

# ORION™ XT Detector

## High Sensitivity Smoke Detector (HSSD®)

Effective: November 2007  
K-77-150

### FEATURES

- *Air Sampling Smoke Detector for Early Warning Applications*
- *Thousands of Times More Sensitive than Conventional Smoke Detectors*
- *Programmable Sensitivity Range of 0.00075%/ft to 0.3%/ft Obscuration*
- *Laser Particle-Counting Technology*
- *Uses Particle Size Discrimination—No Filter Required*
- *Up To 20,000 Sq. Ft. of Coverage*
- *Well Suited for High Air-Flow Environments*
- *Two Programmable Alarm Levels and Two Programmable Pre-Alarm Levels*
- *Three Color Status LED*
- *Optional LCD Display Module*
- *Configuration and History Data Stored in Non-Volatile Memory*
- *History Buffer Stores Up to 28 Days of Smoke History*

- *Advanced Signal Processing Features*
- *Full Configuration Using ORION™ Configuration Software*
- *Modular design for fast and easy servicing*

### NETWORKING OPTIONS

- *Use with Optional Intelligent Interface Module for Networked Systems of up to 127 Detectors*
- *Use with Optional PALM for PEGAsys™ and ARIES™ control units*

### LISTINGS AND APPROVALS

- *UL 268 Listed for Open Area Protection and Special Applications*
- *UL 268A Listed for Duct Detection*
- *FM Approved*
- *ULC Listed for Open Area Protection and Special Applications*
- *CSFM Listed*
- *NYC MEA Approved*

### DESCRIPTION

The ORION™ XT High Sensitivity Smoke Detector consists of a laser particle counter detector head, a high-efficiency fan module and a termination board. One ORION XT Detector, when connected to a pipe network designed using “SNIFF” Version 3 software, provides coverage for an area up to 20,000 sq. ft.

The ORION XT Detector (with a dynamic sensitivity range of 0.00075% to 0.3%/ft) is designed for early warning smoke detection applications such as telecommunications facilities, data processing facilities, museums and warehouses.

### WHY HIGH SENSITIVITY SMOKE DETECTION?

The ORION XT Detector’s laser particle counter detects particles of combustion at levels of obscuration as low as 0.0015%/ft. This is sensitive enough to detect invisible products of combustion such as the outgassing of plasticizers from overheating PVC wire insulation and electrical components, or small changes in the ambient level of obscuration during the incipient stage of a fire.

When a combustible material reaches its ignition temperature, the combustion becomes self-sustaining and is called a fire. At temperatures much below the ignition temperature, chemical reactions generate airborne particles. This is typically called the incipient stage of a fire and is followed by visible smoke, flame and finally an intense heat stage. Detection during the incipient stage allows time for corrective action, possibly preventing an escalation of the fire condition, and thus minimizing fire damage.



Figure 1. ORION XT Detector with Optional Display Module



Figure 2. ORION XT Detector

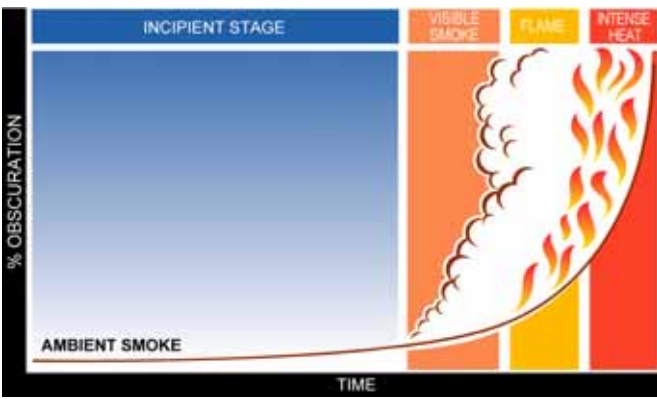


Figure 3. ORION XT Detects Ambient Smoke in the Incipient Stage of Fire

**PARTICLE SIZE**

**DISCRIMINATION = NO FILTER!**

The ORION XT Detector uses a high-efficiency centrifugal fan to draw air continuously from the protected area, into a piping network and through the detector head, without filtration or flow restriction. As a result, filter maintenance and loss of sensitivity due to filter clogging is eliminated.

Smoke concentration is determined by counting the number of discrete particles of a specific size in a given time period. The Detector's particle size discrimination feature allows only a specific range of particle sizes (between 0.01 and 10 microns) to be measured and counted as products of combustion. Anything above or below this range is generally ignored and does not contribute to smoke signal calculations. This discrimination band corresponds to the center of the range of all particles of combustion. Dust particles, which are typically larger than 10 microns, are ignored.

**AIR SAMPLING PIPE NETWORK**

The air sampling pipe network is a system of pipes extended into the protected area with strategically placed sampling holes. The UL Listed/FM Approved "SNIFF" Version 3 computer program is used to dynamically balance the pipe network. The "SNIFF" program allows greater flexibility in pipe configuration and balances the pipe network to insure equal sensitivity at each sampling hole. Each sample hole may be considered an equivalent spot-type detector with a maximum coverage of 900 sq. ft. to provide UL Listed Open Area Protection (see datasheet 77.153).

The ORION XT product line offers an array of air sampling network accessories such as a sampling point, capillary tube rolls, sampling point, port and pipe labels.



Figure 4. Sampling Point with Capillary Tube

**FEATURES**

**DISPLAY OPTIONS:**

The ORION XT Detector has two display options: a status LED faceplate or a Display Module. The status LED faceplate is a plastic molded insert with a tri-color LED that indicates an Alarm, Pre-Alarm or Trouble condition. The standard configuration of an ORION XT Detector has an installed status LED faceplate. The LED reports the following conditions:

CONTINUOUS GREEN.....	NORMAL
FLASHING GREEN.....	AUTO-SETUP™
CONTINUOUS YELLOW.....	TROUBLE/ISO-LATED
FLASHING RED.....	PRE-ALARM
CONTINUOUS RED.....	ALARM

For applications where a user interface at the Detector is necessary, Kidde offers an optional Display Module with a backlit LCD screen. The Display Module allows the user to browse through more detailed information such as protected area smoke levels, sampling pipe airflow rate and selected configuration settings. The optional display module also allows limited detector control functions such as reset, test and isolate. The Display Module can be integrated into the ORION XT Detector or externally mounted away from the Detector (see datasheet 77.151).

**FIRE ALARM PANEL INTERFACE:**

The ORION XT Detector was designed with the flexibility to interface with any fire alarm control panel. There are four different configurations to choose from depending on the type of control panel and the number of Detectors in the system.

The Intelligent Interface Module (IIM) is designed to interface with a large ORION XT Detector to an ARIES control panel. The ARIES compatible IIM is mounted in a backbox located in proximity of the panel enclosure. Up to 127 ORION XT Detectors can be networked together with an IIM. A computer running ORION Configuration Software (OCS) can communicate with the IIM, either with a local computer or from a remote computer using a modem. This allows all networked ORION XT Detectors to be monitored and configured from a central location and saves on installation and maintenance costs (see data sheet 77.157).

For smaller networks connected to a PEGAsys or ARIES control panel, the ORION XT Detector can be connected to the panel's Signaling Line Circuit (SLC) using an PEGAsys Addressable Loop Module (PALM). The PALM is a circuit board that plugs into an ORION XT Detector. With a PALM, the ORION XT Detector operates as one of up to 255 SmartOne® devices on the addressable loop (see datasheet 77.152).

The ORION XT Detector can also interface to other fire alarm control panels by using relay contacts inside the Detector. Each ORION XT Detector is equipped with six relays (Pre-Alarm 1, Pre-Alarm 2, Alarm 1, Alarm 2, Trouble, and Isolate) which allows the Detector to directly interface with the control panel.

Detectors that interface to a fire alarm control panel with relays can also be networked together with an IIM in the stand alone module configuration. This allows up to 127 ORION XT Detectors to be monitored and configured from a central location.

**CONFIGURATION:**

The ORION XT Detector is configured with ORION Configuration Software (OCS) Version 3. To configure the Detector, a computer running OCS software is connected via a programming cable to the RS-232 jack located on the side of the Detector. OCS provides the ability to monitor, configure and download history from the Detector. The advanced signal processing software features of the Detector allow the response of the detector head to be tailored to the environment it is installed in. This provides the most sensitive detection with a minimum of unwanted alarms (see datasheet 77.153).

- Two Pre-Alarm and Two Alarm Levels – Programmable in increments of 5% of the Detector's selected output. Alarm Level 2 and Pre-Alarm Level 2 are optional.
- Day/Night Alarms – A second set of programmed alarm levels is available for the night period which allows the Detector's response to be more sensitive during the day.
- Alarm Delays – Programmable from 0 to 60 seconds for each alarm level. The delays can be used to eliminate unwanted alarms caused by transient conditions.
- Alarm Latching – An option which allows alarm conditions to remain latched until reset, or to automatically reset after a programmable delay of 0 to 60 minutes.
- Smoke Signal Averaging – An option that averages the smoke level over a programmable 2, 4, or 8 second period. This may be used to eliminate spikes in the smoke level caused by transient smoke.

**AUTO-SETUP™ FEATURES:**

Automatically sets the ORION XT Detector's optimal alarm sensitivity threshold at the time of installation. The

Auto-Setup learning time period can be set for fifteen minutes to two weeks.

**HISTORY REPORTING FEATURES:**

- Smoke Level History – A powerful diagnostic feature of the Detector. Up to four weeks of date and time stamped smoke history (40,320 data collection points) may be stored in the Detector. History sampling rate is programmable from 1 to 60 seconds. Using OCS software, this history can be retrieved and graphically displayed, printed or stored to disk.
- Event History – Stores up to 128 events such as alarm or trouble activations, configuration changes or operator actions. Using OCS software, this history can be retrieved and displayed, printed or stored to disk. This feature aids in the analysis of trouble or alarm incidents.

**EASE OF INSTALLATION AND MAINTENANCE:**

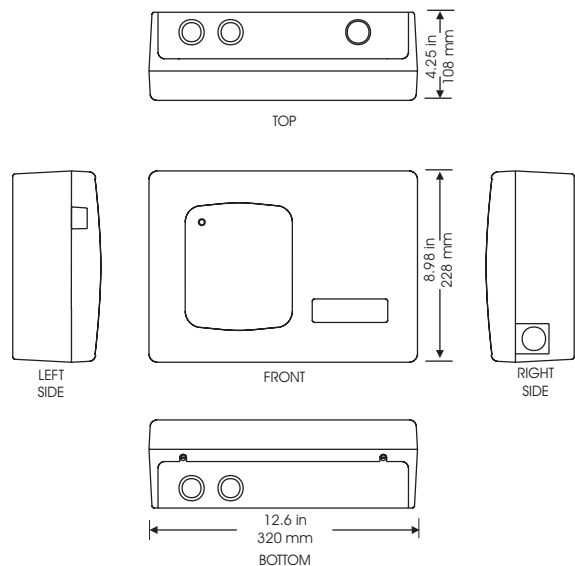
The ORION XT Detector is designed for ease of installation and maintenance. The Detector's main components can be serviced without removing the Detector's enclosure, conduit, inlet or exhaust pipe. The Detector can be surface-mounted by four #10 mounting holes in the back of the Detector or by an optional flush mount trim ring.

**POWER SUPPLY OPTIONS:**

The ORION XT Detector has four different power supply configurations. The Self-Contained Power Supply is designed to provide 24 Vdc power to a Detector from 120 or 240 Vac (see datasheet 77.155). For systems with multiple ORION XT Detectors, a Multi-Zone Power Supply can provide 24 Vdc power for up to eight Detectors from 120 or 240 Vac (see datasheet 77.154). The Multi-Zone Power Supply is also available with a 48 Vdc to 24 Vdc power converter.

Detectors can also have 24 Vdc power supplied by the fire alarm control panel or any listed or approved power supply.

**DIMENSIONS**



## TECHNICAL SPECIFICATIONS

DESCRIPTION	SPECIFICATION
Detector Sensitivity Range	0.00075%/ft. to 0.3%/ft. (0.0025%/m to 1%/m)
Maximum Coverage	20,000 sq. ft. (2000 sq. m.)
Input Voltage	24 Vdc nominal (18 to 30 Vdc)
Input Current	310mA standby, 342 mA alarm
Operating Temperature	32° to 120°F (0° to 49° C)
Operating Humidity	10 to 93% RH non-condensing
Enclosure Rating	NEMA-1 (IP-31)
Finish	Light Grey Polycarbonate with Painted Steel Backbox
Dimensions	12.6" W x 8.98" H x 4.25" D (32.0 cm W x 22.8 cm H x 10.8 cm D)
Alarm & Pre-Alarm Relays	Four relays; each has normally open contacts, 2 Amp @ 28 Vdc, resistive
Trouble Relay	Form C, 2 Amp @ 28 Vdc, resistive (energized on power-up)
Isolate Relay	Optional: Form C, 2 Amp @ 28 Vdc, resistive
Electrical Connections	18 to 12 AWG (0.75 to 2.5mm <sup>2</sup> ) wiring to removable terminal blocks
Service Port Connection	RS232 communications with modular RJ12 jack. Requires ORION Configuration Software Version 3
Network Connection	Optional: RS485 communications, 1 pair in/1 pair out, 7 position address dip switch
Remote Display Connection	Optional: 1 pair RS485 communications, 1 pair power
Power Supply Supervision input	Optional: Monitors normally closed contact on power supply
Air Inlet Port	3/4" NPT threaded
Exhaust Port	Side exhaust, optional rear exhaust with supplied adapter, optional 1" NPT threaded exhaust pipe connection with supplied adapter
Weight	8.0 lb (3.6 kg)

## ORDERING INFORMATION

COMPONENT	PART NUMBER
ORION XT Detector, 0.00075 - 0.3%/ft (0.0025 - 1%/m)	297101
Flush Mount Trim Ring for Detector	297111
Sampling Point Kit, pkg. of 25: Consists of (25) each: Sampling Point, Male 1/2" NPT Capillary Tube Adapter, Female 1/2" NPT Capillary Tube Adapter, Label for Sample Point	297109
Capillary Tube, 3/8" - 250 ft Roll	297110
Sampling Point Label - Roll of 100	297021
Sampling Port Label - Roll of 100	297022
Sampling Pipe Label - Roll of 100	297023
ORION XT Installation, Operation and Maintenance Manual	77.100
ORION Configuration Software	297120
RS-232 Programming Cable Assembly	74-10016-003



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