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

1151EIS Intrinsically-safe Plug-in Ionization Smoke Detector

Specifications

Height:	43 mm (1.7 inches)
Diameter:	101 mm (4.0 inches)
Weight:	110 g (0.25 lb)
Input Voltage:	15 to 28 VDC
Installation Temperature Range:	
U.S. -	32°F to 120°F (0°C to 49°C)
Europe -	-10° C to 60°C
Operating Humidity Range:	10% to 93% Relative Humidity
Intrinsic Safety Rating:	Ex ia IIC T5
(Latching alarm reset by momentary power interruption)	

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

IMPORTANT: This detector should be cleaned at least once a year. If cleaning is performed with non-intrinsically safe equipment, it must be conducted outside the hazardous area.

General Description

Model 1151EIS ionization smoke detectors use state-of-the-art sensing chambers. These detectors are designed to afford open area protection and are for use with compatible two-wire control panels only. Each detector is equipped with two LEDs that provide a local, visual indication of detector status. Remote LED annunciator capability is also included. Once the detector senses a fire, it latches in alarm and remains in this condition until it is reset by a momentary power interruption. The detector can be tested by activating an internal reed switch with a test magnet.

NOTE: Although the 1151EIS is a UL listed smoke-automatic fire detector, UL has not evaluated this product for use in hazardous environments. The detector is FMRC and BASEEFA approved for intrinsic safety.

Installation

NOTE: All wiring must comply with all applicable national codes of practice and regulations.



Disconnect the power to the initiating device before installing the detectors.

1. Detector Installation

- A. Install the base following the base installation instructions.
- B. Position the detector in the base receptacle.
- C. Rotate the detector clockwise until it moves into place.
- D. Continue rotating the detector clockwise until it locks in place.

2. Tamper-Resistance Feature

This detector includes a tamper-resistance 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 resistance tab before installing the detector. The tamper-resistance 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-resistance tab and turn the detector counterclockwise. The tab is accessible through the slot on the mounting bracket.



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 the dust covers from any sensors that were left in place during construction as part of returning the system to service.

Testing

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

IMPORTANT: If testing is done with non-intrinsically safe methods, it should be conducted outside the hazardous area.

Detectors must be tested after installation and following periodic maintenance. Test the detector as follows:

- A. Test Magnet (Model M02-04-01 or M02-09-00)
 1. Position the test magnet against the cover in the location shown in Figure 1.

2. The detector should light both LEDs within 5 seconds, indicating an alarm, and annunciate the panel.

B. Calibrated Sensitivity Test

The MOD400R Test Module is used with a digital or analog voltmeter to test calibrated detector sensitivity as described in the test module manual.

C. Smoke Entry Test

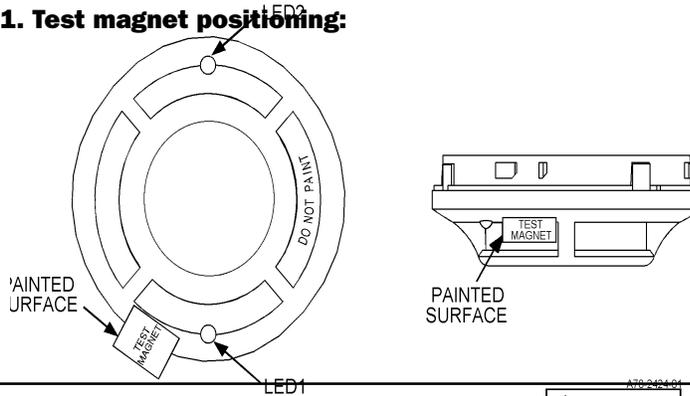
Aerosol generators for smoke entry testing are available from a number of third party manufacturers (e.g., Gemini Scientific). Following the manufacturer’s instructions, apply aerosol until the panel alarms.

Maintenance

Before cleaning, notify the proper authorities that the system is undergoing maintenance and will be temporarily out of service. Disable the system to prevent unwanted alarms.

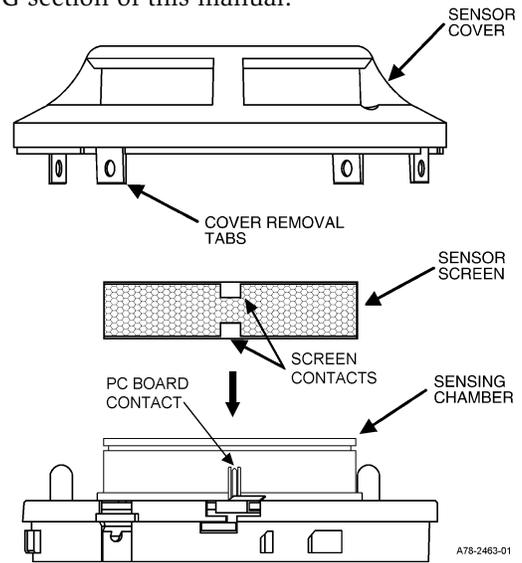
1. Remove the sensor to be cleaned from the system.
2. Remove the sensor cover. Use a small standard screwdriver to release each of the four cover removal tabs that hold the cover in place.

Figure 1. Test magnet positioning:



3. Vacuum the outside of the screen carefully without removing it.
4. Remove the sensor screen. Pull the screen straight away from the sensing chamber until it snaps out of place. Replacement screens are available.
5. Use a vacuum or clean, compressed air to remove dust and debris from the sensing chamber.
6. Reinstall or replace the sensing chamber screen by contact.
7. Reinstall the sensor cover. Use the test module socket and LEDs to align the cover with the sensor. Snap the cover into place.
8. When all sensors have been cleaned, restore power to the system and test the sensor(s) as described in the TESTING section of this manual.

Figure 2:



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.**

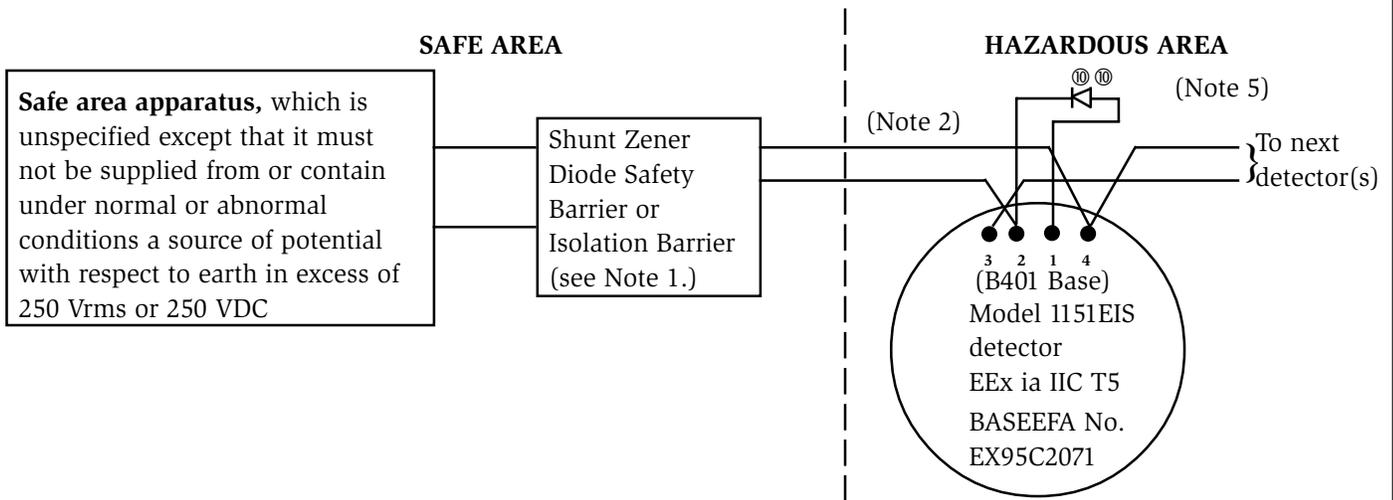
Smoke detectors have sensing limitations, too. Ionization detectors and photoelectric detectors are required to pass fire tests of the flaming and

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.

Typical 1151EIS System Diagram



Terminals 2 and 4 (B401 Base)

Group	Capacitance μF	Inductance mH	OR L/R Ratio μH/OHM
IIC	0.13	4.2	55
IIB	0.39	12.6	165
IIA	1.04	33.6	440

Table 1.

Terminals 2 and 1 (B401 Base)

Group	Capacitance μF	Inductance mH	OR L/R Ratio μH/OHM
IIC	0.04	4.2	55
IIB	0.30	12.6	165
IIA	0.95	33.6	440

Table 2.

Notes:

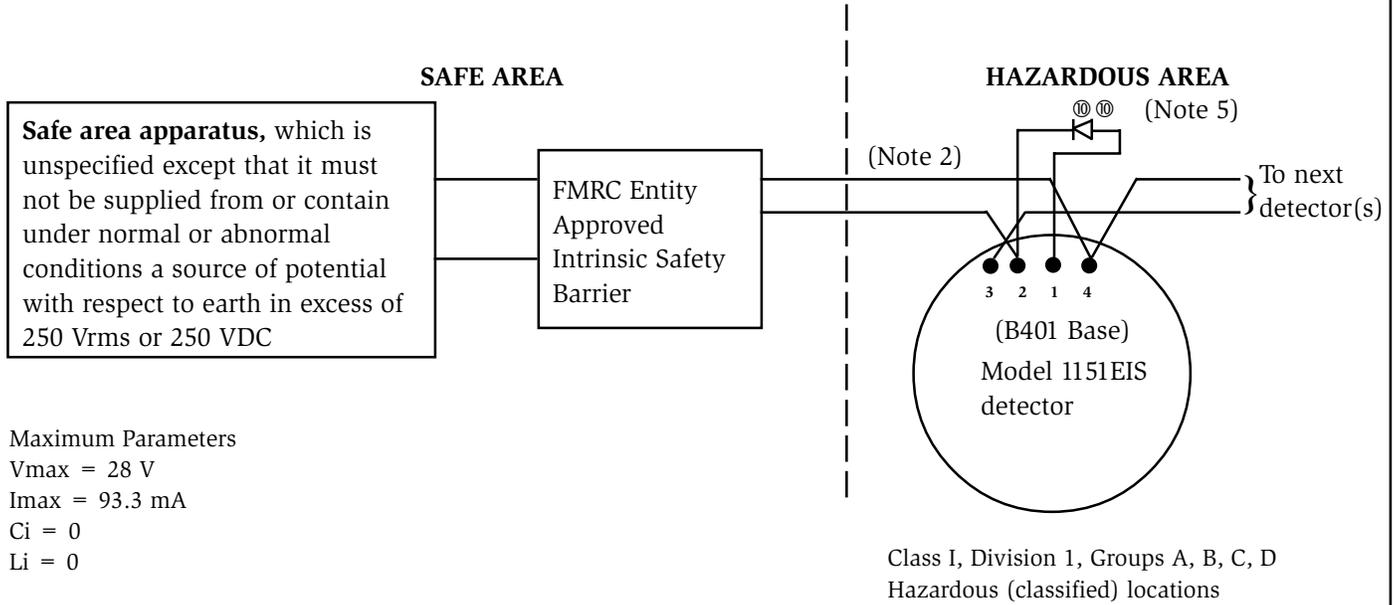
- Any single channel shunt zener diode safety barrier or single channel of a dual channel shunt zener diode safety barrier certified by BASEEFA or any EEC approved certification body to [EEx ia] IIC having the following or lower output parameters:
 $U_z = 28V$; $I_{max: out} = 93.3 mA$; $W_{max: out} = 0.67 W$
 In any safety barrier used, the output current **must** be limited by a resistor "R", such that $I_{max:out} = U_z/R$. Or any of the following isolation barriers may be used:
 MTL : MTL3043 (Ex86B2285), MTL4061 (Ex94C2040), MTL5061 (Ex96D2426)
 Pepperl + Fuchs : KHDO-ICS/Ex151 (Ex88B2331), KHDO-ICS/Ex251 (Ex88B2331), KFDO-CS-Ex151 (Ex88B2331)
- The capacitance and inductance or inductance/resistance (L/R) ratio of the hazardous area cables between the power terminals 2 and 4 (B401 base) must not exceed the values shown in Table 1.
- The installation must comply with the appropriate national installation requirements, e.g. in the U.K. BS5345:Part 4:1977.
- The electrical circuit in the hazardous area must be capable of withstanding an A.C. test voltage of 500 VRMS to earth or frame of the apparatus for one minute. This note does not apply when using an isolation barrier.
- An external light emitting diode (LED) may be fitted to terminals 2 and 1 (B401 base). The capacitance and inductance or inductance/resistance (L/R) ratio of the hazardous area cables between 2 and 1 **must not** exceed the values shown in Table 2. The surface area of the LED must lie between 20mm² and 10cm². The LED and its terminations must be afforded a degree of protection of at least IP20, and be segregated from other circuits and conductors as defined in clause 5 of EN50020: 1977.
- The zone wiring of the detector bases should be checked before the detector heads are installed. To make this possible, this base contains a special spring-type shorting jumper. After a detector base is properly wired and mounted to an electrical box, make sure that the shorting spring is in contact with terminal 3. This temporary connection permits the wiring of the loop to be checked for continuity before installation of the detector heads. The shorting spring in the base automatically disengages when the detector head is removed from the base. DO NOT remove the shorting spring since it reengages as the detector head is turned in the base, completing the circuit.

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Please refer to control panel installation instructions for specific barrier/control panel compatibility information.

**FMRC Approved System Diagram
INTEGRATION OF THE 1151EIS DETECTOR INTO A SYSTEM**



Maximum Parameters

V_{max} = 28 V
 I_{max} = 93.3 mA
 C_i = 0
 L_i = 0

Notes:

1. Any single channel shunt zener diode safety barrier or single channel of a dual channel shunt zener diode safety barrier certified by FMRC.
2. The entity concept allows interconnection of intrinsically safe apparatus to associated apparatus not specifically examined in such combination. The criteria for interconnection is the voltage (V_{max}) and current (I_{max}) that an intrinsically safe apparatus can receive and remain intrinsically safe, considering faults, must be equal to or greater than the voltage (V_{oc} or V_z) and current (I_{sc} or I_z) levels which can be delivered by the associated apparatus, considering faults and applicable factors. In addition, the maximum unprotected capacitance (C_i) and inductance (L_i) of the intrinsically safe apparatus, including interconnecting wiring, must be equal to or less than the capacitance and inductance that can be safely connected to associated apparatus.
3. The installation shall be in accordance with NEC NASI/NFPA 70 and ANSI/ISA RP126.
4. Associated apparatus must be installed in accordance with manufacturers' instructions.
5. An external light emitting diode (LED) should be mounted in an enclosure conforming to the requirements set forth in ANSI/ISA Standard S82.01, S82.02 and S82.03.
6. No revisions without prior FMRC authorization.
7. The zone wiring of the detector bases should be checked before the detector heads are installed. To make this possible, this base contains a special spring-type shorting jumper. After a detector base is properly wired and mounted to an electrical box, make sure that the shorting spring is in contact with terminal 3. This temporary connection permits the wiring of the loop to be checked for continuity before installation of the detector heads. The shorting spring in the base automatically disengages when the detector head is removed from the base. DO NOT remove the shorting spring since it reengages as the detector head is turned in the base, completing the circuit.

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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 Depart-

ment, 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.