

## Installation Instructions D285 and D285TH Photoelectric Smoke Detectors

### 1.0 General Information

The D285 and D285TH are U.L. 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 two and four 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.

### 2.0 Specifications

#### • Product Description:

D285	Detector only (requires base)
D285TH	Detector w/integral 135°F heat sensor (requires base)
D287	Base only, 2-wire
D288	Base only: 2-wire, wide diameter
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

The U.L. Compatibility Identifier for the D285 and D285TH detectors is the letter "A." To determine the U.L. Compatibility Identifier for use with the D287 base, see 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

#### • Alarm Current:

2-wire	Dependent on control panel. Panel must limit the alarm current to 100 mA maximum.	
4-wire	D292:	48 mA @ 12 VDC 51 mA @ 24 VDC (70 mA max. @ 30 VDC)
	D293A:	56 mA @ 12 & 24 VDC (75 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 Technogram P/N 31866.

**Notice:** Radionics, Inc. 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 Technogram 31866.

4-wire: Compatible with all U.L. 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.

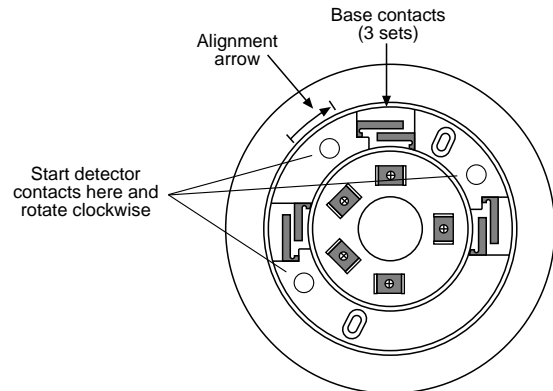


Figure A - Mounting to the base

### 4.0 Testing the Installation

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.

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.

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.

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 U.L. 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.

**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.

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

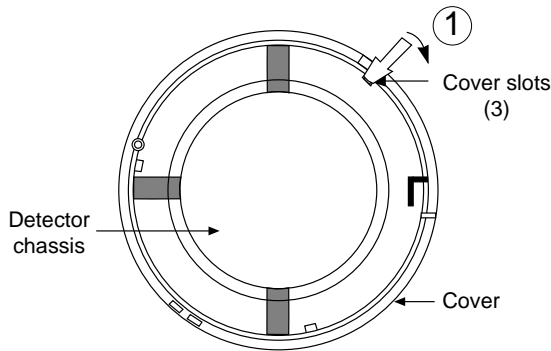
**Note:** It is important to notify all concerned parties prior to any maintenance or testing of the fire alarm system, and then again after completion of these activities.

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:

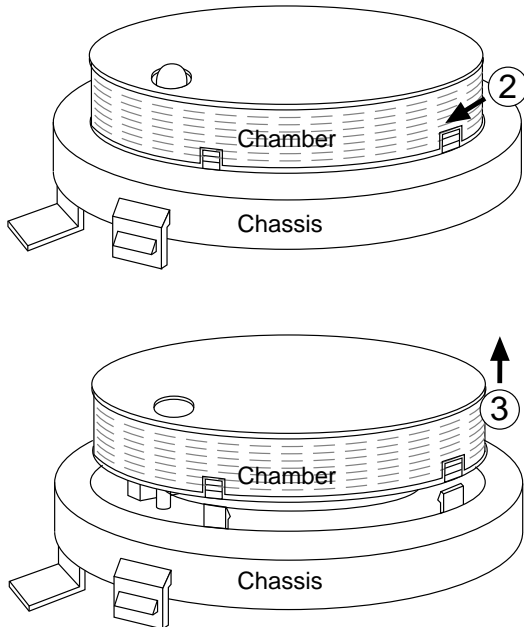
- Remove the detector from the base. Clean the base with a clean cloth and common window cleaner.

- 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).



**Figure B** - Removing the detector's cover

- Using a thin flathead screwdriver, gently pry the cover tab away from the chamber (see Figure C) and pull the chamber up and away from the chamber (see Figure C).



**Figure C** - Removing the detector chamber cover

- Remove any dust or debris from the chassis area using clean, dry compressed air or a vacuum.
- 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.
- Replace the detector's cover. Be careful to line up the holes for the LED (and thermistor).
- Return the detector to its base.

**Important:** 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.

## 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, after one year, then every other year, and Functional testing should be done monthly.

**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 3 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.

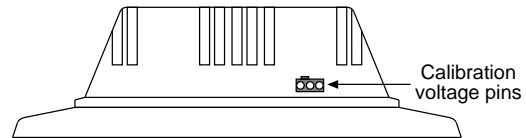
## 6.2 Magnet Test

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 6 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 4 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.

## 6.3 Voltage Measurement Test

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



**Figure D** - Calibration voltage pins

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 2. 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, Inc. 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.

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

## 7.0 FCC Compliance Notice

This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in strict accordance with the manufacturer's instructions and recommendations, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment on and off, the user is encouraged to try to correct the interference by one or more of the following measures:

- 1) Reorient or relocate the receiving antenna.
- 2) Increase the separation between the equipment and the Receiver.
- 3) Connect the equipment into an outlet on a circuit different from the Receiver.
- 4) Consult the installing company or an experienced radio/TV technician for help.

The booklet, "How to Identify and Resolve Radio-TV Interference Problems," prepared by the FCC may prove helpful. It is available from the U. S. Government Printing Office, Washington, DC 20402. Specify Stock No. 004-000-00345-4.

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