TECHNICAL BULLETIN

Using Loop Explorer to Identify Smoke Sensors That Require Maintenance

NFPA 72 requires regular testing of smoke detector sensitivity. This may be performed in various ways. One method of confirming that smoke detectors are within their listed and marked sensitivity range is to use a 'smoke detector / fire alarm control unit arrangement whereby the detector causes a signal at the fire alarm control unit where its sensitivity is outside its listed range'. This is the method utilized by FireNET and FireNET Plus.

The smoke detectors used on FireNET and FireNET Plus are actually smoke *sensors*. These smoke sensors continuously communicate their status to the control panel. If there is a change of status, the sensor communicates this change to the control panel. The panel then determines the appropriate response, such as a fire alarm or other event.

Over time, dust and other contaminants can build up in the chamber of a smoke detector. The result of this build-up is an increased sensitivity to smoke. To illustrate using conventional smoke detectors:

2.0 %/ft (fire alarm)	2.0 %/ft (fire alarm)
2.0 %/ft = alarm	< 2.0 %/ft = alarm
	dust / contamination
0 %/ft (no smoke)	0 %/ft (no smoke)
Clean Detector	Dirty Detector
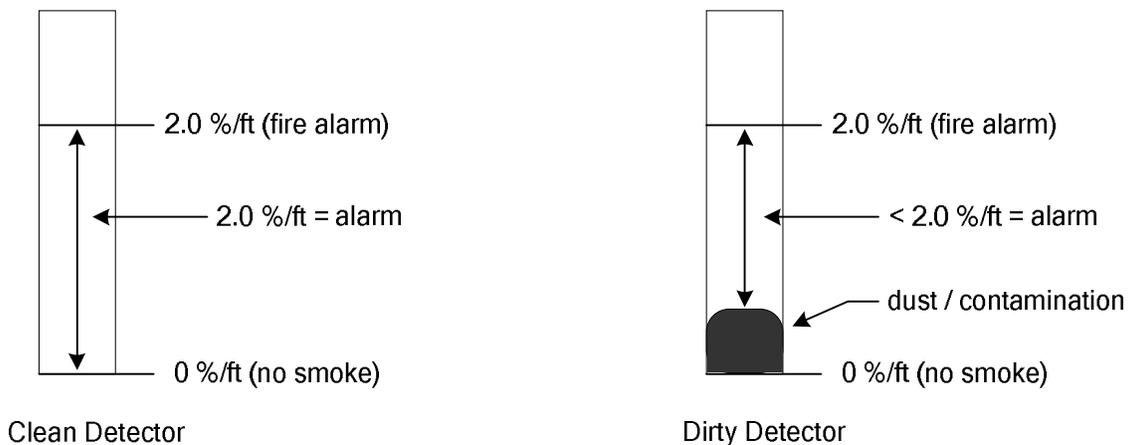
The smoke detector chamber illustrated on the left is clean. It will indicate an alarm when the smoke level reaches 2.0 percent per foot.

The smoke detector illustrated on the right has some contamination present in the chamber. Even when no smoke is present, the detector's sensitivity is affected. The result is that less smoke is required to reach the alarm threshold setting of 2.0 %/ft. The detector has become more sensitive to unwanted alarms because it is unable to compensate for the contamination. Eventually this detector will no longer be within its UL listed sensitivity range.

The FireNET and FireNET Plus control panels can compensate for contamination build-up in the smoke sensors. Each day the panel calibrates all of its smoke sensors at a user-selectable time. The calibration will offset any contamination that may be present in the sensors. This ensures that each smoke sensor will remain within its UL listed sensitivity range.

2.0 %/ft (fire alarm)

2.0 %/ft = alarm

0 %/ft (no smoke)

Clean Sensor

2.0 %/ft (fire alarm)

2.0 %/ft = alarm

0 %/ft (no smoke)

dust / contamination

Calibrated Sensor
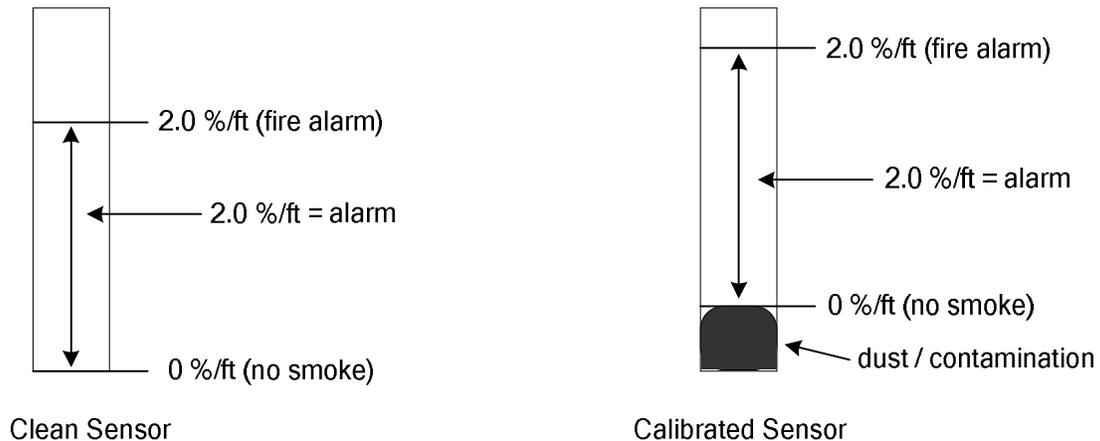
When the panel can no longer compensate for the contamination it will indicate a trouble condition, showing the location text, loop and address of the affected sensor. The sensor can then be serviced or replaced.

Note that the 0 %/ft reference has changed in the calibrated sensor. FireNET and FireNET Plus indicate this 0 %/ft reference as a number, called the *Zero Point*. The actual %/ft value returned from a smoke sensor at any given time is called the *Analog Value*. These numbers can be viewed and saved by using Loop Explorer.

To begin, connect to the panel with Loop Explorer and select the Analog Values tab. Select a panel address and a loop, then click on the "Fetch" button. You should see a screen similar to the one shown below:
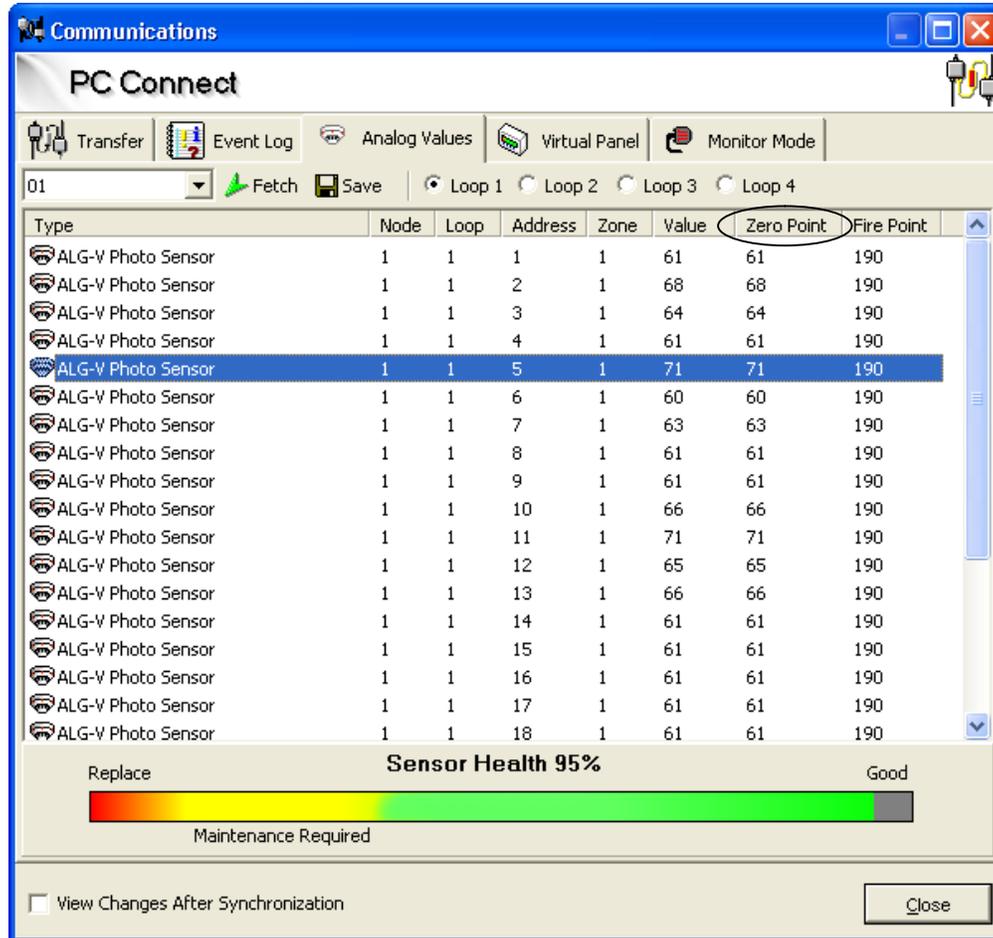
The number value shown in the *Zero Point* column can be used to determine the contamination state of a smoke sensor∗. This information can be saved for each loop. Then a report can then be created to show the status of the sensors. The information shown on the next page can be added to the report as a key to interpreting the Zero Point data obtained from the control panel.

Note that Loop Explorer will also display the health of any single sensor. Select the sensor in the list by clicking on it. Sensor health is indicated by percentage and by bar graph. For example:
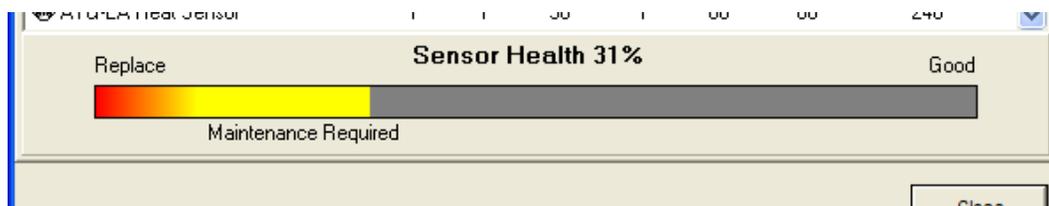
∗The number shown in the *Value* column indicates the real-time analog value of a sensor when the data was copied from the panel. The number shown in the *Fire Point* column is a design parameter used to calculate sensitivity.

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Use the information shown below to determine the status of the smoke sensors on your panel. A sensor is within its UL listed sensitivity if the Zero Point is within the Normal range.

AIE	
Status	**Zero Point**
Normal	40 – 90
Early Warning[1]	93 - 100
Maintenance Required[2]	101 - 109
Internal Trouble[3]	≤ 30 *or* ≥ 110

ALG-V and ALG-DH Duct Sensor	
Status	**Zero Point**
Normal	55 - 80
Early Warning[1]	36 – 40, 83 – 87
Maintenance Required[2]	29 – 35, 88 - 94
Internal Trouble[3]	≤ 28 *or* ≥ 95

ACA-V	
Status	**Zero Point**
Normal	50 – 80
Early Warning[1]	46 – 48, 83 - 87
Maintenance Required[2]	42 – 45, 88 - 94
Internal Trouble[3]	≤ 41 *or* ≥ 95

ALK series	
Status	**Zero Point**
Normal	50 – 80
Early Warning[1]	46 – 48, 83 - 87
Maintenance Required[2]	42 – 45, 88 - 94
Internal Trouble[3]	≤ 41 *or* ≥ 95

ACC-V	
Status	**Zero Point**
Normal	50 – 80
Early Warning[1]	46 – 48, 83 - 87
Maintenance Required[2]	42 – 45, 88 - 94
Internal Trouble[3]	≤ 41 *or* ≥ 95

ALN-V	
Status	**Zero Point**
Normal	50 – 80
Early Warning[1]	46 – 48, 83 - 87
Maintenance Required[2]	42 – 45, 88 - 94
Internal Trouble[3]	≤ 41 *or* ≥ 95

Notes:

1 – FireNET and FireNET Plus have a "Sensor Maintenance Early Warning" menu. The purpose of this menu is to identify sensors that are approaching a contaminated state, allowing action to be taken before a trouble condition occurs. If the Zero Point of a sensor falls within the ranges shown for Early Warning, the sensor should be serviced as soon as possible.

2 – If the Zero Point of a sensor falls within the ranges shown for "Maintenance Required" it must be serviced immediately.

3 – If the Zero Point of a sensor falls within the ranges shown for "Internal Trouble" it must be serviced immediately. If cleaning does not eliminate the problem the sensor should be replaced.

For information on cleaning analog smoke sensors, refer to Hochiki America Technical Bulletin HA-96. This document is available at www.hochiki.com

If you have any questions regarding this matter please contact Technical Support.

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