

# Distributed Intelligence Photoelectric & Ionization Smoke and Thermal Detectors

Effective: August 1999

## The Intelligent Smoke Detectors

74-210

# SmartOne™

### FEATURES

- *True Distributed Intelligence*
- *Field Programmable Alarm and Pre-Alarm Set Points*
- *Internal Supervision*
- *Fail Soft Operation*
- *Alarm Verification*
- *Calibrated Alarm Test by Command to Sensor Level*
- *Drift Compensation*
- *Non-Polarized*
- *Low Profile Style*
- *Eurostyle Base*
- *Full Analog Display of Detector Values*
- *Electronic Addressing*
- *UL Listed*
- *FM Approved*

### DESCRIPTION

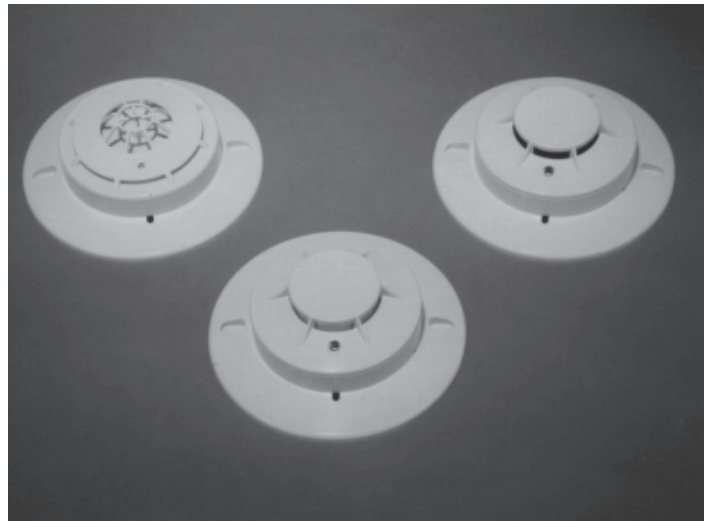
These unique Smart detectors provide true distributed intelligence by storing and analyzing calibration data and pre-alarm and alarm values. Each detector head continuously makes on-location decisions and reports its status, as required, to the Central Control Panel.

This distributed intelligence architecture, featuring an intrinsic microprocessor with 4K of nonvolatile memory in each individual detector, analyzes data and makes decisions within the monitored area. This unique utilization of processing makes possible a system with greater capacity and flexibility than a conventional centralized system.

As an example, up to 255 detectors can be connected on a single pair of wires connected to one RX/TX module. All devices can be full analog, all devices can be in simultaneous alarm.

### TWO PROGRAMMABLE ALARM SET POINTS

The detector alarm and pre-alarm set point levels are factory-set in units of percent obscuration/foot or degrees (F) and may be changed by the operator. Both set points, however, can be set within the UL allowable limits which are stored in the control panel's nonvolatile memory. The pre-alarm set point typically is used as an early warning signal. On receipt of a pre-alarm signal, a trouble condition is generated at the panel. The operator may, in addition to sending someone to investigate, request actual percent obscuration levels from that, or any other, detector.



The alarm and pre-alarm setting of each detector may be changed either electronically or from the Central Control Panel RTC program or even off site via modem. For example, a detector located in a cafeteria can be programmed to desensitize automatically every lunch hour except weekends and holidays.

### DRIFT COMPENSATION

Each smoke detector is self-monitoring for drift from alarm set point caused by long-term environmental conditions, contamination or electronic component aging. Using a carefully designed algorithm, the detector measures and averages 32 days of "normal" smoke level. This data then is used in the drift compensation algorithm to maintain the proper set point as programmed for the unit. If the detector cannot compensate, a trouble signal is sent to the Central Control Panel identifying the affected detector and the state: "Drift Error."

### INTERNAL SUPERVISION

The weakest link in a conventional or standard addressable system is the inability to monitor the operating condition of the smoke detector. The SmartOne™ constantly monitors its own status by supervising and reporting a trouble condition when a fault occurs in one of the following items:

1. Internal Power Supply Voltage
2. Improper Line Voltage from the Control Panel
3. Faulty Writings of Data into Memory
4. Uncompensatable Drift

## FAIL SOFT OPERATION

Should there be a failure in the communications link between the Central Control Panel interface and a detector, the detector will operate as a standard unit. That is, it will cause a general alarm by channel when smoke density or temperature reaches the alarm point. It will not, however, report its status.

Upon reestablishment of communications with central control, the detector will return to its prior program without further action.

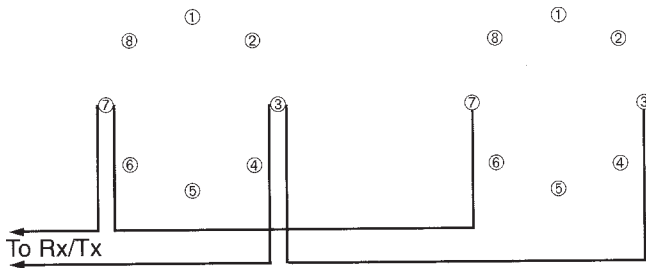
## STATUS LED

A LED is provided on the SmartOne™ to indicate status of the smoke detector. A high flash rate indicates alarm; a slow rate normal; when a trouble exists, the LED is off.

## PROGRAMMING INFORMATION

Each detector is field programmed with its own location message (location of the detector in the building or on the site), its system address (a four digit code), pre-alarm set point and alarm set point (if different from factory settings). In addition, the detector type, either photoelectric, ionization or thermal and proper calibration are stored into the memory at the factory. This permits the Central Control Panel to verify that the proper type detector and correct address is installed in the system.

## BASE WIRING INFORMATION



### WARNING

**TO PREVENT DETECTION CONTAMINATION AND SUBSEQUENT WARRANTY CANCELLATION, SMOKE DETECTORS MUST REMAIN COVERED UNTIL AREA IS CLEAN AND DUST FREE.**

## GENERAL NOTES

1. No E.O.L. device is needed for SmartOne™ detectors.
2. "T" tapping wiring method is acceptable for Class "B" wiring. Number of taps only a function of good practice.
3. To ensure proper installation of the detector head to the base, be sure wires are properly dressed at installation.
  - A. Position all wires flat against the base.
  - B. Take up all slack in outlet box.
  - C. Route wires away from the connector terminals

**NOTE:** Nominal factory settings of detectors are as follows

Photoelectric detectors	Alarm 2.0%/ft., Pre-alarm 1.5%/ft.
Ionization detectors	Alarm 1.0%/ft., Pre-alarm 0.8%/ft.
Thermal	Alarm 140°F (60°C) Pre-alarm 120°F (49°C)

Programming is done via a PC or hand held programmer at the job site or may be accomplished remotely via a modem. To avoid tampering, three levels of security are provided to program or alter the program.

The system will reject attempts to program alarm and pre-alarm set point levels exceeding the Underwriters Laboratories designated window.

## ALARM TEST BY COMMAND

Any or all detectors can be tested by command from the Central Control Panel. This test procedure precisely duplicates in-place testing of each detector by imposing a signal on the detector sensing chamber that will cause an alarm output. Results of the test will be indicated at the Central Control Panel or virtually any remote location for monitoring or troubleshooting purposes.

## COMMUNICATION VERIFICATION

When a detector reaches its pre-alarm or alarm set point, it conducts a verification procedure with the Central Control Panel which repeats the communication cycle four separate times before the system accepts its change of status. The maximum time for this verification procedure is a rapid 2.5 seconds.

## DETECTOR IDENTIFICATION

Part Number	Description
70-400001-100	Common 6" Base Model 6SB
70-400001-101	Common 4" Base Model 4SB
70-400001-200	Mechanical Adapter Model MA -002
70-402001-100	Ionization Detector Model CPD 7052
71-402001-100	Photoelectric Detector Model PSD 7152
70-404001-100	Thermistor Heat Detector Model THD 7252

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## SPECIFICATIONS

Input Voltage	16.5 - 27.5 VDC
Standby Current	350µA, typical
Alarm Current	425µA, typical
Max. Detectors per Channel	255
(all can be in alarm simultaneously)	

## LED PULSE MODES

Normal	9 second interval
Trouble	LED is off
Alarm	2.0 second interval

Operating Temperature	32 - 100°F
EMI Immunity	Meets UL 268

## SENSITIVITY

	Open Area	High Velocity
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Ionization	0.5 - 1.5 %/Ft	0.5 - 1.0 %/Ft
Photoelectric	0.5- 3.5 %/Ft	0.5 - 2.0%/Ft

SPACING	50 Ft	70 Ft
Thermal	135° - 145°F	135° - 155°F

Thermal detectors are limited to 20 Ft spacing when used on Factory Mutual (FM) approved applications.

**NOTE:** These detectors are compatible only with fire alarm systems, utilizing a Receiver/Transmitter Module.

## INSTALLATION

Detector bases are mounted directly to a 4" octagonal box. Please refer to NFPA 72-1996 and Fenwal's "Applications Engineering Manual" (MC-402) for spacing, location of detectors and other guidelines. Also, refer to Fenwal Publication 74-212 for detailed installation instructions.

The detector base is equipped with an integrally molded locking tab to prevent unauthorized removal. Once locked into place, the detector can be removed only by inserting a screwdriver blade into the slot while simultaneously turning the detector head counterclockwise. If the detector is to be mounted to a ceiling high enough to cause access difficulty, it is recommended that the locking tab be removed prior to installation. To remove locking tab, bend outward until it breaks off.

## MAINTENANCE

The minimal 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.

## RADIOACTIVE MATERIAL

Less than 1.0 microcuries Americium 241 in ionization detector. Shielded by stainless steel housing.

### CAUTION

**Do not attempt disassembly of the factory sealed sensing chamber. This assembly is sealed for your protection and is not intended to be opened for servicing.**

## APPLICATION DATA

The smart detectors are compatible with control equipment which utilizes the Receiver Transmitter Module (RX/TX). Each RX/TX can communicate to 255 smart or addressable devices. The circuitry may be either Class "A" or Class "B". Class "A" requires a series loop circuitry with the loop returning to the RX/TX, Class "B" does not require this return to the RX/TX and permits unlimited T Tapping.

All SmartOne™ detectors utilize the same base and may be interchanged. (Changing detector types, however, requires a change in system programming.) Installation is both simple and fast because of screw type connections and the non-polarized detector feature. The detector is fitted to the base by a twist-to-lock action. A removable locking tab secures the head to the base to provide a degree of vandal resistance.

## SMARTONE™ IONIZATION SMOKE DETECTOR

Models CPD 7052 are dual chamber ionization type detectors which sense both visible and invisible smoke. A unique sensing chamber design permits 360° smoke entry and response.

## SMARTONE™ PHOTOELECTRIC SMOKE DETECTOR

Models PSD 7152 are smart photoelectric smoke detectors. These detectors will respond to a broad range of flaming and smoldering fire conditions.

## SMARTONE™ THERMISTOR HEAT DETECTOR

Model THD 7252 are thermistor based analog devices that can be programmed to respond to fixed temperature and/or rate compensated heat rise without problems associated with thermal lags.

## SMARTONE™ DETECTOR MOUNTING BASES

All models of SmartOne detection devices use a universal mounting base arrangement. The mounting base is available in two models, Model 6SB and Model 4SB. Base model 6SB provides a trim ring which masks any inconsistencies

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**SmartOne™**

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