

Appendix G: Pre-Alarm (AWACS™) Applications

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Pre-Alarm (AWACS) Applications

General

The control panel includes a facility to give early warning of incipient or potential fire conditions (U.S. Patent Pending). This is a two level Pre-Alarm function called AWACS (Advance Warning Addressable Combustion Sensing). The two levels are called Alert and Action.

ALERT Level Pre-Alarm Operation

The control panel software, in addition to checking for alarm levels, will check for Pre-Alarm thresholds for each ionization or photo smoke detector (not analog thermal detectors). If a level is reached that exceeds the programmed Alert threshold, the Alert condition is indicated. As an example, a typical display would be as shown.

PREALM is the Pre-Alarm status banner.

ALERT indicates that the Alert level has been reached.

50% is the reading of smoke in approximate percent of alarm. This is a real-time display which is updated every few seconds to show the present reading of this detector. In this case, assume that zone 99 was programmed to **ALERT= 40% OF ALARM**. This means alert will occur at measured smoke levels that exceed $.40 \times 2.0\%$ per foot observation (low) = 0.80% per foot obscuration. In this example above, the reading is at 50% of alarm; therefore, the control panel is in Alert condition.

2.0% is the programmed alarm threshold (2.0% per foot obscuration is the low sensitivity setting).

The following functions are performed at Alert level:

The message is sent to the history file and (if they are installed) to the LCD-80 and printer. The message is sent (and time stamped) only at the time that it first occurred. This historical data could provide valuable information about the progress of a fire.

The Pre-Alarm LED flashes and the piezo sounder pulses until acknowledged.

Zone 99 is activated. Not activated are Zone 00 (general alarm) or any other zone, trouble relay, or alarm relay.

The Pre-Alarm indication for this detector will restore automatically to normal if its sensitivity drops below Alert level. Zone 99 clears automatically when no Pre-Alarm conditions exist.

A subsequent alarm, or an Action level condition for this detector will clear the Alert indication.

***ACTION Level
Pre-Alarm
Function***

If a detector reaches a level that exceeds the programmed Action threshold, an Action condition is indicated. The display shown to the left appears if a detector is in Action level.

```
PREALM SMOKE(PHOTO)
WEST HALLWAY FLR 5
70% 2.0% ACTION
12:00p 12/25/92 D13
```

ACTION indicates that the action level has been reached.

70% is the realtime approximate obscuration reading. Suppose Zone 99 was programmed for **ACTION=60% OF ALARM**. Any measurement over $0.60 \times 2.00\% = 1.20\%$ would cause an Action Pre-Alarm.

The following functions are performed at Action level:

- The message is sent to the LCD-80, printer, and history file.

- The Pre-Alarm LED and piezo sounder pulse until acknowledged.

- Zone 99 is activated. Zone Z00 (general alarm) is not activated, nor are trouble and alarm relays.

- The fifth zone programmed (not the first four) for this detector is activated. The fifth zone is the right-most entry on Line 3 of the Point Programming screen. This zone may be used to control functions of a detector or group of detectors on Action level. The fifth zone activation will also allow ACS annunciation by a detector or group of detectors in Action Pre-Alarm state.

- The Pre-Alarm condition and the zone programmed will latch until System Reset, even if the sensitivity drops below the Action or Alert level.

- A subsequent alarm condition for this detector will clear the Action indication from the LCD display and keypad LED, but will not reset the fifth zone (the fifth zone is also on the alarm list).

Pre-Alarm Programming

You can adjust the setting of the two different levels as desired. The Special Zone 99 display screen is as shown.

PRE-ALARM ZONE 99

ALERT=70% OF ALARM

ACTION=00% OF ALARM

ALERT=70% OF ALARM means that every photo and ion detector will give an Alert indication when its present sensitivity reaches 70% of its alarm level. The **ACTION=00% OF ALARM** means that there will be no Pre-Alarm action level in the system.

The numbers **70%** and **00%** are default values, and may be adjusted in the range from 00% to 99%. ACTION=00% means no Pre-Alarm, therefore the default is no Action level. The control panel's software ensures that the Action level is higher than the Alert level (or the Action level is zero) and that both are below 100%.

The Alert and Action program levels are global settings, meaning that they will apply to all 2x51J or 1x51J detectors. However, different Pre-Alarm action can be selected for each detector by using different alarm levels. For example, if the Alert level is set at 50% of alarm, and detector D13 is set to alarm at 2.00%, D13 will Pre-Alarm at 1.00%, while if detector D14 is set to alarm at 1.00%, it will Pre-Alarm at 0.50% per foot obscuration.

There are applications where only one level of Pre-Alarm function is necessary, but the Pre-Alarm must be latching. This can be done by programming ALERT=00% and only using Action level. Also, if non-latching operation is desired, ACTION=00% can be selected to allow use of Alert level only.

Note: Only the Action level will provide ACS point annunciation.

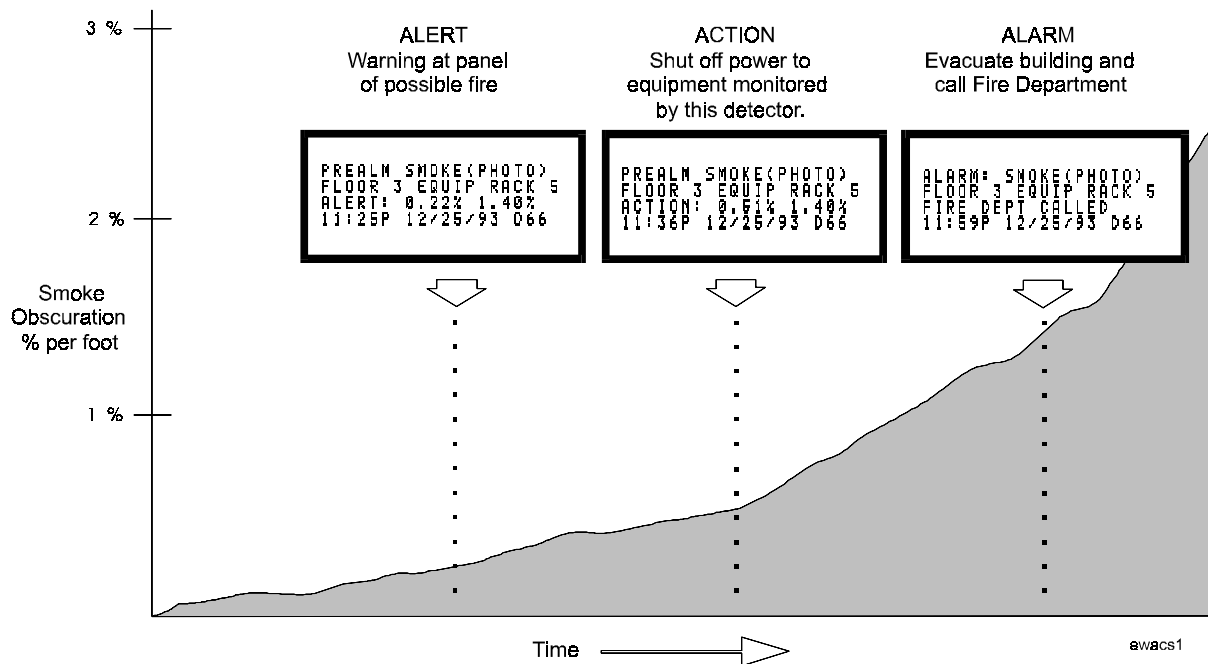


Figure 1: Typical AWACS Application Threshold Levels

Self-Optimizing Pre-Alarm Function

The control panel software (PN 73609 or higher) includes a Self-Optimizing Pre-Alarm selection, where the control panel determines the highest practical prealarm sensitivity for each detector. Statistical methods and special software filters are used to automatically set the optimal Pre-Alarm sensitivity. The software compensates for electrical noise transients, dust buildup, and other environmental factors.

When a detector senses smoke above the calculated optimal Pre-Alarm level, the control panel will latch into an Action level Pre-Alarm. The Action level Pre-Alarm function was described earlier in this appendix.

Applications include computer rooms, electrical equipment rooms, and telecommunication facilities where environments are clean and stable and early warning is very important. It is not recommended for applications where false smoke indications could exist, such as cigarette smoking.

Self-Optimizing Pre-Alarm mode will only operate with 2551J or 2251J photoelectric detector. Ionization detectors will not Pre-Alarm when Self-Optimizing is selected.

Self-Optimizing is selected by programming Special Zone 99 for ALERT=00 and ACTION=01. Select P on the point programming screen for all photoelectric detectors for which Pre-Alarm is desired. The control panel will determine the optimal Pre-Alarm Action Level sensitivity after approximately 10 minutes of data sampling.

Sounder Base Applications for AWACS

The B501BHJ sounder base may be used with AWACS to give a local audible warning prior to general evacuation. This may be used to reduce the impact of false alarms from cooking, smoking, etc. in a multiple unit housing application. An individual in the apartment would receive advanced audible warning and could eliminate the source of the pending false alarm.

Note: The control panel will activate the LEDs on the 2x51J or 1x51J detectors on a Pre-Alarm condition (Alert level or Action level). The detectors LEDs are used to drive the sounder base. When the LEDs on the detector light steadily for 10 seconds the sounder base will activate. If latching operation of the sounder base is desired, program the panel for Action Pre-Alarm. If non-latching (self-restoring) operation is desired, program the system for Alert Pre-Alarm operation. If all sounder-bases are to activate on alarm, wire the power for these bases through two M5x0CJ relay contacts that will reverse the polarity to the B501BHJ bases on alarm.



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