

Guidelines:

Differential Pressure Testing

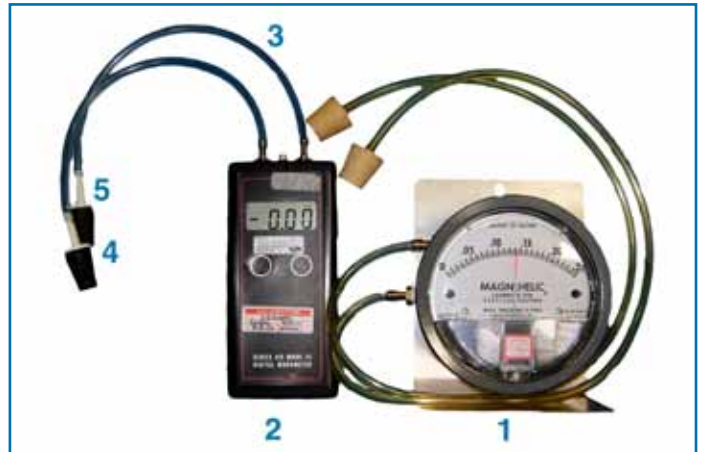
Using Analog and Digital Manometers

Parts:

This test assumes that your duct smoke detector is installed correctly and meets all requirements per the model's specific installation instructions. You will need the following parts to perform this test:

- Analog Manometer – Dwyer Magnehelic Series 2000 OR
- Digital Manometer – Dwyer Series 475 MARK III
- Flexible Tubing
- ½ – inch Rubber Stoppers
- Fittings

Figure 1: Parts



Procedures:

1. Verify that the manometer operating requirements are satisfied (e.g., temperature, max range Analog - 15 PSI, Digital – 150 in. W.C., etc.)
2. Verify and note current manometer reading and adjust if necessary.



Figure 2: Digital and Analog Meters

3. With the duct smoke detector cover removed, plug the manometer, positive (+) end (for Digital) or HIGH end (for Analog), into the sampling tube end.



Figure 3: Sampling Tube End



Figure 4: Analog HIGH and LOW Connection



Figure 5: Digital Positive and Negative Connection

4. Plug the manometer, negative (-) end (for Digital) or LOW end (for Analog), into the exhaust tube end.

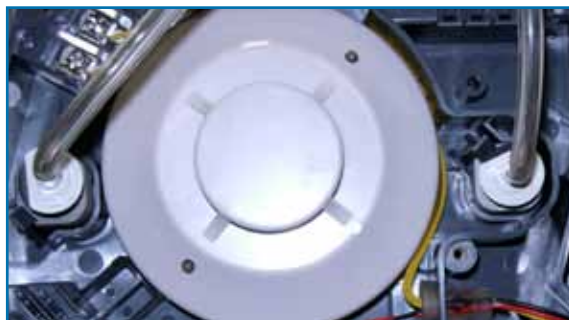


Figure 6: Exhaust Tube Placement

- Measure differential pressure on the Digital meter and read the measurement on the Analog meter.



Figure 7: Digital Meter



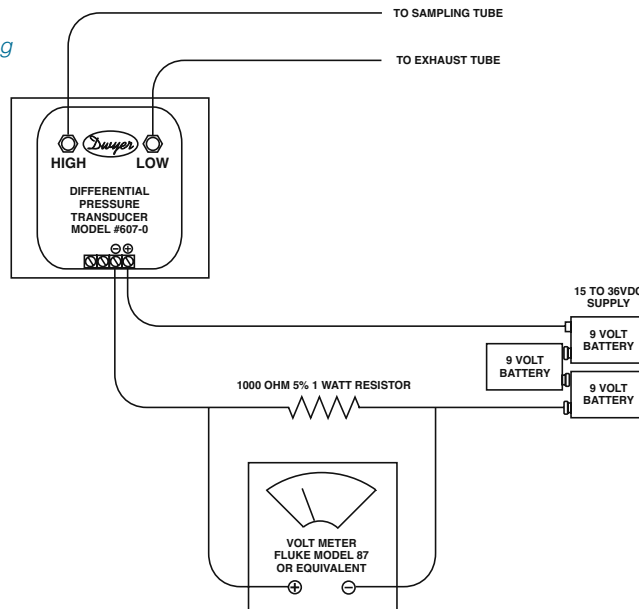
Figure 8: Analog Meter

Note: The D4120 is designed to operate over an extended airspeed of 100 to 4,000 FPM. To verify sufficient sampling of ducted air, turn the air handler on and use the manometer to measure the differential pressure between the two sampling tubes. The differential pressure should measure at least 0.01 inches of water and no more than 1.11 inches of water. Because most commercially available manometers cannot accurately measure very low pressure differentials, applications with less than 500 FPM of airspeed may require the use of a current sourcing pressure transmitter (Dwyer Series 607) or the use of aerosol smoke per sections shown below.

Low Flow AirFlow Test Using Dwyer Series 607 Differential Pressure Transmitter

Verify the air speed of the duct using an anemometer. Air speed must be at least 100 FPM. Wire the Dwyer transmitter as shown in Figure 9. Connect the leads of the meter to either side of the 1,000 Ω resistor. Allow unit to warm up for 15 seconds. With both HIGH and LOW pressure ports open to ambient air, measure and record the voltage drop across the 1,000 Ω resistor (measurement 1). 4.00 volts is typical. 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. Measure and record the voltage drop across the 1,000 Ω resistor (measurement 2). Subtract the voltage recorded in measurement 1 from the voltage recorded in measurement 2. If the difference is greater than 0.15 volts, there is enough airflow through the duct smoke detector for proper operation.

Figure 9: Dwyer Transmitter Wiring



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 above. 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.

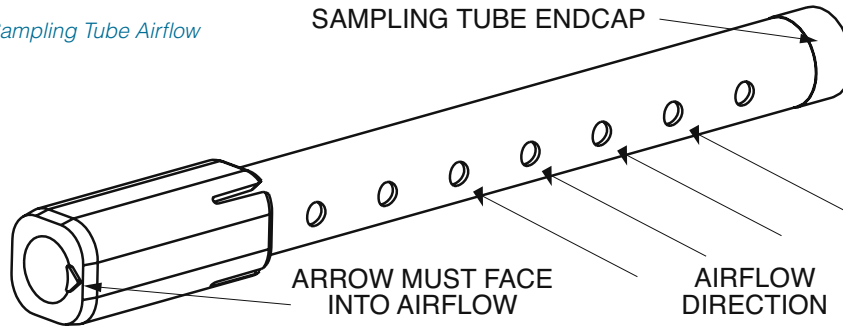
*Aerosol smoke can be purchased from Home Safeguard Industries at homesafeguard.com, model 25S Smoke Detector Tester, and Chekkit Smoke Detector Tester model CHEK02 and CHEK06 available from SDI. When used properly, the canned smoke agent will cause the smoke detector to go into alarm. Refer to the manufacturer's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

CAUTION

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.

Please check the following if the differential pressure measurements are outside the specified range (0.01-1.11 inches of water):

- Ensure that the air velocity in the duct is within the specified range. If necessary, use a velocity meter (anemometer) to check the air velocity in the duct.
- Verify the sampling tube is installed with the air inlet holes facing into the airflow. To assist proper installation, the tube's connector is marked with an arrow. Make sure the sampling tube is mounted so that the arrow points into the airflow as shown in Figure 10. Note that the sampling tube and exhaust tube can be mounted in either housing connection as long as the exhaust tube is mounted downstream from the sampling tube.

Figure 10: Sampling Tube Airflow

- Verify that the end cap is installed at the end of the sampling tube. The sampling tube end cap, included with the detector, is critical to proper operation of the duct smoke detector. The end cap is needed to create the proper airflow to the sensor of the duct smoke detector.
- Verify that the sampling tube extends to a minimum of $\frac{2}{3}$ duct width
- Verify that the duct smoke detector unit is properly sealed to the duct.

For more information, please contact:

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