



Fire Alarms & Detection: Line-Type Heat Detectors

No. FP-2012-28 July 10, 2012

Learning Objective: The student shall be able to explain the difference between coaxial conductor and paired wire line-type heat detectors.

Spot-type heat detectors—those that are installed on a specific ceiling location and protect an area of listed spacing—may not be suitable for all applications. For example, if an electric utility wanted detection in its cable trays, or a wood processor on its conveyor, or even a bulk flammable liquid storage operator around its tanks and valves, spot detectors would not be suitable.

In those cases, and similar unique situations, a line-type heat detector may be an appropriate selection. Line-type heat detectors are installed in a looped, continuous configuration from the fire alarm control panel, throughout the protected asset or premises, and back to the fire alarm control panel.

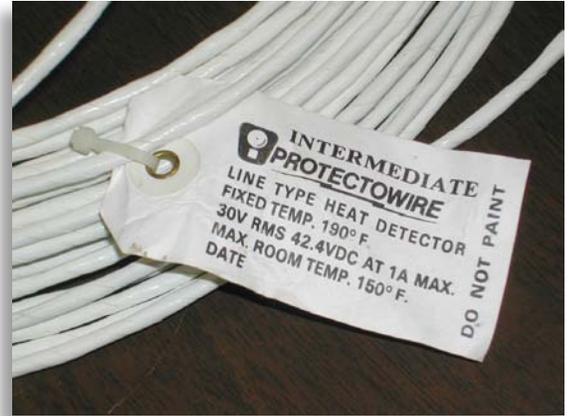
There are two prominent styles of line-type heat detectors: coaxial conductor and paired wire.

Coaxial conductor line-type heat detectors use a semiconductor material inside a stainless steel capillary tube. The tube contains a coaxial center conductor separated from the tube wall by a temperature sensitive material.

Under normal conditions, a small amount of electrical current—below the alarm threshold—flows through the line circuit. As the temperature rises, the electrical resistance of the temperature sensitive material (called thermistor) decreases, and more current flows to initiate an alarm. The looped wiring is connected to special controls that can pinpoint the spot of the temperature change, and report that to responding personnel. Once the coaxial conductor and thermistor cool back to normal temperature, the system will self-restore.

The paired wire line-type detector consists of a parallel pair of steel wires wrapped in a braided-sheath outer cable. The two wires are separated by thermally sensitive insulating material that is manufactured to melt at a specific temperature.

The paired wires are arranged so when the insulation melts because of a fire, the two wires come into contact with one another and the short circuit between them causes an alarm. Like the coaxial conductor, the paired wire line-type device can pinpoint the location of the alarm. The paired wire system measures electrical resistance on the wires to identify the alarm point. Paired wire systems are “nonrestoring.” After the wire has fused, it must be replaced and the electrical continuity of the loop tested to verify it is within the manufacturer’s recommended limits.



This line-type heat detector employs the paired wire principle of detection.

