**INSTALLATION AND MAINTENANCE INSTRUCTIONS**

# 1012 Ionization and 2012 Photoelectronic Smoke Detectors

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

### Smoke Detector Description

Smoke detectors are designed to provide early warning of developing fires at a reasonable cost. They monitor the air and can sense smoke and can provide precious minutes for you and your family to escape before a fire spreads. Early warning fire detection is best achieved by the installation of fire detection equipment in all rooms and areas of the household.

Model 1012 is a low-voltage ionization-type smoke detector. Model 2012 is a low-voltage photoelectronic-type smoke detector. The detector is designed for open area protection in a residential building. Each detector has a built-in relay which may be used to activate auxiliary devices such as bells, horns, and door closers. The relay contacts automatically close eight (8) seconds after the detector goes into alarm, and automatically resets approximately five (5) seconds after the alarm stops. In addition, these detectors can be interconnected, within one household, for a system of up to twelve (12) smoke detectors per household. This way, when one smoke detector sounds its alarm horn, it will cause all of the other connected smoke detectors within the household to sound their alarm horns as well.

### Installation in Australia Only

The installation temperature range for Australia is 5° to 45°C and has been tested per the Australian Standard. Ignore installation temperatures specified for all other applications when installing detectors in Australia.

Detectors should be installed by qualified technicians. Installation of a main connected power supply unit must be performed by qualified electricians only. Ignore the power requirements in "Smoke Detector Requirements" listed below, as these apply to installation in the USA. The primary power should be provided by a power limited, supervised, panel type system. A rechargeable battery is required as a backup to the external power supply in case of a mains failure. In standby operation, the power limited backup battery (fully charged) must be capable of providing uninterrupted power for at least 7 days to the system and all smoke alarms before the panel gives the required low-battery signal. When the low-battery signal is given, the battery should be capable of providing power for another 7 days, after which the backup battery should have enough energy left to allow a 4-minute alarm signal to be given by all connected smoke alarms.

### Smoke Detector Power Requirements (USA)

This smoke detector will not work without power. This smoke detector is only U.L. listed to be powered by System Sensor Part No. A77-727-01 (12-volt DC power supply). The A77-727-01 must be permanently connected to the building's 120-volt AC electrical supply per code. The A77-727-01 will not power the smoke detector if the AC power is cut off for any reason. The 12-volt DC power supply will only power the detector when 120-volt AC power is present—it is not a power back-up source.

Power input rating to the detector is 12VDC @ 0.02 amps. Input power to the A77-727-01 power supply must be from a 24-hour 120V AC 60HZ circuit which cannot be turned off by a switch. **Power supply and detector installation must conform to the electrical codes in your area and Article 760 of the National Electrical Code. It is recommended that wiring be performed by a licensed electrician.**

### Smoke Detector Limitations

- **This smoke detector is designed for residential use only.** System Sensor does not advise the use of this detector in multiple detector systems monitored by a central control. This detector is self-restoring and does not lock into an alarm condition.
- **Smoke detectors will not sense a fire if the smoke does not reach the sensor.** In order for a smoke detector to sense smoke, it must be installed in the immediate vicinity of the fire. In addition, smoke from fires in chimneys, in walls, on roofs, in remote parts of the building, or on another level from where the smoke detector is located, may not reach the smoke detector quickly enough for occupants to escape unharmed. **For this reason, installer shall install smoke detectors on every level, in every sleeping area, and in every bedroom of the household.**
- **Smoke detectors may not be heard.** The alarm horn in this smoke detector meets or exceeds current Underwriter's Laboratories standards. However, if the smoke detector is not located in the same room as the occupant, or if it is blocked by a closed door or normal noise, the alarm horn may not be heard. In addition, sound sleepers, or persons who are under the influence of drugs or alcohol may not hear the alarm or be able to react to it. **Therefore, locate this smoke detector, which has a sounder rated at 85 dB at 10 feet, on every level, in every sleeping area, and in every bedroom of the household.**
- **In general, detectors may not always warn you** about fires caused by carelessness and safety hazards like smoking in bed, violent explosions, escaping gas, improper storage of flammable materials, overloaded electrical circuits, children playing with matches, or arson.
- Smoke detectors are not fool-proof. **Like all electronic devices, smoke detectors have limitations. No type of smoke detector can sense every kind of fire every time. In addition, smoke from slow, smoldering fires rises slowly and may not reach the smoke detector until actual flame breaks out. This type of smoke may not reach the smoke detector in time for occupants to escape unharmed.**
- **Smoke detectors are not a substitute for life or property insurance.** Though smoke detectors have been responsible for saving many lives, they are not warranted or implied to protect lives or property in the event of a fire.
- **Smoke detectors have a limited life.** They contain many parts. Any of these parts could fail at any time. Repair or replace the smoke detector immediately if the alarm horn does not sound when tested. **Do not, in any case, use a smoke detector for more than 10 years from the date of original installation.**

### Where to Install Smoke Detectors

**Warning:** As a minimum requirement, smoke detectors must be installed in accordance with the National Fire Protection Agency (NFPA) Standard 72 which defines the standards for the National Fire Alarm Code (National Fire Protection Association, Batterymarch Park, MA 02269-9101). In addition, observe all local and national building and electrical codes.

### Proper Detector Location:

**Figure 1: Recommended smoke detector protection for single-floor residence with only one sleeping area**

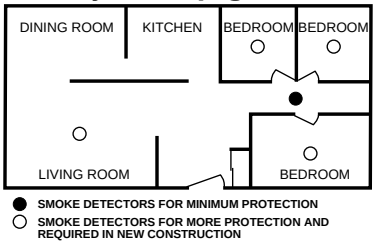


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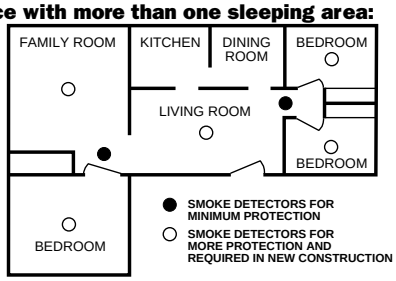
**Figure 2: Recommended smoke detector protection for single-floor residence with more than one sleeping area:**

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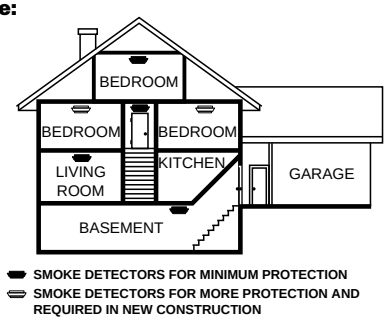
**NFPA 72, Chapter 2, Section 2-2.1.1.1** states as follows: "Smoke detectors shall be installed outside of each separate sleeping area in the immediate vicinity of the bedrooms and on each additional story of the family living unit, including basements and excluding crawl spaces and unfinished attics. In new construction, a smoke detector also shall be installed in each sleeping room."

**The above NFPA standard is a minimum requirement for smoke detector installation. For better protection, we also require the installation of a smoke detector inside every bedroom in existing construction.**

- **Install a minimum of two smoke detectors in any household, no matter how small it is.**
- **Put a smoke detector in the hallway outside of every separate bedroom area.** (See Figure 1.) A minimum of two detectors are required in homes with two bedroom areas. (See Figure 2.)
- **Put a smoke detector on every level of a multi-level residence.** (See Figure 3.)
- Install basement detectors on the ceiling at the bottom of the basement stairwell. (See Figure 3.)

**Figure 3: Recommended smoke detector protection for a multi-level residence:**

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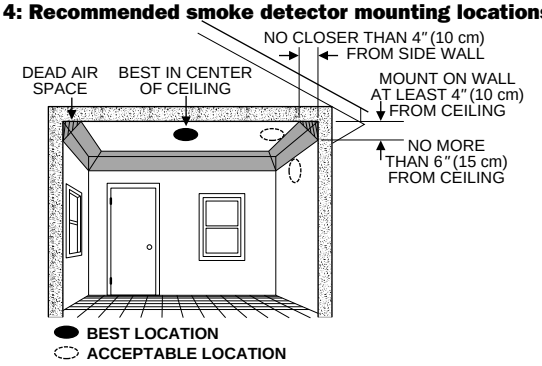
- Install detectors on the ceiling as close to the center of the room as possible. If this is not practical, install it on the ceiling no closer than 4 inches (10 cm) from any wall or corner. (See Figure 4.)
- If wall-mounting is permitted by local and state codes, and ceiling mounting is not practical, install detectors on an inside wall between 4 and 6 inches (10 and 15 cm) from the ceiling. (See Figure 4.)

**Figure 4: Recommended smoke detector mounting locations:**

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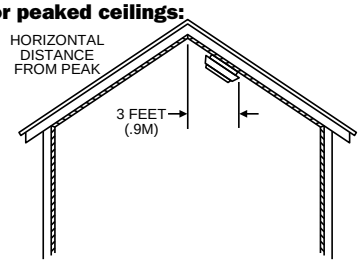
- Put detectors at both ends of a bedroom hallway if the hallway is more than 30 feet (9 meters) long. In addition, large rooms will require more than a single detector if the room is over 900 square feet.
- Rooms or areas that do not have smooth ceilings, or which have short, transom-type walls coming down from the ceiling require additional detectors.
- Install second-floor detectors on the ceiling at the top of the first-to-second floor stairwell. Be sure no door or other obstruction blocks the path of smoke to the detector.
- In rooms with sloped, peaked, or gabled ceilings, install detectors 3 feet (0.9 meter) measured down on the slant from the highest point of the ceiling. See Figure 5.

**Figure 5: Recommended smoke detector location in rooms with sloped, gabled or peaked ceilings:**

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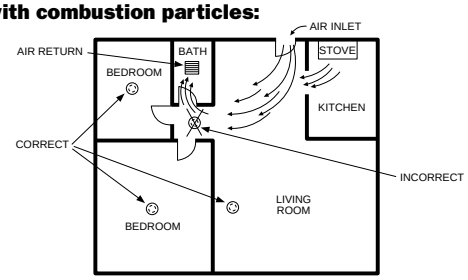
### Where Smoke Detectors Should NOT Be Installed

- **In or near areas where combustion particles are normally present such as kitchens; in garages** where there are particles of combustion in vehicle exhausts; **near furnaces, hot water heaters, or gas space heaters. Install detectors at least 20 feet** (6 meters) **away from kitchens and other areas where combustion particles are normally present.**
- **On the ceiling in rooms next to kitchens** where there is no transom between the kitchen and these rooms. Instead, install the smoke detector on an inside wall, furthest from the kitchen (See Figure 6). Be sure not to install smoke detectors within 4" of the ceiling or any corner or more than 6" from the ceiling.

**Figure 6: Recommended smoke detector locations to avoid air streams with combustion particles:**

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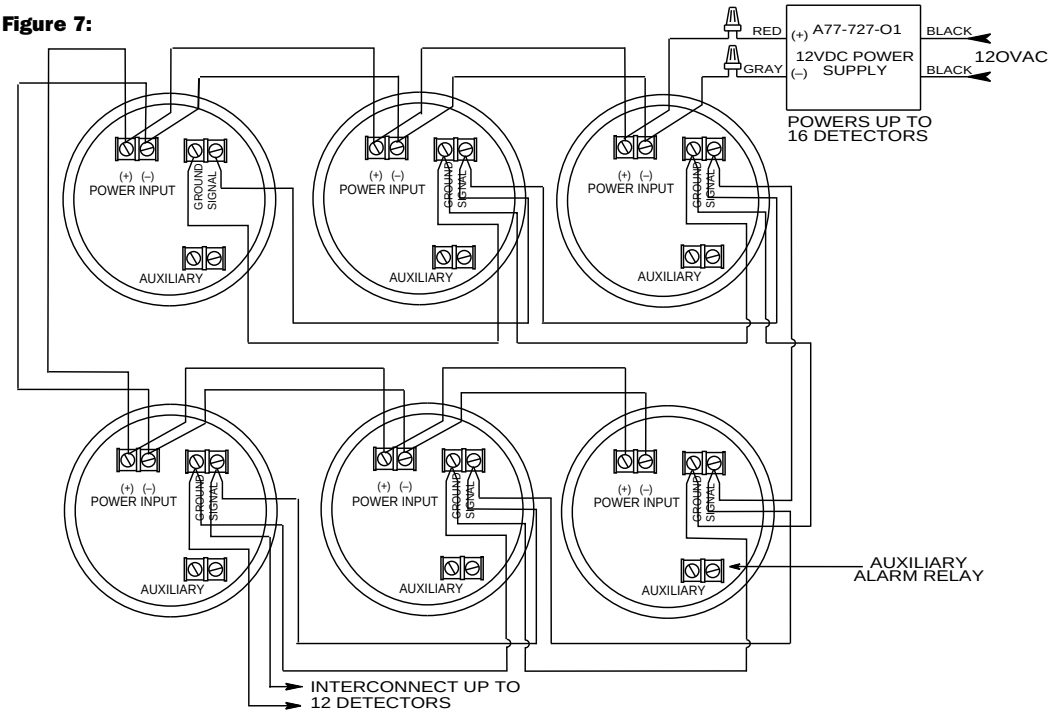
- **In damp or very humid areas, or next to bathrooms with showers.** The moisture in humid air can enter the sensing chamber as water vapor, then cool and condense into droplets that cause a nuisance alarm. **Install detectors at least 5 feet** (1.5 meters) **away from bathrooms.**
- **In very cold or very hot rooms or areas.** Operating temperature of the smoke detector is 40°F to 100°F (4°C to 38°C).
- **In dusty, dirty, or insect-infested areas.** Dust and dirt can build up on the detector's sensing chamber and make it overly sensitive, or can block openings to the sensing chamber and keep the detector from sensing smoke.
- **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 smoke detectors, making the detectors less effective.
- **In dead air spaces** at the top of a peaked ceiling or wall/ceiling intersect. Dead air may prevent smoke from reaching a detector.
- **Near fluorescent light fixtures.** Install detectors at least 10 feet (3 meters) away from such light fixtures.

### Installation Requirements

**Warning: Electrical Shock Hazard.** Turn off power at the main fuse box or circuit breaker to the area of detector installation before beginning installation procedures.

- Mount detector to a 4-inch octagonal junction box only. Mount the 12

**Figure 7:**




| WIRE GAUGE | 1 UNIT | 2 UNITS | 3 UNITS | 4 UNITS | 5 UNITS | 6 UNITS | 7 UNITS | 8 UNITS | 9 UNITS | 10 UNITS | 11 UNITS | 12 UNITS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 14AWG | 5000 | 2970 | 1980 | 1485 | 1188 | 990 | 848 | 742 | 660 | 594 | 540 | 495 |
| 16AWG | 3735 | 1867 | 1245 | 933 | 747 | 622 | 533 | 466 | 415 | 373 | 339 | 311 |
| 18AWG | 2349 | 1174 | 783 | 587 | 469 | 391 | 335 | 293 | 261 | 234 | 213 | 195 |

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Maximum power bus length in feet, given number of units (maximum per bus) and wire size.

Maximum interconnect bus length: 5,000 FT., No. 18AWG or larger dual conductor cable.
All wiring must conform to local electrical codes.
Relay contacts rating: 0.5A 30VDC; 0.5A 30VAC

Volt D.C. power supply to a 4" square junction box 2-1/8" deep only. (If necessary, add an extension ring if the selected box does not have adequate volume.) The power supply may be mounted remotely from the detector.

- All wiring must be performed by a licensed electrician and installed in compliance with the National Electrical Code, applicable local codes, and any special requirements of the local authority having jurisdiction.
- Use only the specified wire gauge. Maximum interconnect bus length is 5,000 feet, #18 AWG or larger two-conductor stranded cable.
- The detector includes a tamper-resist feature that, when activated, requires a tool for detector removal. The following detector installation instructions include how to activate this feature.

### Installation Instructions

1. Turn off power at main service panel.
2. Using wire connectors, attach either **black** wire from power supply to **black AC** power wire. Attach other **black** wire from power supply to **white AC** neutral wire.
3. Using wire connectors, connect **red** and **gray** power supply output wires to the bus line wires supplying power to the remote detectors. (See Figure 7.) Use color-coded bus wires.
4. Mount power supply to junction box and cover junction box with a 4" square box cover, using box mounting screws.
5. Install a junction box where you plan to install the detector. (See type and size for junction box above.)
6. Install bus line wires from power supply output to junction box. Use #14-18 AWG wire only. See Figure 7 to determine maximum power bus length for wire size and number of interconnected detectors.
7. Connect color-coded DC power bus wires to power input screw terminals, located on detector back. If detectors will be interconnected or the relay used, see following sections for specific installation instructions.
8. Remove detector from mounting bracket by turning the detector counter-clockwise and pulling the detector away from the bracket.
9. Remove small tab on mounting bracket to activate tamper-resist feature, if desired. (To release a detector with this feature, push up on locking tab with screwdriver while turning detector counterclockwise.)
10. Install mounting bracket to junction box.
11. Connect power wires to detector(s) as shown in Figure 8. Be sure to tighten each terminal screw to secure wire in place. Tug wire to be sure it is connected properly.
12. Attach smoke detector to mounting bracket by aligning arrows on side of mounting bracket 1-inch to the right of the nib on the detector. Rotate until the arrow and nib line up. (See Figure 8).
13. After installing all detectors, turn on power at the main service panel.
14. Check for the green LED to flash about once every 30 to 40 seconds. This means the detector is receiving power. Check all detectors.

**Note:** If the LED does not flash, power is not getting to the smoke detector. Check wiring. If LED still does not flash, return the smoke detector to the manufacturer for repair.

15. Test each detector in the system. (See "Testing" below for more detailed instructions.)

**Figure 8:**

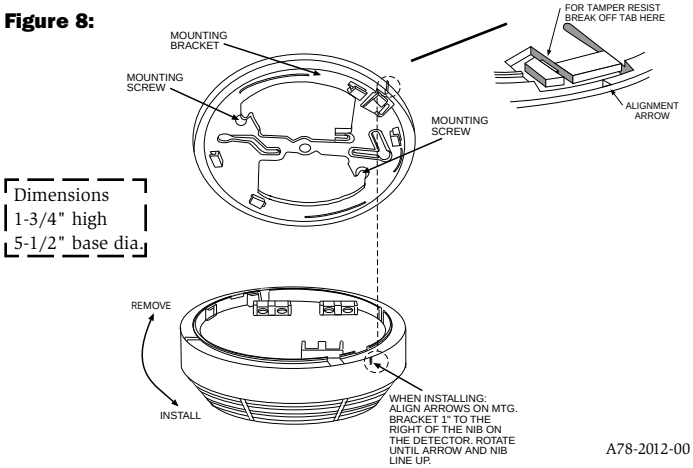


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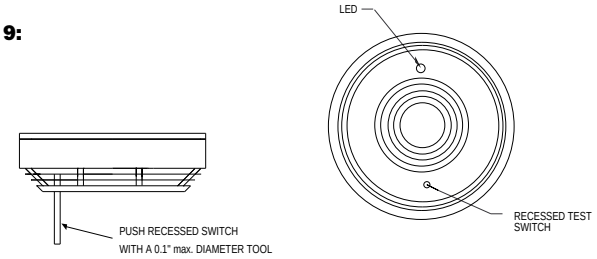
**Figure 9:**




### Connecting Auxiliary Devices with Relay

This detector has a built-in relay which may be used to activate auxiliary devices such as bells, horns, and door closers. The relay contacts automatically close approximately eight (8) seconds after the detector goes into alarm, and automatically resets approximately five (5) seconds after the alarm stops. For wiring refer to Figure 8. Auxiliary voltage and current requirements must be within relay contact ratings and appropriate wiring must be used.

### How to Interconnect Detectors

**NOTE:** Interconnect smoke detectors within one household only. If detectors are interconnected between households, nuisance alarms will occur when a detector in another residence is tested.

- Up to twelve 1012, 2012, and 2001LVRI detectors may be interconnected so that if one detector senses smoke, all of them will sound an alarm. After interconnecting the detectors, push the test switch on one detector. The alarm horns on all of the other detectors should sound if they are connected correctly.
- Connect the detectors together by connecting all the **signal** terminals to each other and all **ground** terminals to each other. (See Figure 7.) Use 18 guage (#18AWG) or larger two-conductor stranded wire.
- If detectors will not be interconnected, **DO NOT** use **signal** and **ground** terminals.
- The LEDs on all smoke detectors should flash about 1 to 2 times per minute when power is turned on to the detectors. Test detectors after interconnection wiring is complete.

**Cautionary Note:** Test interconnection wiring after installation is completed. Test each unit in a system and make sure ALL other units alarm. **FAILURE TO OBSERVE ANY OF THESE CONDITIONS CAN CAUSE SYSTEM MALFUNCTION AND/OR DAMAGE TO THE DETECTORS.**

### Testing Information

- You should test your detector at least once a week to assure yourself of its operation, as recommended by NFPA. Test the detector by firmly depressing the recessed test switch located on the detector cover (marked "Push to Test") with a 0.1 inch diameter tool such as an allen wrench or small screwdriver FOR 20 SECONDS. (See Figure 9). The alarm horn should sound, and the LED should flash rapidly.
- In an interconnected system, all of the detectors should sound their alarm horns when any one of the test buttons is pushed. If the alarm horn makes a continuous loud sound, the detector is working properly. **This is the only way to be sure the detector is working. Test the detector weekly. If the detector fails to test properly, have it repaired or replaced immediately.**

**WARNING: Never use an open flame of any kind to test the smoke detector.** You may set fire to and damage the detector, as well as your home. The built-in test switch accurately tests **all detector functions**, as required by Underwriter's Laboratories.

- **DANGER: If the alarm horn sounds a loud continuous sound and you are not testing the detector, the detector has sensed smoke or combustion particles in the air. THE ALARM HORN IS A WARNING OF A POSSIBLY SERIOUS SITUATION. IT REQUIRES YOUR IMMEDIATE ATTENTION.** See "What to Do In Case of Fire" section of this manual.
- The alarm could be caused by a nuisance situation. Cooking smoke or a dusty furnace can cause the alarm to sound. If this happens, open a window or fan the air to remove the smoke or dust. The alarm will turn itself off as soon as the air is completely clear. **DO NOT TURN OFF POWER TO THE SMOKE DETECTOR. THIS WILL REMOVE YOUR PROTECTION.**

### Monitoring Your Detector

Once the detector is powered, a green LED flashes about 1 to 2 times per minute. This signals that the detector is receiving power and is in the detect mode. If the detector is not operating properly, the green LED will be OFF. (If so, have the detector repaired or replaced immediately.) When the smoke detector senses smoke, the green LED will flash rapidly. If the initiating smoke detector senses smoke and signals other interconnected smoke detectors to sound their alarms, their LEDs will flash about 1 to 2 times per minute. See chart below for specific LED functions.

**TABLE 1: DETECTOR STATUS**

| **Detector Status** | **Electronic Horn** | **LED** |
|---|---|---|
| Functioning Normally | Silent | Flashing about 1-2 times per minute |
| Sounding Alarm; Detecting Smoke | Beeping Continuously (Steady Pulse) | Flashing Rapidly |
| Sounding Alarm; Smoke Sensed by a Connected Detector | Beeping Continuouslly (Steady Pulse) | 2012–Flashing about 1-2 times per minute<br>1012–No flashing<br>2001LVRI–No flashing |

The detector will automatically return from Alarm to Normal state when the reason for alarm, as the presence of smoke, is completely removed.

### Cleaning and Maintenance

**DANGER: Electrical Shock Hazard.** Turn off power to the smoke detector at the main service panel before cleaning the smoke detector.

This smoke detector has been designed to be as maintenance-free as possible. However, regular testing (see "Testing" above) and periodic maintenance are necessary.

To clean the detector, turn off power and vacuum the outside of the detector with the soft brush attachment of a vacuum cleaner. Do this at least once every year, preferably every six months. **DO NOT ATTEMPT TO CLEAN THE DETECTOR IN ANY OTHER WAY.**

If the detector requires service, do not attempt to service it yourself; this will void your warranty. Send the detector to: Repair Department, System Sensor, 3825 Ohio Avenue, St. Charles, Illinois 60174. Enclose a note describing what is wrong with the detector.

### 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.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