



Single-Package Rooftop Units Accessory Return Smoke Detectors

Installation Instructions

Part No. CRSMKDET002C00

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GENERAL

An HVAC (heating, ventilation and air-conditioning) system supplies conditioned air to virtually every area of a building. Smoke introduced into this air duct system will be distributed throughout the entire building. Smoke detectors designed for use inside the unit are used to sense the presence of smoke passing through the unit.

The smoke detector utilizes photoelectric technology for the detection of smoke. This detection method, when combined with an efficient ducting design, samples air passing through the unit. If sufficient smoke is sensed, an alarm signal is initiated and the *ComfortLink* controls will shut down the unit. With the unit shut down, the unit will not blow toxic smoke and fire gases throughout the areas served by the duct system.

SAFETY CONSIDERATIONS

Installation and servicing of air-conditioning equipment can be hazardous due to system pressure and electrical components. Only trained and qualified service personnel should install, repair, or service air-conditioning equipment.

Untrained personnel can perform the basic maintenance functions of cleaning coils and filters and replacing filters. All other operations should be performed by trained service personnel. When working on air-conditioning equipment, observe precautions in the literature, tags and labels attached to the unit, and other safety precautions that may apply.

Follow all safety codes. Wear safety glasses and work gloves. Use care when handling and installing the accessory.

⚠ WARNING

Before performing service or maintenance operations on unit, turn off main power switch to unit. Electrical shock could cause personal injury.

⚠ WARNING

The National Fire Protection Association has established that DUCT DETECTORS MUST NOT BE USED AS A SUBSTITUTE FOR OPEN AREA DETECTOR PROTECTION as a means of providing life safety. Nor are they a substitute for early warning in a building's regular fire detection system. Carrier supports this position and strongly recommends that the user read NFPA Standards 90A, 72, and 101. This smoke detector is listed per UL 268A.

⚠ WARNING

This device will not operate without electrical power. Fire situations may cause an interruption of power. The system safeguards should be discussed with your local fire protection specialist.

⚠ WARNING

This device will not sense smoke unless the ventilation system is operating and the cover is installed.

⚠ WARNING

For this detector to function properly, it **MUST** be installed according to the instructions in this manual. Furthermore, the detector **MUST** be operated within ALL electrical and environmental specifications listed in this manual. Failure to comply with these requirements may prevent the detector from activating when smoke is present in the air duct.

INSTALLATION

⚠ CAUTION

When installing the smoke detector in the unit, follow all local codes. Damage to unit may result.

Check Package Contents — Remove accessory packaging and inspect shipment for damage. If any damage is found, file a claim with the shipping agent immediately. If any item is missing or any part does not assemble properly, notify your Carrier distributor.

Table 1 lists the accessory package contents. Figure 1 shows the smoke detector.

Table 1 — Accessory Package Contents — Return Air Smoke Detector (CRSMKDET002C00)

ITEM	QUANTITY
Smoke Detector with Cover	1
Sampling Tube (long)	1
Sampling Tube Filters	2
Test Magnet	1
Foam Gaskets	2
Screw, no. 6 Self Tapping	2
Tube End Plug (large)	1
Sampling Tube Support Bracket	1
Screw, 8-18 3/4-in. Pan Head	2
Screw, 1/4 AB-14 5/8-in.	2
Snap Bushing	1
Harness Assembly	1
Smoke detector bracket 50ZZ500420	1
Sampling tube bracket 50ZZ500421	1
Sampling tube bracket 50ZZ500431 (48/50Z030-050 with Power Exhaust)	1

Return Air Smoke Detector Installation

⚠ WARNING

Prior to installation of this accessory, make sure all power is disconnected to the unit and locked out. Failure to disconnect power supply prior to servicing may result in serious injury.

NOTE: For horizontal applications it is easiest to install the smoke detector prior to making duct connections.

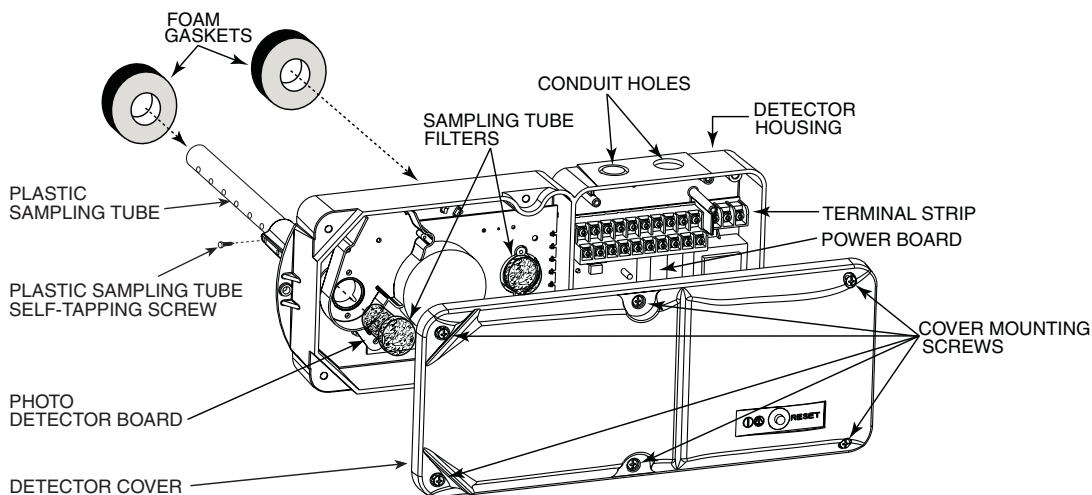


Fig. 1 — Smoke Detector

48/50A Units — The return air smoke detector is to be installed in the predrilled holes located in the indoor section above the auxiliary control box.

1. Open the hinged auxiliary control box access door and secure.
2. Find the 2 plugs located in the partition above the control box, remove and discard. See Fig. 2.
3. Remove cover from smoke detector. The screws will remain captured in the cover.
4. Place foam gaskets over each sampling tube on smoke detector. See Fig. 1.
5. Remove one knockout from top of smoke detector.
6. Insert stripped ends of wire harness through knockout and wire to smoke detector as shown in Fig. 3. Use ground screw in the smoke detector to secure a wire tie. Use wire tie to provide strain relief for the wire harness.
7. Slide smoke detector into holes in partition. Do not secure at this time.

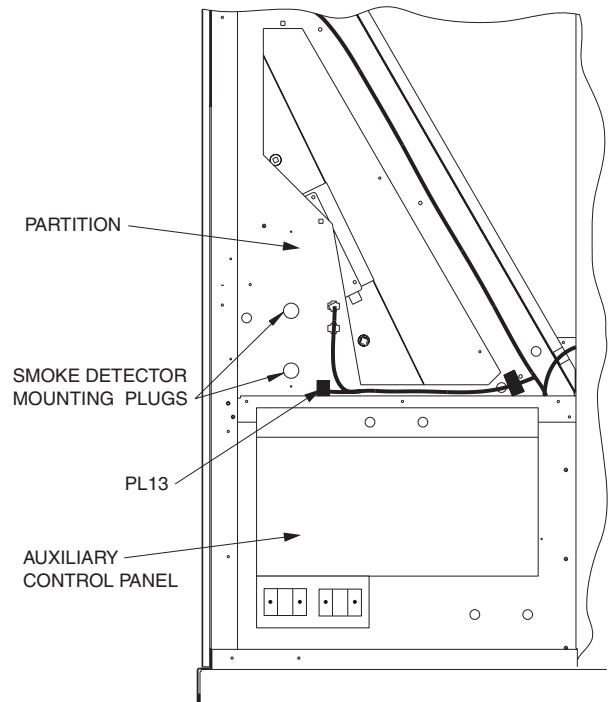


Fig. 2 — Smoke Detector Mounting Location for 48/50A020-060

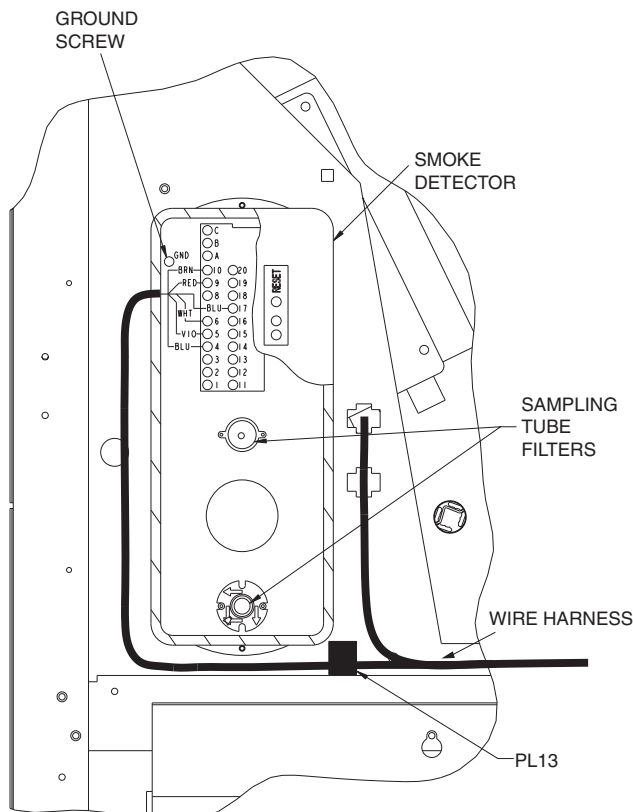


Fig. 3 — Smoke Detector Wiring Connections

8. Insert tube end plug into sampling tube and slide sampling tube into bottom hole of smoke detector.
9. Remove the unit side panel at the return end of the unit (downshot units only). Save screws for use later.
10. Mount the sampling tube support bracket to the cross member with two 1/4 AB-14 5/8-in. screws as shown in Fig. 4. Insert snap bushing into hole in bracket.
11. Slide sampling tube into bracket, making sure that the sampling holes point in the opposite direction of the return air flow. Insert the sampling tube all the way into the smoke detector.
12. Return to the auxiliary control box and secure sampling tube to smoke detector with two no. 6 self-tapping screws.
13. Attach smoke detector to partition using two, 8-18 3/4-in. pan head screws. See Fig. 4.

⚠ CAUTION

Do not overtighten the screws. Damage to smoke detector may result.

14. Return to side panel and insert tube end plug into sampling tube.
15. Replace the unit side panel.
16. Return to auxiliary control box section and insert sampling tube filters into both sampling tube holders. (See Fig. 1.)
17. Connect harness PL13 as shown in Fig. 3.
18. Restore power to the unit.
19. Configure *ComfortLink™* controller as specified in Controls and Troubleshooting Guide.
20. Perform Standby, Alarm, and Sensitivity Tests on page 6. At a minimum, the Magnet test should be performed to verify smoke detector wiring.

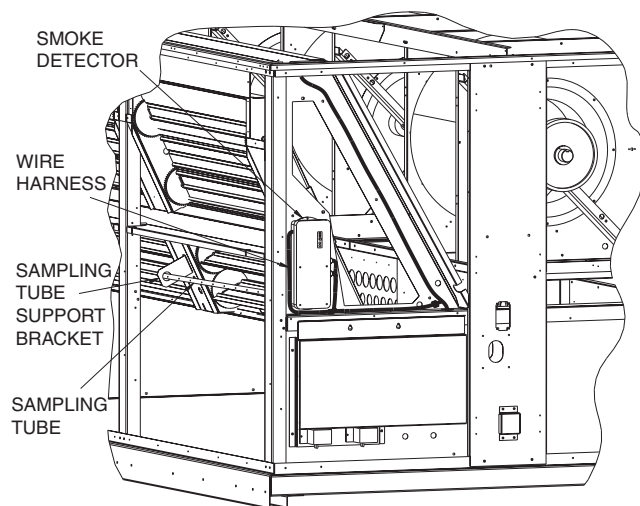


Fig. 4 — Smoke Detector Installed (48/50A020-060)

21. Replace smoke detector cover.
22. Check for alarms. Correct any problems.
23. Close and secure auxiliary control box door.

48/50Z Units — The return air smoke detector is to be installed on the upright in the power exhaust section. See Fig. 5-10.

NOTE: For size 075-105 units with return fan option, the smoke detector should be installed in the return duct. Do not use the bracket provided in this accessory kit.

1. Open the power exhaust section doors/panels on both sides of the unit to gain access.
2. Find plug 13 in the power exhaust section.
3. Remove cover from smoke detector. The screws will remain captured in the cover.
4. Place foam gaskets over each sampling tube on smoke detector. See Fig. 1.
5. Remove one knockout from top of smoke detector.
6. Insert stripped ends of wire harness through knockout and wire to smoke detector as shown in Fig. 3. Use ground screw in the smoke detector to secure a wire tie. Use wire tie to provide strain relief for the wire harness.
7. Mount the smoke detector bracket 50ZZ500420 on the upright.

See Fig. 5 for size 030-050 units without economizer.

See Fig. 6 for size 030-050 units with economizer only option.

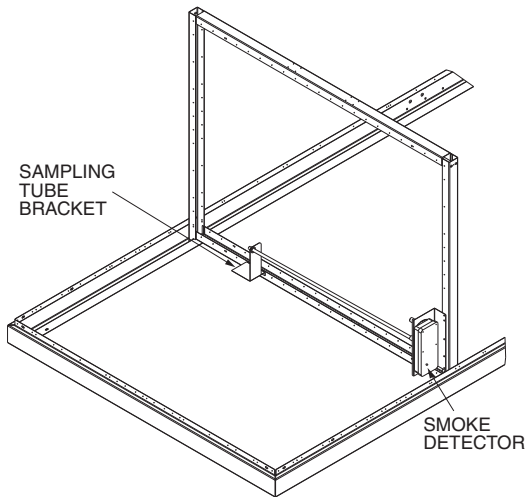
See Fig. 7 for size 030-050 units with economizer and power exhaust option.

See Fig. 8 for size 055-105 units without economizer.

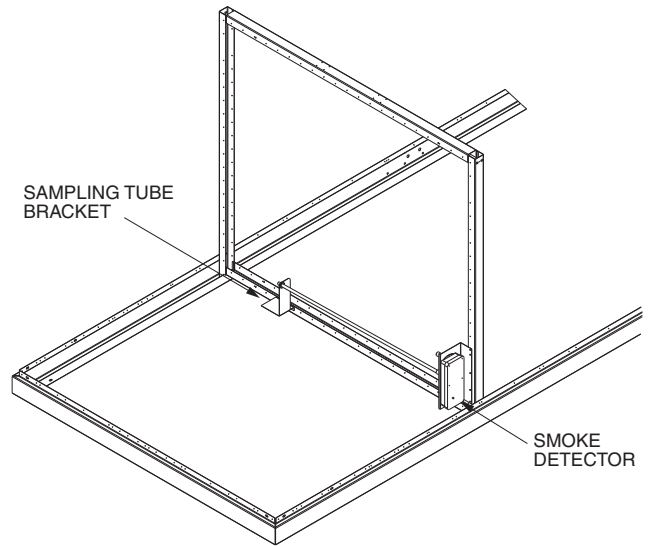
See Fig. 9 for size 055-105 units with economizer only option.

See Fig. 10 for size 055-105 units with economizer and power exhaust option.

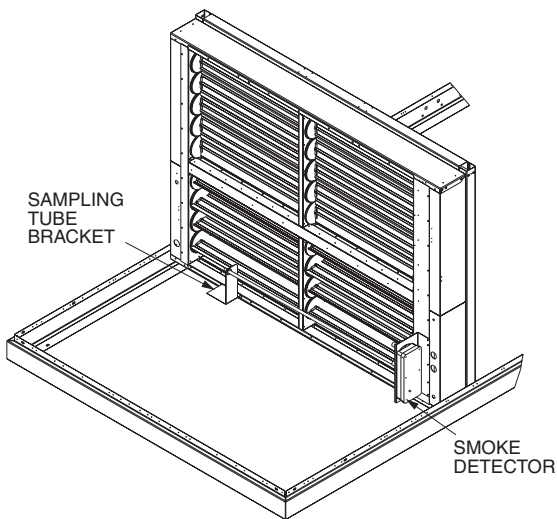
8. Slide smoke detector into holes in bracket. Do not secure at this time.
9. Insert tube end plug into sampling tube and slide sampling tube into bottom hole of smoke detector.
10. Mount the sampling tube bracket to the bottom of the power exhaust section using two 1/4 AB-14-5/8-in. screws. For size 030-050 units with power exhaust, use bracket 50ZZ500431 as shown on Fig. 7. For all other units use bracket 50ZZ500421, as shown on Fig. 5 and 6 for size 030-050 units, Fig. 8-10 for size 055-105 units.



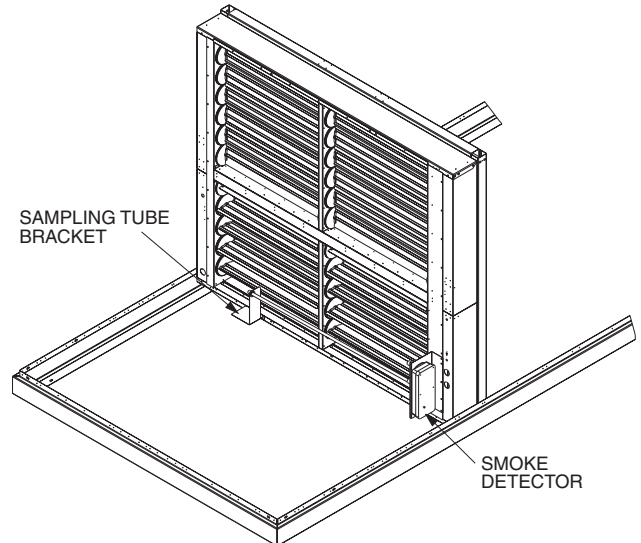
**Fig. 5 — Smoke Detector for 48/50Z030-050
(No Economizer or Power Exhaust)**



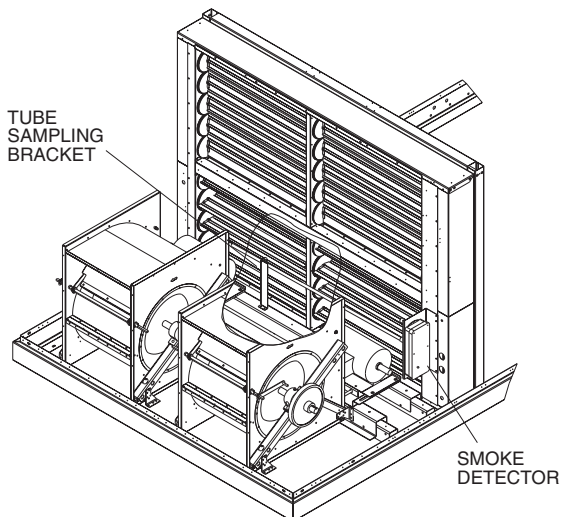
**Fig. 8 — Smoke Detector for 48/50Z055-105
(No Economizer or Power Exhaust)**



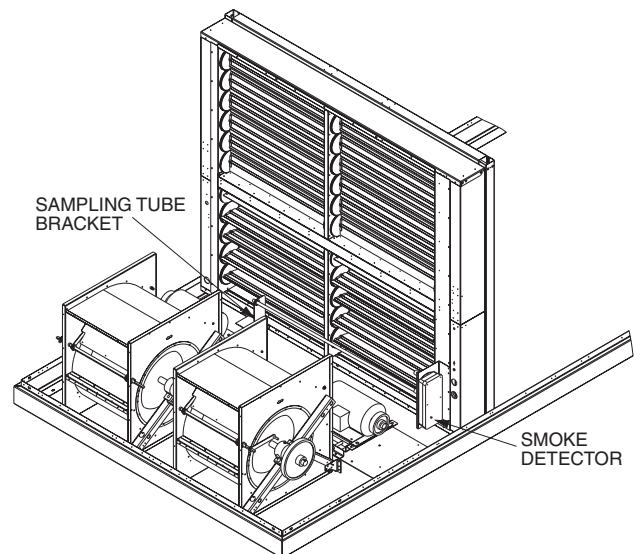
**Fig. 6 — Smoke Detector for 48/50Z030-050
(Economizer Only)**



**Fig. 9 — Smoke Detector for 48/50Z055-105
(Economizer Only)**



**Fig. 7 — Smoke Detector for 48/50Z030-050
(Economizer with Power Exhaust)**



**Fig. 10 — Smoke Detector for 48/50Z055-105
(Economizer with Power Exhaust)**

11. Slide sampling tube into bracket, making sure the sampling holes point in the opposite direction of the return airflow. Insert the sampling tube all the way into the smoke detector.
12. Secure sampling tube to smoke detector with two no. 6 self-tapping screws.
13. Attach smoke detector to the bracket using two 8-18 ³/₄-in. pan head screws.
14. Insert the tube end plug into sampling tube.
15. Insert sampling tube filters into both sampling tube holders. See Fig. 1.
16. Connect harness PL13 as shown on Fig. 3.
17. Restore power to the unit.
18. Configure *ComfortLink*[™] controller as specified in Controls and Troubleshooting Guide.
19. Perform Standby, Alarm, and Sensitivity Tests. At a minimum, the Magnet test should be performed to verify smoke detector wiring.
20. Replace smoke detector cover.
21. Check for alarms. Correct any problems.
22. Close and secure all doors and panels.

Configuring the *ComfortLink* Controller — For configuration settings refer to the Control and Troubleshooting Guide for 48/50A020-060 and 48/50Z030-105 units.

OPERATION

▲ CAUTION

The smoke detector must be tested and maintained regularly following NFPA 72 requirements. The smoke detector should be cleaned at least once a year. Damage to equipment may result.

The smoke detector accessories contain a photoelectric detector approved for an extended air speed range of **100 to 4000 feet per minute** (0.5 to 20.3 m/s) and an operational temperature range of 32 to 131 F (0° to 55 C). Do not operate the smoke detector outside of these ranges.

The smoke detector operates on 24 VAC, 120 VAC, or 240 VAC. The thermostat power terminals on the unit are used to power the smoke detector. Alarm and supervisory relay contacts are available for control panel interface (alarm initiation), HVAC control, and other auxiliary functions. Auxiliary relays are also provided for fan shut down or signaling of up to 9 other detectors in the loop for multiple fan shut down. The smoke detector is not designed for 2-wire applications.

The smoke detector can be reset by a momentary power interruption, by the reset button on the front cover, by the control panel, or by the remote reset accessory. **The smoke detector incorporates a cover tamper feature that provides a trouble signal after 20 minutes if the cover is removed or improperly installed.** Proper installation of the cover removes the trouble condition.

MAINTENANCE

Cleaning Procedure — Notify the proper authorities that the smoke detector system is undergoing maintenance, and that the system will temporarily be out of service. Disable the zone or system undergoing maintenance to prevent unwanted alarms and possible dispatch of the fire department.

AIR FILTERS

1. Turn off power to the system.

2. Remove and inspect sampling tube filters.
3. If filters are heavily coated with dirt, replace them with new filters. If they are not heavily coated, use a vacuum cleaner or compressed air nozzle to remove dust, then reinstall the filters.

PHOTO DETECTOR BOARD

1. Remove the screen by gently grasping on each side and pulling straight off.
2. Lift the photo chamber in the same fashion. Vacuum the screen and cover. Use clean, compressed air to loosen and blow out any remaining debris.
3. Vacuum photo chamber, then use clean compressed air to blow area clean.
4. Replace the chamber by pressing it onto the base. Press the screen into place. It should fit tightly on the chamber.

Filter Replacement — The filters do not substantially affect smoke detector performance even when up to 90% of the filter is clogged. Quarterly visual inspection usually suffices to determine whether the filters should be replaced. Only a high percentage of contamination affects performance. If further testing is required, compare differential pressure readings with and without the filters installed. If the difference exceeds 10%, then replace the filters. The pressure differential should never fall below 0.0015 in. wg.

Board Replacement

SMOKE DETECTOR BOARD REPLACEMENT

1. Remove the two detector board mounting screws.
2. Pull gently on the board to remove it.
3. To replace the board, align the board mounting features, holes, and the interconnect terminals. Push the board into place.
4. Secure board with the two mounting screws.

POWER BOARD REPLACEMENT

1. Disconnect wiring from the terminal block.
2. Remove the two power board mounting screws.
3. Pull gently on the board to remove it.
4. To replace the board, align the board mounting features, holes, and the interconnect terminals. Push the board into place.
5. Secure board with the two mounting screws.
6. Re-connect wiring to terminal block.

TROUBLESHOOTING

Test and maintain unit smoke detectors as recommended in NFPA 72. Before conducting these tests, notify the proper authorities that the smoke detection system will be temporarily out of service. Disable the system under test to prevent unwanted alarms.

Smoke Entry Tests

AIRFLOW TEST — The smoke detector is designed to operate over an extended air speed range of 100 to 4000 fpm. To verify sufficient sampling of unit air, turn on the unit indoor fan using the Service Test function (see Controls and Troubleshooting Guide for details on Service Test) and use a manometer to measure the differential pressure between the two sampling tubes.

The differential pressure should measure at least 0.0015 in. wg and no more than 1.2 in. wg. Because most commercially available manometers cannot accurately measure very low pressure differentials, applications with less than 500 fpm of unit air speed may require the use of a current-sensing pressure transmitter or the use of aerosol smoke (see Smoke Response Test on page 6).

SMOKE RESPONSE TEST — Drill a 1/4-in. hole 3 ft upstream from the unit smoke detector. Use the Service Test function (see Controls and Troubleshooting Guide for details on Service Test) to turn on the unit indoor fan. Measure the air velocity with an anemometer. Air speed must be at least 100 fpm. If the air speed is greater than 500 fpm, use a conventional manometer to measure differential pressure between the sampling tubes.

Spray aerosol smoke into the unit through the 1/4-in. hole for 5 seconds. Wait two minutes for the unit smoke detector to alarm. If the unit smoke detector alarms, then air is flowing through the detector. Remove the unit smoke detector cover and blow out the residual aerosol smoke from the chamber and reset the unit smoke detector. Use duct tape to seal the aerosol smoke entry hole.

To determine if smoke is capable of entering the sensing chamber, visually identify any obstructions. Plug the exhaust and inlet tube holes to prevent unit air from carrying smoke away from the detector head, then blow smoke directly at the head to cause an alarm.

⚠ CAUTION

Remove the plugs after this test, or the smoke detector will not function properly and damage may result.

Standby, Alarm and Sensitivity Tests — The cover of the smoke detector must be removed to perform these tests.

STANDBY AND TROUBLE TEST

Standby — Look for presence of flashing green LED. The LED should flash approximately every 10 seconds.

Trouble — If the detector LED does not flash, then the detector lacks power, the detector board is missing (replace), the cover has been missing or not secured properly for more than 20 minutes (secure cover properly), or the unit is defective (return for repair).

Test — The trouble condition can be caused intentionally to verify correct operation of the system. Remove the detector board to cause an alarm.

Cover

Tamper — If the cover is removed or not properly secured for a period longer than 20 minutes, a trouble signal is generated to indicate the cover is missing.

ALARM TEST

Magnet Test

1. Place the painted surface of the magnet onto the TEST locator on the bottom of the housing.
2. The red alarm LED on the detector should switch on. Verify system control panel alarm status and control panel execution of all intended auxiliary functions (i.e., fan shutdown, damper control, etc.).
3. The detector must be reset by the front cover reset button.

SENSITIVITY TEST — After verification of alarm capability, use a field-supplied voltmeter to check detector sensitivity. The housing cover must be removed to perform this test. If readings indicate that the detector head is outside of the acceptable range that is printed on the label of the detector, the detector chamber requires cleaning.

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