



Non-Contact Troubleshooting for LV High incident energy circuits

- For Wind turbine technicians
- Solar, Green Power Generation operators and maintenance technicians
- Midstream oil and gas power
- Steam co-gen, hydroelectric and nuclear power plant electricians
- 4160V/480V metal clad switchgear and MCC equipment maintenance
- Pulp and paper mill Electricians

NFPA 70E, OSHA 1910(S) define working on to include testing and troubleshooting which can become troublesome, uncomfortable and perilous on low voltage high incident energy. We train the technicians in the art of non-contact and de-energized troubleshooting with the use of DLROs and Thermography, especially of relevance now that NFPA 70B has become legislation since the fall of 2023

Pre-requisites

- Technicians must have current 70E/Z462 training certificates (< 3 yrs)
- Technicians must have recent LOCKOUT/TAGOUT training (< 1 yr)
- Technicians must be current trained in CPR/AED/First Aid (< 2 yrs)
- Technicians must bring their own voltmeter/ohmmeters (CAT III, 1000V)
- Technicians must have Arc flash PPE rated for min. 8 cal/cm²
- Technicians must have Shock gloves rated for 1000VAC, tested (< 6 months)

LOCKOUT TAGOUT Training hands on preceded by theory (1.5 days)

- Review of OSHA 1910.147 LOTO standard
- Study of Control of Hazardous Energy and its limitations
- Difference between Simple and Complex LOTO per OSHA
- 10 steps of LOCKOUT/TAGOUT per OSHA 1910.147
- When and how to execute a TAGOUT
- Risk Assessment and JHA (**written Examination**)
- Written procedures for Complex LOTO and switching orders
- Group LOTO and different Lockout Devices
- Establishing an Electrically Safe Work Condition
- Setup/Staging of a safe work zone
- Inspection of PPE, live-line tools and measurement instruments



- Case studies on fatalities due to lack of Notify Affected Party
- Practical on three phase energized equipment demonstrating ...
- Notify Affected Party
- Normal Stop/De-energize Apply Locks
- Verify LOTO, Challenge LOTO
- Test for Absence of Voltage (Live-Dead-Live)
- Perform Work
- Bump test (Partial Re-energization for phase/amp draw test)
- De-energized troubleshooting prior to re-energize
- Return to Normal with all above steps in reverse
- **Written Test (Examination)**

Electrical Safety refresher, setting up safe work zone (1.5 days)

- Shock Tables AC/DC, meaning of avoid contact
- Boundaries, their rules and limitations
- Suitably Guarded, use of boundaries, barriers, barricades
- Reding and interpreting of arc flash labels
- Empirical calculations with tables to determine PPE with table method
- De-energized troubleshooting with resistance meters, DLROs
- Megger Testing De-energized circuits before startup
- Working on “Testing/Troubleshooting” three phase circuits live
- **Written test (Examination)**

Non-contact Troubleshooting (1 days)

- Setting up of IR scan device
- Training on variables to be set for a baseline scan
- Take baseline readings of three phase system under normal operating condition
- **Troubleshoot Circuit for Fault condition #1 (examination)**
- **Troubleshoot Circuit for Fault condition #2 (examination)**
- **Troubleshoot Circuit for Fault condition #3 (examination)**
- Successful completion of all test awards student with “non-contact troubleshooting technician” designation