

Installation Guide

1.0 Notice

These instructions cover the installation of the Radionics D331A, D332A Analog Duct Detectors in an analog system controlled by a Fire Alarm Control Panel (FACP) using the advanced digital communications protocol. Such analog FACPs are Radionics' D8024, D9024 and D10024.

Install, test and maintain the D331A, D332A according to these instructions, NFPA 72, Local Codes and the Authority Having Jurisdiction. Failure to follow these instructions may result in failure of the device to operate properly. Radionics is not responsible for improperly installed, tested or maintained devices.



NFPA 72 requires a complete system-wide functional test be performed following any modifications, repair, upgrades or adjustments made to the system's components, hardware, wiring, programming and software/firmware.



These instructions contain procedures to follow in order to avoid personal injury and damage to equipment.

Note: The D331A and D332A Analog Duct Detectors are not intended for open-area protection. Refer to NFPA 90A and NFPA 72, National Fire Protection Association publications for general and additional information on duct smoke detectors concerning operation and installation.

Note: When using a D332A analog duct detector with built-in relay on a polling circuit, only four analog devices can be installed on that particular polling circuit (for example, one D332A analog duct detector and three other analog devices, three D332A analog duct detectors and one other analog device, etc.).

2.0 Device Description

The D331A and D332A are UL-listed analog duct detectors for use with Radionics' D8024, D9024 and D10024 analog FACPs.

Air sampling is accomplished by two tubes, which protrude into the duct. An exhaust tube of one standard length is supplied in the installation kit with the duct detector housing unit. Once the duct width has been determined, the air intake sampling tubes must be ordered. Sampling tubes are supplied in three standard lengths and cut to size to fit the duct.

The D331A is a duct detector housing unit with a Radionics analog photoelectric smoke detector head; the D332A is a duct detector housing unit with a Radionics analog photoelectric smoke detector head and two sets of Form "C" contacts rated at 10 A. The pilot and alarm visual indicators, provided on the front of the D332A, signal the operating status of the device. A manual test/reset switch is located along the side of the visual indicators.



D331A, D332A

Mounting the D331A, D332A

3.0 Mounting the D331A, D332A

Note: To prevent false alarms, do not mount the D331A or D332A Duct Detectors in areas of extreme high or low temperatures, in areas where high humidity exists, in areas where duct air may contain gases or excess dust. Refer to NFPA 90A, 72E and 101.

3.1 Duct Preparation

Remove the paper backing from the mounting template that is packaged in the installation kit. Affix the template to the duct at the desired location.

Using the template as a guide, drill four mounting holes ($3/32$ in. diameter) for the duct mounting screws (four #12 x $1/2$ in. sheet metal screws packaged in installation kit). Drill or punch holes for the sampling tubes in the air duct ($1-3/8$ in.). Clean all holes.

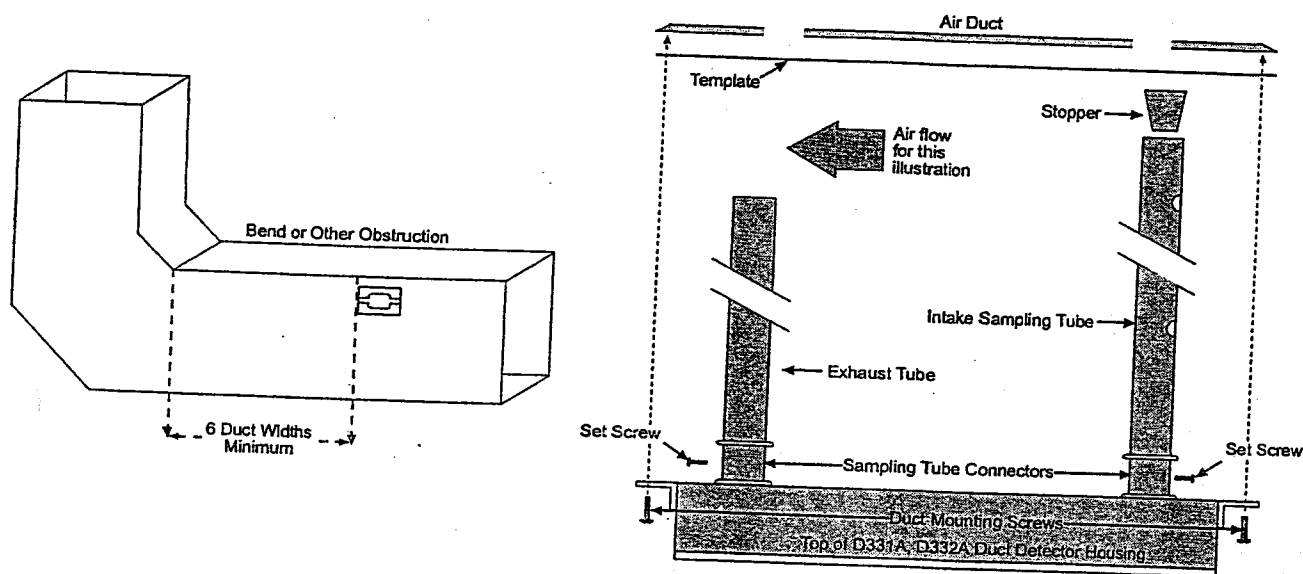


Figure 1: Duct Housing Mounting

3.2 Verify Air Flow and Direction

Use the D331A and D332A in ducts with air velocities between 300 to 4,000 ft. (91 to 1,219 m) per minute. Verify air velocity by checking duct installation specifications, or by using an Anor Model 6000P (or equivalent) velocity meter. See Figure 2 for sampling tube orientation to air flow direction.

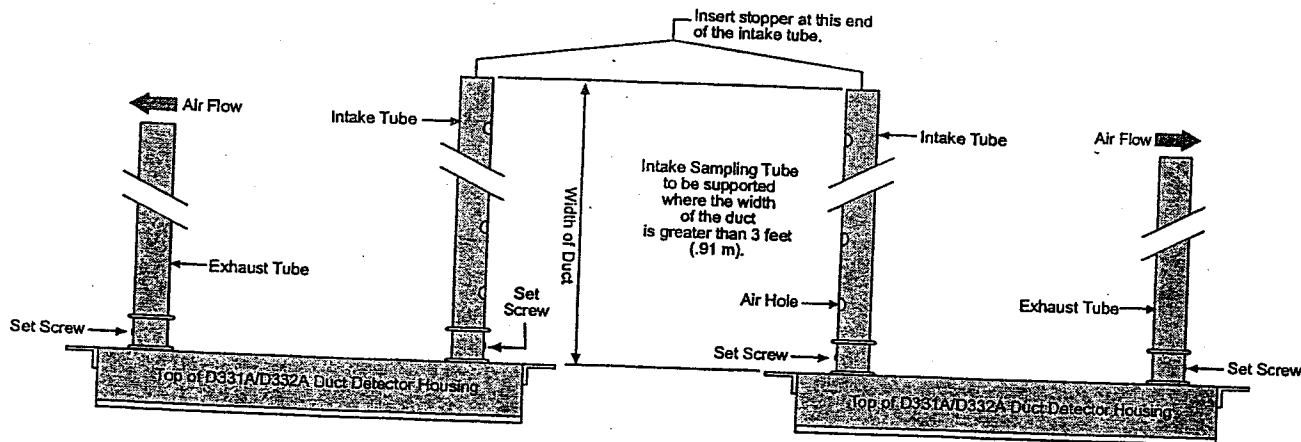


Figure 2: Sampling Tube Orientation

Mounting the D331A, D332A

3.3 Assembling the Sampling Tubes

The sampling tubes can be ordered in one of three standard lengths and cut to requirements. The intake sampling tube is a piece of steel piping with a series of holes drilled along the entire length of the tube, and should extend the entire width of the duct. The holes must be facing into the airflow. The exhaust tube is a piece of steel piping approximately 7.5 in. (19 cm) long.

| Intake Sampling Tube Model Number | Intake Sampling Tube Length |
|-----------------------------------|---|
| D312 | For duct widths of 1.0 ft. to 2.5 ft. (0.3 m to 0.76 m) |
| D313 | For duct widths of 2.5 ft. to 5.0 ft. (0.76 m to 1.5 m) |
| D314 | For duct widths of 5.0 ft. to 10.0 ft. (1.5 m to 3.0 m) |

Table 1: Intake Sampling Tubes Standard Lengths

Assemble the intake tubes by cutting them to the desired length and then firmly inserting the stopper packaged in the installation kit in the end of the intake sampling tube.

3.4 Mounting the Sampling Tubes

Sampling tube connectors are equipped with set screws that allow the tubes to be mounted only in the directions shown in Figure 2. Establish proper orientation with consideration of the airflow direction.

Insert the intake and exhaust tubes into the connectors, align the set screws to the set screw holes in the tubes and tighten firmly.

See Figure 1 for mounting details.

3.5 Mounting the Detector

Move the detector/sampling tube assembly into position. Using four duct mounting screws (four #12 x 1/2 sheet metal screws packaged into the installation kit), secure the detector/sampling tube assembly to the duct.

3.6 Verify the Air Sampling

To verify the correct sampling of air, use a Dwyer Model 4000 differential pressure gauge or its equivalent. The pressure differential between input sampling tube and exhaust tube should be greater than 0.01 in. (0.03 cm) of water and less than 1.2 in. (3.1 cm) of water.

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Setting the Detector Head Address

4.0 Setting the Detector Head Address

Each analog detector head is assigned a specific address, which is set by programming an EEPROM microchip. It is not necessary to wire the devices to the FACP's polling circuit in any particular order.

4.1 Using the D5070 Analog Device Programmer



The D5070 Analog Device Programmer must be used to set the addresses on the D331A and D332A's detector heads BEFORE connecting them to the FACP's polling circuit. Make sure the battery in the D5070 is connected prior to programming.

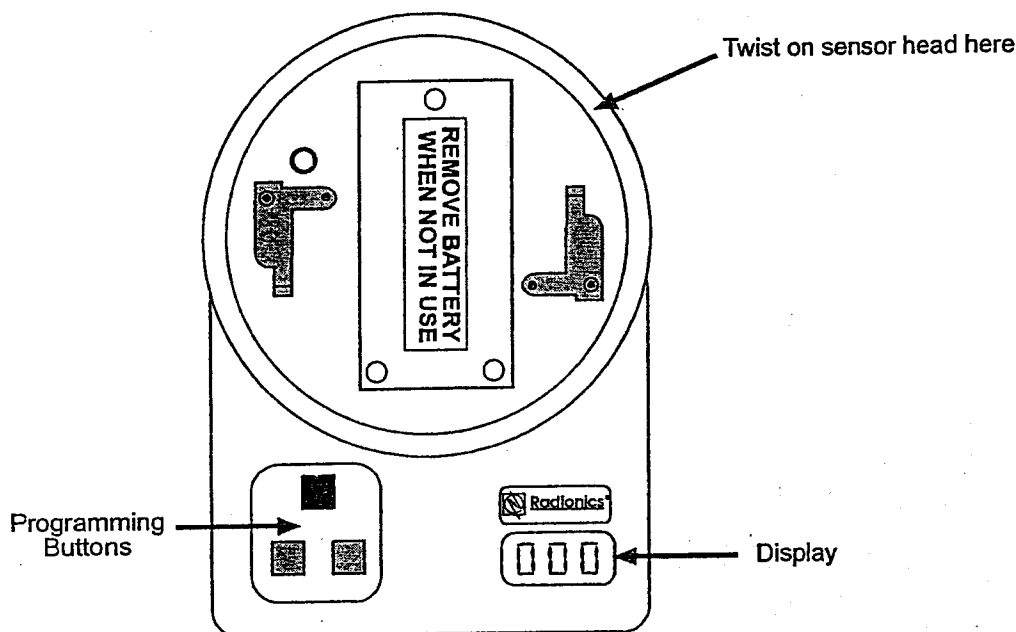


Figure 3: D5070 Analog Device Programmer

4.1.1 D5070 Programming Buttons

See Table 2 for a description of the three programming buttons on the D5070 Analog Device Programmer.

| Programming Button | Description |
|--------------------|---|
| Left Gray Button | Power On. Automatically reads the address of a detector. Advances the address by ten. |
| Right Gray Button | Power Off. Advances the address by one. |
| Red Button | Stores the displayed address in the detector. Also reads analog level. |

Table 2: D5070 Programming Button Descriptions

Setting the Detector Head Address

4.1.2 Setting the Address

The following steps explain how to set an address using the D5070 Analog Device Programmer.

- 1) Place the detector head onto the programmer. Make sure the detector head tabs align with the programmer grooves.
- 2) Press the left gray button to turn the D5070 on. a battery check message will appear followed by the device's address (detectors that are not programmed will read address 126).
- 3) Set the required address by pressing the left and gray buttons until the desired address is reached (the display will show three red flashing dots if the address being programmed is different than the device's current address).
- 4) When the desired address is displayed, press the red button to program that address. The three red dots on the display will no longer be present.

4.1.3 Reading Analog Value

The analog value represents the real time hexadecimal reading of the environment inside the chamber at the time it is checked. The analog value can be used as a field "litmus test", or a non-calibrated test to determine whether or not the device is putting out a consistent analog value. See Table 3 for device information.

Install the detector and power up the D5070 as described in Section 4.1.2 of this manual. Press the red button. An "A" will appear on the display followed by the analog value. This value will be continuously updated for three minutes, or until the unit is turned off.

| Device | Standard Pre-Alarm Threshold | Standard Fire Threshold | Just-Calibrated | Range |
|---------------------------------|------------------------------|-------------------------|-----------------|----------------|
| D323A-DH Photoelectric Detector | 2.5% | 3% | 0.1% | 0.88% to 2.75% |

Table 3: Device Data Table

4.1.4 D5070 Display Messages

Table 4 provides a description of each message that may appear on the D5070.


| Display Message | Description |
|-----------------|---|
| bat | Battery Check. Displayed upon power up and when the battery is low. A low battery is good for approximately 3,000 address setting operations. |
| E0 | Address past 126 will not be recognized by the panel. |
| E1 | Attempting to program an address with no device connected. |
| E2 | Cannot find the device after power up, or replace the device. |
| E3 | Invalid detector response (replace the detector). |
| E4 | Cannot find the device to program. |
| E5 | Device read error. |
| E6 | Fail during analog value reading (replace the detector). |

Table 4: D5070 Display Messages

D331A, D332A

Wiring the D331A, D332A

5.0 Wiring the D331A, D332A

 **Note:** When using a D332A analog duct detector with built-in relay on a polling circuit, only four analog devices can be installed on that particular polling circuit (for example, one D332A analog duct detector and three other analog devices, three D332A analog duct detectors and one other analog device, etc.).

Wiring must conform to applicable local codes, ordinances and regulations covering this type of device. Wire the detectors according to the engineering drawing for that particular job requirement.

Terminals are suitable for up to #14 AWG (1.8 mm) wire.

- 1) With the power source de-energized, wire all connections per engineering drawings.
- 2) Check system wiring.
- 3) Energize the detector.

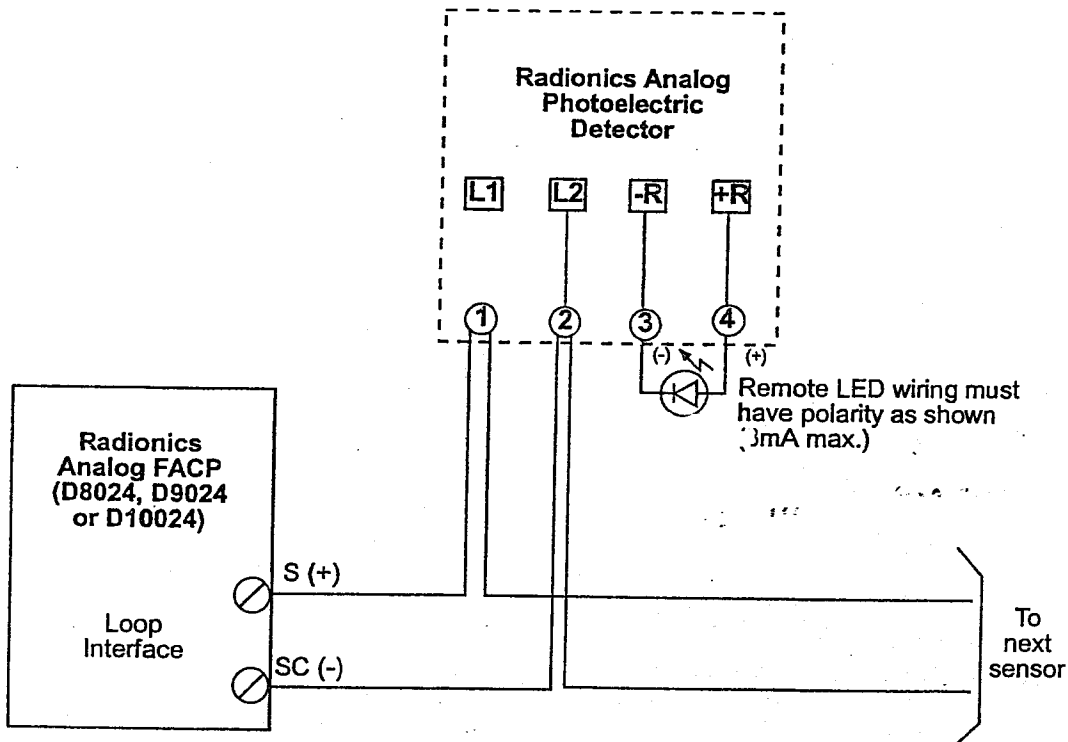


Figure 4: Wiring the D331A Analog Duct Detector

Note: The D331A Analog Duct Detector is not a self-contained detector. It is only compatible with Radionics' D8024, D9024 and D10024 Analog FACP's.

Testing the D331A, D332A

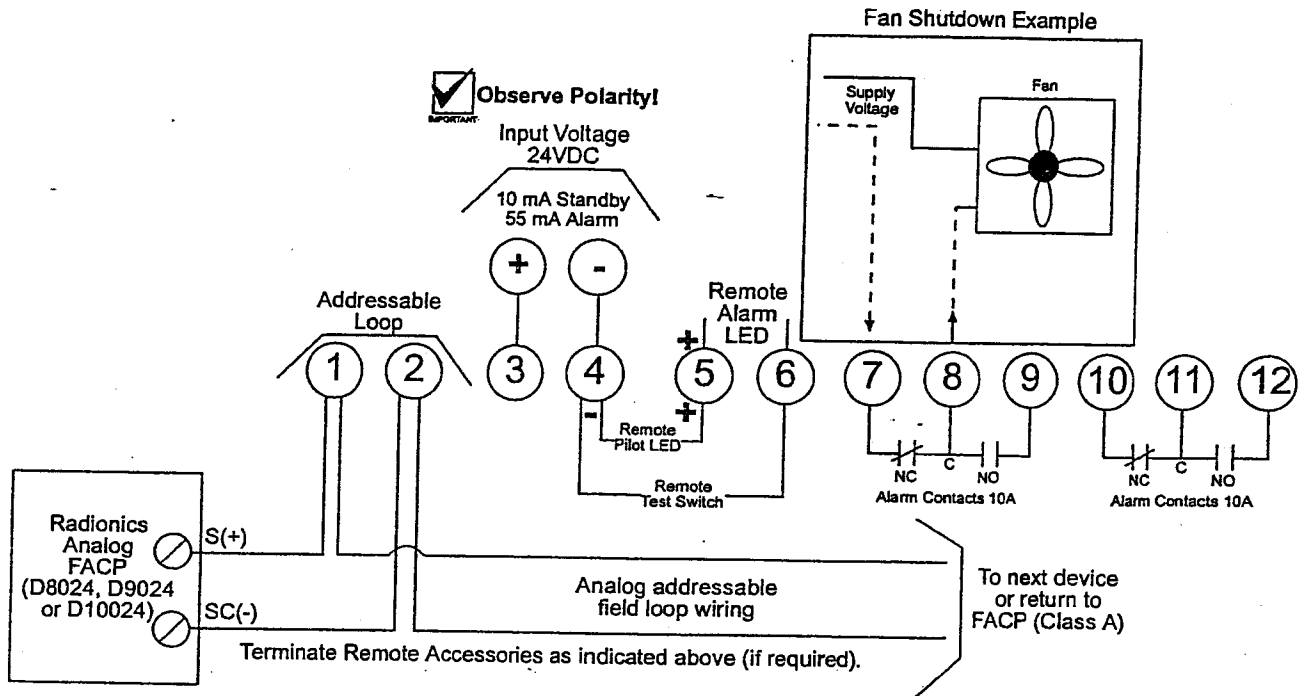


Figure 5: Wiring the D332A Analog Duct Detector

Note: The D332A Analog Duct Detector is not a self-contained detector. It is only compatible with Radionics' D8024, D9024 and D10024 Analog FACP's.



Note: Since the analog loop is current-limited similar to a conventional two-wire loop, the D332A cannot be guaranteed to operate under all conditions. This analog duct housing must be treated as a two-wire conventional duct detector when considering auxiliary functions necessary for smoke control. When smoke control is absolutely necessary, the conventional four-wire duct detector (D300A, D300A-HV) used with a contact monitoring module will satisfy the condition.

6.0 Testing the D331A, D332A

To test either the D331A or the D332A, use the following steps:

- 1) Install the duct smoke detector housing.
- 2) The green pilot indicator on the front of the D331A/D332A Detector should be illuminated.
- 3) Remove the head. The green indicator must go off. This indicates supervision of head.
- 4) Replace the head. Reset the FACP.
- 5) Test the detector operation by lighting a piece of clothesline, placing it approximately 3 in. (7.6 cm) from the head and blowing across the lit area toward the detector head. The alarm indicator should illuminate within one minute and the two alarm relays should be energized, shorting Terminals 8 to 9 and 11 to 12.
- 6) Reset the detector housing. The detector will reset momentarily and then return to alarm condition. Perform this operation several times. After five minutes, the smoke in the detector head should be cleared, and then the device will remain reset.
- 7) Replace the cover.

7.0 Replacing the Detector Head in the D331A, D332A

If it is determined that the detector head supplied with the D331A or D332A must be replaced, only replace the existing head with a D323A-DH Replacement Analog Photoelectric Smoke Detector Head.

Follow these steps when changing detector heads:

- 1) Remove the four screws that hold the cover over the D331A or D332A in place.
- 2) To remove the existing detector head, twist it counterclockwise.
- 3) Insert the D323A-DH Replacement Analog Photoelectric Smoke Detector Head and turn it clockwise.
- 4) Replace the cover and tighten the screws.
- 5) Set the detector head's address using the D5070 Analog Device Programmer. See Section 4.0 of this installation guide for details.

8.0 D331A, D332A Specifications

| Specification | D331A | D332A |
|------------------------------|--|---|
| Detector Head Type | Analog photoelectric detector head | Analog photoelectric detector head |
| Input Voltage | | 24 VDC |
| Standby Current | 390 μ A | 10 mA |
| Alarm Current | 8 mA (when polled) | 55 mA |
| Alarm Contacts | | 2 Form "C" rated at 10 A @ 250 VAC; 7 A @ 30 VDC |
| Sensitivity Test Method | FACP | FACP |
| Remote Indication Capability | Alarm LED | Power, Alarm, Horn/Piezo, Test |
| Air Velocity | 300 ft. (91 m)/min. to 4,000 ft. (1,219 m)/min. | |
| Ambient Temperature | +32°F to +120°F (0°C to +49°C) | |
| Humidity | 10% to 85% Relative Humidity (non-condensing) | |
| Housing Material | 18 GA. steel back box; clear plastic cover | |
| Max. Net Weight | 3 lb. (1.4 kg) | |
| Length | 9.1 in. (23.2 cm) | |
| Width | 2.3 in. (18.4 cm) | |
| Height | 2.3 in. (5.7 cm) | |
| Sampling Tubes | D312 (2.5 ft./0.8 cm); D313 (5.0 ft./1.5 m); D314 (10.0 ft./3.0 m) | |