Course Objectives

This is an introductory course on how to troubleshooting low voltage systems as a technician or service responder.

The goal is to provide the basic approach however technical knowledge of the specific system will still likely be needed to fully understand and address the issue.

See the provided outline for quick reference.

Troubleshooting Basics

- Initial Remote Assessment
- Identifying the Needs of the Customer
- Communicating Findings
- Completion and Solution Follow Through
- System Troubleshooting Approach
- Multi-meter Use
- Electronic Circuit Troubleshooting

Initial Remote Assessment

- Review Service Response Procedure for that facility or customer if established
- Gather information within a template or written log
- Your goal is to identify the type of problem and verify what resources may be needed prior to travelling to the site or area of the facility
- It is unrealistic to resolve most problems remotely, make certain the customer is aware of this and the need to establish some basic information before proceeding for the most efficient response
- If remote access is unavailable a verbal conversation with onsite personnel can be very helpful

Identifying the Role and Requirements of the Customer

- If the account is UL Listed the response procedure will over-ride the on site personnel's opinion of response needs in most cases.
- Determine the motivation of the customer and what symptoms brough the issue to their attention
- What resolution would they prefer? Is their request in conflict with the AHJ? This may require explanation of code requirements and your obligation to them.
- Can the customer assist with access to the facility or response area? What items, resources or personnel does the customer need to provide to you for other related systems in the facility?

Communicating Findings

- Always communicate with the customer before leaving the site
- Keep explanation relevant and concise
- Review with AHJ if necessary, provide required on site service paperwork and/or tagging
- Take time to produce documentation before leaving the site and communicate with the central station while still at the control panel before leaving
- Information provided including next steps and equipment needed (if applicable) should assume you may not be the technician returning to resolve the issue

Completion and Solution Follow Through

- Where you a resource for addressing the problem? How can you leverage this information for future responses by yourself or others?
- Check back with the office or customer to verify resolution
- Realize there can be more than one problem
- How can we improve the response in the future?
- What information/documentation should be updated for the confidence testing team?

System Troubleshooting Approach

- Advance preparation and accumulation of documents/resources can help greatly
- Do not loose sight of timelines and pre-designating time to allocate to each troubleshooting step
- Documentation can start at any time always keep written notes from the start even if you believe it to be a simple issue to resolve
- Maintain a systematic approach
- Narrow down general to specific and from larger areas to specific

Multi-meter Use

- What do the symbols represent? If you are unsure, review documentation as these may differ even with the same manufacturer
- Do you have replacement battery and fuses for the meter if needed?
- What range do the readings fall into? Make sure the decimal point and range parameters are taken into consideration.
- Keeping your meter and tools clean, protected and organized will save time provide the best results

Electronic Circuit Troubleshooting

- What are factors that can affect a circuit?
 - Ground faults, inductance, resistance, capacitance, voltage drop
- Isolating the problem big steps first
 - If problem is unknown, eliminating sub-systems or components from the system can be an option
 - If the circuit does have an issue at an unknown location pick a halfway point on the circuit and disconnect it there. If the problem exists half the circuit towards the controller, if not work reconnect and work away from the controller

Equipment Troubleshooting

- Equipment issues can be tricky to identify if a replacement part is unavailable to use. Remember to check jumpers and interconnecting cables as well.
- Firmware and software can impact the performance of equipment. When replacing equipment, checking compatibility is a prior step before considering this option.
- Always identify boxes/containers of removed or replaced equipment with temporary form attached to the container along with service number reference. If the factory is involved, they will usually issue an RMA number – record this on the form attached to the equipment and service documentation