

Introduction to Low Voltage Circuit Breakers - Virtual

3 Days, 2.1 CEUs

Low voltage circuit breakers must be able to quickly recognize and respond to various abnormal system conditions. The problem could be caused by a motor that won't start or by a careless contractor inadvertently digging into a buried cable. Circuit breakers must automatically trip open to prevent or minimize the damage. This is made possible by fitting the circuit breakers with overcurrent protective devices that can detect these abnormal conditions.

Modern overcurrent devices typically come with a multitude of pickup and delay settings that can be overwhelming to technicians who maintain and test them. Each combination of overcurrent device and circuit breaker has its operating features shown on time current characteristic curves that are provided by the manufacturer. Different manufacturers are not consistent at conveying the information given on their curves.

Several examples are discussed during the class, and practical exercises are given to show participants the necessary steps to learn how to use and interpret trip device curves.

The industry standards for performing primary current injection on long-time, short-time, instantaneous, and ground will also be discussed. Participants should have a working knowledge of low voltage circuit breakers, an understanding of basic math functions, and should have a calculator available for this class.

This course is intended for electricians and technicians that install, maintain, repair or troubleshoot low voltage circuit breakers, and need to understand the operation of trip devices and the correct use of time curves.

Learning Objectives

To receive 2.1 CEUs, participants must attend 3 days of virtual classes (21 contact hours) and attain a minimum grade of 80% on the final exam. Upon completion of this course the participant will demonstrate that he/she is able to:

- Outline the basic operating principles of low voltage circuit breakers.
- Describe the various overcurrent functions found on modern trip devices.
- Identify and document pickup values and time delay bands found on modern trip devices.
- Calculate pickup values and trip times from various trip curves.
- Summarize industry standards for testing overcurrent trip devices

SCOPE

Day 1* (7 contact hours)

- I. Introduction to Low Voltage Circuit Breakers
- II. Normal Power System Conditions
- III. Overcurrent Conditions
 - A. Overload current
 - B. Short circuit or fault current
 - C. Ground fault current
- IV. Overcurrent Devices
- V. Manufacturer's Trip Curves
 - A. Practical exercise 1
 - B. Review of practical exercise
 - C. Practical exercise 2
 - D. Review of practical exercise

Day 2 (7 contact hours)

- VI. Solid-State/Microprocessor Trip Devices
- VII. Working with Trip Devices Settings
- VIII Interpretation of Solid-State Trip Curves
 - A. Navigating trip curves
- IX. Testing Solid-State Trip Devices
 - A. Practical exercise 3
 - B. Practical exercise 4
 - C. Practical exercise 5

Day 3 (7 contact hours)

- X Review of Practical Exercises
- XI. Conclusion
 - A. Review
 - B. Exam

*Class scheduling times may vary based on discussions and size of class



STANDARD EQUIPMENT LIST
Introduction to Low Voltage Circuit Breakers - Virtual

REVISED: 9/7/2022

Course No. 301V

BY: RYAN STANSBURY

DAYS: 3

NOTE: All items indicated with an asterisk (*) must be supplied by the client on On-Site courses

TEXT (PER 1 STUDENT)	
1	AVO COURSEBOOK - INTRODUCTION TO LOW VOLTAGE CIRCUIT BREAKERS - VIRTUAL

MATERIALS NEEDED (PER CLASSROOM)	
*1	PROJECTOR OR TV WITH PROJECTION CAPABILITIES
*1	DRY ERASE BOARD WITH MARKERS AND ERASER
*10	STUDENT TABLES
*10	STUDENT CHAIRS

FOR VIRTUAL CLASSES:
CONTENT MATERIAL WILL BE PROVIDED IN DIGITAL FORMAT