

U.S. Fire Administration / National Fire Academy

# Coffee Break Training

## Topic: Power-Limited and Nonpower-Limited Circuits

**Learning objective:** The student shall be able to explain the difference between power-limited and nonpower-limited fire alarm circuits.

While NFPA 72, National Fire Alarm Code® establishes standards for the design, installation and maintenance of fire detection and alarm systems, it is NFPA 70, National Electrical Code® (NEC), that prescribes the rules for point-to-point wiring in a fire protection signaling system. Article 760 provides detailed requirements for wire types permitted in fire alarm systems, and Article 770 provides rules for optical fiber cables.

NEC Article 760 applies to all the wiring between the “load side of the overcurrent protection device (circuit breaker) or the power-limited supply (battery) and all connected equipment.”

There are two types of fire alarm system circuits: power-limited and nonpower-limited. The purpose for identifying the different circuits is to specify the appropriately rated wire, as well as provide protection so high voltage conductors are not inadvertently connected to low voltage ones. The result could be an accidental electrocution or destruction of the fire alarm system.

**Power-Limited Fire Alarm (PLFA) Circuits.** A power-limited fire alarm circuit is one that is inherently unable to exceed maximum voltages, or is equipped with a power-limiting source (transformer or battery) and a circuit breaker. Generally, these operate in the 24-volt direct current range, although they may employ higher voltages.

**Nonpower-Limited Fire Alarm (NPLFA) Circuits.** Nonpower-limited fire alarm circuits cannot operate at more than 600 volts, and there is no other power or current limitation for these systems. Usually these are used in 120-volt alternating current (AC) systems which have been rendered generally obsolete by the advent of low-voltage, direct current (DC) systems.

For additional information, refer to NFPA 70, National Electrical Code™, Article 760; or NFPA 72, National Fire Alarm Code®.

