



MIXING DIFFERENT TWO-WIRE SMOKE DETECTORS ON THE SAME INITIATING DEVICE CIRCUIT

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Unless only very few detectors are involved, the mixing of different brands or models of two-wire smoke detectors on the same initiating device circuit, is generally not recommended by most Fire Alarm Manufacturers. Here's why:

Establishing compatibility between two-wire smoke detectors and initiating circuits is a complex process. There is no cut and dry mathematical formula or simple electrical determination for this.

Two-wire smoke detectors place an impedance on the initiating circuit. The more detectors wired in parallel, the lower the impedance. When a detector goes into alarm, it lowers the impedance of the circuit even further, low enough to place the circuit into alarm, but yet allowing enough current to latch the detector into alarm and allow the detector indicating LED to light. Enough current also remains for one detector to transfer auxiliary relay contacts if the detector contains such a relay.

Both detector and circuit have response curves, which intersect in the alarm zone. This alarm zone defines an area where the detector lowers its impedance just enough to sense the specified amount of smoke to place it into alarm. The relative effect of impedance becomes compounded when a quantity of detectors are installed on the circuit. If these paralleled detectors lower the impedance sufficiently, a break near the end of the circuit may go undetected. This may occur because the impedance loading may make the circuit think the end of

line resistor remains intact. In addition, the accumulated impedance may cause unwanted alarms in the circuit. Or as mentioned above, the impedance may reach a value too low to allow enough current to flow to the detector to sustain an alarm condition.

Product and installation liabilities being what they are today, it is not worth the risk of mixing different two-wire smoke detectors.

Different brands or models of smoke detectors place different impedances on the circuits. For example, some circuits can accommodate up to 50 smoke detectors of one model, or only up to 15 of another. A fire alarm system manufacturer can simply not make a determination of the effect of the multiple variations and combinations of such a wide range of other manufacturer's detectors.

For example: Will a circuit operate properly with 20 of the first detector above and 10 of the second installed? The answer: Nobody

knows. A quality assurance testing laboratory would have to make this determination.

Product and installation liabilities being what they are today, it is not worth the risk of mixing different two-wire smoke detectors. If an installer has to make additions or replacements to circuits containing discontinued smoke detector models, consider installing all new detectors on one circuit, and using the replaced units as spares for other circuits in the system.

Better yet, before reinstalling the discontinued units, make sure the units have not reached the end of their useful life. Detector design has come a long way in the last ten or fifteen years. Manufacturers have designed new detectors using the latest developments and materials, while their engineers have the benefit of reviewing past failures and problems. Components change with age. The material used to construct many insect/dust filters in detectors may have begun to crumble, contributing to contamination in the detection chamber.

To date, no organization has set a standard regarding the useful life of a detector, but, in regard to recommended replacement of old, obsolete detectors, no installer or end user has been able to answer my query: "How many computers or color TVs do you have in use in your house that are as old as these detectors?"