Simplex

UL Listed, ULC Listed, CSFM Approved***

Datasheet

TrueAlarm® Analog Sensing

Air Aspiration Addressable Duct Smoke Detection with TrueAlarm Photoelectric Sensors

Features

Air aspiration duct smoke detection system provides remote sensor location for ducts with difficult service access, see note:

- Available as either a single or dual-inlet detection system; includes a TrueAlarm® photoelectric sensor and addressable base for each inlet.
- For use with Simplex addressable fire alarm control units (FACUs) supporting IDNet™ or MAPNET II® communications.
- Supports remote housing up to 82 ft (25 m) with 1.05 in. (26.7 mm) O.D. rigid pipe.
- Supports remote housing up to 50 ft (15 m) with 3/4 in. (19 mm) O.D. flexible tubing.

Note: Smoke detection in air ducts indicates the presence of smoke in the duct. Smoke detection in air ducts does not replace smoke detection requirements for open areas or other non-duct applications.

Microprocessor controlled aspiration system provides:

- Adjustable air speed settings for easy setup.
- Monitoring of airflow from the HVAC ducts.
- Integral indicators located under the front cover for convenient programming and status indications.
- Easily accessible air filter element.

SKU 4098-XAD-110:

- Single-inlet housing with one smoke sensor.
- Duct probe kit.

SKU 4098-XAD-210:

- Dual-inlet housing with two smoke sensors, one for each inlet.
- Duct probe kit.
- Compatibility with ducts wider than 90 in. (2286 mm).

General features:

- UL listed to Standard 268A
- ULC listed to Standard S529
- Requires separate 24 VDC power.
- Duct sensor housing with supervised output for multiple remote relays.
- Relay output control through programming at the FACU that you can activate or deactivate manually in response to a separate alarm or other input, or that you can bypass for unobtrusive system testing.

Testing functions, on the interface board accessed by removing the cover:

- Remote functional smoke testing.
- Magnetic testing feature for alarm initiation at housing.

Sampling tubes, ordered separately:

- Available in multiple lengths to match the duct size.

Figure 1: 4098-XAD-110 Single-inlet Duct Sensor Housing



Figure 2: 4098-XAD-210 Dual-inlet Duct Sensor Housing



In Figure 1 and Figure 2 the duct probe kit is not shown.

Remote module options, ordered separately:

- Remote red status/alarm LED (2098-9808)
- Remote test station with LED (2098-9806)
- 4098-9843 remote relays

Introduction

Remotely located smoke sensors. For smoke detection in HVAC ducts or other area locations that are inconvenient or difficult to access, these smoke sensing systems mount the sensor remotely and use traditional air aspiration techniques to sample the air.

TrueAlarm Smoke Sensing. Mounted in the smoke sensor housings is a Simplex TrueAlarm photoelectric smoke sensor that samples the air and reports its analog monitoring information to the FACU for processing. This provides the TrueAlarm smoke sensing feature set complete with environmental compensation including Dirty, Excessively Dirty and Almost Dirty trouble detection.

Operation

Air Aspiration. Air draws from the ducts through sampling holes in duct-mounted sampling tubes. Sampled air then filters before analysis by the TrueAlarm® sensor. Single or dual sensor versions are available.

Airflow Supervision. A high performance aspirator with programmable flow and monitoring circuitry provides the airflow. The airflow displays on a ten element bar graph under the front cover that can be adjusted for high and low flow thresholds. Flow failure reports as a trouble to the FACU.

Solution for humid environments. An optional water trap with a ball valve can be ordered. The water from condensation that accumulates in a clear water trap is clearly visible and can be drained with a ball valve well before nuisance alarms or troubles develop due to moisture.

Minimal configuration (programming) requirements. Function buttons to setup the Simplex XAD are located on the housing. The XAD requires minimal settings. The aspirator speed and air flow monitoring are configured during the commissioning phase without the use of special tools. Unlike other aspirating systems, no special engineering software is required to design the Simplex XAD detection system.

Replaceable air filter element. The Simplex XAD includes a replaceable air inlet filter. Change the filter element every 12 months or as necessary, such as when the dust particles impede airflow. The frequency of filter replacement depends on environmental conditions.

Remote Test Capability You can test the XAD at the remote location where it is mounted. A convenient test port is located in the inlet tubes so that a functional test that requires smoke or simulated smoke to enter the detection chamber can be initiated.

* For open area applications, 4098-XAD does not meet the requirements of 7th edition of UL 268. ** These products have been approved by the California State Fire Marshal (CSFM) pursuant to Section 13144.1 of the California Health and Safety Code. See CSFM Listing 3240-0026.0367 for allowable values and/or conditions concerning material presented in this document. It is subject to re-examination, revision, and possible cancellation. Additional listings may be applicable; contact your local Simplex product supplier for the latest status.

TrueAlarm sensor operation

Digital Communication of Analog Sensing. Analog information from the sensor transmits to the control unit for analysis. The system stores and tracks sensor input as an average value, and uses this information as a reference to detect an alarm or abnormal condition.

Intelligent Data Evaluation. The system monitors each photoelectric sensor's average value and compensates for environmental factors such as dust, dirt, or component aging. This provides an accurate reference for evaluating new activity and reduces the probability of false alarms.

Control Unit Selection. The system stores peak activity for each sensor to evaluate specific locations. The alarm set point for each sensor is determined at the control unit, selectable as the individual application requires.

Sensor Status LED. Each sensor's red status LED, located on the electrical interface board, accessed by removing the cover, pulses to indicate communications with the unit. If the control unit determines that a sensor is in alarm, or that it is dirty or has some other type of trouble, the details are annunciated at the control unit and that sensor housing's status LED turns on steadily. During a system alarm, any LEDs that indicate a trouble pulses to identify an alarmed sensor.

Remote Status/Alarm LEDs track the operation of the duct sensor housing LED. See Figure 3 and Figure 4.

Figure 3: 2098-9808 Remote Status/Alarm Indicator

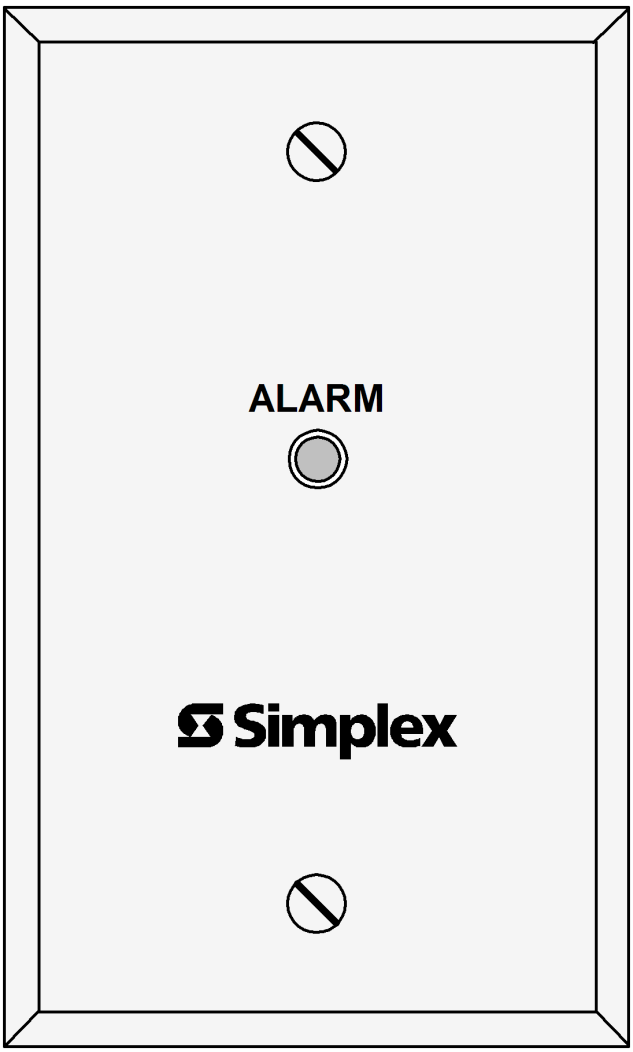
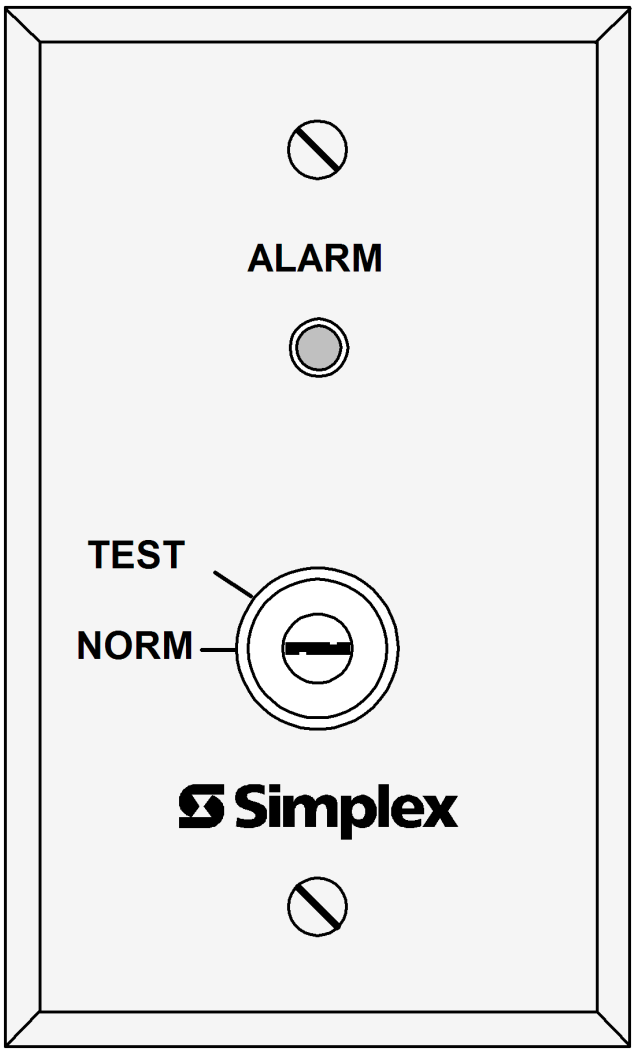


Figure 4: 2098-9806 Test Station



Fire alarm control unit features

- Individual smoke sensitivity selection
- Sensitivity monitoring that meets NFPA 72 and CAN/ULC-S536 and S537 sensitivity testing requirements
- Peak value logging allows accurate analysis for sensitivity selection
- Automatic individual sensor calibration check every 60 seconds to verify sensor integrity
- Automatic environmental compensation
- Smoke sensitivity displays in percent for each foot
- Displays and prints easy-to-understand sensor information
- 4098-9843 Remote relay is under unit control for ON, OFF, or override

Product selection

Table 1: Single-inlet Duct Detection Application

SKU	Description
4098-XAD-110	Single-inlet sensor housing with single-duct probe kit, LF42241, see Figure 5 for included equipment
Sampling Tubes	See Table 2
LF-42250	25 ft (7.5 m) Flexible single-core tubing. See note.
LF-42249	50 ft (15m) Flexible single-core tubing. See note.
LF-42282	Single-inlet water trap kit. This is optional and is recommended for humid environments.
Note: Select one pair of single-core flex tubes either 25 ft or 50 ft length.	

Table 2: Sampling Tubes selection chart, ordered separately for each duct width, select one

Overall duct width up to	Tube kit required	Description
27 in. (686 mm)	LF-42285	Includes one 18 in. (457 mm) Inlet Sampling Tube, two holes, and one 8 in. (203 mm) Exhaust Tube, two holes.
54 in. (1372 mm)	LF-42286	Includes one 36 in. (914 mm) Inlet Sampling Tube, three holes, and one 8 in. (203 mm) Exhaust Tube, three holes.
90 in. (2286 mm)	LF-42287	Includes one 60 in. (1524 mm) Inlet Sampling Tube, four holes, and one 8 in. (203 mm) Exhaust Tube, four holes.

Table 3: Dual-inlet Duct Detection Application

SKU	Description
4098-XAD-210	Dual-inlet sensor housing with dual-duct probe kit, LF42243, see Figure 6 for included equipment
Sampling Tubes	See Table 4
LF-42250	25 ft (7.5 m) Flexible single-core tubing. See note.
LF-42249	50 ft (15m) Flexible single-core tubing. See note.
LF-42283	Dual-inlet water trap kit. This is optional and is recommended for humid environments.
Note: Dual-inlet Duct detection requires three single core flex tubes; select either 25 ft or 50 ft length.	

Table 4: Sampling Tubes selection chart, ordered separately for each duct width, select one

Overall duct width up to	Tube kit required	Description
27 in. (686 mm)	LF-42288	Includes two 18 in. (457 mm) Inlet Sampling Tubes, two holes, and one 8 in. (203 mm) Exhaust Tube, two holes.
54 in. (1372 mm)	LF-42289	Includes two 36 in. (914 mm) Inlet Sampling Tubes, three holes, and one 8 in. (203 mm) Exhaust Tube, three holes.
90 in. (2286 mm)	LF-42290	Includes two 60 in. (1524 mm) Inlet Sampling Tubes, four holes, and one 8 in. (203 mm) Exhaust Tube, four holes.

Note: Dual-inlet Duct Sensor housing SKU 4098-XAD-210 is recommended for ducts wider than 90 in. (2286 mm), see System installation reference, or fabricate sampling tubes in the field according to following specification: Sampling tube outside diameter: 3/4 in (19 mm); inside diameter: 1/2 in. (12.7 mm); Hole diameter: 1/8 in (3.175 mm); Number of holes: 1 for each ft; the inlet sampling tube and exhaust tube must have same number of holes. Refer to the latest version of 4098-XAD-200/210 Product Guide document number 18576 for further installation details.

Table 5: Accessories

SKU	Description
02-FL53	Replacement air filter package of ten model 80-0020-0 filters
LF-42241	Single-inlet duct probe kit that includes sampling tube mounting plate, compression fittings, adapters, elbows, and reducers. This kit is included with 4098-XAD-110.
LF-42243	Dual-inlet duct probe kit that includes sampling tube mounting plates, compression fittings, adapters, elbows, and reducers. This kit is included with 4098-XAD-210.

Table 6: Remote LED Indicator and Test Station, select one if required, ordered separately

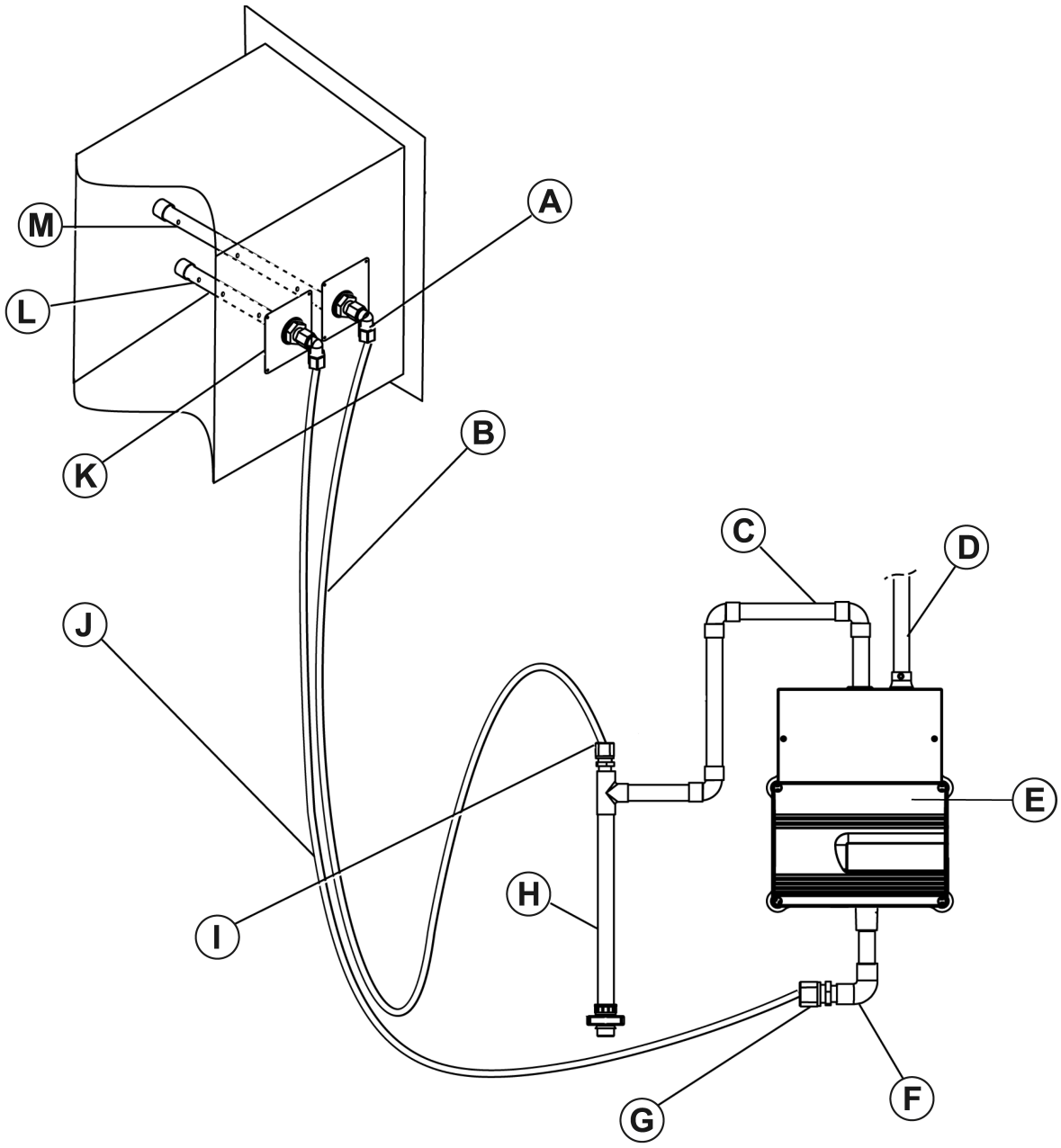
SKU	Description
2098-9808	Red LED status indicator on single-gang stainless steel plate.
2098-9806	Test station with key switch and red LED status indicator, on single-gang stainless steel plate; turning the switch to TEST initiates alarm for system testing.

Table 7: Epoxy Encapsulated Remote Relay and End-of-Line Resistor, ordered separately

SKU	Description
4098-9843	Relay; single Form C, 7 A at 120 VAC; must be ordered separately; wiring is 18 AWG (0.82 mm²) color coded wire leads; connect up to 15 relays; locate relays within 3 ft (1 m) of device being controlled as in NFPA72
4081-9008	End-of-Line Resistor Harness; 10K Ω, 1/2 W; ref. 733-894; required to supervise remote relay coil connection; locate at last relay location.

System installation reference

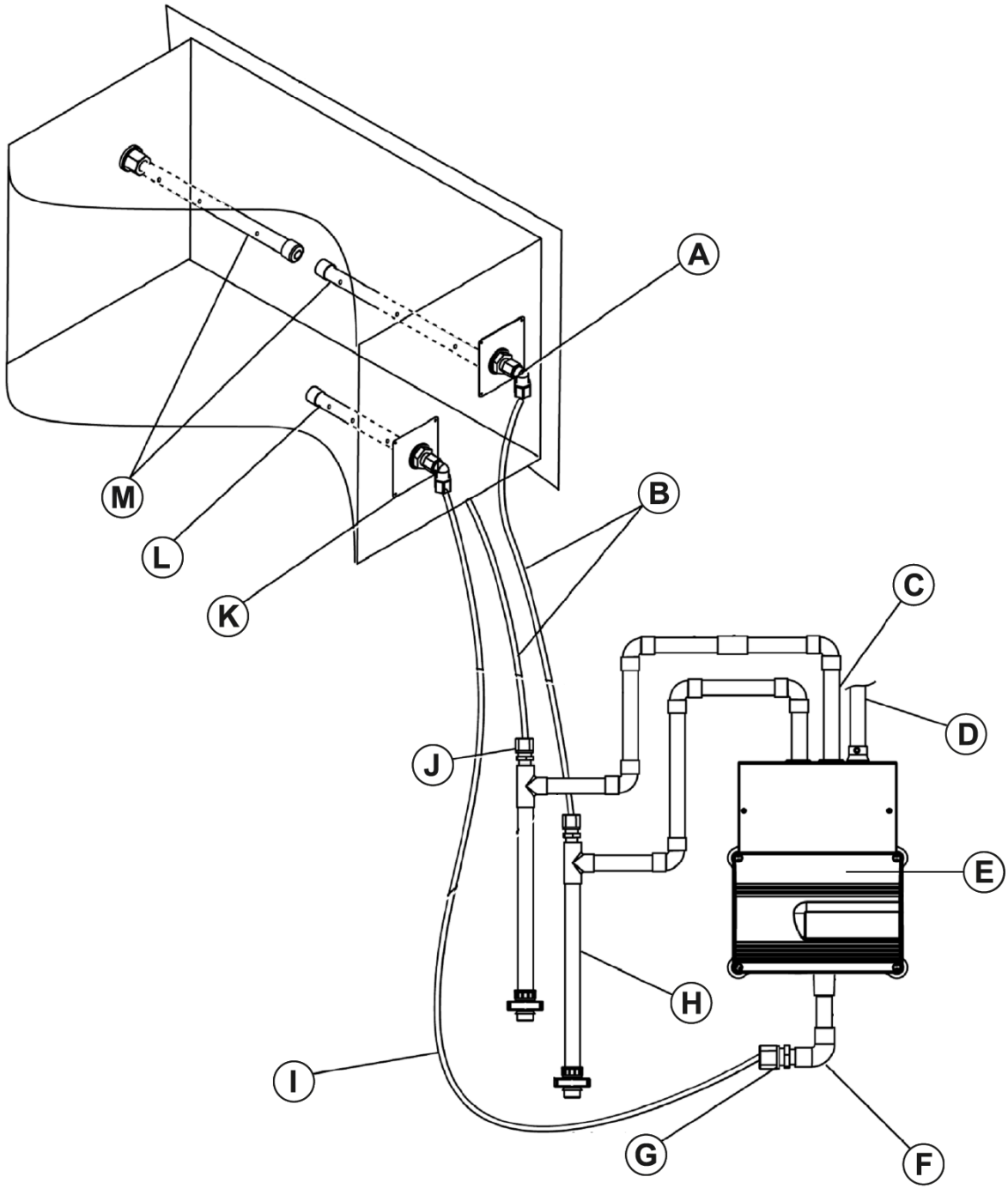
Figure 5: Typical single-inlet duct detection



Callout	Description	Callout	Description
A	Duct probe mounting plate and elbow connector. See note.	H	Water trap, optional
B	Flexible tubing, ordered separately	I	Adapter. See note.
C	Rigid tubing, optional.	J	Flexible tubing, ordered separately
D	Electrical conduit, supplied separately	K	Duct probe mounting plate and elbow connector. See note.
E	Sensor housing	L	Exhaust tube, ordered separately
F	Exhaust bend. See note.	M	Duct sampling tube, ordered separately for each system requirements
G	Adapter. See note.		

Note: Items included with the duct probe kit.

Figure 6: Typical Dual-inlet Duct Detection, for ducts greater than 90 in. width



Callout	Description	Callout	Description
A	Duct probe mounting plate and elbow connector. See note.	H	Water trap, optional
B	Flexible tubing, ordered separately	I	Flexible tubing, ordered separately
C	Rigid tubing, optional	J	Adapter. See note.
D	Electrical conduit, supplied separately	K	Duct probe mounting plate and elbow connector. See note.
E	Sensor housing	L	Exhaust tube, ordered separately
F	Exhaust bend. See note.	M	Duct sampling tubes, ordered separately for each system requirements
G	Adapter. See note.		

Note: Items included with the duct probe kit.

4098-XAD Open Area Detection Application

Open Area Detection. The 4098-XAD is also suitable for use in other areas where the use of point type detectors is not always practical. Typical applications are for prison cells in correctional facilities, transformer vaults, cable tunnels, MRI rooms and for detection at the top of elevator shafts. Refer to the latest version of 4098-XAD Product Guides, document number 18379 for 4098-XAD-100/110 and document number 18576 for 4098-XAD-200/210, for further application details.

Note: For open area applications, 4098-XAD does not meet the requirements of 7th edition of UL 268.

SKU 4098-XAD-100:

- One smoke sensor, supports up to 164 ft (49.9872 m) of pipe, with maximum two sampling holes for each inlet.
- Provides area coverage of up to 1800 square feet.

SKU 4098-XAD-200:

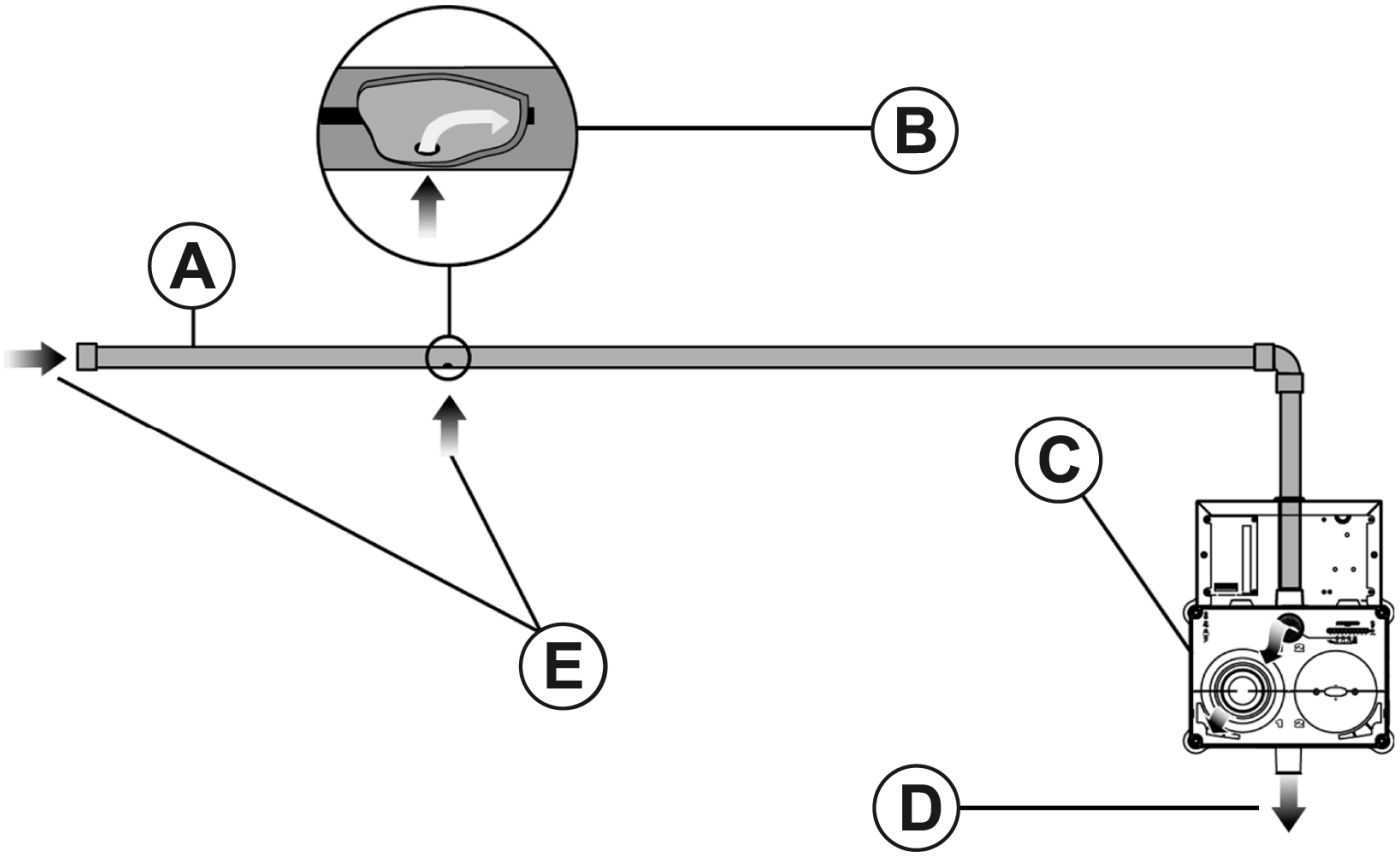
- Two smoke sensors, one for each zone/run, up to 82 ft (24.9936 m) of pipe on each run, with maximum two sampling holes for each inlet.
- Provides area coverage of up to 3600 square feet.

Product selection

Table 8: Open Area Application

SKU	Description
4098-XAD-100	Single-inlet sensor housing only, sampling pipe is ordered separately. For open area applications, this item does not meet the requirements of 7th edition of UL 268.
4098-XAD-200	Dual-inlet sensor housing only, sampling pipe is ordered separately. For open area applications, this item does not meet the requirements of 7th edition of UL 268.

Figure 7: Typical open area detection



Callout	Description
A	Sampling pipe
B	Sampling hole
C	XAD-100
D	Exhaust
E	Air samples

Specifications

Table 9: Specifications

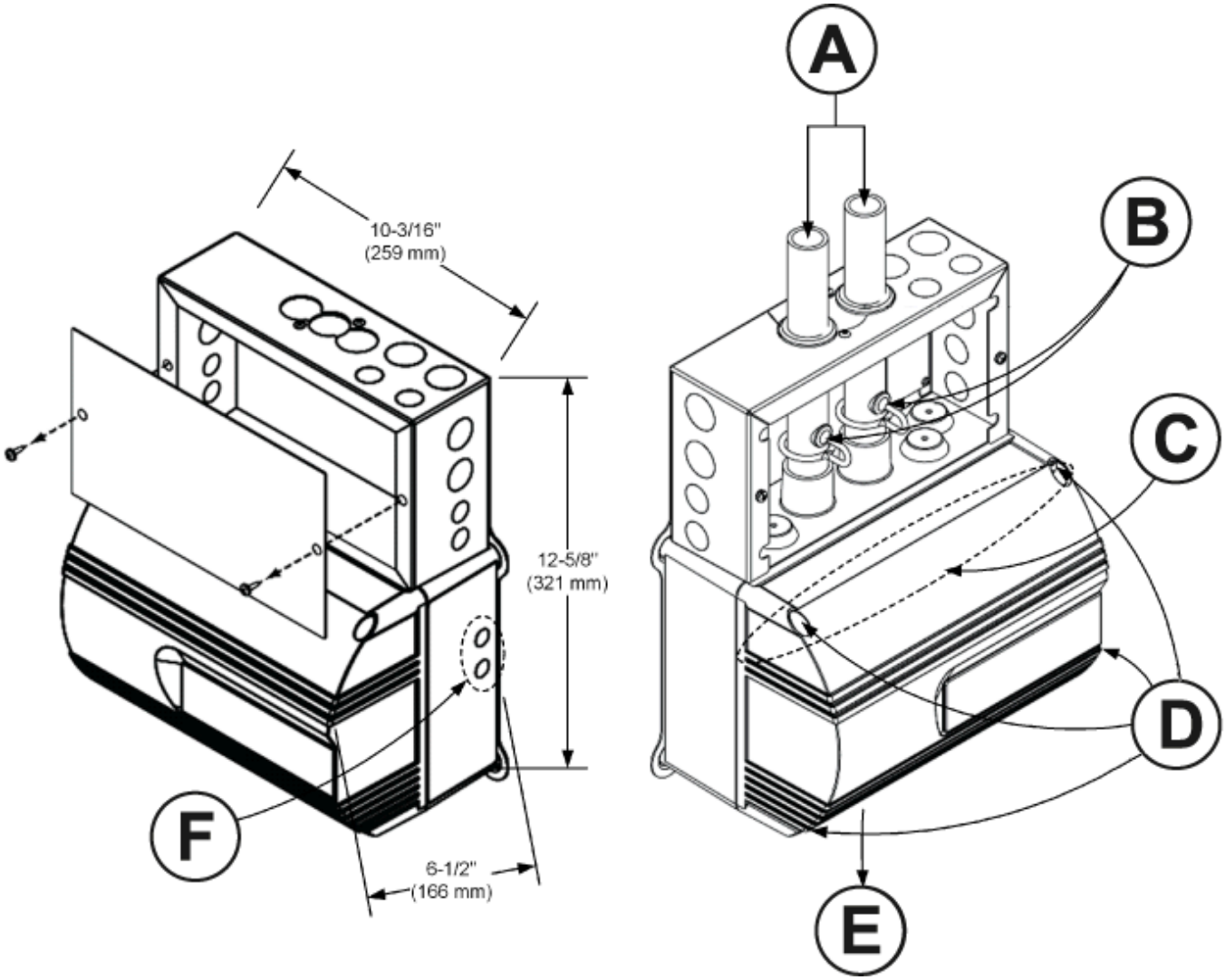
Specification		Details									
Supply voltage		18 VDC to 30 VDC supplied from fire alarm system									
Current	In-rush current	680 mA									
	Bar graph value	0	1	2	3	4	5	6	7	8	9
	Fan speed	1	2	3	4	5	6	7	8	9	10
	Current in mA	110	120	130	150	170	190	220	235	265	300
Wiring connections		Terminal blocks, 18 AWG to 12 AWG (0.82 mm^2 to 3.31 mm^2)									
Data communications		IDNet or MAPNET II communications, one address for each sensor									
Alarm current, one relay activated, add to the fan current requirements defined in a previous row of this table.		15 mA at 24 VDC; add 15 mA for each additional remote 4098-9843 relay									
Supervised Remote Relay Control Output		For use with 4098-9843 relay only, quantity of 15 maximum; distance of 500 ft (152 m) maximum; requires 4081-9008 (ref. 733-894) 10K Ω, 1/2 W end of line resistor									
Inlet pipe size		Outer diameter: 1.05 in. (26.7 mm)									
		Inner diameter: 0.87 in. (22.1 mm)									
Sampling network **Note:** Pipe length may vary subject to specifications by local codes and standards		Inlet Pipe: O.D. = 1.05 in. (26.7 mm); I.D. = 0.87 in. (22.1 mm)									
		Rigid Pipe Length = 82 ft (25 m) maximum; 3/4 in. CPVC pipe (19 mm), for duct detection									
		Rigid Pipe Length = 164 ft (50 m) maximum; 3/4 in. CPVC pipe (19 mm), for open area detection **Note:** Total rigid pipe length including inlet and exhaust = 164 ft (50 m) maximum. For open area applications, 4098-XAD does not meet the requirements of 7th edition of UL 268.									
		Flexible Tube Length = 50 ft (15 m) maximum Flexible Tube size: O.D. = 3/4 in. (19 mm); I.D. = 1/2 in. (12.7 mm)									
Flow monitoring and reporting		High and Low adjustable									
Air velocity range in linear ft./min.		0 to 4000 ft/min (0 to 1220 m/min)									
Sensor sensitivity range		For duct application: 0.5% and 1.0% for each foot of obscuration, selectable at host control unit For open area application: 1.5% to 3.0% for each foot of obscuration, selectable at host control unit.									
Fan control settings		10 programmable speeds; Pressure = 250 Pa, approx. 1 in. of water column pressure									
Filtration		Replaceable filter 80-0020-0 (inspect every 12 months and replace if necessary)									
Dimensions		See Figure 8									
UL listed temperature range		32°F to 100°F (0°C to 38°C)									
Operating temperature range		32°F to 122°F (0°C to 50°C)									
Storage temperature range		0°F to 140°F (-18°C to 60°C)									
Humidity rating		10% to 95% RH non-condensing; for indoor applications									

Table 10: 4098-9843 Relay Output Ratings, Single Form C

Rating	Details
Coil Current	15 mA at 24 VDC, up to 15 maximum for each relay control output
Relay Contacts	7 A at 0.35 PF at 28 VDC and 120 VAC; 250 µA at 5 VDC
Location Distance	500 ft (152 m) maximum to relay coils; locate relays within 3 ft (1 m) of device being controlled as in NFPA 72.

Dimension reference

Figure 8: Dimension reference



Callout	Description
A	Airflow input for the sampling probes, dual sensor model shown for reference.
B	Smoke test ports, circuit board assemblies with wiring terminals are not shown.
C	Control panel indicators are located here, behind the cover.
D	Cover is secured with four tamper resistant screws, one at each corner.
E	Airflow output is on the bottom.
F	Program switches

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