

Microprocessor Based Relay Testing - Feeder Protection

4.5 Days, 3.2 CEUs

This hands-on course is designed for test technicians and other persons involved in setting, testing, and diagnosing microprocessor-based relays that protect feeder and bus systems. NETA and NFPA 70B maintenance and testing standards recommend testing relays either every two years or at other regular intervals. This course will present the fundamentals of microprocessor-based feeder protection, combined with hands-on testing of selected elements of the protective relays.

Pre-Requisites

Student must bring a laptop and have full administration rights to complete the class labs. Laptop must have the most up to date version of Windows, 4+GB hard drive space, 1+GB RAM, and a CD-ROM drive. iPads and tablets without CD-ROM or USB ports are not acceptable. Instructions to download the needed software prior to attending the class is attached.

Lab and Classroom Attire

AVO Training Institute is committed to the personal safety of each participant and require long pants and ANSI rated "safety-toe" work shoes for lab activities. Lecture courses may involve a tour of a work or shop area and for this reason open-toe shoes and shorts are not considered appropriate attire for the classroom.

Learning Objectives:

- Outline how the relay is applied in the power system and identify critical components.
- Interpret external wiring connections and internal logic functions.
- Follow NETA standards when performing tasks with the microprocessor.
- Establish communication with the relay.
- Verify proper operation of relay indicators and output operation.
- Connect relay test set and perform metering check and field tests.
- Perform the following relay element tests and interpret the results:
 - Phase Time Overcurrent
 - Phase Instantaneous Overcurrent
 - Ground Time Overcurrent
 - Ground Instantaneous Overcurrent
 - Neutral Time Overcurrent
 - Neutral Instantaneous Overcurrent
 - Negative Sequence Time Overcurrent
 - Negative Sequence Instantaneous Overcurrent
 - Sensitive Ground Time Overcurrent
 - Sensitive Ground Instantaneous Overcurrent
 - Bus Undervoltage
 - Overvoltage
 - Line Undervoltage
 - Underfrequency
 - Synchrocheck

Note: Relays used in lab exercises will be SEL-751A, GE-SR750, and ABB REF615.

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

AVO Training Institute is accredited by the International Association for Continuing Education and Training (IACET) and is accredited to issue IACET CEUs

Microprocessor Based Relay Testing - Feeder Protection

4.5 Days, 3.2 CEUs

SCOPE

Day 1* (7 contact hours)

I. Introduction (0.5 hour)

- A. Schedule
- B. Course Outline

II. Introduction to Feeder Protection Fundamentals (3.5 hours)

- A. Causes of Faults
- B. Protection Requirements
- C. Feeder Protection Application
- D. Feeder Protection Components

AM BREAK (15 min)

- E. Instrument Transformers
- F. Protective Relay Elements
- G. Protective Relay Testing

LUNCH (60 min)

III. SEL 751A (3.5 hours)

- A. Relay Connections
- B. Establish Communications
- C. Event Record Data Management

PM BREAK (15 min)

- D. Verify Operation of Front Panel LED's
- E. Verify Date and Time
- F. Conduct Meter Check

Day 2 (7 contact hours)

III. SEL 751A (cont'd) (7 hours)

- G. Protective Element Testing

AM BREAK (15 min)

- H. Clear Event Record

LUNCH (60 min)

- I. Restore Relay Settings

PM BREAK (15 min)

- I. Restore Relay Settings

Day 3 (7 contact hours)

IV. GE SR 750 (7 hours)

- A. Relay Connections
- B. Establish Communications

AM BREAK (15 min)

- C. Event Record Data Management
- D. Verify Operation of Front Panel LED's

LUNCH (60 min)

- E. Verify Date and Time
- F. Conduct Meter Check
- G. Protective Element Testing

PM BREAK (15 min)

- H. Clear Event Record
- I. Restore Relay Settings

Day 4 (7 contact hours)

V. ABB REF615 (7 hours)

- A. Relay Connections
- B. Establish Communications
- C. Event Record Data Management

AM BREAK (15 min)

- D. Verify Operation of Front Panel LED's
- E. Verify Date and Time

LUNCH (60 min)

- F. Conduct Meter Check
- G. Protective Element Testing

PM BREAK (15 min)

- H. Clear Event Record
- I. Restore Relay Settings

Day 5 - 1/2 Day (4 contact hours)

VI. Conclusion (4 hours)

- A. Review

AM BREAK (15 min)

- B. Final Exam

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

AVO Training Institute is accredited by the International Association for Continuing Education and Training (IACET) and is accredited to issue the IACET CEU



STANDARD EQUIPMENT LIST

Microprocessor-Based Relay Testing Feeder Protection (MBRT-FP)

REVISED: 02/11/2019

COURSE NO. 553

BY: RALPH PARRETT

DAYS: 4.5

TEXT (PER 1 STUDENT)	
QUANTITY	ITEM
1	MBRT-FP COURSE 553, MAY 2019, REV. 1

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

EQUIPMENT (PER 1 Student)	
QUANTITY	ITEM
1 PER 2 STUDENTS	SMRT 410 WITH ACCESSORY KIT SEL
1 PER 2 STUDENTS	351A
1 PER 2 STUDENTS	SEL 387
1 PER 2 STUDENTS	Multilin SR750
1 PER 2 STUDENTS	Multilin SR745
1	SCIENTIFIC CALCULATOR
1	AVO LOGO MINI-SCREWDRIVER

MISCELLANEOUS EQUIPMENT (INSTRUCTOR CONTROLLED TOOL KIT)	
QUANTITY	ITEM
6 EACH	RS232 SERIAL 6FT. (RS232 DB9 MALE TO DB9 FEMALE)
6 EACH	RS232 SERIAL (FEMALE) TO USB 2.0 CABLE & DRIVER SOFTWARE
6 EACH	RS232 NULL MODEM ADAPTER (MALE TO FEMALE)
6 EACH	POWER STRIP EXTENSION CORD 6FT.
3 EACH	POWER EXTENSION CORD 25 FT.
60 EACH	SPADE CONNECTORS (SMALL 30 RED AND 30 BLK)
6 EACH	SCREWDRIVER 5 IN 1 (KLEIN TOOL)
6 EACH	ETHERNET TO USB CONVERTER
6 EACH	CAT 5E ETHERNET CABLE 6 FT

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

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