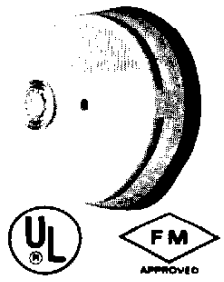
A Product of Sentrol, Inc.

INSTRUCTION MANUAL
Part number 10757, REV 1192

ESL 425FS SERIES PHOTOELECTRONIC SMOKE DETECTORS

MODEL	DESCRIPTION	Compatibility Identifier
425FS	Smoke detector with 85 dB horn	S22
425FST	Smoke detector with 85 dB horn and 135°F heat sensor	S22
425FSR	Smoke detector with 85 dB horn and Form C alarm contact set	S24
425FSRT	Smoke detector with 85 dB horn, Form C alarm contact set, and 135°F heat sensor	S24
425FSH	Smoke detector with 85 dB horn and isolated 135°F heat sensor	S22



California State Fire Marshal Approved **Patented**

GENERAL DESCRIPTION

ESL 425FS Series Photoelectronic, two-wire system smoke detectors with an 85 dB sounder operate on the light-scattering principle. 425FS Series are especially suited for occupancies such as hotels, motels and dormitories, where efficient distribution of the alarm signal is essential. The detectors can be used effectively in commercial, industrial and institutional applications.

They are intended for two-wire connection to UL Listed compatible fire alarm control units. An alarm relay contact (Form C SPDT) for auxiliary functions and/or an integral heat sensor are available as options. *Those equipped with the auxiliary alarm contacts (option R) are listed as suitable for releasing service.*

Model 425FSH includes an electrically isolated heat sensor for connection to a separate alarm initiating circuit.

ELECTRICAL COMPATIBILITY

ESL 425 Series are two-wire system smoke detectors. Two-wire detectors and controls must have compatibility Listing with Underwriters Laboratories, Inc. For information on detector/control unit compatibility, see ESL Detector Compatibility Index Guide.

WARNING: SYSTEM MAY NOT OPERATE IF THE DETECTOR IS NOT CONNECTED TO THE CONTROL UNIT INITIATING DEVICE CIRCUIT AS SPECIFIED IN THE DETECTOR OR CONTROL UNIT LITERATURE.

INSTALLATION

The 425 Series smoke detectors mount to standard single-gang or 4" octagonal (e.g., RACO #25 or equivalent) electrical boxes, and to WIREMOLD No. 5739 fixture boxes. The volume of the electrical box is determined by the number and size of conductors as required by the National Electrical Code (NFPA 70). All wiring must be installed in compliance with the NEC or the local code(s) having jurisdiction.

All field wiring connections are made to a terminal block on the printed circuit board. Access this area by inserting the blade of an 1/8" screwdriver in the small slot on the detector base, opposite the hinge. Gently depress the cover release tab and swing the cover open. Remove the terminal block cover by gently pulling straight out. Dress all system wiring through the opening in the base of the smoke detector. Secure the detector to the mounting surface using the appropriate mounting holes and hardware. Strip 3/8" of insulation from each conductor and insert under the appropriate screw terminal. The barrier-type terminal block will accommodate one wire of 14 AWG to 22 AWG under each side of each screw/clamping plate. This design prevents "looping" of wires and provides for supervision of conductors. See Diagram #2 WIRING for correct terminal usage.

CHECK ALL WIRING AND MOUNTING CONNECTIONS. Dress wiring neatly and re-install the terminal block cover. Close and securely latch the detector cover.

NOTE: Positive air pressure from wire openings, conduit, mounting boxes, irregular mounting surfaces, or plenums causing air movement through and away from the detector may prevent proper operation. Seal all such openings causing unwanted air flow using UL Listed Expanding Foam or Duxseal.

TESTING THE INSTALLATION

After all connections are completed and the wiring is checked for errors, apply power to the system. There should *not* be an alarm. If there is, power down the system and check each detector for correct wiring. If no alarm has occurred, check each detector's LED to verify that it is pulsing at approximately one pulse every seven seconds. Go to the last detector and check the smoke detector power with a volt meter for the specified voltage.

To test each detector for alarm operation, hold a smoldering punk stick or cotton wick near the smoke entry areas and blow gently directing the smoke into the detector. Continue for up to 20 seconds or until an alarm is indicated.

BE SURE TO PROPERLY EXTINGUISH THE SMOKE SOURCE AFTER TESTING!

This is a gross test and is not a reliable indication of the sensitivity of the detector. To insure no significant loss of sensitivity has occurred, you must also utilize the ESL Test Tool Model 401. To do so, place the tool on the side of the detector, between the hinges. The magnet of the test tool will close a reed switch on the printed circuit board which, in turn, will simulate a smoke density greater than the alarm threshold of the smoke detector. Continue the test for 20 seconds or until an alarm occurs. If a successful test, the LED will light. To reset the detector, operate the system reset switch for 2 to 3 seconds to remove power from the detectors.

Control unit alarm and all ancillary functions should be verified for a complete test of each detector. Follow this procedure for the remaining detectors.

TEST EVERY DETECTOR FOR PROPER OPERATION. This testing procedure should be conducted semi-annually by qualified personnel. If a detector fails to function properly, obtain a Return Authorization Number by calling 1-800-648-7422 or 503-692-4052, then carefully pack it and return it prepaid to the manufacturer. Include an explanation of the suspected failure mode.

SENSITIVITY MEASUREMENT

The actual sensitivity of a detector may be determined by testing in a correlated UL 217/268 smoke test chamber. For a nominal charge ESL will perform this test and, if a detector is found to be outside of the marked sensitivity range, will clean the detector.

Contact ESL Customer Service for details on the return of the product.

As an alternate to the above procedure, the Gemini Model 501 Aerosol Generator may be used. Follow the operating instructions supplied with the Gemini. Adjust the Gemini flow meter setting to the lower value in the table below. No alarm should occur with this value. Now adjust the Gemini setting to the higher value and re-conduct the test. The detector should alarm to the second test.

GEMINI FLOW METER SETTINGS

	Sensitivity	Flow Meter Setting
400 SERIES	3.1 + 0.5%/ft.	85
Photoelectronic Detectors	3.1 – 0.5%/ft.	74

Sensitivity measurements should be taken on all detectors towards the end of the first 12 months of operation, and every 24 months subsequent.

If a detector responds incorrectly, contact ESL Customer Service for details on the return of the product.

ESL *does not* endorse the use of pressurized aerosols in detector testing.

Pressurized aerosols do not test detector sensitivity with accuracy. In fact, the result of such test may be misleading.

The test feature on ESL Smoke Detectors provides the most accurate test for minimum smoke sensitivity response.

The ESL product warranty *does not* cover contamination by aerosols.

APPROVALS

The smoke detector is for use in commercial fire protective signaling systems (NFPA 71, 72A, 72B, 72C, or 72D) and in household fire warning systems (NFPA 74).

Listed by Underwriters Laboratories, Inc.; California State Fire Marshal approved (Listing #7257-447:104); Factory Mutual approved (J.I.OK789.AY); State of Maryland approved (Permit #1885); City of Cleveland approved (Docket S-5-88); New York City, Board of Standards and Appeals approved (Calendar #122-73-SA).

MAINTENANCE

The 425 Series smoke detectors are designed to require little maintenance. Once a year (more often in dusty environments), open the detector cover and use a vacuum and/or filtered compressed air to loosen and remove dust from the screen surrounding the optical sensing mechanism. For detectors installed in hostile (dusty) environments, it may be necessary to purge the chamber with canned or clean, dry compressed air. It is important to notify all concerned parties when any maintenance or testing of a fire alarm system is to occur. Always test each detector after cleaning.

DO NOT attempt to adjust or alter the detector.

ELECTRICAL SPECIFICATIONS—ALL MODELS

Standby Voltage*	10.2-44 VDC
Standby Current	50 μA Max.
Equivalent Capacitance	0.001 μF Max.
Alarm Voltage	33 VDC Max.
Alarm Current	50 mA ±10% @ 24 VDC
Alarm Current @ 15 VDC	40 mA Min.
Reverse Polarity Voltage*	10.2-33 VDC
Reverse Polarity "ON" Current	25 mA
Reverse Polarity Average Current	12.5 mA

To insure reset, reduce detector voltage to 4.0 V or less or current to 1 mA or less. Reset time: 1 second Max.

Contact Rating (resistive)—
425FSR and 425FSRT: 2A @ 30 VDC or 120 VAC

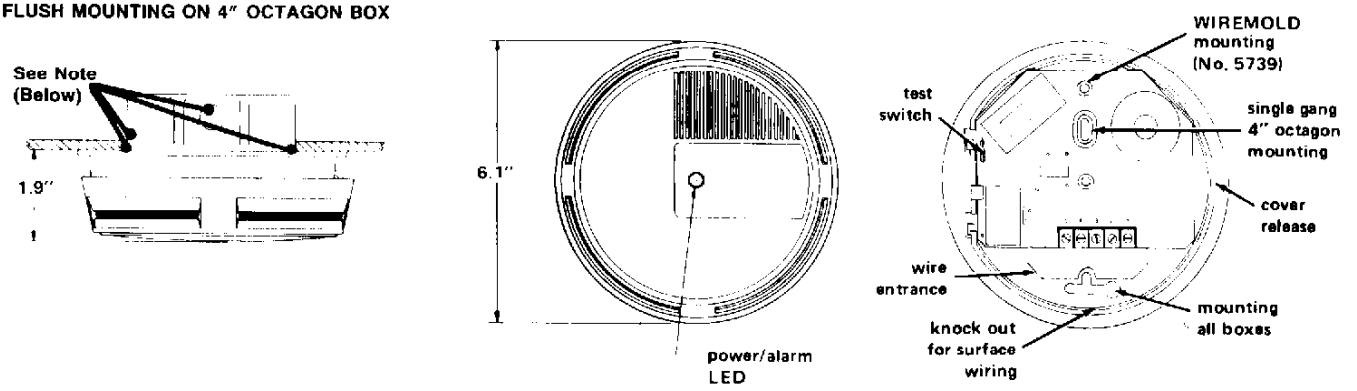
* VDC — Filtered; 10% Maximum Ripple

OPERATIONAL DATA

Operating Temperature Range	0°C to 50°C; 32°F to 120°F	
Operating Humidity Range	0 to 95% RH	
Detector Size: Diameter	6.1 in.	15.5 cm
Height	2.0 in.	5.0 cm
Weight	8.8 oz.	0.25 kg
Power/Alarm Indicator LED	Standby — Flashing Alarm — Steady	
Electronic Alarm Latch	Reset by momentary power interruption	
Sensitivity to Smoke	3.1 ± 0.5%/ft.	

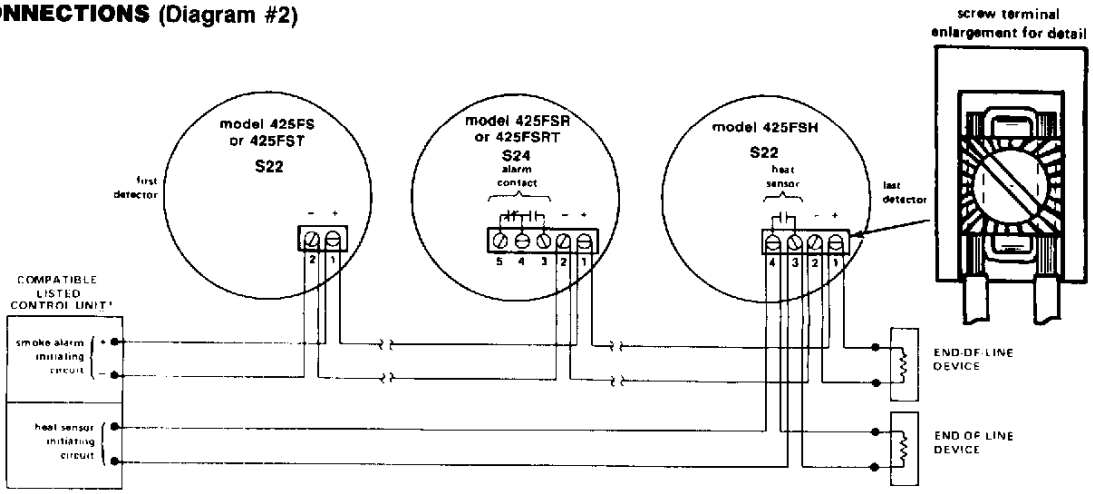
INSTALLATION (Diagram #1)

FLUSH MOUNTING ON 4" OCTAGON BOX



NOTE: Positive air pressure from wire openings, conduit, mounting boxes, irregular mounting surfaces, or plenums causing air movement through and away from the detector may prevent proper operation. Seal all such openings causing unwanted air flow using UL Listed Expanding Foam or Duxseal.

WIRING CONNECTIONS (Diagram #2)



* ESL 1500 Series Control Unit with BMB, ZEM. Styles B or D wiring. **Maximum** line resistance = **50 ohms.** Compatibility Identifier is **C01A.**

Compatible Detectors are Models 425FS, FST, FSH; Compatibility Identifier S22; maximum 40 detectors per circuit.

Compatible Detectors are Models 425FSR, FSRT; Compatibility Identifier S24; maximum 40 detectors per circuit.

Emergency operation [Style D (Class A)]: Return initiating circuit wiring to appropriate Control Unit terminals and connect the end of line devices per the Control Unit instructions.

CAUTION: DO NOT use looped wire under screw terminals. These terminals are designed to prevent looping of unbroken wire around or under a terminal screw in a manner that would permit the looped wire to remain unbroken during installation. This would preclude supervision if the wire were to dislodge from the terminal.

SMOOTH CEILING SPACING

On smooth ceilings, spacing of 30 feet (9.1 meters) may be used as a guide. Other spacing may be used depending on ceiling height, high air movement, and other conditions or response requirements.

In all installations, good engineering judgment should govern.

Consult National Fire Protection Association Publications', "NFPA 72E, Standard on Automatic Fire Detectors," and, where applicable, "NFPA 74, Standard for the Installation, Maintenance, and Use of Household Fire Warning Equipment."

A Product of Sentrol, Inc.

Sentrol, Inc.
Corporate Headquarters:
503-692-4052
Sales: 800-547-2556
Technical Support: 800-648-7424