Advanced Photoelectric Smoke Detectors

Models PSD-7157 and PSD-7157D

Kidde Fire Systems
A UTC Fire & Security Company

Effective: January 2010
K-70-02

FEATURES

- ***Approvals/Listing***
  - ***US and Canadian UL Listed (cULus)***
  - ***FM Approved***
  - ***CSFM Approved***
  - ***NYC MEA Accepted***
- ***Nominal Sensitivity***
  - ***PSD-7157: 3.25% per ft. Obscuration***
  - ***PSD-7157D: 2.40% per ft. Obscuration***
- ***Sensitivity Measurement/Testing***
  - ***Wireless Measurement in %/ft. Obscuration***
  - ***Remote and Local Functional Test Capability***
- ***Wide Range of Input Voltage 10.2 to 36.8 Vdc***
- ***Low Current Design***
- ***Dual Response LEDs Allow 360-degree Viewing***
- ***Trouble Indication***
- ***Low Profile Appearance Using Surface Mount Technology***
- ***Electrically and Mechanically Compatible with all Fenwal Smoke and Electronic Heat Detectors and Bases***
- ***Interchangeable 2-Wire and 4-Wire Bases***
- ***Universal Relay Modules***
- ***Non Polarized***
- ***Locking Feature for Vandal Resistance***
- ***Fine Mesh Insect Screen***
- ***EMI and RFI Resistant***

DESCRIPTION

The Models PSD-7157 and PSD-7157D Photoelectric Smoke Detectors respond to a broad spectrum of both flaming and smoldering fire conditions. The Detectors have advanced solid-state, low-voltage, surface-mount circuitry and are designed for 2-Wire and 4-Wire installation using the appropriate Detector base. The characteristic 360-degree detector design permits smoke entry from any direction. A unique sensing chamber design permits the operation of the Models PSD-7157 and PSD-7157D in open areas with air velocities from 0 to 300 fpm and 0 to 4000 fpm respectively. The Model PSD-7157D is also suitable for duct housing applications in air velocities from 500 to 4000 fpm. The Detectors are designed for open area/duct housing applications per UL268/UL268A and may be installed in systems intended for Releasing Device Service through use of compatible Fire Alarm Control Panels.

Two Red Light Emitting Diodes are located diametrically opposite each other so as to allow 360-degree viewing. Both LEDs continuously indicate the operating condition of the Detector. During standby, the LEDs flash once every six seconds. During alarm, both LEDs light steady at full brilliance. A double flash every six seconds indicates a detector with a sensitivity threshold outside acceptable limits. A unique gated output circuit design provides improved stability and transient suppression. Special signal processing techniques verify the presence of smoke before the detector will alarm. A fine mesh insect screen protects the chamber area and is used to avoid potential nuisance alarms. The detector head is installed into the base with a simple twist-lock action. A locking feature is provided for vandal resistant security.

Table 1 lists the Technical Specifications for Models PSD-7157 and PSD-7157D Photoelectric Smoke Detectors.

CONTROL UNITS

The Models PSD-7157 and PSD-7157D Detectors are designed for operation with control units and releasing devices having specific voltage and current characteristics that are compatible with the detector circuitry. The Detectors are compatible with the Kidde AEGIS control unit. The Kidde AEGIS has three detection circuits which can support up to 26 detectors per circuit.

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Table 1: Technical Specification

Model Number	PSD-7157	PSD-7157D
Part Number	71-570000-001	71-570000-002
Detection	Photoelectric	Photoelectric
Approvals	cULus, FM, CSFM, MEA-NYC	cULus, FM, CSFM, MEA-NYC
UL Compatibility I.D.	P55FE1	P55FE1
Listed Spacing	30 ft. (9.1 m) centers or 900 ft.^{2} (83.6 m^2)	30 ft. (9.1 m) centers or 900 ft.^{2} (83.6 m^2)
Nominal Sensitivity	3.25% + 0.45% - 1.78% per foot Obscuration	2.40% + 0.04% - 1.34% per foot Obscuration
Standby Voltage (Vdc) Using 2WB: Using 4WRB:	 10.2 to 36.8 16.8 to 36.8	 10.2 to 36.8 16.8 to 36.8
Maximum Current Standby: Alarm:	 70 µA 100 mA	 70 µA 100 mA
Response Indicators Quantity: Standby Condition: Thermistor Trouble: Alarm Condition:	 2 external LEDs One flash every 11 seconds Double flash every 11 seconds Steady at full brilliance	 2 external LEDs One flash every 11 seconds Double flash every 11 seconds Steady at full brilliance
Operating Environment Operating Temperature: Storage Temperature: Relative Humidity:	 32° to 120°F (0° to 49°C) -20° to 180°F (-29° to 82°C) 0 to 93% Non-condensing	 32° to 120°F (0° to 49°C) -20° to 180°F (-29° to 82°C) 0 to 93% Non-condensing
Air Velocity Open Area: Duct Housing: Altitude:	 0 to 300 fpm (0 to 1.5 m/s) N/A Up to 7,500 feet (2,286 m)	 0 to 4000 fpm (0 to 20 m/s) 500 to 4000 fpm (2.5 to 20 m/s) Up to 7,500 feet (2,286 m)
Physical Characteristics Material and Finish: Weight:	 High-impact, flame-retardant plastic, off white 35.3 oz. (110g) w/o base	 High-impact, flame-retardant plastic, off white 35.3 oz. (110g) w/o base
Dimensions Detector Height: Detector Diameter: Base Height: Base Diameter:	 1-3/8 in. (35 mm) 3-29/32 in. (99 mm) 3/64 in. (11 mm) 5-29/32 in. (150 mm)	 1-3/8 in. (35 mm) 3-29/32 in. (99 mm) 3/64 in. (11 mm) 5-29/32 in. (150 mm)

DETECTOR BASE OPTIONS

The Models PSD-7157 and PSD-7157D can be used with the detector base options and accessories in Tables 2. Various base options are available to provide auxiliary relay and/or remote indication and remote test feature.

The Models PSD-7157 and PSD-7157D Photoelectric Smoke Detectors may be interchanged with other Fenwal Series THD-705X Electronic Heat Detectors and Series CPD-705X Ionization Smoke Detectors when using multifunction base configuration.

SPACING (OPEN AREA LOCATION)

The Models PSD-7157 and PSD-7157D Detectors are listed to be installed on maximum 30 ft. (9.1 m) centers, typically on smooth ceilings up to 15 ft. (4.6 m) high and will operate with minimum air circulation.

Resultant maximum 900 square foot (83.6 m^2) spacing may be used as a reasonable guide for comparable applications. Where special conditions exist (ceiling obstructions, high air exchange rates, etc.), reduced spacing must be used to achieve adequate protection. Computer rooms and other such installations may require spacing with a maximum of 200 $ft.^2$ (18.6 m^2) due to high air exchange rates.

Detectors should not be located in areas with excessive exhaust fumes, kitchen areas, near fireplaces or furnace rooms and within three (3) ft. (.9 m) of air supply ducts or air diffusers.

For additional information, consult the Fenwal Automatic Fire Detection Application Engineering Manual MC-402, NFPA-72 and the local Authority Having Jurisdiction.

WIRING DIAGRAMS

For detailed wiring diagrams with Fenwal 2- and 4-wire bases, please refer Fenwal Document 70.104

INSTALLATION

Detector bases are directly mounted on the electrical junction boxes (3-inch, 3-1/2-inch and 4-inch octagonal, 3-inch round or 4-inch square) (76 mm, 89 mm, 102 mm octagonal, 76 mm round or 102 mm square) without the need for any mechanical adapter required. Refer Fenwal Document 06-235056-001 for additional details.

The detector bases also include a locking feature that prevents removal of the detector without use of a tool.

TESTING AND MAINTENANCE

Testing shall be performed upon installation of the detector and once a year thereafter as stated in NFPA-72 latest edition.

Detector sensitivity shall be checked within one year of installation and every alternative year thereafter as stated in NFPA 72. Refer Fenwal Documents 06-236524-001 and 06-235056-001 for details on using the Infrared Wireless Sensitivity Tester Model DST-003. The tester provides direct readout in percent per foot obscuration from a distance of 15 ft. without removing the detector from its base. A go/no-go test can be performed using a test magnet.

The recommended requirement for detector maintenance consists of an annual cleaning of dust from the detector head by using the suction of a vacuum cleaner. Cleaning programs should be geared to the individual environment in conformance with NFPA 72.

CAUTION

Do not attempt disassembly of the factory sealed smoke detector. This assembly is sealed for your protection and should not be opened for servicing. Opening of the detector will void its warranty.

SPARE PARTS

The Models PSD-7157 and PSD-7157D Detectors are factory repairable only and have no field serviceable spare parts. No field repair should therefore be attempted. For service, return detector head intact to manufacturer.

ARCHITECT/ENGINEER SPECIFICATIONS

The contractor shall furnish and install where indicated on the plans, UL268/UL268A listed Photoelectric Smoke Detectors, Fenwal Models PSD-7157 and PSD-7157D. The combination detector head and twist-lock base shall be UL Listed compatible with a UL Listed fire alarm control unit. The Models PSD-7157 and PSD-7157D Photoelectric Smoke Detectors shall share interchangeable bases with the CPD-7054 and CPD-7054D Ionization Smoke Detectors and the THD-7052 and THD-7053 Heat Detectors.

The Fenwal Models PSD-7157 and PSD-7157D Photoelectric Smoke Detectors shall have two Red LEDs located diametrically opposite each other so as to allow 360-degree viewing. The LEDs shall continuously indicate the operating condition of the Detector. During standby, the LEDs shall flash once every six seconds. During alarm, both LEDs shall light steady at full brilliance. If the sensitivity of the detector drifts outside acceptable limits, the LEDs shall double flash every six seconds. The detector may be reset by actuating the control panel reset switch. The vandal-resistant security locking feature shall be used in those areas as indicated on the drawings. The locking feature shall be field removable when not required.

It shall be possible to measure the sensitivity of the Fenwal Models PSD-7157 and PSD-7157D Photoelectric Smoke Detectors from a distance of up to 15 feet (4.6 m) without removal from the base. Measurement shall be accomplished with a wireless infrared Fenwal Sensitivity Tester (DST-003) allowing direct measurement in percent per foot obscuration. Sensitivity measurement techniques requiring wiring between the Detector-Base combination and the Tester shall not be acceptable. It shall also be possible to perform a functional test of the detector without the need for generating smoke.

The Models PSD-7157 and PSD-7157D Photoelectric Smoke Detectors shall operate over an input voltage range from 10.2 to 36.8 Vdc. Voltage and RF transient suppression techniques to withstand up to 20 volt/meter shall be employed to minimize susceptibility to false alarms.

Supplementary SPDT relays, remote test, and/or remote LED alarm indicators shall be installed where indicated

Table 2: Ordering Information

Part Number	Model	Description
Detector Heads - Ionization Smoke		
70-540000-001	CPD-7054	Ionization *Advanced* Smoke Detector (cULus)
70-540000-002	CPD-7054D	Ionization *Advanced* Smoke Detector (cULus)
Detector Heads - Photoelectric Smoke		
71-570000-001	PSD-7157	Photoelectric *Advanced* Smoke Detector (cULus)
71-570000-002	PSD-7157D	Photoelectric *Advanced* Smoke Detector (cULus)
Detector Heads - Heat		
70-520000-001	THD-7052	135°F (57°C) Fixed Heat Detector, 15°F (-9°C) Rate of Rise (cULus)
70-530000-001	THD-7053	135°F (57°C) Fixed Heat Detector (cULus)
Detector Bases		
70-501000-001	2-Wire	2-Wire Standard Base. Connects to circuit via screw terminals. (CID = FE51A)
70-501000-002	2WRLT	2-Wire Base w/ Remote LED & Test capabilities. Connects to circuit via screw terminals. Minimum Alarm Current 15 mA @ 24 Vdc. (CID = FE52A)
70-501000-005	2WRB	2-Wire Base w/ 2WRM, Remote LED & Test capabilities. Connects to circuit via pigtail leads. Minimum Alarm Current 19 mA @ 24 Vdc. (CID = FE55A)
70-501000-101	4WRB	4-Wire Base w/ 4WRM, Remote LED & Test capabilities. Connects to circuit via pigtail leads. Minimum Alarm Current 35 mA @ 24 Vdc.
70-500000-004	2WRM	Spare SPDT Relay for 2WRB Bases. Contacts rated 1.0 A, 30 Vdc/0.5 A, 125 Vac.
Detector Accessories		
06-117883-001		Test Magnet
29-116788-001		EOL Supervisory Relay
70-200000-911	RA-911	Remote Alarm Indicator
70-200000-914	RA-914	Remote Alarm Indicator with Smoke Detector Switch
70-500000-003	DST-003	*Advanced* Handheld Wireless Smoke Detector Sensitivity Tester
70-501000-003	MA-001	Mechanical Retrofit Adapter. Allows CPD-705X and PSD-715X Detectors to physically connect to Base P/Ns 70-201000-001, -002, -003, -005 & DH-22. (CID = MAFE1)

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