INSTALLATION AND MAINTENANCE INSTRUCTIONS

1412 and 1424 Direct Wire Ionization Smoke Detectors

SYSTEM SENSOR®
A Division of Pittway
3825 Ohio Avenue, St. Charles, Illinois 60174
1-800-SENSOR2, FAX: 630-377-6495

Specifications

Diameter:	5.5 inches (14 cm)
Height:	3.12 inches (8.0 cm)
Weight:	0.7 lb (310 gm)
Operating Temperature:	0° to +49°C (32° to 120° F)
Operating Humidity:	10% to 93% Relative Humidity Non-condensing
Locking Alarm:	Reset by momentary power interruption.

Relay Contact Ratings

Resistive or Inductive (60% power factor) load

Form A:	2.0A @ 30VAC/DC
Form C:*	0.6A @ 110VDC, 2.0A @ 30VDC
	1.0A @ 125VAC, 2.0A @ 30VAC

*For Canadian installations, relay contact rating is 2.0A @ 30VAC/DC

Electrical Ratings:	**1412**	**1424**	
System Voltage:	12	24	DC (4V Maximum Ripple)
Supply Voltages:	11.3	20	VDC Minimum
	17.3	29	VDC Maximum
Reset Voltages:	.73	.8	VDC Minimum
Standby Current:	100	100	μA Maximum
Alarm Currents:	35.2	21.3	mA Minimum
	77.0	40.6	mA Maximum
The alarm and auxiliary relay operate within the specified voltage ratings.			
Reset Time:	0.3	0.3	Seconds
Start-up Time:	30	30	Seconds

Before Installing

Please thoroughly read the System Sensor manual I56-407-XX, *Guide for Proper Use of System Smoke Detectors*, which provides detailed information on detector spacing, placement, zoning, wiring, and special applications. Copies of this manual are available at no charge from System Sensor. (For installation in Canada, refer to CAN/ULC-S524, *Standard for the Installation of Fire Alarm Systems* and CEC Part 1, Sec. 32.)

General Description

System Sensor 1412 and 1424 dual-chamber ionization smoke detectors utilize state-of-the-art, unipolar sensing chambers. These detectors are designed to provide open area protection, and to be used with UL-listed 4-wire control panels. The 1412 for 12 volt panels operates at 12VDC, and the 1424 for 24 volt panels operates at 24VDC. The detectors' operation and sensitivity can be tested in place. These detectors are listed to UL 268 and are latching type system detectors. When latched in alarm, the detectors must be reset by a momentary power interruption.

An LED on the detector provides a local indication of the detector's status. If power is applied to the detector, and the detector is functioning properly in standby, the status LED will blink every 10 seconds. In alarm, the LED will be latched on continuously until the detector is reset.

Each detector contains one Form A (SPST-NO) contact for connection to the alarm-initiating circuit, and one Form C (SPDT-NO/NC) set of auxiliary contacts. Supervision of detector power is accomplished by installing a Power Supervisory End-of-Line Relay Module (A77-716) at the end of the detector power loop. When power is applied to and through the detectors, the EOL Power Supervisory Module is energized. Its relay contacts close and provide a closed series circuit in the control panel's alarm-initiating loop. A power failure or a break in the detector power loop de-energizes the EOL Module. The relay contacts open and trigger a trouble signal at the control panel.

Figure 1. Flush mounting of detector on 4 inch octagonal box:

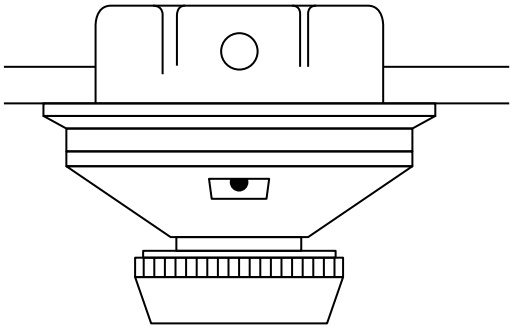

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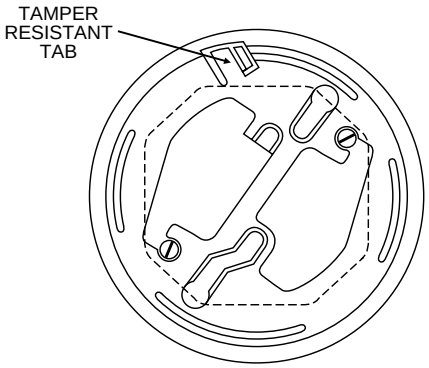
Figure 2. Detector mounting bracket:



TO MAKE DETECTOR TAMPER RESISTANT,
BREAK OFF TAB EXTENSION
AT SCRIBED LINE

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Mounting

Each 1412 and 1424 detector is supplied with a mounting bracket kit that permits the detector to be mounted:

1. Directly to a 3-1/2 inch or 4 inch octagonal, 1-1/2 inch deep electrical box, or
2. To a 4 inch square electrical box by using a plaster ring with the supplied mounting bracket kit.

Spacing

Spacing of 30 ft. on a smooth ceiling as per NFPA 72E. Where conditions or response requirements vary, other spacing may apply.

Wiring Installation Guidelines

All wiring must be installed in compliance with the National Electrical Code and the applicable local codes, and any special requirements of the local authority having jurisdiction. Proper wire gauges should be used. The conductors used to connect smoke detectors to control panels and accessory devices should be color-coded to prevent wiring mistakes. Improper connections can prevent a system from responding properly in the event of a fire.

NOTE: Refer to releasing device manufacturer's installation instruction for proper connections.

NOTE: Contacts are shown in stand-by mode and will transfer in alarm condition.

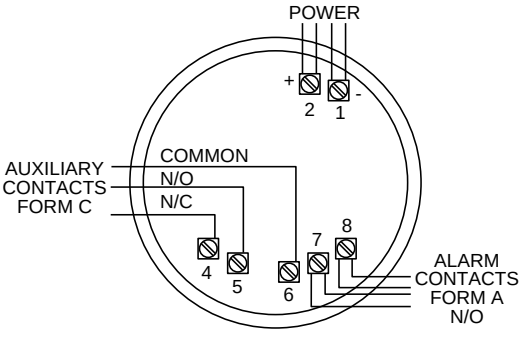
⚠CAUTION

For system supervision: for terminals 1, 2, 7, and 8, do not use looped wire under terminals. Break wire run to provide system supervision of connections.

For signal wiring (the wiring between interconnected detectors), it is recommended that the wire be no smaller than 18 gauge. Wire sizes up to 12 gauge wire may be used. For best system performance, the power (+) and (–) loop wires should be twisted pair and installed in separate grounded conduit to protect the loop from extraneous electrical interference.

Smoke detectors and alarm system control panels have specifications for allowable loop resistance. Consult the control panel manufacturer's specifications for the total loop resistance allowed for the particular model control panel being used before wiring the detector loops.

Figure 3. Wiring diagram for models 1412 and 1424 detectors used with Class A or Class B four-wire control panels.



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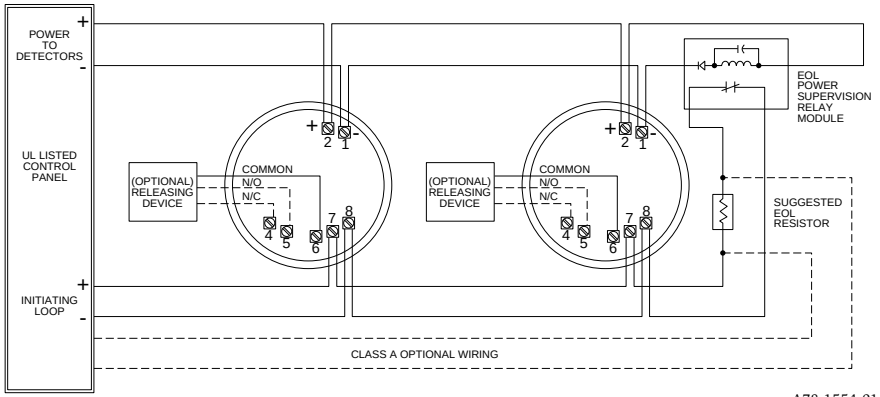

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Wire connections are made by stripping about 3/8" of insulation from the end of the wire (use strip gauge molded in base), sliding the bare end of the wire under the clamping plate, and tightening the clamping plate screw. A typical wiring diagram for a 4-wire detector system is shown in Figure 3.

Tamper-proof Feature

This detector includes a tamper-proof feature that, when activated, prevents removal of the detector without the use of a tool. To activate this feature, break off the smaller tab at the scribed line on the tamper-proof tab, located on the detector mounting bracket (see Figure 2), then install the detector. To remove the detector from the bracket once the tamper-proof feature has been activated, depress the tamper-proof tab located in the slot on the mounting bracket (see Figure 4) and turn the detector counterclockwise for removal.

Installation

⚠WARNING

Remove power from initiating-device circuits before installing detectors.

1. Wire detector per installation guidelines.
2. Line up arrows on the detector with arrows on the mounting bracket.
3. Turn the detector clockwise until it clicks into place.
4. After all detectors have been installed, apply power to the control unit.
5. Test the detector as described under TESTING.
6. Reset the detector at the system control panel.
7. Notify the proper authorities the system is in operation.

⚠CAUTION

Dust covers can be used to help limit dust entry to the detector, but they are not a substitute for removing the detector during building construction. Remove any dust covers before placing system in service.

Testing

NOTE: Before testing, notify the proper authorities that the smoke detector system is undergoing maintenance, and therefore will temporarily be out of service. Disable the zone or system undergoing maintenance to prevent unwanted alarms.

Before testing the detector, look for the presence of the flashing LED. If it does not flash, power has been lost to the detector (check the wiring), or it is defective (return for repair, see warranty information).

Detectors must be tested after installation and following periodic maintenance. The 1412 and 1424 may be tested as follows:

A. Recessed Test Switch
   1. A test switch is located on the detector housing (see Figure 4).
   2. Push and hold the recessed test switch with a 0.1 inch maximum diameter tool.
   3. The LED on the detector should light within 30 seconds.
   4. Reset the detector at the system control panel.

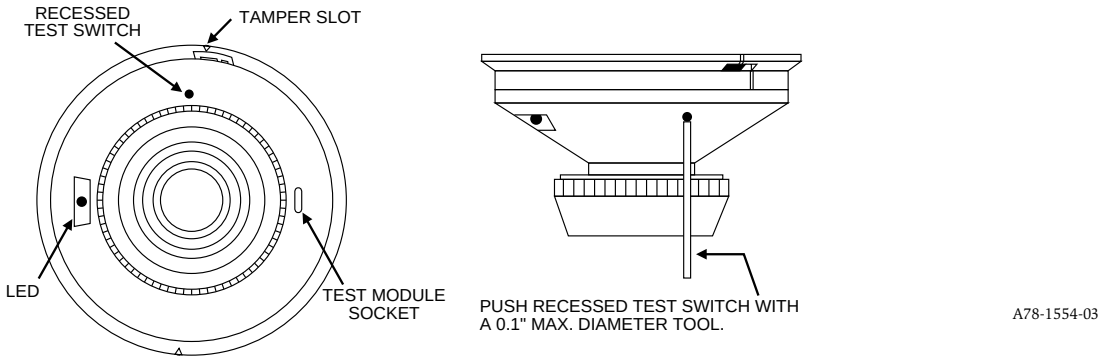
B. Test Module (System Sensor Model No. MOD400R)
   The MOD400 or MOD400R is used with an analog or digital voltmeter to check the detector sensitivity as described in the test module's manual.

C. Aerosol Generator (Gemini 501)
   Set the generator to represent 4%/ft. to 5%/ft. obscuration as described in the Gemini 501 manual. Using the bowl shaped applicator, apply aerosol until unit alarms.

Notify the proper authorities the system is back on line.

Detectors that fail these tests should be cleaned as described under MAINTENANCE and retested. If the detectors still fail these tests, they should be returned for repair.

Figure 4. Bottom and side view showing position of test switch:



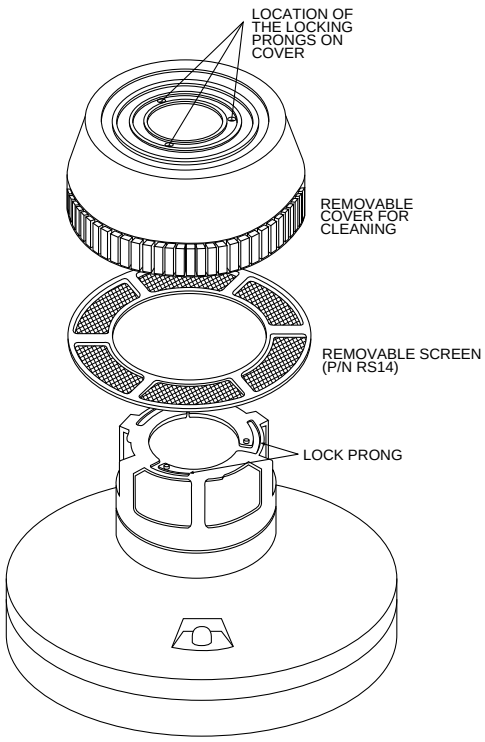
Maintenance

NOTE: Before starting, notify the proper authorities that the smoke detector system is undergoing maintenance, and therefore will temporarily be out of service. Disable the zone or system undergoing maintenance to prevent unwanted alarms.

The 1412 and 1424 are cleaned as follows:

1. Remove the detector screen and cover assembly by depressing the three lock prongs on the top of the cover, rotate the cover counterclockwise, and pull the screen and cover assembly away from the detector (see Figure 5). Usage of System Sensor CRT400 cover removal tool is recommended.
2. Remove the screen from the cover.
3. Use a vacuum cleaner to remove dust from the screen, the cover, and the sensing chamber.
4. After cleaning, snap the screen into the cover, then place the cover and screen assembly on the detector, turning clockwise until it is locked in place.
5. Test detector as described under TESTING.
6. Notify the proper authorities that the system is back on line.

Figure 5. Removal of cover and screen for cleaning:



⚠WARNING

The Limitations of Property Protection Smoke Detectors

This smoke detector is designed to **activate and initiate** emergency action, but will do so only when it is used in conjunction with an authorized fire alarm system. This detector must be installed in accordance with NFPA standard 72.

Smoke detectors will not work without power. AC or DC powered smoke detectors will not work if the power supply is cut off.

Smoke detectors will not sense fires which start where smoke does not reach the detectors. Smoldering fires typically do not generate a lot of heat which is needed to drive the smoke up to the ceiling where the smoke detector is usually located. For this reason, there may be large delays in detecting a smoldering fire with either an ionization type detector or a photoelectric type detector. Either one of them may alarm only after flaming has initiated which will generate the heat needed to drive the smoke to the ceiling.

Smoke from fires in chimneys, in walls, on roofs or on the other side of a closed door(s) may not reach the smoke detector and alarm it. A detector cannot detect a fire developing on another level of a building quickly or at all. For these reasons, detectors **shall be located on every level and in every bedroom within a building.**

Smoke detectors have sensing limitations, too. Ionization detectors and photoelectric detectors are required to pass fire tests of the flaming and smoldering type. This is to ensure that both can detect a wide range of types of fires. Ionization detectors offer a broad range of fire sensing capability but they are somewhat better at detecting fast flaming fires than slow smoldering fires. Photoelectric detectors sense smoldering fires better than flaming fires which have little, if any, visible smoke. Because fires develop in different ways and are often unpredictable in their growth, neither type of detector is always best, and a given detector may not always provide early warning of a specific type of fire.

In general, detectors cannot be expected to provide warnings for fires resulting from inadequate fire protection practices, violent explosions, escaping gases which ignite, improper storage of flammable liquids like cleaning solvents which ignite, other similar safety hazards, arson, smoking in bed, children playing with matches or lighters, etc. Smoke detectors used in high air velocity conditions may have a delay in alarm due to dilution of smoke densities created by frequent and rapid air exchanges. Additionally, high air velocity environments may create increased dust contamination, demanding more frequent maintenance.

Smoke detectors cannot last forever. Smoke detectors contain electronic parts. Even though smoke detectors are made to last over 10 years, any part can fail at any time. Therefore, smoke detectors shall be replaced after being in service for 10 years. The smoke detector system that this detector is used in must be tested regularly per NFPA 72. This smoke detector should be cleaned regularly per NFPA 72 or at least once a year.

Three-Year Limited Warranty

System Sensor warrants its enclosed smoke detector to be free from defects in materials and workmanship under normal use and service for a period of three years from date of manufacture. System Sensor makes no other express warranty for this smoke detector. No agent, representative, dealer, or employee of the Company has the authority to increase or alter the obligations or limitations of this Warranty. The Company's obligation of this Warranty shall be limited to the repair or replacement of any part of the smoke detector which is found to be defective in materials or workmanship under normal use and service during the three year period commencing with the date of manufacture. After phoning System Sensor's toll free number 800-SENSOR2 (736-7672) for a Return Authorization number, send defective units postage prepaid to: System Sensor, Repair Department, RA #_____, 3825 Ohio Avenue, St. Charles, IL 60174. Please include a note describing the malfunction and suspected cause of failure. The Company shall not be obligated to repair or replace units which are found to be defective because of damage, unreasonable use, modifications, or alterations occurring after the date of manufacture. In no case shall the Company be liable for any consequential or incidental damages for breach of this or any other Warranty, expressed or implied whatsoever, even if the loss or damage is caused by the Company's negligence or fault. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. This Warranty gives you specific legal rights, and you may also have other rights which vary from state to state.