InnovairFlex™ Testing and Maintenance

Duct Smoke Detector Testing and Maintenance Guide

Testing and maintenance is important to any duct smoke detector application. This document will provide details on proper duct smoke detector testing and maintenance as well as NFPA recommendations.

NFPA Recommendations

- System Sensor strongly recommends that the user read NFPA Standards 90A, 72, and 101. The D4120 Air Duct Smoke Detectors are listed per UL 268A.
- Per NFPA it is recommended that duct smoke detectors be visually inspected twice a year and functionally tested once a year..

Measurement Testing

- The D4120 is designed to operate over an extended air speed range of 100 to 4000 FPM. To verify sufficient sampling of ducted air, turn the air handler on and use a manometer to measure the differential pressure between the two sampling tubes. The differential pressure should measure between 0.01 and 1.11 inches of water. Most commercially available manometers cannot accurately measure pressure differentials with less than 500 FPM of air speed. These applications may require one of the following: 1) the use of a current-sourcing pressure transmitter, or 2) the use of aerosol smoke.

Low Flow Air Flow Test Using Dwyer Series 607 Differential Pressure Transmitter

1. Verify the air speed of the duct using an anemometer. Air speed must be at least 100 FPM.
2. Using Dwyer Series 607 connect the leads of the meter to either side of the1000Ω resistor.
3. Allow unit to warm up for 15 seconds.
4. With both HIGH and LOW pressure ports open to ambient air, measure and record the voltage drop across the 1000Ω resistor (measurement 1), 4.00 volts is typical.
5. Using flexible tubing and rubber stoppers, connect the HIGH side of the transmitter to the sampling tube of the duct smoke detector housing, and the LOW side of the transmitter to the exhaust tube of the duct smoke detector housing.
6. Measure and record the voltage drop across the 1000Ω resistor (measurement 2).
7. Subtract the voltage recorded in measurement 1 from the voltage recorded in measurement 2.
8. If the difference is greater than 0.15 volts, there is enough air flow through the duct smoke detector for proper operation.

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Alarm Testing Procedures

- Test/Reset Button - Press and hold the test button located on the power board cover for at least 2 seconds.
- M02-04-00 Magnet Test - Place the painted surface of the magnet onto the MAGNET TEST location on the sensor cover of unit. Or use Remote Test Accessory including RTS151, RTS151KEY, RTS2 and RTS2-AOS.
- During testing the red alarm LED on the sensor and the power board should latch on, as should any accessories (RA100Z, RTS151). Verify system control panel alarm status and control panel execution of all intended auxiliary functions.
  - The detector must be reset by the system control panel, front cover Test/Reset button, or remote accessory.
  - To reset using the Test/Reset button on the power board cover simply press and release.

Smoke Response Tests

- To determine if smoke is capable of entering the sensing chamber, visually identify any obstructions. Plug the exhaust and sampling tube holes to prevent ducted air from carrying smoke away from the detector head, then blow smoke such as cigarette, cotton wick, or punk directly at the head to cause an alarm. **Remember to remove the plugs after this test, or the detector will not function properly.**

Smoke Entry Using Aerosol Smoke

- This test is intended for low-flow systems (100-500 FPM). If the air speed is greater than 500 FPM, use a conventional manometer to measure differential pressure between the sampling tubes, as described in Section 7.1.
- Drill a ¼ inch hole 3 feet upstream from the duct smoke detector. With the air handler on, measure the air velocity with an anemometer. Air speed must be at least 100 FPM. Spray aerosol smoke* into the duct through the ¼ inch hole for five seconds. Wait two minutes for the duct smoke detector to alarm. If the duct smoke detector alarms, air is flowing through the detector. Remove the duct smoke detector cover and blow out the residual aerosol smoke from the chamber and reset the duct smoke detector. Use duct tape to seal the aerosol smoke entry hole.

* Aerosol smoke can be purchased from Home Safeguard Industries at homesafeguard.com, model 25S Smoke Detector Tester, and Chekkit Smoke Detector Tester model CHEK02 and CHEK06 available from SDi. When used properly, the canned smoke agent will cause the smoke detector to go into alarm. Refer to the manufacturer's published instructions for proper use of the canned smoke agent.

Maintenance Procdeures

- Canned aerosol simulated smoke (canned smoke agent) formulas will vary by manufacturer. Misuse or overuse to these products may have long term adverse effects on the smoke detector. Consult the canned smoke agent manufacturer's published instructions for any further warnings or caution statements.
- 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.

1. Remove the sensor to be cleaned from the system.
2. Remove the sensor cover by pulling outward on each of the four removal tabs that hold the cover in place.
3. Vacuum the screen carefully without removing it. If further cleaning is required continue with Step 4, otherwise skip to Step 7.
4. Remove the chamber cover/screen assembly by pulling it straight out.
5. Use a vacuum cleaner or compressed air to remove dust and debris from the sensing chamber.
6. Reinstall the chamber cover/screen assembly by sliding the edge over the sensing chamber. Turn until it is firmly in place.
7. Replace the cover using the holes for the LEDs for alignment and then gently pushing it until it locks into place.
8. Reinstall the detector.
9. Restore system power.
10. Perform Detector Check
11. Notify the proper authorities testing has been completed and the smoke detector system is back in operation.

* Note: If any unitary packaged air conditioning units are run during the drywall installation phase of any building under construction to accelerate the drying of joint compound, the subsequent sanding of those drywall joints and resulting dust may compromise the sensor heads in duct smoke detectors. To avoid this condition it is recommended that the sensor heads be removed during the construction phase.

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