

## Installation Instructions

### 1.0 Introduction

The D285 Series are UL Listed, open-area photoelectric smoke detectors designed for use with commercial fire protective signaling systems and household fire warning systems (see NFPA 72, "The National Fire Alarm Code"). The detectors are available in 2 and 4-wire models with an optional 135°F (57°C) fixed-temperature heat sensor.

For commercial and industrial installations, 30 ft. (9.2 m) spacing between detectors is recommended (in accordance with NFPA 72).

When properly installed using the D280/D290 Series bases, tamper protection is provided by IN/OUT wiring of the positive power line. This causes the control to initiate a trouble signal when a detector is removed from its base. Supervision of 2-wire systems is provided by the master control, and 4-wire system supervision is provided by an End-of-Line Power Supervision device such as a D275 or a D293E Power Supervision Base and an EOL resistor as specified by the control manufacturer.

### FCC Notice

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesirable operation. Changes or modifications not expressly approved by Detection Systems, Inc. can void the user's authority to operate the equipment.

### 2.0 Specifications

#### Product Description

- **D285** Detector only (requires base)
- **D285TH** Detector w/integral 135°F (57°C) heat sensor (requires base)
- **D285DH** Detector only, for D340 Series Duct Smoke Detectors
- **D287** Base only, 2-wire
- **D292** Base only, 4-wire
- **D293A** Base only, 4-wire, Form "C" Aux. relay
- **D293E** Base only for power supervision, 4-wire, EOL relay, Normally Open Aux. relay
- **D293S** Base only, 4-wire, with Sounder
- **D275** EOL supervision module for 4-wire systems
- **TP280** Trim Plate 6 in. (16.2 cm) in diameter

The UL Compatibility Identifier for the D285 Series detectors is the letter "A." To determine the UL Compatibility Identifier for use with the D287 base, see the Radionics 2-Wire Smoke Detector Compatibility Technogram (P/N 31866).

- **Operating Temperature** +32° to 100°F (0° to +38°C)  
0 to 95% relative humidity (non-condensing)

#### Detector Power Requirements:

- **Standby Voltage:** 2-wire 8.5 to 33.0 VDC  
4-wire 10.0 to 30.0 VDC
- **Maximum RMS Ripple:** 25 percent of DC input.
- **Start-up Current:** 120 micro-amps maximum
- **Standby Current:** 80 micro-amps @ 12 VDC  
90 micro-amps @ 24 VDC  
100 micro-amps @ 33 VDC

**Note:** The D293E = 24 mA @12 & 24 VDC

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### Alarm Current

- **2-wire** Dependent on control panel. Panel must limit the alarm current to 100 mA maximum.
- **4-wire** D292: 48 mA @ 24 VDC and 51 mA @ 24 VDC (70 mA max. @ 30 VDC)  
D293E: 80 mA @ 12 and 24 VDC (100 mA max. @ 30 VDC)  
D293S: Base 48 mA @ 12 VDC, Sounder 15 mA @ 12 VDC, 25 mA @ 24 VDC
- **Power-up Time:** 22 seconds maximum.

### Compatible Control Panels:

- **2-wire:** See the Radionics 2- Wire Smoke Detector Compatibility Technogram (P/N 31866).

**Notice:** Radionics makes no claim written, oral, or implied that the D285 Series smoke detectors will work with any 2-wire control panels except those specified in the Base Compatibility chart in the Radionics 2-Wire Smoke Detector Compatibility Technogram (P/N 31866).

- **4-wire:** Compatible with all UL Listed 4-wire control panels. Refer to the manufacturer's Installation Instructions for proper End-of-Line resistor selection.

## 3.0 Mounting

Before mounting, remove the dust cover from the detector. The dust cover may be replaced during construction periods, but must be removed once the alarm system is enabled.

**Note:** The Tamper screw is located in the recess on the top of the dust cover.

Mount the base in accordance with its instructions.

Mount the detector to the base by turning it clockwise until it clicks into place. When it is secure, the alignment line will be lined-up with the tamper screw hole (see Figure A).

**Note:** The detectors are "keyed" and should not be forced onto the bases.

## 4.0 Testing the Installation

1. Check the wiring from the control panel to the last head on each run for proper polarity and continuity.
  - Make sure each run terminates with an End-of-Line resistor as specified by the control panel manufacturer.
  - Make sure 4-wire runs terminate with EOL Modules or D293E bases.
2. Apply power to the system. Check for alarms and troubles.
  - Note which detectors are in alarm (if any) and then shut the system down. Remove these detectors from their bases and recheck the bases for proper wiring. If the problems persist, replace the affected detectors or swap them with known good units. This will determine if the problem is caused by the detector or the base.
  - In the event of a system alarm with no detector alarms present, remove all detectors and check the wiring at each base. Pay close attention to the wiring of each EOL Resistor and EOL Module.
3. When the system is free of alarms, check each detector to ensure that the red LED indicator is flashing approximately every three seconds. This verifies that the detector is receiving power and operating properly.
4. Test each detector to ensure it will cause a control panel alarm. This is the only way to ensure proper operation. To alarm the detectors, do one of the following:
  - Place a magnet horizontally against the detector's side (centered over the "T" marked on the head) to activate an internal reed switch, or
  - Use a UL Listed Aerosol smoke detector tester such as the Home Safeguard Industries' 25S to simulate an alarm. Follow the instructions with the Aerosol smoke detector tester.

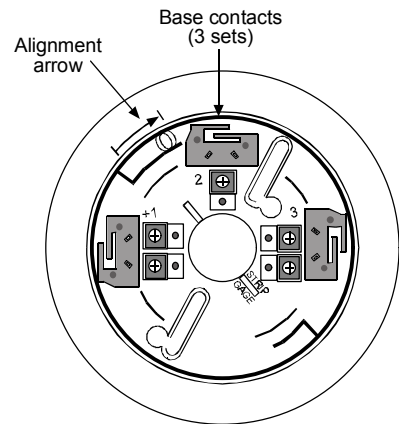


Figure A: Mounting the Base

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**Note:** When a detector alarms, the red LED indicator will activate and latch into the ON position. Clear the alarm before proceeding to the next detector.

5. Finally, check the overall loading of the alarm loop by measuring the voltage across each End-of-Line Resistor. This voltage should equal or exceed the minimum specified by the control panel manufacturer.

### 5.0 Maintenance

**Note:** It is important to notify all concerned parties prior to any maintenance or testing of the fire alarm system, and then again after completion of the tests.

At least once a year, the detector and base should be cleaned. Use a vacuum or clean/dry compressed air. Particular attention should be paid to the screens. In dusty areas or areas of heavy insect concentration, cleaning may be required more often.

To clean the detectors, perform the following:

1. Remove the detector from the base. Clean the base with a clean cloth and common window cleaner.
2. Remove the cover of the detector. Use a thin, flathead screwdriver to pry the chassis from the cover. Insert the screwdriver into the cover slots and pry up (see Figure B ①).
3. Gently pry the cover tab away from the chamber cover and pull the chamber cover up and away from the chamber (see Figure C ②).
4. Remove any dust or debris from the chassis area using clean, dry compressed air or a vacuum.
5. Replace the chamber. Make sure the hole for the LED (and thermistor) is properly aligned over the LED (and thermistor). For easiest results, place the chamber parallel to the chassis, then gently snap the locking tabs into place.
6. Replace the detector's cover. Be careful to line up the holes for the LED (and thermistor).
7. Return the detector to its base.



**The detectors should be tested for proper calibration after cleaning. Use one of the tests described in Section 6.1, 6.2, or 6.3**



**Do not paint the detectors. Paint or other foreign matter covering the screens may prohibit or retard smoke from entering the detector.**

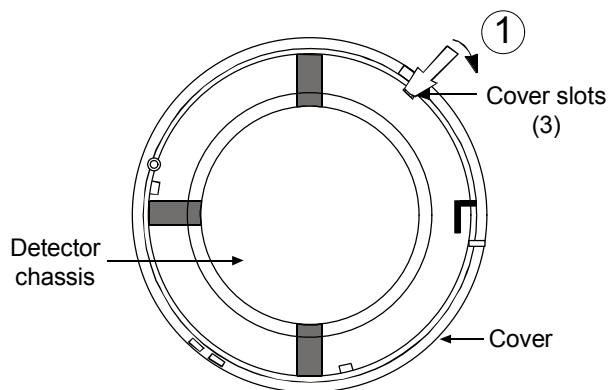


Figure B: Removing the detector's cover

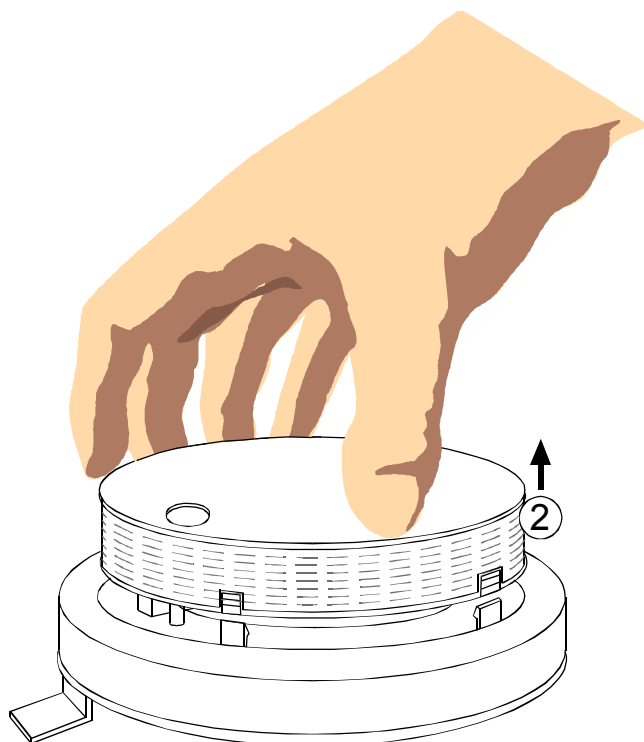


Figure C - Removing the detector chamber cover

## 6.0 Periodic Testing

**Note:** The calibration of the detector is very important in determining its continued operation. Depending on local regulations, the frequency of calibration testing may be required more often than once a year. The National Fire Protection Association (NFPA) Standard 72, "The National Fire Alarm Code" recommends calibration tests be made at installation, then every other year, and Functional testing should be done annually.

**Note:** It is important to notify all concerned parties prior to any maintenance or testing of the fire alarm system, and then again after completion of these activities.

The calibration can be checked (to meet NFPA 72 "The National Fire Alarm Code" requirements) using any of the following methods. These tests will confirm whether or not the detector is within its factory marked calibration range.

### 6.1 Visual Check

This detector includes the Chamber Check Automatic Trouble Indication which allows the detector to automatically indicate if its calibration is out of the factory listed range. This allows you to meet the NFPA guidelines for sensitivity testing by visually inspecting the detector and checking the flash rate of the LED.

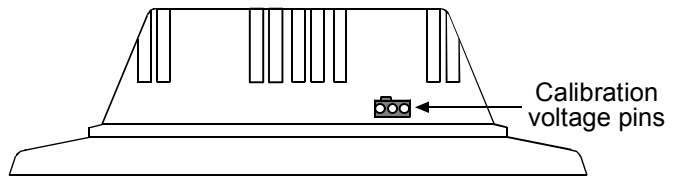
If the calibration is out of range for more than 24 hours, the alarm LED on the detector will begin to flash once per second. The LED will flash once every three seconds when the detector is operating normally.

Perform the visual check on all detectors before resetting power. Disconnecting the detector power will erase this indication. If the detector has been reset within the last 24 hours, or you are unsure of the last reset time, you should use the magnet test or voltage output to confirm the sensitivity.

### 6.2 Magnet Test

Place a magnet horizontally against the detector, centered over the "T" marked on the head. Observe the LED.

- If the detector is within the factory marked calibration range, it will go into alarm and the alarm LED will latch ON.
- If the detector is too sensitive, the LED will flash six times rapidly (once every 1/2 second) and then the detector will go into alarm.
- If the detector is not sensitive enough, the LED will flash four times slowly (once every two seconds) and then the detector will go into alarm.
- If the detector is not operational, it will not signal an alarm.



**Figure D: Calibration voltage pins**

### 6.3 Voltage Measurement Test

Plug a D1005 Test Cable (optional) into the calibration voltage pins (see Figure D).

Connect a digital voltmeter to the D1005 Test Cable. Connect the negative terminal of the meter to the black wire of the D1005 and connect the positive terminal of the meter to the test cable's red wire. The white wire of the D1005 is not used.

- The voltage measured by the voltmeter equals 1/2 the sensitivity (in %/ft. obscuration) of the detector.
- Multiply the voltage by two. The result should be within the factory marked calibration range printed on the label attached to the bottom of the detector.

If the detector is outside of the factory marked calibration range, it should be removed and cleaned as described in Section 5.0.

- Recheck the calibration voltage measurement.
- If the detector is still outside of the factory marked calibration range after cleaning, send the unit back to Radionics for re-calibration.

### 6.4 Thermistor Test

Expose the thermistor to a heat source such as a hair dryer or a shielded heat lamp. Expose the thermistor until the detector goes into alarm and the alarm LED latches on. If the unit does not go into alarm, send the unit back to Radionics for repair.

**Note:** Be sure to clear each alarm for each test before proceeding to the next detector.