



i⁴ Series Combination Carbon Monoxide(CO)/Photoelectric Smoke Detector

COSMO-2W (2-wire) and COSMO-4W (4-wire)

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SPECIFICATIONS	COSMO-2W	COSMO-4W
Electrical Specifications		
System Voltage:	12/24 volts DC	12/24 volts DC
Min:	8.5 volts	8.5 volts
Max:	35 volts	35 volts
Max Startup Current:	200uA	200uA
Max Standby Current:	50uA	50uA
Max Alarm Current:	50mA	40mA
Max Reverse Polarity Current:	20mA	20mA
Audible Signal (Supplemental*):	85dBA	85dBA
Max Start-up Capacitance:	.10uF	.10uF

Physical Specifications	
Operating Temperature Range:	0 - 50° C (32 - 122° F)
Operating Humidity Range:	20-95% RH
Storage Temperature Range:	-10 - 70° C (14 - 158° F)
Diameter:	5.5 inches
Height:	2.5 inches
Weight:	9.2 oz; 261 g
Wire Gauge Acceptance:	Min: 22 AWG Max: 14 AWG
2-Wire Compatibility Zone Identifier:	A

*NFPA requires a UL listed sounder on the NAC circuit

Notice: This manual shall be left with the owner/user of this equipment.

BEFORE INSTALLATION

Please read this manual thoroughly along with manual I56-3871 for the i⁴ series interface module and the Application Guides for System Sensor Smoke (SPAG91) and CO Detectors (COAG103), which provide detailed information on detector spacing, placement, zoning, wiring, and special applications. These manuals are available online at www.systemsensor.com.

IMPORTANT: This detector must be tested and maintained regularly following NFPA 72/NFPA 720 requirements. At a minimum, cleaning and testing should be performed annually.

GENERAL DESCRIPTION

The i⁴ series is a plug-in, system-connected, combination carbon monoxide/smoke detector. It is available in either a 2-wire or 4-wire configuration. The i⁴ series detectors must be used with the corresponding i⁴ series Interface Module to connect to the panel. The i⁴ interface module is also compatible with i³ series smoke detector model 2WTA-B or 4WTA-B.

FEATURES

Smoke Features

- Photoelectric smoke sensor
- Drift compensation and noise rejection algorithms
- Red smoke LED indicator
- Smoke test switch

CO Features

- Field replaceable, electrochemical CO sensor
- RealTest® functional test capable
- Blue CO LED indicator
- Sensor end-of-life notification

Audible Annunciation

- Local integral sounder
- Polarity reversal

Installation and Maintenance

- Stop-Drop-N-Lock plug-in base
 - SEMS wiring terminals
 - COSMO-2W designed for 2-wire i4 Zone type
 - COSMO-4W designed for 4-wire i4 Zone type
 - SENS-RDR sensitivity reader compatible with extended range
 - Removable cover for cleaning
 - Replaceable screen
- #### Other Features
- Green supervisory LED
 - Listed to UL standards 268 and 2075

VISIBLE ANNUNCIATION

The i⁴ series detector has three visible LED's; Green, Red and Blue. The green LED is a supervisory LED; it blinks during power on, reset, and during normal operation. It is extinguished during smoke maintenance, CO trouble, smoke alarm and CO alarm events. The red LED signals smoke events; it blinks during smoke maintenance events and lights constantly during smoke alarm events. The blue LED signals CO events; it blinks blue during CO trouble or CO end-of-life; it blinks rapidly during RealTest®; and lights constant during CO alarm.

Trouble feature: When the sensor (supervision) is in a trouble condition (such as a detector that is dirty), the detector will send a trouble signal to the module then to the FACP. Depending on the issue, the detector must then be serviced or replaced.

CO sensor end-of-life timer feature: When the CO sensor has passed end-of-life, a trouble signal will be sent to the module then to the FACP. This indicates that the CO sensor inside the detector must be replaced. If unresolved for 30 days, the detector will chirp intermittently. The typical life of the CO sensor is ten years from the date of manufacture; it is recommended to periodically check the "Replace by" sticker located on the replaceable CO cell.

TABLE 1. OPERATION MODES

OPERATION MODE	GREEN LED	RED LED	BLUE LED	SOUNDER
Normal (standby)	Blink 5 Sec.	OFF	OFF	OFF
Alarm Smoke	OFF	ON	OFF	Temp 3
Alarm CO	OFF	OFF	ON	Temp 4
Alarm Smoke & CO	OFF	ON	ON	Temp 3
RealTest® Mode	OFF	OFF	Blink 1 Sec.	OFF
(After CO is Sprayed)	OFF	OFF	ON	Temp 4

INSTALLATION GUIDELINES

Ceiling: Detector should be at least 12 inches from any wall.

Wall: Detector should be no closer than 6 inches from ceiling.

- Do not install outdoors or in any environment that does not comply with the detector's environmental specifications
- Install in accordance with NFPA 72 and 720 standards. NFPA 72 and 720 define standards for both commercial and residential installation of smoke and CO detectors. State and local laws involving CO detection should also be considered.
- If the installation can be interpreted as residential, consult the section of NFPA 720 that outlines residential applications. Chapter 9.4.1.1, for example, states that carbon monoxide alarms or detectors shall be installed as follows:
 - Outside each separate dwelling unit sleeping area in the immediate vicinity of the bedroom
 - On every level of a dwelling unit, including basements
 - Consult NFPA 72, the local Authority Having Jurisdiction (AHJ), and/or applicable codes for specific information regarding the spacing and placement of smoke detectors.
- Do not install detectors in the following areas:
 - In or near areas where particles of combustion are normally present such as kitchens, in garages, near furnaces, hot water heaters, or gas space heaters.
 - In very cold or very hot areas.
 - In wet or excessively humid areas, or next to bathrooms with showers.
 - In dusty, dirty, or insect-infested areas.
 - Near fresh air inlets or returns or excessively drafty areas. Air conditioners, heaters, fans, and fresh air intakes and returns can drive smoke away from the detector.

Note: This unit is UL listed as containing a supplemental sounder and should not be used as a primary sounder for evacuation.

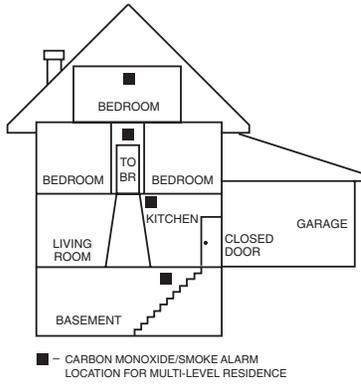
Note: Smoke detectors are not to be used with detector guards unless the combination has been evaluated and found suitable for that purpose.

MOUNTING

The i⁴ detector can be ceiling mounted or wall mounted:

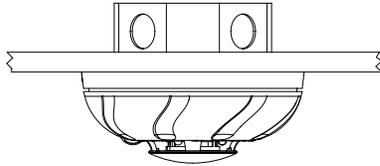
1. To a single gang box, 2 in. by 4 in. box, 3 1/2 in. or 4 in. octagonal or 3 1/2 in. or 4 in. round ceiling
2. Direct mount to ceiling or to wall using drywall fasteners

FIGURE 1. ALARM LOCATION DIAGRAM FOR RESIDENTIAL APPLICATION



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FIGURE 2. MOUNTING OF DETECTOR



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WIRING INSTALLATION GUIDELINES

All wiring must be installed in compliance with the NFPA 70 standards, National Electrical Code, applicable state and local codes.

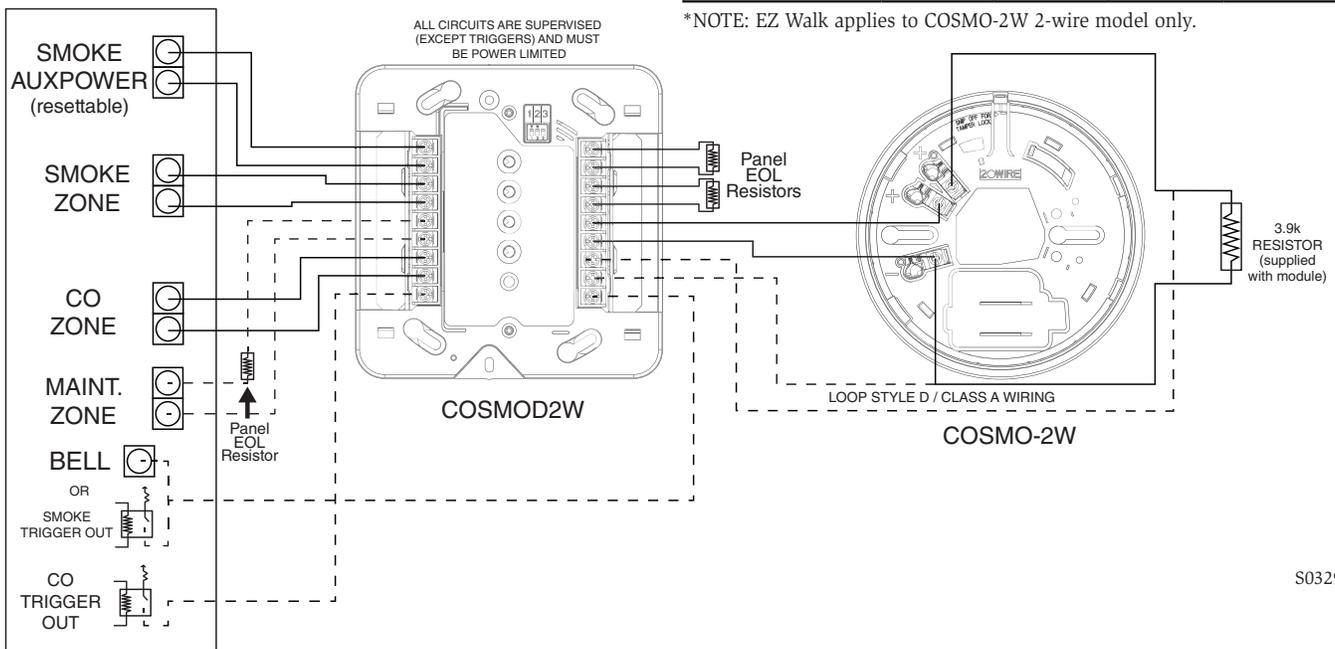
The screw terminals in the mounting base will accept 14-22 gauge wire. Wire connections are made by stripping approximately 3/8" to 1/2" of insulation from the end of the feed wire, inserting it into the proper base terminal, and tightening the screw to secure the wire in place. Do not put wires more than 2 gauge apart under the same clamping plate.

WARNING

Remove power from alarm control unit or initiating device circuits before installing detectors.

1. Remove detector from packaging and separate the base from the detector head.
2. Wire the detector base screw terminals.
3. Screw the base of the detector onto an electrical box, or to the surface of the wall or ceiling using the hardware included in the packaging.
4. Attach the detector head to the base by applying light pressure and rotating clockwise. The detector will lock in place when properly aligned.

FIGURE 3. COSMO-2W WIRING DIAGRAM



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5. After all detectors have been installed, apply power to the alarm control unit. Refer to Table 3 for time to LED stabilization. Once stabilized, the green LED will blink once every 5 seconds.
6. Test each detector as described in the Testing section.
7. Notify the proper authority that the system is in operation.

CAUTION

NFPA 72 recommends the installation of detectors only after completing construction or any other dust producing activity

TABLE 2. LED INDICATION DURING POWER UP SEQUENCE

	Green LED	Red LED	Blue LED
No Power	OFF	OFF	OFF
Power on Reset	Blink 5 Sec.	Blink 5 Sec.	Blink 5 Sec.

TABLE 3. POWER UP TIME TO FIRST ALARM / LED STABILIZATION

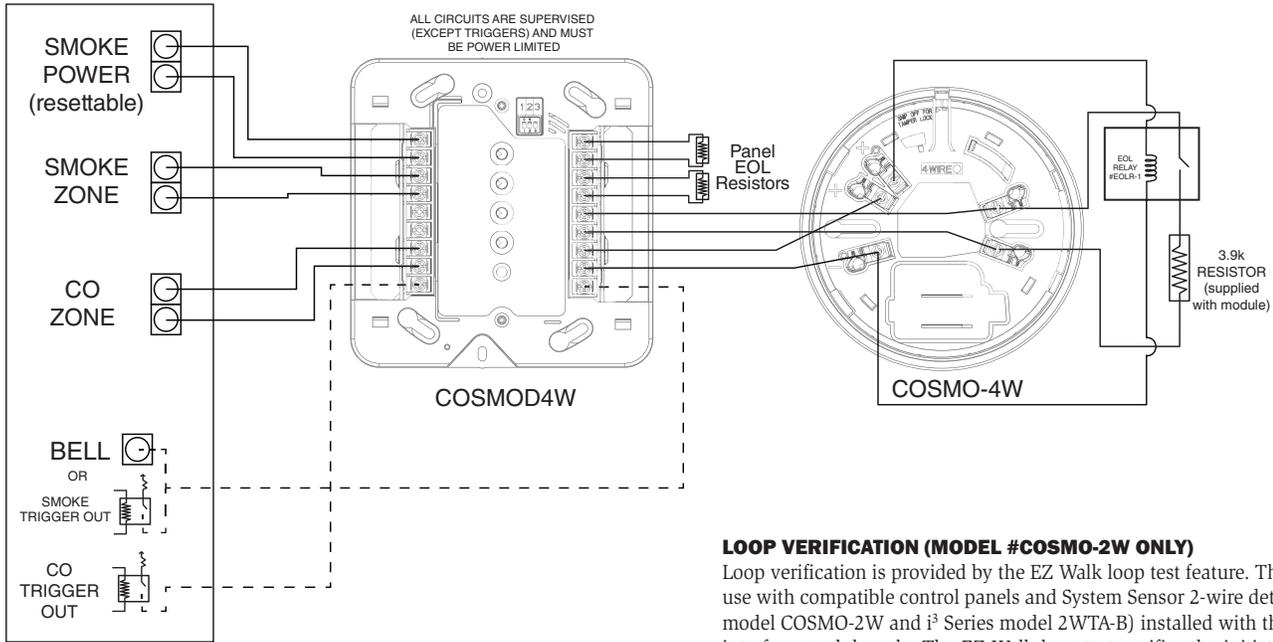
Power Up Time	45 Seconds
Power up time after 10 second reset	15 Seconds
LED Indication time	Typical: 45 seconds Maximum: 55 seconds
Status LED indication stabilization time	Typical: 55 seconds Maximum: 268 seconds

TABLE 4. LED INDICATION & SOUNDER DURING TEST AND MAINTENANCE

	Green LED	Red LED	Blue LED	Sounder
Smoke Maintenance	OFF	Blink 5 Sec.	OFF	OFF
CO Trouble/End-of-Life	OFF	OFF	Blink 5 Sec.	Intermittent chirp after 30 days
Simultaneous Smoke Maintenance & CO Trouble/EOL				
	OFF	Blink 5 Sec.	Blink 5 Sec.	OFF
EZ Walk Test® - Normal				
	Double Blink 5 Sec.	OFF	OFF	OFF
EZ Walk® - Smoke Maintenance				
	OFF	Double Blink 5 Sec.	OFF	OFF
EZ Walk® - CO Trouble/End-of-Life				
	OFF	OFF	Double Blink 5 sec.	OFF
EZ Walk® - Smoke Maintenance & CO Trouble/End-of-Life				
	OFF	Double Blink 5 sec.	Double Blink 5 sec.	OFF

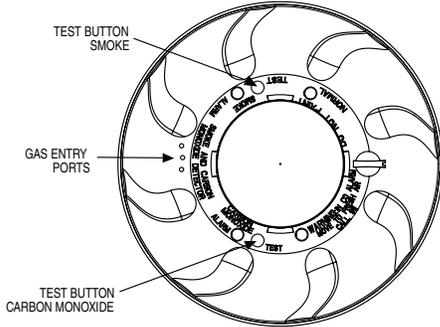
*NOTE: EZ Walk applies to COSMO-2W 2-wire model only.

FIGURE 4. COSMO-4W WIRING DIAGRAM



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FIGURE 5. TEST BUTTON LOCATION AND OPERATION



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TESTING

The detector must be tested after installation. The detector has two discrete test switches, one for smoke testing and one for CO testing. The detector may also be functionally tested using canned smoke and canned CO.

NOTE: Before testing, notify the proper authorities to avoid any nuisance alarms. Ensure the proper wiring and power is applied to the detector. After power up, allow approximately 5 minutes for the detector to stabilize before testing.

SMOKE TEST SWITCH

1. A recessed smoke test switch is located on the detector housing and identified by text that says "TEST" next to it and "SMOKE" above it. It is the switch closest to the red LED. (See Figure 5)
2. With the detector in standby mode, use a small screwdriver to press and release the smoke test switch.
3. If the detector is within the listed sensitivity limits, the sounder will alarm temporal 3 and the red alarm LED will light up.

SMOKE SENSITIVITY READING

To measure the detector's smoke sensitivity, the Infrared Sensitivity Reader model #SENS-RDR should be used.

1. Point the SENS-RDR directly to the center of the detector at a distance of 1 to 10 feet. A broomstick can be attached to the SENS-RDR for extended reach.
2. The sensitivity will be displayed on the SENS-RDR. The SENS-RDR will also display "replace" if a detector is found faulty.

SMOKE ENTRY TEST

1. With the detector in standby mode, spray UL listed compatible, canned smoke into the detector.
2. When the detector senses the presence of the smoke, the sounder will alarm temporal 3 and the red alarm LED will illuminate.

Note: On some panels, resetting a smoke alarm may require additional steps at the keypad to clear the trouble conditions on CO and smoke maintenance zones due to power loss to the module.

LOOP VERIFICATION (MODEL #COSMO-2W ONLY)

Loop verification is provided by the EZ Walk loop test feature. This feature is for use with compatible control panels and System Sensor 2-wire detectors (i⁴ Series model COSMO-2W and i³ Series model 2WTA-B) installed with the COSMOD2W interface module only. The EZ Walk loop test verifies the initiating loop wiring and provides visual status indication at each detector:

1. Ensure proper wiring and power is applied. Wait approximately 6 minutes after power-up before performing the EZ Walk test.
2. Place COSMOD2W interface module into EZ Walk test mode by depressing the recessed test button on the COSMOD2W Interface Module.
3. Observe the LED's at each detector.

NOTE: The EZ Walk loop test should not be used in lieu of functional testing (alarm, trouble and other functional tests) of the system.

CO TEST SWITCH

1. A recessed CO test switch is located on the detector housing and identified by text that says "TEST" next to it and "CARBON MONOXIDE" above it. (See Figure 5)
2. With the detector in standby mode, use a small screwdriver to press and release the CO test switch. Pressing the switch one time will enter into RealTest® Mode (see instructions below), pressing two times will enter test mode.
3. If the test is successful, the blue LED will light up. The detector and module will automatically reset within 60 seconds.

If the detector fails either of the above test methods the CO cell or the detector should be replaced.

FUNCTIONAL GAS TEST

Solo C6 brand canned CO may be used to verify the detector's ability to sense CO by utilizing the RealTest® feature as follows:

1. Press and release the test switch once as described in Testing above. The blue LED will start blinking rapidly indicating it is RealTest® mode. If the detector will not go into RealTest® mode, the CO sensor may be in fault or at end-of-life.
2. While the blue LED is blinking, spray a small amount of canned CO directly into the CO gas entry ports from ¼" away. (See Figure 5)
3. The detector will go into alarm if the gas entry was successful and the cell is functioning properly.
4. The CO test will automatically clear when the CO clears or in 30 seconds if no CO was introduced.

NOTE: Testing the detector will activate the alarm and send a signal to the panel. Carbon monoxide gas may be present in other areas.

This detector is NOT:

- A substitute for the proper servicing of fuel-burning appliances or the sweeping of chimneys.
- To be used on an intermittent basis, or as a portable alarm for the spillage of combustion products from fuel-burning appliances or chimneys.

Carbon monoxide gas is a highly poisonous gas which is released when fuels are burnt. It is invisible, has no smell and is therefore impossible to detect with the human senses. Under normal conditions in a room where fuel burning appliances are well maintained and correctly ventilated, the amount of carbon monoxide released into the room by appliances should not be dangerous.

SYMPTOMS OF CARBON MONOXIDE POISONING

Carbon monoxide bonds to the hemoglobin in the blood and reduces the amount of oxygen being circulated in the body. The following symptoms are examples taken from NFPA 720; they represent approximate values for healthy adults.

Concentration (ppm CO)	Symptoms
200	Mild Headache after 2-3 hours of exposure
400	Headache and nausea after 1-2 hours of exposure
800	Headache, nausea, and dizziness after 45 minutes of exposure; collapse and unconsciousness after 2 hours of exposure

Many cases of reported carbon monoxide poisoning indicate that while victims are aware that they do not feel well, they become so disoriented that they are unable to save themselves by either exiting the building or calling for assistance. Also young children and pets may be the first to be affected.

CO ALARM ACTIVATION

Per UL standard 2075, the i⁴ series detector has been tested to the sensitivity limits defined in UL standard 2034.

TABLE 6. CO ALARM THRESHOLDS

Parts per Million (ppm)	Detector Response Time (Min.)
30 + -3ppm	No alarm within 30 days
70 + -5ppm	60-240
150 + -5ppm	10-50
400 + -10ppm	4-15

What to do if the carbon monoxide detector goes into alarm:

Immediately move to a spot where fresh air is available, preferably outdoors. Find a phone in an area where the air is safe and call your security service provider. Tell your provider the detector alarm status, and that you require professional assistance in ridding your home of the carbon monoxide.

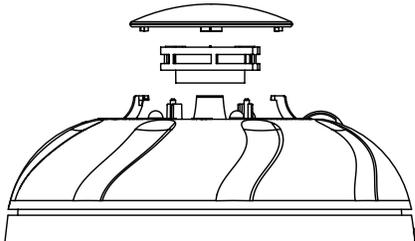
MAINTENANCE

NOTE: Before performing any maintenance on the detector, notify the proper authorities that maintenance is being performed and the system will be temporarily out of service. Disable the zone or system undergoing maintenance to prevent any unwanted alarms. Power must be removed from the detector before performing maintenance of any kind.

CLEANING

1. Remove the detector head by turning counterclockwise.
2. Clean the outside casing with a cloth. Ensure that the holes on the front of the alarm are not blocked with dirt and dust. Canned air can be used to remove any dust or debris.
3. Remove the white cover of the screen/sensing chamber located in the center of the detector head by turning counterclockwise.
4. Remove the black screen/sensing chamber by pulling up on it.
5. Use canned air to remove any dust or particles that are present on both the chamber cover/screen and chamber itself.
6. Replace the top half of the screen/sending chamber by aligning the two arrows on the chamber cover with the notches in the detector head. Press down until the screen/sensing chamber is fully seated.
7. Replace the white cover by placing it over the screen/sensing chamber and turning it clockwise until it snaps into place
8. Reattach the detector head to the base by applying light pressure and rotating clockwise. The detector will lock in place when properly aligned.
9. Test the detector to insure it is fully functional. (See Testing section)
10. Notify the proper authorities when the system is back in service.

FIGURE 6. REMOVING/REPLACING SCREEN/SENSING CHAMBER



Do not paint, and do not use cleaning agents, bleach or polish the detector.

LIMITED LIFE OF CO SENSOR

This detector is manufactured with a long-life carbon monoxide sensor. Over time the sensor will lose sensitivity, and will need to be replaced. A replacement CO sensor, model #CO-REPL, is available. The life span of the CO sensor is approximately ten years from the date of manufacture.

Periodically check the detector's replacement date. Remove the detector head and refer to the sticker placed on the replaceable CO cell. The sticker will indicate the date the CO cell should be replaced.

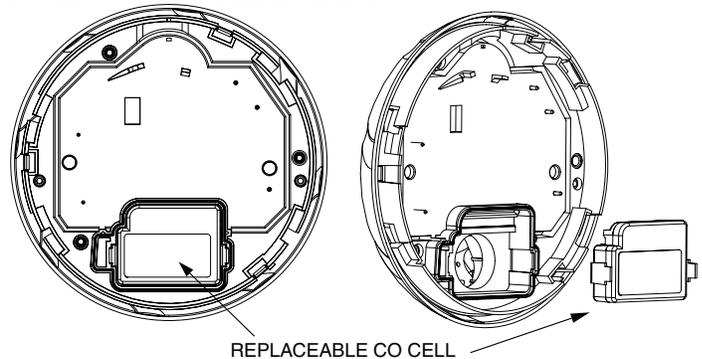
Reminder: This detector is also equipped with a feature that will signal the panel once the CO sensor has passed the end of its' useful life. If this occurs, it is time to replace the CO sensor.

REPLACEMENT OF CO SENSOR

1. Remove the detector head by turning counterclockwise.
2. Locate the CO sensor on the back side of the detector head. (Refer to Figure 7)
3. Depress the 2 tabs on the CO sensor and pull it out.
4. Insert replacement CO sensor model CO-REPL.
5. Reattach the detector head to the base by applying light pressure and rotating clockwise. The detector will lock in place when properly aligned.
6. Test the detector to insure it is fully functional. (See Testing section)
7. Notify the proper authorities when the system is back in service.

NOTE: Before replacing the sensor or detector, notify the proper authorities that maintenance is being performed and the system will be temporarily out of service. Disable the zone or system undergoing maintenance to prevent any unwanted alarms. Follow the proper testing protocol as outlined in the Testing section to make sure the device is functioning properly. Dispose of detector in accordance with any local regulations.

FIGURE 7. CO SENSOR REPLACEMENT



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SPECIAL APPLICATION

When configured at the fire alarm control panel, this detector is capable of operating in a special application mode such that it has a higher sensitivity than is normally allowed by UL 268 for areas where early warning is important. In this mode, the detector does not comply with the Cooking Nuisance Smoke Test. Detectors (Sampling ports) set to the special application mode are not suitable for use in areas where cooking appliances may be used. If cooking appliances are used within the protected space, a normal application detector or normal application mode must be used for that area.

Special application mode is not for general use and the detector may be more prone to false alarms if used in unsuitable environments. While no list is all-inclusive, some examples of unsuitable environments for special application mode are areas with airborne particulate or aerosols including sawing, drilling, and grinding operations, textile or agricultural processing, or areas with engines that are not vented to the outside. A complete list of aerosol and particulate sources is available in the Annex of NFPA 72.

Suitable environments for special application mode could include early warning for hospitals, museums, assisted living and other areas that do not have airborne particulate or aerosols.

Refer to the fire alarm control panel documentation for information on how to configure the detector for special application mode.