D321A, D322A, D323A, D324A, D336A Analog Detection Devices

Installation Guide

1.0   Notice

- These instructions cover the installation of detection devices in an analog system controlled by a Fire Alarm Control Panel (FACP) using the Advanced Analog Transmission Protocol. In the analog system, devices receive power and communicate with the control panel over the same two-wire circuit.

- Installing detection devices in an analog system consists of:
    - Addressing the Devices
    - Wiring the Detector Bases in a Polling Circuit
    - Attaching the Detection Devices to the Bases

⚠️ **CAUTION** **These instructions detail procedures to follow in order to avoid damage to equipment.**

2.0   Installation Standards

- Install, test, and maintain these devices according to these instructions, NFPA 72, Local Codes and the Authority Having Jurisdiction. Failure to follow these instructions may result in failure of the detector to initiate an alarm condition. Radionics is not responsible for improperly installed, tested or maintained detectors.

3.0   Detector Base and Head Specifications

Table 1: Detector Bases Specifications

Model #	Description	Voltage Range
D321A	6" Detector Base	17 - 39.5 V DC
D336A	4" Detector Base	17 - 39.5 V DC

- The D321A analog detector base installs easily on three- or four- inch square back boxes. The D336A requires a 3 inch octagonal box for mounting purposes. The D321A can use either a 4 inch octagonal box or a 4 inch square box. Mount the detector base to an appropriate back box using the mounting holes. Use 3M Weatherban™ #606 non-flammable sealing compound to seal field wiring openings in the mounting back box to reduce the "stack effect.".

- See Table 2 for the detector heads that can be installed on the D321A and D336A detector bases.

Table 2: Detector Head Specifications

Model #	Description	Voltage Range	Idle Current	Alarm Current	Type of Detector
D322A	Heat Head	17 – 39.5 V DC	390 µA	8 mA*	Heat
D323A	Smoke Head	17 - 39.5 V DC	390 µA	8 mA*	Photoelectric
D324A	Smoke Head	17 - 39.5 V DC	390 µA	8 mA*	Ionization

- *25 mA max. The panel latches the LED on to the first five devices. Add 8 mA for remote LED.

✓ **IMPORTANT** **Smoke detectors mounted on a wall must be at least 4 inches, but no more than 12 inches, below the ceiling.**

4.0   LED Functions

- There is not an LED on either the D321A base or the D336A base. There is an LED on each of the detector heads. The LED flashes red when polled (once every 18 seconds), and it latches steady red when an alarm condition occurs.

5.0   Device Address

- Each analog detector device is assigned a specific address. The address is set by programming an EEPROM microchip. Each D9067's polling circuit can support up to 126 addresses. It is not necessary to wire the devices in any particular order in the circuit.

5.1   Using the D5070 Analog Device Programmer

IMPORTANT

The D5070 Analog Device Programmer must be used to set the addresses on the D322A, D323A and D324A detector heads. Make sure the battery is connected prior to programming.
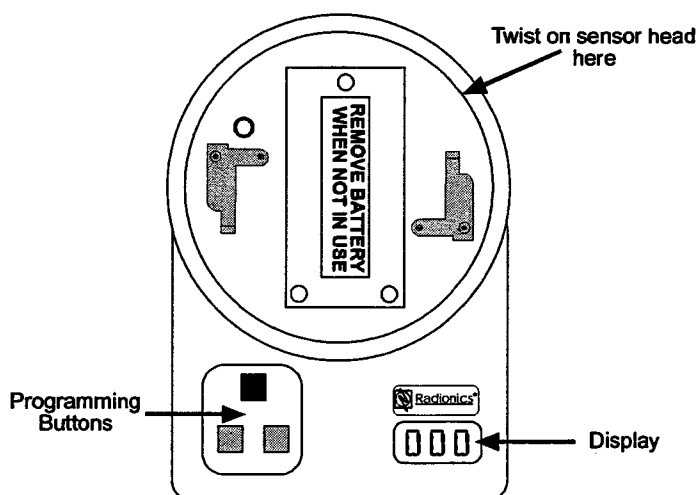

Figure 1:D5070 Analog Device Programmer

D5070 Programming Buttons

- See Table 3 for a description of the three programming buttons on the D5070 Analog Device Programmer.

Table 3: Programming Button Description

Programming Button	Description
Left Gray Button	Power On. Automatically reads the address of a sensor. Subsequent operations will advance the device by ten.
Right Gray Button	Power Off. Advances the device address by one.
Red Button	Stores the displayed address to the device, and is used to read analog levels.

Setting the Address

- The following steps explain how to set an address using the D5070 Analog Device Programmer.
    1. Install the sensor onto the programmer, ensuring that the sensor tabs align with the programmer grooves.
    2. Press the left gray button to turn the programmer on. A battery check message will appear followed by the device's address (sensors that are not programmed will read address 127).
    3. Set the required address by pressing the left and right 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.

       37090C   11/98

Reading Analog Value

- **Ion detectors require a 30 second stabilization period. Do not attempt to read the Ion Detector head analog value during this period.** 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 address information.

- Install the sensor and power up the D5070 as previously described. Press the red button. An "A" will appear on the display followed by the analog value. This value will be continuously updated for 3 minutes or until the unit is turned off.

Table 4: Address Information Data Table

Device	Standard Pre-Alarm Threshold	Standard Fire Threshold	Just Calibrated	Range	Normal Reading	Fault Input	Fire
D322A Heat Detector	113°F (45°C)	142°F (61°C)		136°F - 149°F (58°C - 65°C)			
D323A Photoelectric Detector	2.5 %	3%	.1%	.5% - 4%			
D324A Ion Detector	1%	1%	1%	N/A			
D325A Manual Station					16		64
D326A Point Contact Module					16	44	64
D327A NAC Output Module					16	44	
D334A Point Contact Module					16	44	64

Display Message

- See Table 5 for a description of the display messages that may appear on the D5070 Analog Device Programmer.

Table 5: Display Message Descriptions

Display Message	Description
bat	Battery Check. Displayed upon power up, and when the battery is low. A low battery is good for up to 3,000 address setting operations.
E0	Address past 127 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 device..
E3	Replace detector.
E4	Cannot find the device to program.
E5	Device read error.
E6	Replace detector.

6.0 Detector Base Wiring

⚠️ **CAUTION**

Remove AC and standby power from the Fire Alarm Control Panel (FACP) before connecting or disconnecting any devices.

- Analog Polling Circuits connect to the FACP over two-wire cable. The bus protocol resists interference from most types of EMI and RF generated noise. There are no special wiring requirements other than attention to wire gauge. Under extremely noisy conditions, use twisted pair wire to reduce interference.

- If EMI is a problem, use shielded cable, being careful to ground the drain wire to the "E" terminal on the FACP Control Module (See Figure 5).

6.1 Circuit Configuration

• Polling circuits connect to the FACP in either a Class "A" or a Class "B" configuration. "T" tapping is acceptable in Class "B" circuits. For specific Class "A" and "B" circuit installation requirements, see NFPA 72.

• See the Installation Instruction for the FACP for instruction on connecting the polling circuit to the panel.

6.2 Class A, Style 6 Circuit Wiring

• Install the D321A or D336A Detector Bases in the polling circuit by connecting the Data/Power Positive (+) and Data/Power Common (-) terminals as shown in Figure 2.

• The Data/Power Positive (+) wire of the polling circuit connects to the + terminal of the Data Terminal Block at the top of the Control Communicator. The Data/Power Common (-) wire of the polling circuit connects to the (-) terminal of the Data Terminal Block. Connect the returning Data/Power wires to the respective terminals. See Figures 2 and 3 for wiring details.
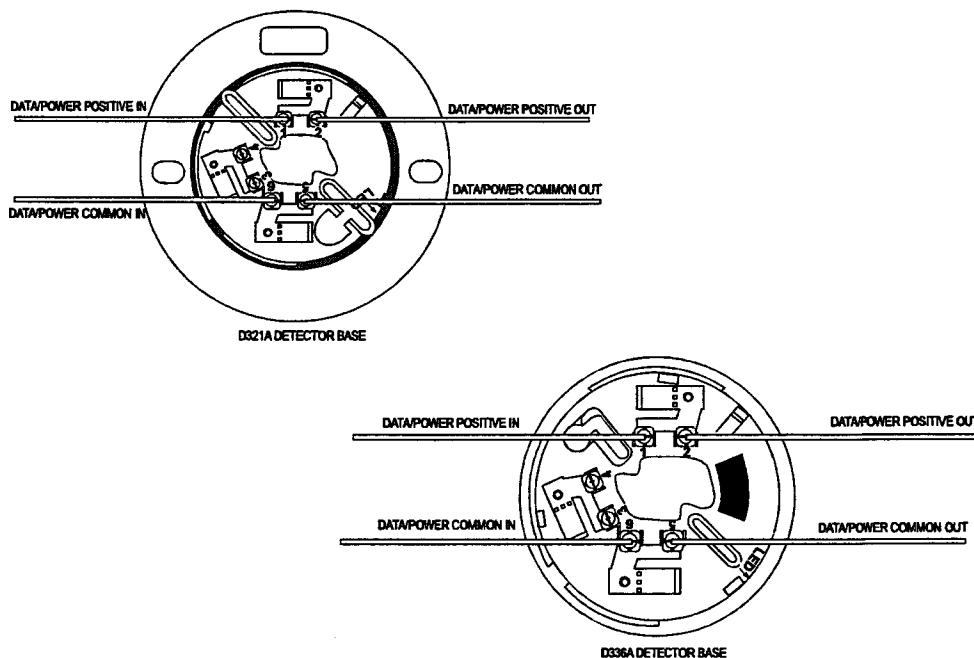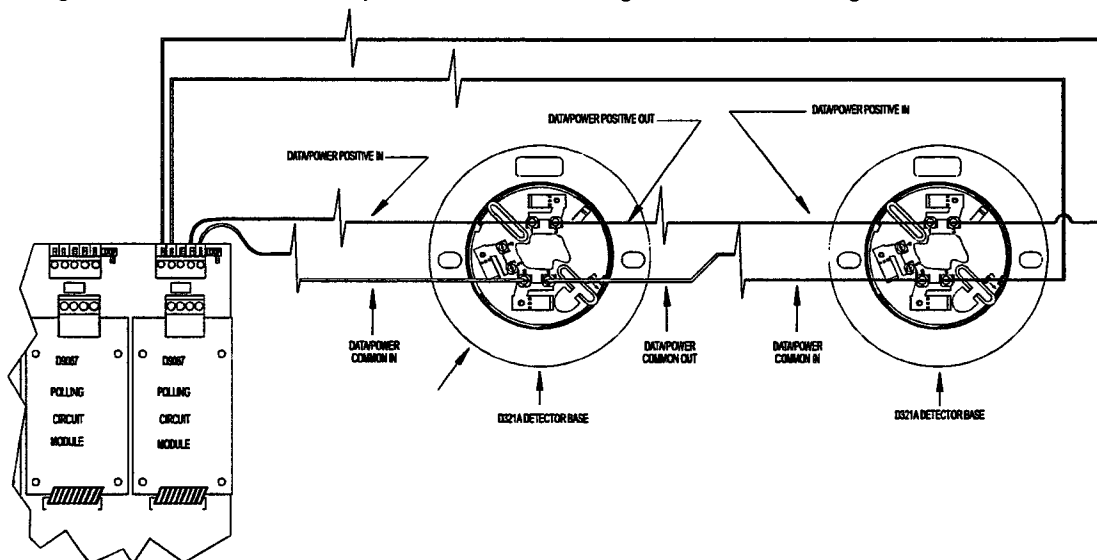

Figure 2: Detector Base Wiring

Figure 3: D9067 Class A, Style 6 Circuit

Page 4
37090C 11/98

6.3 Class B, Style 4 Circuit Wiring

- Install the D321A or D336A Detector Bases in the polling circuit by connecting the Data/Power Positive (+) and Data/Power Common (-) terminals. Refer to Figures 2 and 4 for wiring details.

- The Data/Power Positive (+) wire of the polling circuit connects to the + terminal of the Data Terminal Block at the top of the Control Communicator. The Data/Power Common (-) wire of the polling circuit connects to the - terminal of the Data Terminal Block.

- Connect the positive and negative terminals of the Data Terminal Block with jumper wires as shown in Figure 4.
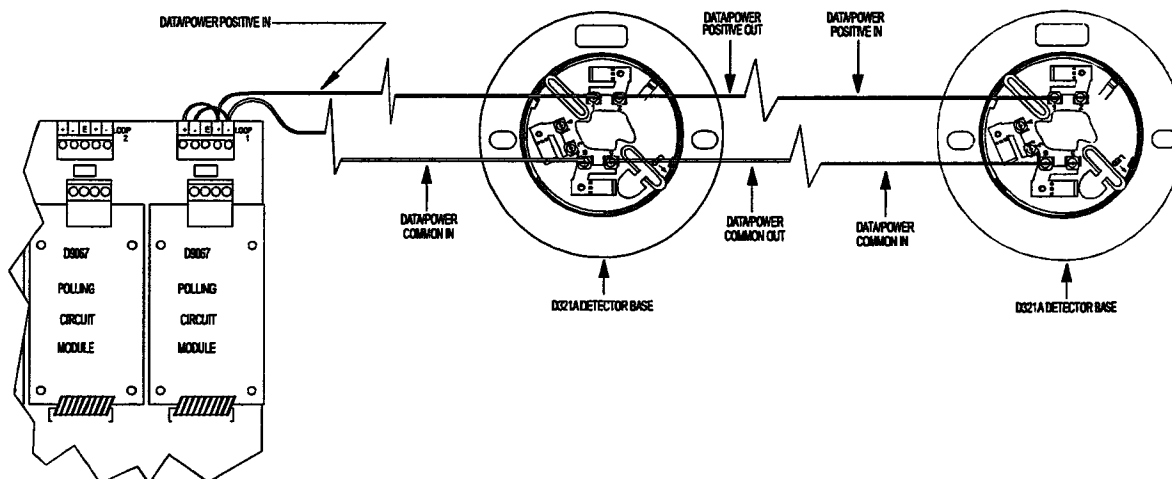

Figure 4: D9067 Class B, Style 4 Circuit

6.4 Circuit Length

- **Data Circuit Length** is the distance over the circuit wire from the connection at the D9067 Module to the most distant device and back to the D9067 Module. Data Circuit Length must include the distance to any device connected to the circuit in a "T" tap. **The screw terminals will accept 14 AWG (1.5 mm), but this will reduce the allowable length of the circuit.**

Table 6: Polling Circuit Length/Wire Gauge

Polling Circuit Length	Wire Gauge
Up to 4,000 ft. (1,219 m)	18 (1.1 mm)
Up to 7,200 ft. (2,195 m)	16 (1.3 mm)
Up to 6,800 ft. (2,073 m)	14 (1.5 mm)

6.5 Shielded Cable

- If shielded cable is used, and the cable is of good quality, then it should not have a significant effect on the polling circuit length. Good quality shielded cable will allow 1μfd of capacitance, 1mH of inductance and 50 ohms resistance.

- Connect the drain wire for shielded cable to the E terminal of the Data Terminal Block.

IMPORTANT ✓ **Unless shielded cable is properly grounded, it may aggravate rather than eliminate noise problems. The shield must be reconnected each time the cable is cut to install a device.**
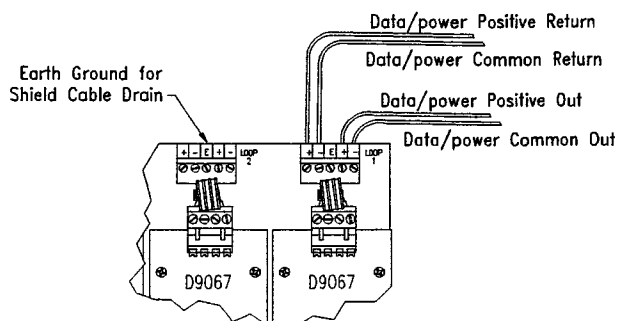

Figure 5: "E" Terminal Location

6.6   Remote Annunciation

• Terminal points 3 and 4 serve as connection points for a remote LED on the D321A and D336A detector bases.

• Each analog detector device is assigned a specific address by programming an EEPROM microchip on that device. Each polling circuit can support up to 126 addresses. It is not necessary to wire the devices in any particular order in the circuit.

7.0   Attaching the Detection Devices to the Bases

• The following instructions will explain how to activate the security feature to prevent any unauthorized head removal, and to deactivate the security feature so that the sensor can be removed from the base. See Figure 6 for more information.

1. Take any sensor and turn it over to view the bottom as shown in Figure 6. Using a small flathead screwdriver, break the tab. This will allow the base security locking tab to stay elevated, thus preventing the sensor removal from the base.

2. To remove the sensor from its base, take a small flathead screwdriver and insert it into the hole on the outer rim of the sensor. **Use caution when pushing the base security tab down. Only use enough force to remove the sensor.** Rotate the sensor counter-clockwise enough to clear the base security locking tab when pushing down on the tab. Once this is accomplished, the sensor can be completely removed.
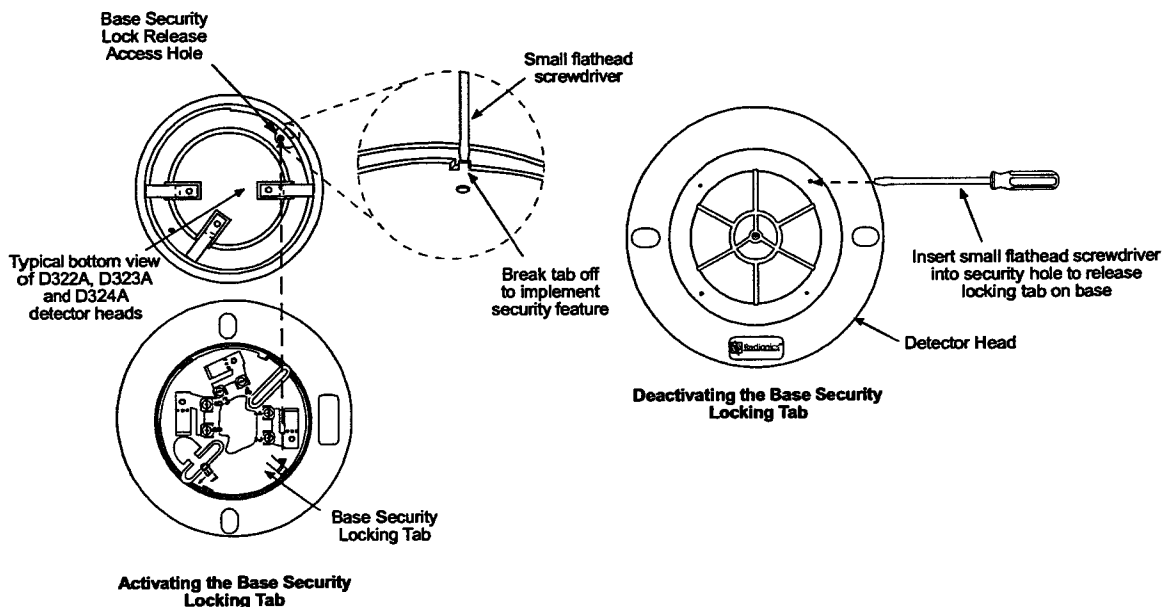
Base Security Lock Release Access Hole

Small flathead screwdriver

Typical bottom view of D322A, D323A and D324A detector heads

Break tab off to implement security feature

Insert small flathead screwdriver into security hole to release locking tab on base

Detector Head

Deactivating the Base Security Locking Tab

Base Security Locking Tab

Activating the Base Security Locking Tab

Figure 6: Base Security Locking Tab

8.0   Testing Instructions

• Test detection devices immediately after installation. Test smoke detectors according to Chapter 7, NFPA 72, or more often as required by local code. The approved testing method for the D323A Photoelectric Smoke Detector and the D324A Ionization Smoke Detector is a smoke test. To perform the smoke test on the D323A and D324A detector heads, use the Radionics D1002 Smoke Test Pole. NFPA regulations require a calibrated test of the detector. The D10002 Smoke Test Pole does not meet NFPA requirements for a calibrated test, but it does provide a simple go, no-go type test.

⚠ CAUTION **The D322A Heat Detector should be tested with a controlled heat source, but NOT an open flame.**

Radionics®