FIRE ALARM SENSOR

MODE INFORMATION AND SELECTION GUIDE

VES FIRE DETECTION SYSTEMS

Mode	VF2010 ATJ-EA	VF2011 ALN-V	VF2012 ACC-V	VF2014 ACD-V	VF2047 ACF-V	VF2015 ALO-V	VF2016 ACE-V	VF2045 SOE-24V	VF2046 SOE-24H
+COHb				●	●				
+FT			●	●	●		●		●
+FT +COHb				●	●				
+FT +RoR	●			●	●		●		
+FT +RoR +COHb				●	●				
+RoR				●	●		●		
+RoR +COHb				●	●				
+S		●	●	●	●	●	●	●	●
+S +COHb				●	●				
+S +FT +RoR +CO +COHb				●	●				
+S +FT +RoR +SCADM							●		
+S +FT +RoR +SCADM +RFA							●		
+S +H							●		
+S +H +RFA							●		
+S +RFA				●	●		●		
+S/FT +COHb +RFA				●	●				
+S/FT/CO +RFA				●	●				
+S/H			●	●	●				●
+S/H +RFA				●	●				
+S/H +S +FT +RoR							●		
+S/H +S +FT +RoR +RFA							●		
+S/H/CO +S +FT +RoR +CO/COHb				●	●				

CO = Carbon Monoxide   COHb = CO Toxicity Threat   FT = Fixed Temperature   RFA = Reduced False Alarm

RoR = Rate of Rise   SCADM = Single Criteria Average Data Mode   S = Smoke

"+" indicates that the following technology (or technologies) work individually in this mode
"/" indicates that these detection technologies work together in a multi-sensor fashion.

CONTENTS

SELECTING A MODE

Selecting the appropriate mode starts with evaluating the environment!

Is it a sleeping room where COHb is required?
Use a mode with COHb detection in conjunction with a sounder base to provide CO alarm notification (Temporal 4 pattern).

Is it a space such as apartments, dormitories, or assisted-living facilities?
Use a mode with independent operation of the detection elements (such as +S +FT +RoR +CO +COHb), and set the Input Action to Supervisory. An alarm caused by smoke will create a Supervisory Alarm, but an alarm caused by heat will create a Fire Alarm.

Is it a space where smoke detection is needed but unwanted alarms could occur due to tobacco smoke, auto exhaust, or other such nuisance sources?
Use one of the Smoke/Heat/CO multi-modes with RFA; for example, +S/FT/CO +RFA.

Is it an area where the temperature varies widely?
Avoid the +RoR modes. The rate-of-rise alarm threshold is 15°F temperature increase or more per minute.

Is it an area where fire detection is required but there are high levels of transient smoke during the day?
Use one of the heat modes during the day and switch to a smoke/heat/CO mode during the night.

+RFA: The Reduce False Alarm Feature

The Reduce False Alarm feature is applied to six of the ACD modes:

- +S +COHb
- +S/FT +COHb +RFA
- +S +RFA
- +S/H +RFA
- +S/FT/CO +RFA
- +S/H/CO +S +FT +RoR +CO/COHb

The +RFA feature is applied only to the smoke-sensing element. When a sensor is initially installed, internal algorithms are used to monitor and adjust for transient smoke events. If the environment is "clean", with no transient smoke events occurring over a period of time, the sensor will automatically adjust its operation to respond to smoke more quickly. However, if the environment has repeated events that may be detected by a smoke sensor (cigarette smoke, auto exhaust, dust, others), the sensor will automatically adjust to delay its response, allowing more time to evaluate the conditions and confirm if there is an actual fire emergency or a passing event. When using one of the multi-modes, the sensor will further check for the presence of high heat and/or CO to modify its smoke detection operation too.

Single Criteria Average Data Mode

The Single Criteria Average Data Mode indicates that a sensor uses a single criteria to determine alarm activation for smoke and heat. This is equivalent to +S +FT +RoR.

COHb Detection

Traditionally, CO detection is integrated into a multi-sensor to assist with the rapid detection of smouldering fires through the release of CO gas. However, sensors can also recognize the threat of carboxyhemoglobin toxic poisoning, commonly referred to as carbon monoxide poisoning.

Carbon monoxide poisoning can be suffered as the result of either a sudden high exposure to CO, or a prolonged exposure over time. The sensor therefore monitors for both criteria and will report an alarm condition if either scenario is met.

+COHB

APPLICATION

This mode is recommended for use in sleeping areas, hotel rooms, day care centers, hospital patient rooms, etc. where the early warning of the toxicity threat from high and long exposure to CO gas is required to protect life.

DESCRIPTION

This is a COHb-only operation mode. The sensor will ignore smoke and heat events while in this mode.

SENSORS USING THIS MODE

VF2014
ACD-V

VF2047
ACF-V

CO = Carbon Monoxide | COHb = CO Toxicity Threat | FT = Fixed Temperature | H = Heat
RFA = Reduced False Alarm | RoR = Rate of Rise | SCADM = Single Criteria Average Data Mode | S = Smoke

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+FT

APPLICATION

In this mode, the fixed temperature heat element is able to activate an alarm, after reaching
a specific heat threshold.

This mode is recommended for property protection in environments where smoke detectors are not suitable due to dust, steam, or smoke. Applications may include elevator shafts, plant rooms, and boiler rooms.

DESCRIPTION

This mode provides fixed temperature heat detection operation only. The sensor will ignore smoke and CO.
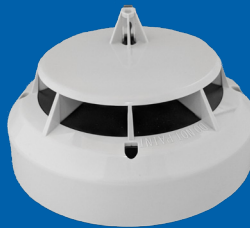
SENSORS USING THIS MODE

VF2012	VF2014	VF2047	VF2016	VF2046
ACC-V	ACD-V	ACF-V	ACE-V	SOE-24H

CO = Carbon Monoxide | COHb = CO Toxicity Threat | FT = Fixed Temperature | H = Heat
RFA = Reduced False Alarm | RoR = Rate of Rise | SCADM = Single Criteria Average Data Mode | S = Smoke

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+FT +COHB

APPLICATION

This mode is intended for use in sleeping areas, hotel rooms, day cares, hospital patient rooms, etc. where the early warning of the toxicity threat from high and long exposure to CO gas is required to protect life.

DESCRIPTION

This mode provides:
- fixed temperature heat detection **plus**
- COHb detection

Each detection element operates independently of the other. The sensor will ignore smoke while in this mode.

SENSORS USING THIS MODE

VF2014
ACD-V

VF2047
ACF-V

CO = Carbon Monoxide | COHb = CO Toxicity Threat | FT = Fixed Temperature | H = Heat
RFA = Reduced False Alarm | RoR = Rate of Rise | SCADM = Single Criteria Average Data Mode | S = Smoke

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+FT +ROR

APPLICATION

In this mode either heat element is able to activate an alarm - either through a sharp rise in temperature or after reaching a specific heat threshold.

This mode is recommended for property protection in environments where smoke detectors are not suitable due to dust, steam, or smoke. Applications may include elevator shafts, plant rooms, and boiler rooms.

DESCRIPTION

This mode provides
- fixed temperature
- rate-of-rise heat detection

Each heat detection technology operates independently of the other. The sensor will ignore smoke and CO in this mode.

SENSORS USING THIS MODE

VF2010
ATJ-EA

VF2014
ACD-V

VF2047
ACF-V

VF2016
ACE-V

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+FT +ROR +COHB

APPLICATION

In this mode either heat element is able to activate an alarm - either through a sharp rise in temperature or after reaching a specific heat threshold.

This mode is recommended for property protection in environments where smoke detectors are not suitable due to dust, steam, or smoke. The CO element is also monitoring for COHb toxicity threat, i.e. CO concentration over time. Applications may include elevator shafts, plant rooms, and boiler rooms.

DESCRIPTION

This mode provides:
- fixed temperature heat detection **plus**
- rate-of-rise heat detection **plus**
- COHb detection

Each detection element operates independently of the other. The sensor will ignore smoke while in this mode.

SENSORS USING THIS MODE

VF2014
ACD-V

VF2047
ACF-V

CO = Carbon Monoxide | COHb = CO Toxicity Threat | FT = Fixed Temperature | H = Heat
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+ROR

APPLICATION

In this mode, the heat element activates an alarm by detecting a sharp rise in temperature.

This mode is recommended for property protection in environments where smoke detectors are not suitable due to dust, steam, or smoke, such as elevator shafts, plant rooms, and boiler rooms.
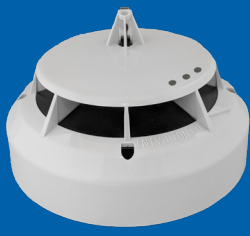
DESCRIPTION

This mode provides rate-of-rise heat detector operation only. The sensor will ignore smoke and CO in this mode.
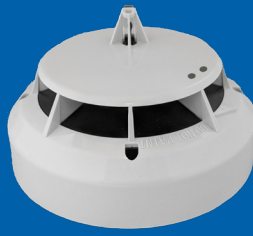
SENSORS USING THIS MODE

VF2014
ACD-V

VF2047
ACF-V

VF2016
ACE-V

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+ROR +COHB

APPLICATION

This mode is recommended for areas where smoke sensors would not be suitable due to dust, steam, or smoke, such as laundry rooms, boiler rooms, workshops, enclosed car parks, shower areas, and kitchens. The CO element is also monitoring for COHb toxicity threat, i.e. CO concentration over time.

DESCRIPTION

This mode provides
- rate-of-rise heat detection **plus**
- COHb detection

Each detection element operates independently of the other. The sensor will ignore smoke while in this mode.

SENSORS USING THIS MODE

VF2014
ACD-V

VF2047
ACF-V

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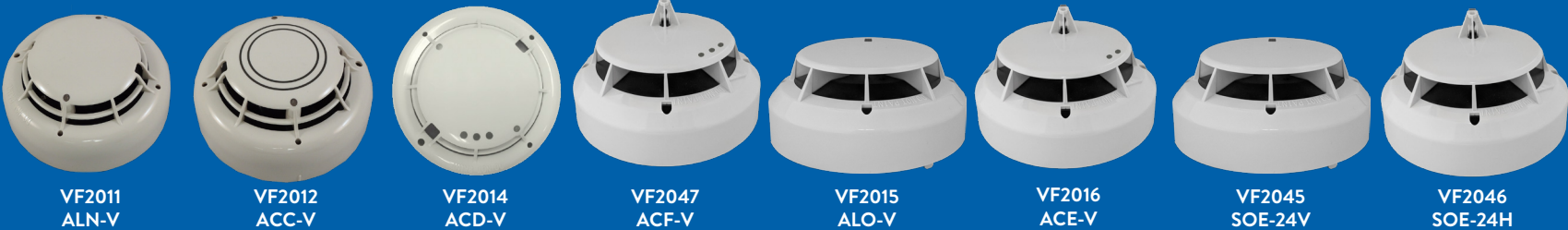
+S

APPLICATION

This mode is for smoke detection only. Applications include offices, hallways, classrooms, and other indoor areas where fast, reliable detection of smoke is required. Use the Smoke mode in combination with another mode for the best in Day/Night protection.

DESCRIPTION

This mode provides smoke sensor operation only. The sensor will ignore heat and CO in this mode.

SENSORS USING THIS MODE

| VF2011 ALN-V | VF2012 ACC-V | VF2014 ACD-V | VF2047 ACF-V | VF2015 ALO-V | VF2016 ACE-V | VF2045 SOE-24V | VF2046 SOE-24H |

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RFA = Reduced False Alarm | RoR = Rate of Rise | SCADM = Single Criteria Average Data Mode | S = Smoke

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+S +COHB

APPLICATION

This mode is recommended for rooms where smoke and potential life-threatening CO detection is needed, such as hotel rooms, classrooms, sleeping rooms, hotel hallways, and parking garages.

DESCRIPTION

This mode provides
- smoke detection **plus**
- COHb alarm
- RFA feature

The smoke and COHb functions work independently, so if the sensor detects smoke that exceeds the programmed alarm threshold, the panel will indicate a fire alarm. If the sensor detects a dangerous level of CO, the panel will indicate a CO alarm. Because the element are independent, two events may be generated by the sensor (smoke alarm (Fire or Supervisory) and a Carbon Monoxide alarm).

SENSORS USING THIS MODE
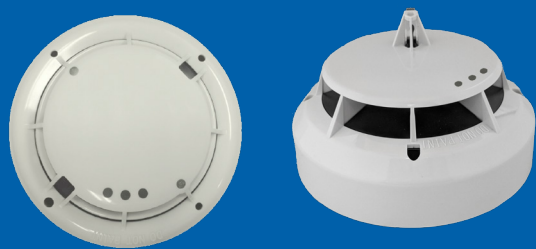
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+S +FT +ROR +CO +COHB

APPLICATION

Complete detection is provided by this mode as it combines smoke, heat, and CO detection. Applications include sleeping rooms, classrooms, day care centers, hospital patient rooms, and laboratories. The COHb toxicity threat function will indicate a life-threatening concentration of CO that requires urgent action and should be used in environments populated by those most vulnerable to CO poisoning.

If the sensor is configured for Fire Alarm, the smoke and heat sensor will produce a fire alarm when activated; the panel will not specify if the activation was due to smoke or heat. It can only produce one fire alarm in this case. If the sensor is configured for Supervisory, the smoke sensor will generate a Supervisory and the heat sensor will generate Fire Alarm. The CO sensor will always indicate CO Alarm. This means that when the input action is set as Supervisory, it is possible to see 3 unique events from the same address; smoke at sub-address 00, heat at sub-address 01, and CO at sub-address 02.

DESCRIPTION

This mode provides
- smoke detection **plus**
- fixed temperature heat detection **plus**
- rate-of-rise heat detection **plus**
- CO detection **plus**
- COHb alarm

Each detection element operates independently and is capable of creating an alarm event. If the sensor detects an elevated CO condition or a COHb event, it will indicate a CO alarm.

SENSORS USING THIS MODE

VF2014
ACD-V

VF2047
ACF-V

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+S +FT +ROR +SCADM

APPLICATION

This mode combines smoke and heat detection with SCADM (single criteria average data mode). This is a highly sophisticated algorithm which continually monitors the analog value reading from a series of multiple samples of the environment and calculating an average value. This 'moving average' value is learned by the sensor over time to determine the environment's baseline reading.

DESCRIPTION

This mode provides:
- smoke detection **plus**
- fixed temperature heat detection **plus**
- rate-of-rise heat detection **plus**
- single criteria average data mode

SENSORS USING THIS MODE

VF2016
ACE-V

CO = Carbon Monoxide | COHb = CO Toxicity Threat | FT = Fixed Temperature | H = Heat
RFA = Reduced False Alarm | RoR = Rate of Rise | SCADM = Single Criteria Average Data Mode | S = Smoke

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+S +FT +ROR +SCADM +RFA

APPLICATION

This mode combines smoke and heat detection with SCADM (single criteria average data mode). This is a highly sophisticated algorithm which continually monitors the analog value reading from a series of multiple samples of the environment and calculating an average value. This 'moving average' value is learned by the sensor over time to determine the environment's baseline reading.

DESCRIPTION

This mode provides:
· smoke detection **plus**
· fixed temperature heat detection **plus**
· rate-of-rise heat detection **plus**
· single criteria average data mode

This sensor has the Reduced False Alarm function (+RFA), which automatically adjusts the sensitivity of the optical sensing element over time, learning from its surrounding environment from the moment of installation.

SENSORS USING THIS MODE

VF2016
ACE-V

CO = Carbon Monoxide | COHb = CO Toxicity Threat | FT = Fixed Temperature | H = Heat
RFA = Reduced False Alarm | RoR = Rate of Rise | SCADM = Single Criteria Average Data Mode | S = Smoke

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+S +H

APPLICATION

This mode is recommended for areas where smoke and heat detection is needed. Recommended locations include offices, classrooms, equipment protection, hallways, and elevator lobbies.

DESCRIPTION

This mode provides:
- smoke detection **plus**
- fixed temperature heat detection **plus**
- rate-of-rise heat detection **plus**

SENSORS USING THIS MODE

VF2016
ACE-V

CO = Carbon Monoxide | COHb = CO Toxicity Threat | FT = Fixed Temperature | H = Heat
RFA = Reduced False Alarm | RoR = Rate of Rise | SCADM = Single Criteria Average Data Mode | S = Smoke

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+S +H +RFA

APPLICATION

This mode is recommended for areas where smoke and heat detection is needed, but the possibility of unwanted alarms is still a concern. The RFA Reduce False Alarm function will work to eliminate unwanted alarms from transient smoke or other false alarm sources. Recommended locations include offices, classrooms, equipment protection, hallways, and elevator lobbies.

DESCRIPTION

This mode provides:
- smoke detection **plus**
- fixed temperature heat detection **plus**
- rate-of-rise heat detection **plus**

This sensor has the Reduced False Alarm function (+RFA), which automatically adjusts the sensitivity of the optical sensing element over time, learning from its surrounding environment from the moment of installation.

SENSORS USING THIS MODE
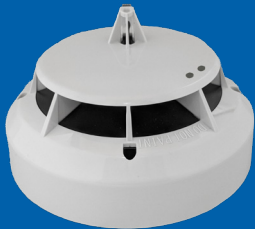
**VF2016
ACE-V**

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+S +RFA

APPLICATION

This mode is recommended for areas where only smoke detection is needed, but the possibility of unwanted alarms is still a concern. The RFA Reduce False Alarm function will work to eliminate unwanted alarms from transient smoke or other false alarm sources. Recommended locations include offices, classrooms, equipment protection, hallways, and elevator lobbies.

DESCRIPTION

This mode provides
- smoke sensor operation
- Reduce False Alarm feature

The sensor will ignore heat and CO in this mode.

SENSORS USING THIS MODE

VF2014
ACD-V

VF2047
ACF-V

VF2016
ACE-V

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+S/FT +COHB +RFA

APPLICATION

This mode is recommended for sleeping rooms, classrooms, day care centers, and any locations where the possibility of unwanted alarms exists due to smoke, dust, or steam. COHb toxicity threat detection provides protection from CO poisoning based on time and concentration of invisible, yet toxic, CO gas.

DESCRIPTION

This mode provides
- a smoke/fixed temperature multi alarm **plus**
- COHb alarm
- Reduce False Alarm feature

The smoke/heat multi operation provides a "heat-enhanced smoke sensor" function. If the temperature increases, the sensor will automatically adjust its alarm threshold to increase the sensitivity of the smoke sensor, detecting smoke (and fire) more quickly. If the sensor detects a dangerous level of CO, the panel will indicate a CO alarm. Because they work independently, two events may be generated by the sensor (smoke alarm (Fire or Supervisory) and a Carbon Monoxide alarm). The heat element is used only to modify the smoke sensitivity; there will be no alarm from the heat sensor (high temperature) in this mode.

SENSORS USING THIS MODE

VF2014
ACD-V

VF2047
ACF-V

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+S/FT/CO +RFA

APPLICATION

This is the mode recommended for most indoor applications. Smoke detection is modified by heat and CO influence, providing the best detection of an actual alarm while minimizing unwanted alarms.

DESCRIPTION

This mode is a smoke/heat/CO multi operation that provides heat- and/or CO-enhanced operation of the smoke sensor along with the Reduce False Alarm feature. In the event of temperature and/or CO increase, the sensor will automatically adjust its alarm threshold to increase the sensitivity of the smoke sensor. The heat and CO elements are only used to modify the smoke sensor operation; therefore, the panel will not indicate a heat or CO sensor alarm in this mode.

SENSORS USING THIS MODE

VF2014
ACD-V

VF2047
ACF-V

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+S/H

APPLICATION

Use the Smoke/Heat multi-mode in combination with another mode for the best in Day/Night protection of offices, classrooms, theatres, workshops, etc.

DESCRIPTION

This mode provides smoke/heat multi-sensor detection with a "heat-enhanced smoke sensor" operation. If the temperature increases, the sensor will automatically adjust to increase the sensitivity of the smoke sensor. The ACD will ignore CO events in this mode. The heat element is only used to modify the smoke sensor operation and will not create an alarm.
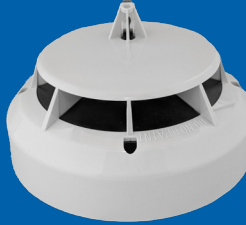
SENSORS USING THIS MODE

VF2012
ACC-V

VF2014
ACD-V

VF2047
ACF-V

VF2046
SOE-24H

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+S/H +RFA

APPLICATION

This mode is recommended in areas that have no special conditions, but where unwanted alarm prevention is a concern, such as Indoor spaces, offices, classrooms, data centers, and hallways.

DESCRIPTION

This mode provides
- smoke/heat multi-sensor detection with an "heat-enhanced smoke" operation
- Reduce False Alarm feature

If there is no temperature increase, the Reduce False Alarm feature will be applied to the operation of the smoke sensor. In the event of temperature increase, the sensor will automatically adjust to increase the sensitivity of the smoke sensor. The sensor will ignore CO events in this mode. The heat element is only used to modify the smoke sensor operation and will not create an alarm.

SENSORS USING THIS MODE

VF2014
ACD-V

VF2047
ACF-V

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+S/H +S +FT +ROR

APPLICATION

This mode is intended for use in sleeping areas, hotel rooms, day cares, hospital patient rooms, etc. where the early warning of the toxicity threat from high and long exposure to CO gas is required to protect life.

DESCRIPTION

This mode provides the COHb threat detection only, intended for the specific detection of a CO poisoning condition, i.e., life-threatening CO concentration over time. The sensor will ignore smoke and heat events while in this mode.

SENSORS USING THIS MODE

**VF2016
ACE-V**

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+S/H +S +FT +ROR +RFA

APPLICATION

This mode is intended for use in sleeping areas, hotel rooms, day cares, hospital patient rooms, etc., where the early warning of the toxicity threat from high and long exposure to CO gas is required to protect life.

DESCRIPTION

This mode provides the COHb threat detection only, intended for the specific detection of a CO poisoning condition, i.e., life-threatening CO concentration over time. The sensor will ignore smoke and heat events while in this mode.

SENSORS USING THIS MODE

**VF2016
ACE-V**

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+S/H/CO +S +FT +ROR +CO/COHB

APPLICATION

With all detection options and combinations active in making the fire decision in conjunction with the Reduced False Alarm (RFA) feature, this mode will detect any fire event while ignoring transient smoke, dust, or steam that would otherwise result in an unwanted alarm. Applications include apartments/dormitories, sleeping rooms, day care centers, hospital rooms and common areas, and classrooms.

DESCRIPTION

This mode provides
- Smoke/Heat/CO multi operation **plus**
- smoke-only operation **plus**
- fixed temperature heat operation **plus**
- rate-of-rise temperature operation **plus**
- heat-enhanced CO detector operation **plus**
- COHb operation
- Reduce False Alarm feature

Each technology operates independently. If there is a heat and/or CO increase when smoke is present, the sensitivity of the smoke sensor is increased. If heat is present without smoke, the FT and/or RoR elements will detect the event. If heat and CO are present, the CO alarm threshold is adjusted to increase the sensitivity of the CO sensor. If CO is present without heat, or if CO is present, the sensor will indicate a CO alarm (either due to CO or COHb).

SENSORS USING THIS MODE

VF2014
ACD-V

VF2047
ACF-V

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