

INSTALLATION AND MAINTENANCE INSTRUCTIONS

2112/24AITR

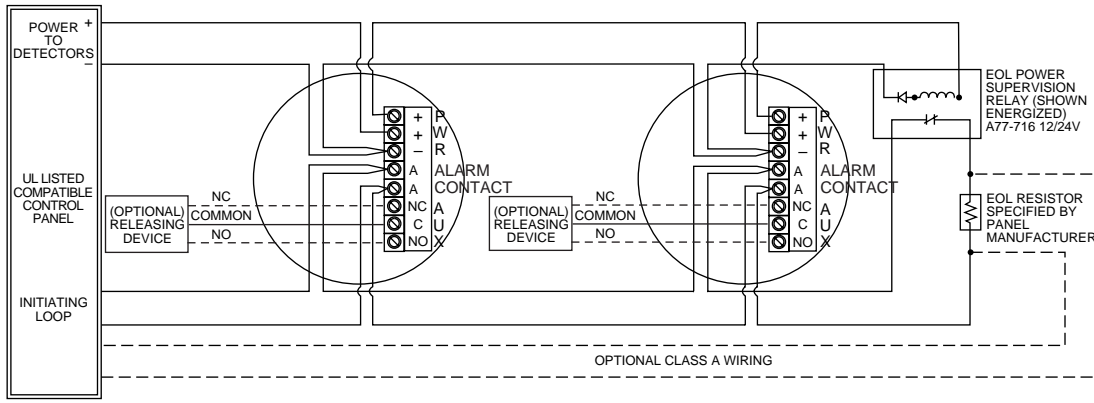
Photoelectronic Smoke Detector with Fixed Heat and Integral Temp-3 Sounder



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1-800-SENSOR2, FAX: 630-377-6495

Figure 1. Wiring diagram for the 2112/24AITR detector:

IMPORTANT: OBSERVE POLARITY
As with all sounder models, polarity must be observed on the power connections.



A78-2336-16

Specifications

Diameter:	5.5 inches (140 mm)
Height (including mounting bracket):	2.05 inches (52 mm)
Weight:	7.5 oz. (210 g)
Operating Temperature Range:	32° to 100°F (0° to 38°C)
Operating Humidity Range:	10% to 93% Relative Humidity, Noncondensing
Latching Alarm:	Reset by momentary power interruption
Audible Signal:	85 dBA minimum when in alarm or with supply polarity reversed
Heat Sensor:	135°F Fixed Temperature Electronic Thermistor

Electrical Ratings

System Voltage (nominal):	12 or 24 VDC
Minimum:	10 VDC
Maximum:	35 VDC
Maximum Ripple Voltage:	30% of nom. Voltage (peak to peak)
Standby Current:	50 µA maximum
Alarm Current:	49 mA typical, 60 mA max. at 12V 57 mA typical, 65 mA max. at 24V
Reset Voltage:	0.8 VDC minimum
Reset Time:	1.0 second maximum
Start-up Time:	30 seconds maximum (after 60 sec. reset)
EOL Relay:	A77-716B, 12/24 VDC

Note: Relay changes only when the thermal alarm state is reached
Alarm Initiation and Auxiliary Relay: 1A @ 30 VAC
Contact Ratings, Resistive Load: 1A @ 30 VDC
Special Considerations: Due to the built-in temporal pattern, use these detectors only with a non-coded power supply.

Before Installing

Please thoroughly read the System Sensor manual I56-407, *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.

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

IMPORTANT: This detector must be tested and maintained following NFPA 72 requirements. The detector should be cleaned at least once a year.

General Description

Model 2112/24AITR is a 4-wire photoelectronic smoke detector that uses a state-of-the-art optical sensing chamber. This detector also provides restorable, 135°F fixed-temperature heat detection. The photoelectronic smoke sensor is isolated from the fixed-temperature heat sensor, providing a self-resetting, local audible smoke alarm that does not alarm at the panel. Only the fixed-temperature heat sensor will cause the 2112/24AITR to alarm at the panel and the relay to change its state.

In addition, a piezoelectric horn in each detector produces an interrupted, 85 dBA tone when the individual detector alarms or when the supply voltage polarity is reversed.

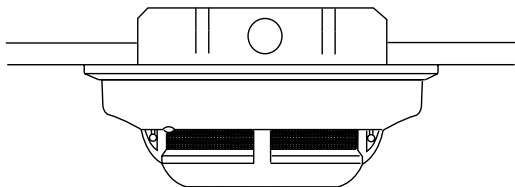
NOTE: In order for all detectors on a loop to sound when the panel alarms, the panel must reverse the supply voltage polarity to that loop upon alarm. For panels that do not reverse the polarity during alarm, a reversing relay, such as System Sensor's RR-2, must be used. The RR-2 is designed to allow all the detectors in the same loop to sound when one of the detectors goes into alarm. Some panels may require the use of programmable outputs. Refer to System Sensor literature for further information on the RR-2.

Installation of this detector is simplified by the use of a mounting bracket and a plug-in screw terminal block that can be prewired to the system, allowing the detector to be easily installed or removed for cleaning. The detector's sensitivity can be tested in place using the MOD400R Test Module.

An LED on the detector provides a local visual indication of the detector's status. If power is applied to the detector and it is functioning normally in standby within the listed sensitivity range, the status LED blinks every ten seconds. The LED also latches on in alarm.

If the LED stops blinking, the unit should be removed for maintenance and inspection.

Figure 2. Surface mounting of 2112/24AITR smoke detector on 3½-inch and 4-inch octagonal box:



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Mounting

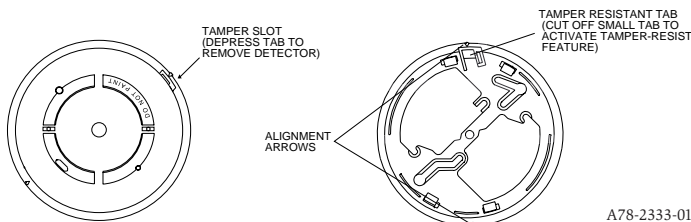
Each 2112/24AITR detector is supplied with a mounting bracket that permits the detector to be mounted:

1. To a single gang box, or
2. Directly to a 3½ inch or 4 inch octagonal box, or
3. To a 4 inch square electrical box by using a plaster ring.
4. Directly to the ceiling using drywall anchors, if permitted by local codes and/or the authority having jurisdiction.

Tamper-resistant Feature

This detector includes a tamper-resistant feature that prevents its removal from the bracket without the use of a tool. To make the detector tamper-resistant, remove the smaller tab by breaking it at the scribed line on the tamper resistant tab on the detector mounting bracket (see Figure 3), then install the detector. To remove the detector from the bracket once it has been made tamper resistant, use a small screwdriver to depress the tamper-resistant tab, located in the slot on the mounting bracket, and turn the detector counterclockwise.

Figure 3. 2112/24AITR smoke detector mounting bracket:



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Wiring Installation Guidelines

All wiring must be installed in compliance with the National Electrical Code, 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 reduce the likelihood of wiring errors. Improper connections can prevent a system from responding properly in the event of a fire.

The screw terminal block accepts 14 – 22 gauge wire. For best system performance, all wiring should be installed in separate grounded conduit. Do not mix fire system wiring in the same conduit as any other electrical wiring. Twisted pair may be used to provide additional protection against electrical interference.

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

Wire connections are made by stripping about 1/4 inch of insulation from the end of the feed wire, inserting the wire into the appropriate terminal, and tightening the screw to secure the wire in place.

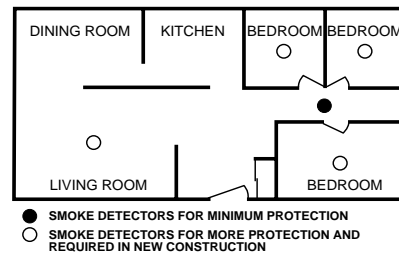
Installation

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.

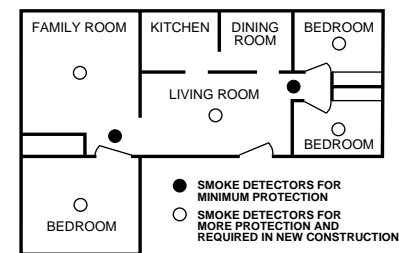
Proper Detector Location:

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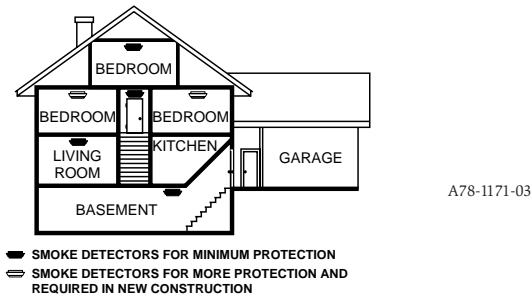
NFPA 72, Chapter 2, Section 2-2.1.1.1 states as follows: "Smoke detectors shall be installed outside of each separate sleeping area in the immediate vicinity of the bedrooms and on each additional story of the family living unit, including basements and excluding crawl spaces and unfinished attics. In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

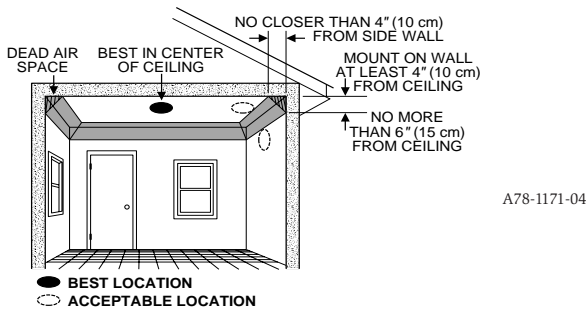
- Put a smoke detector on every level of a multi-level residence. (See Figure 3.)
- Install basement detectors on the ceiling at the bottom of the basement stairwell. (See Figure 3.)

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



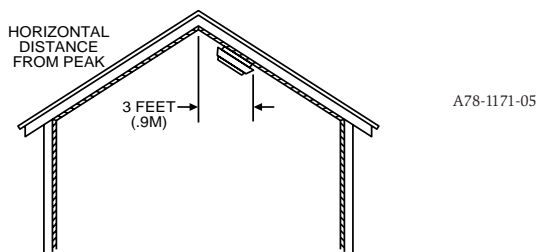
- Install detectors on the ceiling as close to the center of the room as possible. If this is not practical, install it on the ceiling no closer than 4 inches (10 cm) from any wall or corner. (See Figure 4.)
- If wall-mounting is permitted by local and state codes, and ceiling mounting is not practical,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



- 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:

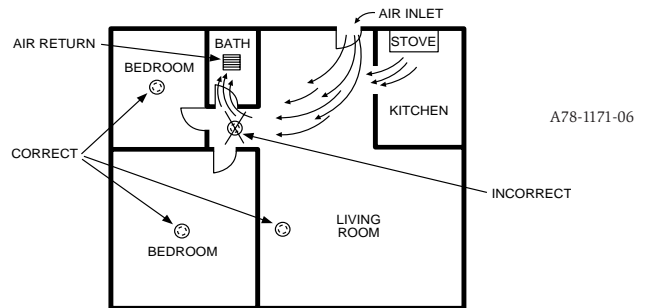


Where Smoke Detectors Should NOT Be Installed

- 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:



- 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 32°F to 100°F (0°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.



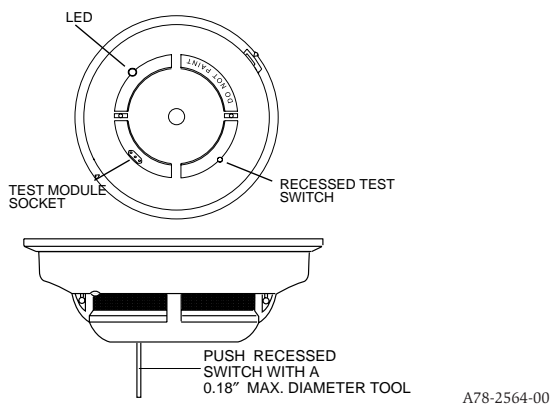
Remove power from the control unit or initiating device circuits before installing detectors.

1. Wire the plug-in screw terminal block per Figure 1 and plug the terminal block into the detector.
2. Align the arrows on the detector with the arrows on the mounting bracket.
3. Turn the detector clockwise in the mounting bracket until it clicks into place.
4. After all detectors have been installed, apply power to the control unit or initiating device circuits.
5. Test the detector as described in TESTING.
6. Reset the detector at the system control panel.
7. Notify the proper authorities the system is in operation.



Dust covers are an effective way to limit the entry of dust into smoke detector sensing chambers. However, they may not completely prevent airborne dust particles from entering the detector. Therefore, System Sensor recommends the removal of detectors before beginning construction or other dust producing activity. Be sure to remove dust covers from any sensors that were left in place during construction as part of returning the system to service.

Figure 4. Top and side views showing position of test switch:



Testing

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

Detectors must be tested after installation and following periodic maintenance. Test the 2112/24A1TR as follows:

A. Test Switch

1. A recessed test switch is located on the detector housing (See Figure 4).
2. Press and hold the recessed test switch with a 0.18 inch maximum diameter tool such as an allen wrench or small screwdriver.
3. The detector's LED should light within 5 seconds.

B. Test Module (System Sensor Model No. MOD400R).

The MOD400R test module can be used with a DMM or analog voltmeter to check the detector sensitivity as described in the test module's manual.

C. Smoke Entry Test

Hold a smoldering punk stick or cotton wick at the side of the detector and gently blow smoke through the detector until the unit alarms.

D. Direct Heat Method (Hair dryer of 1000-1500 watts)

Direct the heat toward either of the side thermistors. Hold the heat source about 12 inches from the detector in order to avoid damage to the plastic. The detector will reset only after it has had sufficient time to cool and the power source has been momentarily interrupted.

Both smoke and heat detection testing are recommended for verifying system protection capability.

A detector that fails to activate with any of the above tests should first be cleaned as outlined in **MAINTENANCE**. If the detector still fails to activate, return it for repair.

Notify the proper authorities the system is back in operation.

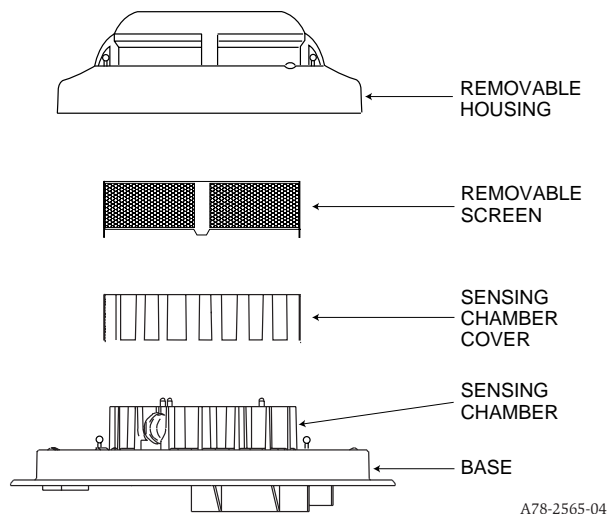
Maintenance

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

NOTE: Before removing the detector cover, note the position of the thermistors. Make sure the thermistors are not bent over when the housing is replaced.

1. Remove the detector housing by gently prying the four housing tabs on the bottom of the base with a small-bladed screwdriver and pull the housing from the base. Use caution to avoid damaging the thermistors.
2. Vacuum the screen carefully without removing it.
3. Remove screen assembly, pulling straight out (please see Figure 5).
4. Remove the sensing chamber cover.
5. Clean the sensing chamber by vacuuming or blowing out dust and particles.
6. Replace the sensing chamber cover, aligning the arrow on the cover top with the arrow on the printed circuit board.
7. Replace the screen by placing the screen assembly over the sensing chamber cover and twisting until it snaps into place.
8. Replace the housing by aligning the three triangular slots on the base with their counterparts on the housing. Gently press the housing until it locks in place. Check to make sure that the thermistors are in the upright position.
9. Reinstall the detector.
10. Notify the proper authorities that the system is back in operation.

Figure 5. Removal of cover and screen for cleaning:



Please refer to insert for the Limitations of Fire Alarm Systems

Smoke detectors shall be replaced after being in service for 10 years. However, any smoke detector, fire alarm equipment, or any component of that system which fails prior to that shall be repaired or replaced as soon as possible. Batteries shall be replaced upon indication of a pre-low battery condition.

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, Returns

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.