

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

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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

REVISED 10/6/16 BY: MARK FRANKS
COURSE NUMBER 132, REV.2
4 1/2 DAYS

TEXT

1 / STUDENT *CABLE FAULT LOCATION & TRACING,
MEDIUM VOLTAGE, #132, REV1 AUG 2016*
INCLUDE: USB WITH APENDICES

EQUIPMENT

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

DEVICES

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

STANDARD EQUIPMENT LIST

CABLE FAULT LOCATION & TRACING, MEDIUM VOLTAGE

MISCELANEOUS MATERIALS - A/V EQUIPMENT

1 / CLASS	COMPUTERIZED PROJECTOR
1 / CLASS	WHITEBOARD WITH MARKERS
1 / STUDENT	SAFETY GLASSES