

# Photoelectric Smoke Detectors

Series PSD-7155 and PSD-7156  
71.55

# FENWAL®

## FEATURES

- UL 268 and 268A Listed #S1064, Vol 12/13, Sec 1
- FM Approved #OW3A2-AY (3230)
- CSFM Listed #07272-1076:117
- MEA Accepted #346-92E
- ULC Listed #3810 D19 - File CS 194
- In Place Sensitivity (% per foot obscuration)
- Optional thermistor heat detector
- Functional Test Capability - Remote and Local (magnet test)
- Input voltage range 10.2 to 36.8 Vdc
- Low Profile Appearance with SMT- Surface Mount Technology
- Electrically and Mechanically compatible with all Fenwal detectors and bases
- Three year warranty
- Optional 2- and 4-wire relay bases
- Universal relay modules
- Nonpolarized
- High air velocity rating
- Low-current design
- Interchangeable bases
- Flashing LED for visual supervision
- EMI/RFI resistant
- Tamper Resistant, Fine Mesh Insect Screen
- Locking feature for vandal resistance
- Nominal sensitivity 3.25% obscuration/foot

## DESCRIPTION

The Series PSD-7155 and PSD-7156 photoelectric smoke detectors respond to a broad spectrum of both flaming and smoldering fire conditions. They incorporate state-of-the-art, solid state, low-voltage circuitry featuring SMT (Surface Mount Technology) and are designed for 2-wire and 4-wire installation with the proper base. The detectors are designed for open area protection (UL 268) and for duct applications (UL 268A). They may be installed in fire protection systems and systems intended for releasing device service with commercially available fire suppression or detection control units, provided compatibility has been established.

These models operate over a 10.2 to 36.8 Vdc range (2WB base only, 24 V nominal) with compatible control units. EMI/RFI noise immunity up to 20 volts/meter assures virtual elimination of false alarms from electrical interference.

High signal-to-noise ratio permits a significant reduction in light baffling, thereby improving smoke entry characteristics



while reducing nuisance alarms. The Fenwal photoelectric smoke detectors are, therefore, ideal for fire alarm and suppression systems service.

The models PSD-7155 and PSD-7156 are set at a nominal sensitivity of 3.25% per foot smoke obscuration. The PSD-7155P has a nominal sensitivity of 1.45% per foot. Sensitivity ranges can be measured in place using a voltmeter and a Fenwal meter (ST-001). Readings found to be within specified limits are acceptable for normal field applications. The models PSD-7155 and PSD-7156 are rated for 0-300 fpm air velocity while the model PSD-7155P is rated for 0-4000 fpm air velocity.

The model PSD-7156 includes a thermistor heat detector with 135°F (57°C) set point. Operation of the thermistor detector is independent of smoke detector circuitry. For releasing service applications, thermistor actuation electrically shorts the detector circuit and may be used to release suppressant.

Base installation is both simple and fast because of screw-type connections. The detector is fitted to the base by a twist-to-lock action. A removable locking tab secures the head to base to provide a high degree of vandal resistance. An extra fine mesh insect screen protecting the chamber area reduces potential nuisance alarms.

Photoelectric detectors may be interchanged with Fenwal ionization detectors when using multifunction base configuration. Optional bases are shown in Table 4.

## ELECTRICAL SPECIFICATIONS

These 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 information provided under the heading CONTROL UNITS and Table 3 are intended to assist in proper application of the detector in a system. Reference the UL compatibility listing for other panels listed.

## TECHNICAL SPECIFICATIONS

Table 1. Technical Specifications

	PHOTOELECTRIC MODEL PSD 7155 P/N 71-550000-001	PHOTO w/HEAT MODEL PSD 7156 P/N 71-560000-001	PHOTOELECTRIC MODEL PSD 7155P P/N 71-550000-002	PHOTOELECTRIC MODEL PSD 7155C P/N 71-550000-011	PHOTOELECTRIC MODEL PSD 7156C P/N 71-560000-011
Standby Voltage	2WB: 10.2 to 36.8 Vdc/4WB: 16.8 to 36.8 Vdc				
Maximum Ripple	50% of DC input				
Standby Current	55µA (typical) 100µA peak @ 24 Vdc				
Start-up Current	0.1 mA max.				
Alarm Current*	10-100 mA max.				
Alarm Indicator	LED				
Operating Temperature	32°F (0°C) to 100°F (37.8°C) as per UL268				
Operating Relative Humidity	0 to 93%(noncondensing)				
Reset Voltage	3V (typical) min.				
Reset Time	1.0 sec. Max.				
Start-up Time	20 sec. Max.				
Detector Alarm Voltage	5.5V (typical)				
Finish	Smooth, Off White, High-Impact Plastic				
Weight	2.82 oz. (80 g) w/o base				
Approvals	UL 268, FM, CSFM, MEA	UL 268, FM, CSFM, MEA	UL 268A, FM, CSFM, MEA	ULC	ULC
UL Sensitivity Window	1.47 - 3.75%/ft.	1.47 - 3.75%/ft.	0.83 - 2.00%/ft.	1.47 - 3.75%/ft.	1.47 - 3.75%/ft.
Compatibility ID	P55FE1	P56FE1	P55FE1	P55FE1	P56FE1
Height	35mm, 1.38"	48mm, 1.89"	35mm, 1.38"	35mm, 1.38"	48mm, 1.89"
Diameter	99mm, 3.90" (w/o base)				
EMI Immunity:	20 volts/meter to 1 GHz, 10 volts/meter from 1GHz to 2GHz, Spikes to 2400 volts or 1 joule				
Smooth Ceiling Spacing:	30 ft. center (900 sq. ft.) max.				
Storage Temperature:	-20° to 180°F (-29° to 82°C)				
*Alarm currents below 19mA result in diminished brilliance of LED alarm indicator and precludes the use of the auxiliary relay option.					

## ENVIRONMENTAL SPECIFICATIONS

Models PSD-715X have been tested by Underwriters Laboratories for environmental stability. Some of the basic conditions that must be met for compliance are listed below and are presented to help serve as application guidelines:

Table 2. Environmental Specifications

<b>Temperature:</b>	
<b>UL Test</b>	32° to 120°F (0°C to 49°C)
<b>Operating</b>	32° to 100°F (0°C to 37.8°C)
<b>Humidity:</b>	0-93% (non-condensing)
<b>Air Velocity:</b>	
<b>PSD-7155, PSD-7156</b>	0-300 ft./min. for open area detection
<b>PSD-7155P</b>	0-4000 ft./min. for open area protection
<b>PSD-7155D</b>	500-4000 ft./min. for duct applications
<b>Altitudes:</b>	For altitudes above 7500 ft., consult factory.

## CONTROL UNITS

These detectors are compatible with the Fenwal control units and interface modules listed in Table 3.

Table 3. Control Units

CONTROL UNIT MODEL NUMBER	COMPATIBILITY IDENTIFIER NUMBER	MAX. NUMBER OF DETECTORS PER LOOP
2210	C10FE1	40
2212	C12FE1	40
3210	ZDM01, ZDMD01, VZM01	25
2320	C30FE1	15
3220	C32FE1	40
Contact Fenwal for information on compatibility for other manufacturers' panels or refer to the compatibility cross reference list (DOC. #70.63).		

## BASE OPTIONS

Control units in Table 3 can be used with the detector base options in Table 4. Various base options are available to provide auxiliary relay and/or remote indication and remote test feature.

Table 4. Detector Base Options

UL PART NO./MODEL	COMPATIBILITY IDENTIFIER	DESCRIPTION
ULC PART NO./MODEL		
70-501000-001, 2 WB	FE51A	Connects to 2-wire detection circuit via screw terminals
70-501000-011, 2 WBC		
70-501000-002, 2 WRLT	FE52A	Same as above plus provision for remote LED indicator and remote functional test. Minimum alarm current: 15mA, 24 Vdc.
70-501000-012, 2 WRLTC		
70-501000-005, 2 WRB	FE55A	Connects to 2-wire detection circuit via pigtail leads. Equipped with 2 WRM. Minimum alarm current: 19mA, 24 Vdc. Remote LED and test capable.
70-501000-015, 2 WRBC		
70-501000-101, 4 WRB	N/A	Connects to 4-wire detection circuit via pigtail leads. Equipped with 4 WRM. Minimum alarm current: 19mA, 24 Vdc. Remote LED and test capable.
70-501000-111, 4 WRBC		
70-500000-004, 2 WRM	N/A	SPDT Relay with 2 WRB & 2 WRBC bases. Contacts rated 1A @ 30 Vdc/0.5A @ 125 Vac.
70-500000-102, 4 WRM	N/A	SPDT Relay with 4 WRB & 4 WRBC bases. Contacts rated 1A @ 30 Vdc/0.5A @ 125 Vac.
70-501000-003, MA-001	MAFE1	Mechanical retrofit adapter allows PSD-7155 and PSD-7156 to physically connect to all Fenwal Series 70 bases.

### SPACING (OPEN AREA LOCATION)

The PSD-715X Series detectors are intended for use on 30 foot centers, smooth ceilings up to 15 feet high with minimum air circulation. Resultant 900 square foot spacing may be used as a reasonable guide for comparable applications. Where special conditions exist (ceiling obstruction, high air exchange rates, etc.), reduced square footage spacing must be used to achieve adequate protection. Computer rooms and other such installations may require spacing with a maximum of 200 square feet due to high air exchange rates. For additional information, consult NFPA Standard 72 and the Fenwal Automatic Fire Detector Application Engineering Manual. For special applications, consult your Fenwal technical representative.

### TYPICAL WIRING DIAGRAMS

Figures 1 thru 5 are typical wiring diagrams of 2- and 4-wire detector systems. For greater clarity and detail, refer to Installation Sheet 7X.5X.A.

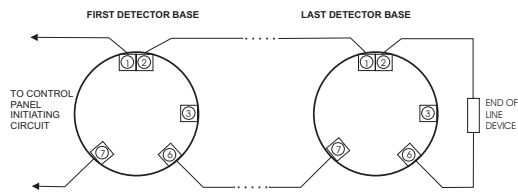


Figure 1. 2WB/2WBC Wiring

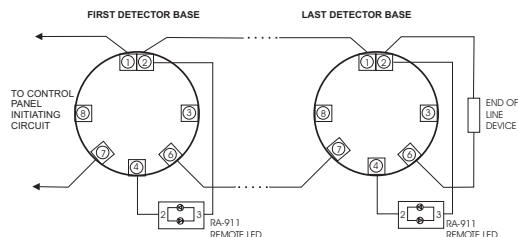


Figure 2. 2WRLT/2WRLTC Wiring with Remote Indicator

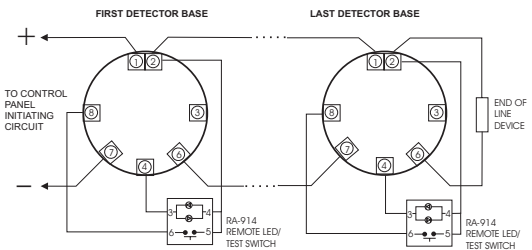


Figure 3. 2WRLT/2WRLTC Wiring with Remote Indicator and Test Switch

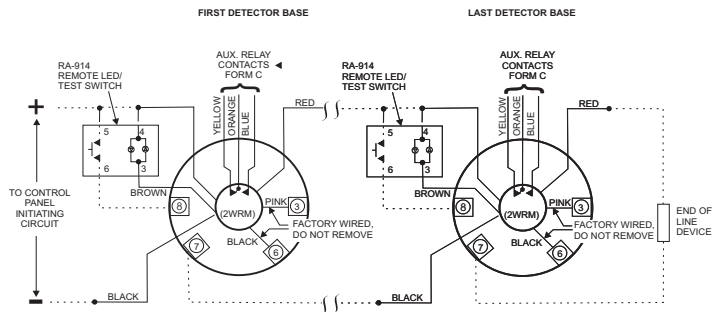


Figure 4. 2WRB/2WRBC Wiring

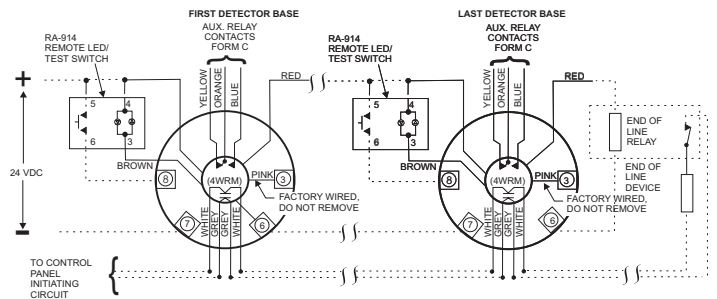


Figure 5. 4WRB/4WRBC Wiring

**Note:** All relays shown in normal position (power on).

## INSTALLATION OF DETECTORS AND BASES

Detector bases are directly mounted on the electrical junction boxes (3, 3.5 and 4 inch octagonal; 3 inch round; 4 inch square) without the need for any mechanical adapter required. Refer to Data Sheet 7X.5X.A for complete installation details.

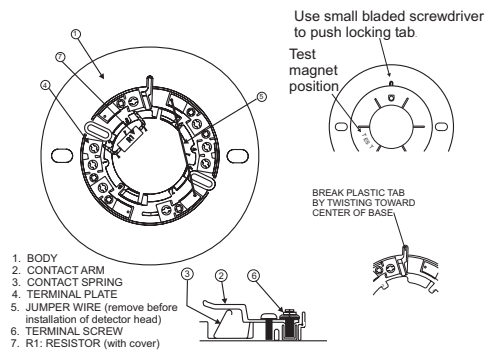


Figure 6. Detector Installation & Removal

These 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. All alarm signal devices, releasing devices, and extinguishing systems should be disengaged while the test is being performed and re-engaged at the conclusion of testing.

Detector sensitivity shall be checked within one year of installation and every alternative year thereafter as stated in NFPA 72. To conduct sensitivity testing, Sensitivity Tester, Model ST-001 (P/N 70-500000-002) is required as shown in Figure 7. (Refer to Data Sheet 70.50.A for details.)

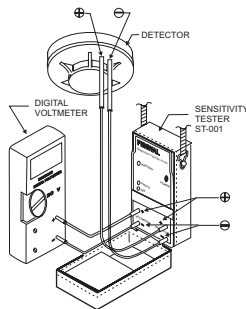


Figure 7. Sensitivity Measurement

If sensitivity readings are out of limits specified on detector label, contact the Fenwal customer service department for details concerning the detector EXCHANGE PROGRAM. The detector EXCHANGE PROGRAM offers the customer new product of the latest design as direct replacement for existing detectors. The EXCHANGE PROGRAM is available to all end-users for a nominal fee, regardless of the age of the detector.

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 is not intended to be opened for servicing. Opening of the detector will void the warranty.**

Refer to Installation Sheet 7X.5X.A for details.

## ARCHITECT/ENGINEER SPECIFICATIONS

The contractor shall furnish and install photoelectric smoke detectors, Fenwal Series PSD-7155 or PSD-7156 where indicated on the plans. The combination detector head and twist-lock base shall be UL Listed compatible with a UL Listed fire alarm control unit. PSD-715X series photoelectric detectors and CPD-705X series ionization detectors shall share an interchangeable base.

The Fenwal smoke detector shall have a flashing status indicating LED for visual supervision. When the detector is actuated, the flashing LED will latch on steady at full brilliance. 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 level of the detector without removal from the base. Metering test points shall be accessible on the exterior of the detector head. Measurement shall be accomplished with a commercially available voltmeter and a Fenwal Sensitivity Tester (ST-001) allowing direct measurement in percent per foot obscuration. It shall also be possible to perform a functional test of the detector without the need for generating smoke. The test method must simulate effects of products of combustion in the optical chamber to ensure testing of all detector circuits. This test can be performed locally and/or remotely.

By using a furnished wire jumper, it shall be possible to check circuit loop continuity prior to installing the detector head. The detector shall be listed and approved for wall and ceiling mounting.

Models PSD-7155 and 7156 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.

The smoke detector may contain an optional 135°F thermistor temperature, self-restoring heat detector. Actuation of this device shall activate an alarm and function independent of the smoke detector electronic circuit.

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



**FENWAL**<sup>®</sup>  
Protection Systems

LICO Electronics GmbH, www.mess-regeltechnik.at, office@lico.at

This literature is provided for informational purposes only. FENWAL assumes no responsibility for the product's suitability for a particular application. The product must be properly applied to work correctly. If you need more information on this product, or if you have a particular problem or question, contact