirchhoff's Voltage Law

Calculate the Total Power Used by a Series Circuit

Calculate the Main Line Current in a Parallel Circuit

Calculate the Total Parallel Resistance

Calculate the Total Power Used in a Parallel Circuit

Operate a Circuit Using a Fuse

Test and Replace a Fuse

Operate a Circuit Using a Circuit Breaker Test and Reset a Circuit Breaker

Learning Objectives

State the Formula for Calculating Series Resistance and Give an Application

State Ohm's Law, Explain Its Importance, and Give an Application

State Kirchhoff's Voltage Law for a Series Circuit and Give an Application

Define Power and Give Its Units of Measurement

State a Formula for Calculating the Total Power Used in an Electrical Circuit

State Kirchhoff's Current Law and Give an Application

State a Formula for Calculating Total Parallel Resistance

Describe the Function of Two Types of Circuit Protection and Give an Application of Each

Describe the Operation of a Fuse and Give Its Schematic Symbol

Describe the Operation of Two Types of Circuit Breakers and Give Their Schematic Symbols