

Cable Fault Location and Tracing, MV

4.5 Days, 3.2 CEUs

Medium voltage cable systems are the backbone of electrical systems worldwide, yet often they are the most ignored part of the power system – until there is a failure. One of the most important aspects of medium voltage cable maintenance is “fault location.” Cable systems today have higher failure rates than ever before due to aging, environmental stresses and improper installation. The ability to efficiently locate faults greatly reduces downtime thus outage costs.

This hands-on course is intended for new or experienced electricians and technicians that install, maintain, repair or troubleshoot 5-35 kV solid dielectric power cables.

The student should have some field experience and basic knowledge of AC/DC electricity.

Lab and Classroom Attire

AVO is committed to the personal safety of each participant and requires safety glasses, 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

To receive 3.2 CEUs, the participant must attend 4.5 days of class (32 contact hours) and attain a minimum average grade of 80% (overall grade will consist of 50% lab practice and 50% final exam). Upon completion of this course, the participant will demonstrate that he/she is able to:

- Identify medium voltage cable components and causes of failure.
- Utilize safe work practices for cable testing per OSHA and industry consensus standards.
- Trace cable installations with modern cable route tracing and identification equipment.
- Locate secondary faults using earth gradient (sheath fault) technologies.
- Pinpoint faults using magnetic and acoustical tracing system and arc reflection technologies.
- Apply a proven fault locating process; test, analyze, localize.
- Locate faults in a comprehensive cable field lab environment.

SCOPE

Day 1* (7 contact hours)

- I. Introduction (0.5 hr)
 - II. Introduction To Power Cable (1.5 hrs)
 - A. Purpose of Power Cables
 - B. Power Cable Construction
 - C. Power Cable Termination
 - D. Conditions Causing Cable Faults
 - E. Fault Locating Safety
- AM Break

- III. Power Cable Identification & Tracing (2 hrs)
 - A. Safety Precautions
 - B. Cable Identification
 - C. Tracing Methods and Technology
 - D. Direct Coupling Method of Tracing
 - E. Signal Tracing Using Integrated Antenna
 - F. Modes of Operation for the Receiver

Lunch

- IV. Earth Gradient Fault Location (3 hrs)
 - A. Safety Precautions
 - B. Principles of Operation
 - C. Connections and Controls
- PM Break
- D. Basic Operation of Indicator Unit
 - E. Setting Adjustments
 - F. Locating the Fault

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

Cable Fault Location and Tracing, MV

4.5 Days, 3.2 CEUs

SCOPE

Day 2 (7 contact hours)

- V. Cable Fault Location and Tracing Labs (7 hours)
 - A. Cable Identification using Cable Identifier Test Set
- AM Break
- B. Cable Test using a 5/10 kV Megohmmeter
- Lunch
- C. Cable Tracing using Line Location System
- PM Break
- D. Earth Gradient Cable Fault Location using Earth Fault Locator

Day 3 (7 contact hours)

- VI. TDR Cable Fault Location (4 hrs)
 - A. Safety Precautions
 - B. Purpose for Power Cable Fault Location
 - C. Principles of Operation
- AM Break
- D. Time Domain Reflectometer (TDR)
- E. TDR Used with the HV Cable Fault Locator
- F. Cable Fault Location Testing
- G. Evaluation of Test Results
- Lunch
- VII. Cable Fault Location (3 hrs)
 - A. Safety Precautions
 - B. Purpose for Power Cable Fault Location
- PM Break
- C. Cable Fault Locating Methods
- D. Cable Fault Locating

Day 4 (7 contact hours)

- VIII. Cable Fault Locating and Tracing Labs (7 hours)
 - A. Cable Fault Pre-locating using Time Domain Reflectometer
- AM Break
- B. EZ Thump Cable Fault Location using Digiphone Acoustic and Magnetic Tracer
- Lunch
- C. Fault Tracing Using Digiphone Acoustical and Magnetic Tracer
- PM Break
- D. Smart-Thump Cable Fault Location using Digiphone Acoustic and Magnetic Tracer

Day 5 (4 contact hours)

- IX. Conclusion (4 hrs)
 - A. Review
 - B. Test



STANDARD EQUIPMENT LIST
Cable Fault Location & Tracing, Medium Voltage
Course 132, Rev 1

REVISED:10/06/2016

BY: Mark Franks

DAYS: 4.5 DAYS

TEXT (PER 1 STUDENT)	
1	CABLE FAULT LOCATION & TRACING, MEDIUM VOLTAGE , #132, REV2 OCT 2017

EQUIPMENT (PER CLASS)	
QUANTITY	ITEM
1	MEGGER E-Z THUMP FAULT LOCATING UNIT WITH LEADS & MANUALS INCLUDING ELBOW CONNECTOR
1	MEGGER EASYLOC CABLE TRACER WITH TRANSMITTER UNIT, LEADS AND MANUAL
1	MEGGER ESG NT SHEATH FAULT LOCATOR WITH LEADS MANUAL, & A-FRAME
1	MEGGER TELEFLEX TIME DOMAIN REFLECTOMETER WITH LEADS AND MANUAL
1	MEGGER 5/10 kV INSULATION RESISTANCE TESTER WITH LEADS AND MANUAL
1	MEGGER DIGIPHONE ACOUSTIC & ELECTROMAGNETIC PINPOINTER
1	MEGGER SMART-THUMP FAULT LOCATING UNIT WITH LEADS & MANUALS INCLUDING ELBOW CONNECTOR
1	CI LCI-SET, CABLE IDENTIFIER

DEVICES (PER CLASS)	
QUANTITY	ITEM
2	RUBBER GLOVES SIZE 10
1	BIDDLE GROUNDING STICK
2	BARIERS (DALLAS ONLY)
50	CABLE ROUTE FLAGS
2	25 FT EXTENSION CORDS
1	CABLE ROUTE MEASURING WHEEL
2	3 PHASE URD GROUNDING SETS
2	LIVE LINE TOOL (SHOT GUN STICK)
2	HARD HAT AND FACE SHIELD
6	15 kV JUMPERS WITH ELBOWS
3	15 kV FEED THROUGH DEVICES
6	15 kV PARKING STANDS
2	T-HANDLE LIFTING TOOLS
1	PENTA SOCKET & RATCHET TOOL
6	ELBOW TEST PROBES

2	ELBOW CONNECTOR FOR EZ THUMP AND SMART THUMP
1	ELBOW PULLER

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