



INSTALLATION AND MAINTENANCE INSTRUCTIONS FOR MODEL 2312/24TB

Before installing detectors, please thoroughly read 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.

GENERAL DESCRIPTION:

Model 2312/24TB is a 4-wire combination smoke/heat detector. In addition to photoelectronic smoke detection, two supervised electronic thermistors provide restorable 135°F fixed temperature heat detection. The installation is simplified by the use of an adaptor bracket and a plug-in screw terminal block which can be pre-wired to the system allowing the detector to be easily installed or removed for cleaning. It is designed to provide open area protection, and to be used with UL listed 4-wire control panels. The detector's sensitivity can be tested in place using the MOD400R field sensitivity test module.

The 2312/24TB is listed to UL 268 and is a latching type system detector. When latched in alarm, the detector 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. The detector performs a self-test on its smoke sensing chamber and internal electronics every 40 seconds. If this test fails, the detector stops blinking the status LED in standby, and the LED will remain off. In alarm, the LED will be latched on continuously until the detector is reset.

SPECIFICATIONS:

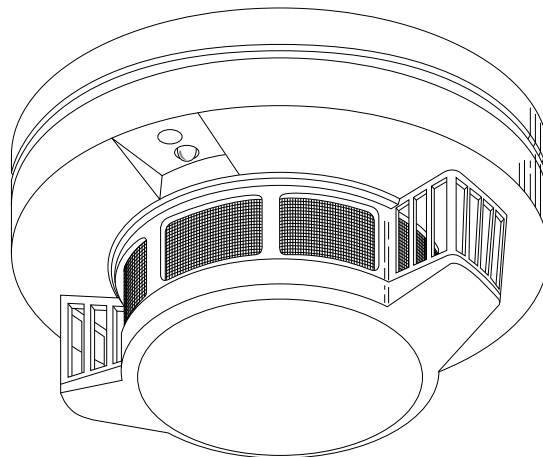
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|------------------------------|---|
| Diameter: | 5.5 inches (14 cm) |
| Height: | 2.5 inches (6.4 cm) |
| Weight: | 0.7 lb (310 gm) |
| Operating Temperature Range: | 0° to +38° C (32° to 100° F) |
| Operating Humidity Range: | 10% to 90% Relative Humidity Non-condensing |
| Latching Alarm: | Reset by momentary power interruption. |
| Test Feature: | Recessed test switch. |
| Maximum Air Velocity: | 3000 Ft./Min. (15 Meters/Sec.). |
| Sensitivity: | Nominal 3%/Ft. |
| Heat Sensor: | 135°F Fixed Temperature Electronic Thermistor |

ELECTRICAL RATINGS:

| | | |
|-------------------------|----------|--|
| System Voltage | nominal: | 12 or 24 VDC |
| | minimum: | 8.5 VDC |
| | maximum: | 35 VDC |
| Maximum Ripple Voltage: | | 30% of nom. Voltage (peak to peak) |
| Standby Current: | | 120 μ A max. |
| Alarm Current: | | 10mA minimum. 50mA maximum. |
| Reset Voltage: | | 0.8 VDC minimum |
| Reset Time: | | 6 Sec. maximum |
| Start-up Time: | | 34 Sec. maximum (After 60 Sec. Reset) |
| EOL relay: | | A77-716B, 12/24 Volt |

ALARM INITIATION CONTACT RATINGS:

| | |
|---|------------------|
| Resistive or inductive load (60% power factor): | |
| Form A: | 2.0A @ 30 VAC/DC |



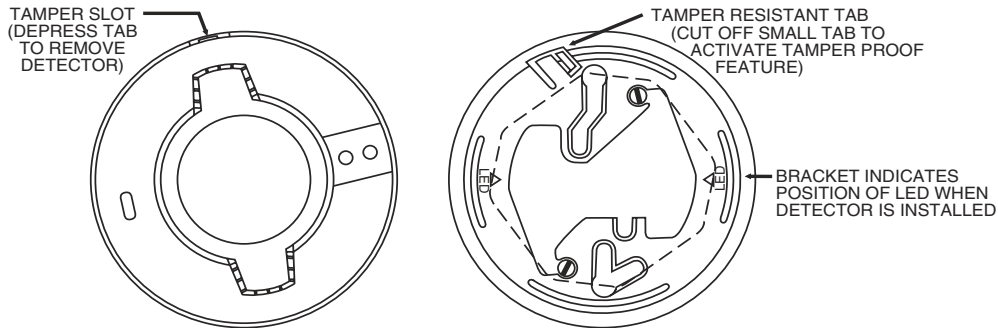
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Figure 1. 2312/24TB Smoke/Heat Detector

MOUNTING:

Each 2312/24TB 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 3-1/2 inch or 4 inch octagonal box, or
3. To a 4 inch square electrical box by using a plaster ring.



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Figure 2. 2312/24TB smoke detector mounting bracket

TAMPER RESISTANCE:

This detector includes a tamper-resistant capability 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 before installing the detector. The tamper resistant tab is on the detector mounting bracket.

To remove a tamper-resistant detector from the bracket, use a pocket screwdriver, or similar tool, to depress the tamper-resistant tab and turn the detector counterclockwise. The tab is accessible through the slot on the mounting bracket.

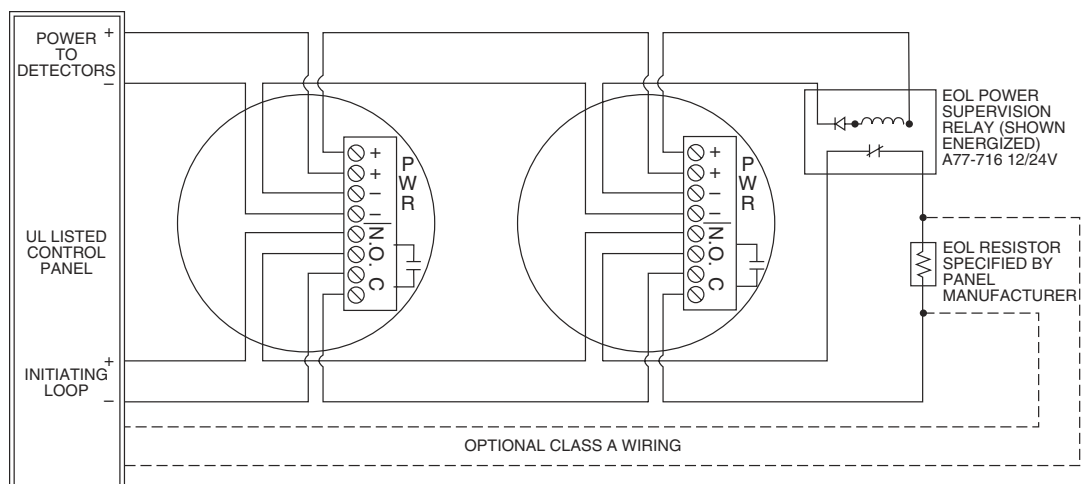
WIRING INSTALLATION GUIDELINES:

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 prevent wiring mistakes. Improper connections can prevent a system from responding properly in the event of a fire.

The screw terminal block will accept 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 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.

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.



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Figure 3. Wiring diagram for 2312/24TB detector

INSTALLATION:

WARNING: REMOVE POWER FROM THE CONTROL UNIT OR INITIATING-DEVICE CIRCUITS BEFORE INSTALLING DETECTORS.

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

CAUTION

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.

TESTING:

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

Detectors must be tested after installation and following periodic maintenance. The 2312/24TB may be tested as follows:

NOTE: 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 the unit is defective (return for repair).

A. TEST SWITCH

1. A recessed 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 such as an allen wrench or small screwdriver.
3. The LED on the detector should light within 5 seconds.

B. TEST MODULE (System Sensor Model No. MOD400R).

The MOD400 or 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.

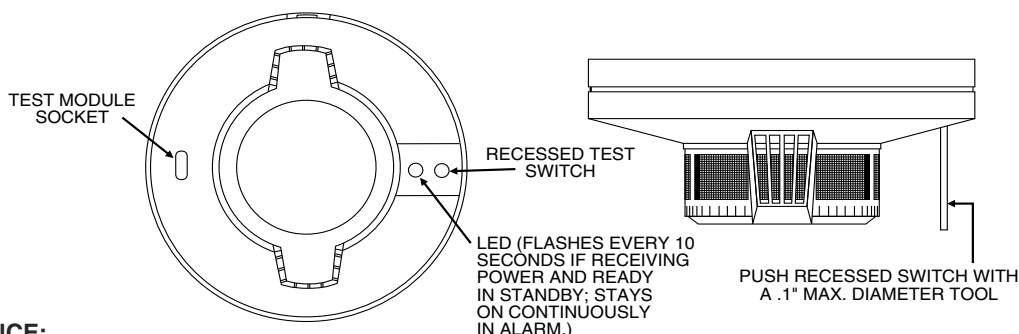
Both smoke and heat detection testing are recommended for verifying system protection capability.

A detector that fails to activate with any of the above tests should first be cleaned as outlined in the Maintenance section which follows. If the detector still fails to activate, it should be returned for repair.

Notify the proper authorities that the system is back on line.

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



MAINTENANCE:

When removing the detector from a system of more than 1 detector per loop, an optional detector bypass plug can be inserted into the

screw terminal block in order to maintain the system's continuity. Order accessory model number J2300TB.

NOTE: Before removing the detector, notify the proper authorities that the smoke detector system is undergoing maintenance and will temporarily be 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 seated and not bent over when the cover is replaced.

1. Remove the detector cover by placing a small-bladed screwdriver in the cover removal slot and twisting it slightly until the cover can be turned counterclockwise for removal.
2. Remove the screen by pulling it straight out. (See Figure 5).
BE CAREFUL NOT TO DAMAGE THE THERMISTORS. (See note above). Vacuum the screen thoroughly.
3. Clean the black vaned chamber piece by vacuuming or blowing out dust and particles.
4. To re-install the screen, rotate the screen on the housing until it drops into the alignment slots. Carefully push the screen onto the base, making sure it fits tightly to the chamber. Replacement screens are available (order part number RS23).
5. Replace the cover by gently rotating it clockwise until it locks in place. **CHECK TO MAKE SURE THE THERMISTORS ARE IN AN UPRIGHT POSITION.**
6. Reinstall the detector into the system, enable system operation, and notify the proper authorities that the system is back on line.

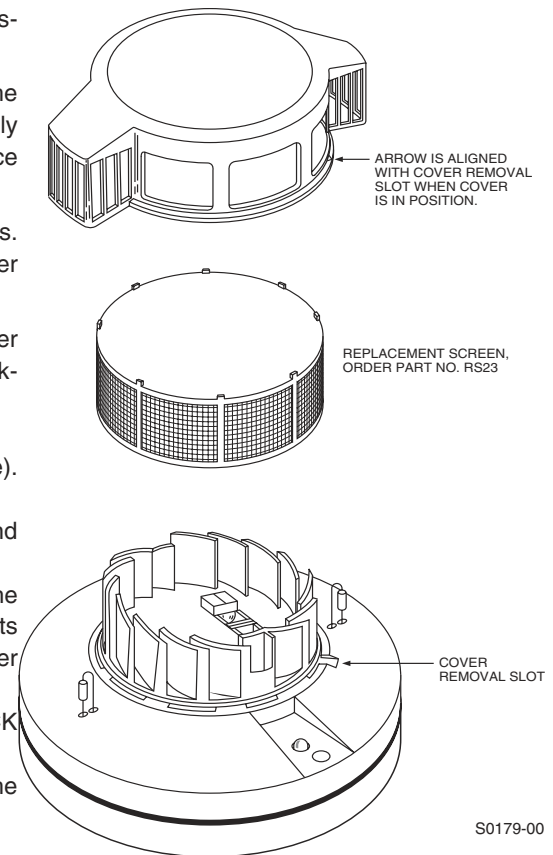


Figure 5. Removal of cover and screen for cleaning.

WARNING **Limitations of 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. Air velocity conditions may fail to alarm due to dilution of smoke densities created by such 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 detectors are made to last over 10 years, any of these parts could fail at any time. Therefore, test your smoke detector system at least semiannually. Clean and take care of your smoke detectors regularly. Taking care of the fire detection system you have installed will measurably reduce your product liability risks.