

Technical Service Note

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Concerns: Architect/Engineer Specifications

Affects: DS840, DS840T Tri-Tech
Microwave/PIR Intrusion Detectors

Dated: January 8, 1998

NOTE: Words/statements within square brackets [] may be included when appropriate, or when selection is required.

The Intrusion Detector[s] shall operate on the Verified Intrusion principle using combined Passive Infrared (PIR) and Microwave Intrusion Detection technologies, and shall be Listed by Underwriter's Laboratories, Inc., and FCC Certified to operate in the 10.525 Ghz band in the United States.

[Each] [The] detector shall provide the detection, signal processing, alarm relay, and operating power circuitry in the same enclosure; and shall provide an alarm relay actuation upon the simultaneous detection of an intruder moving into or through its combined protection pattern. The enclosure shall be ready for surface and/or corner mounting, and shall be capable of mounting to a compatible Gimbal Mount Bracket without modification.

The detector[s] shall incorporate a three-color LED to indicate the different operating conditions. Red shall indicate an alarm condition. Green shall indicate a PIR activation. Yellow shall indicate a microwave activation. The LED shall be able to be field disabled using a jumper.

The detector[s] shall be capable of operating from a DC power source rated within the range of 6 to 15 volts DC, and shall draw a nominal 15 milli-amperes (mA) over the rated voltage range.

A condition of alarm shall occur when both the PIR and microwave alarm conditions are met. The detector shall signal the condition of alarm using a Supervised Normally Closed Reed Relay with terminal strip connections.

To accomplish PIR detection, [each] [the] detector shall contain a sealed Pyro-Electric sensor peaked for the detection of near-infrared energy in the 10 micron region. Spike-Noise suppression circuitry shall inhibit alarms caused by noise burst signals. To guard against unwanted alarms caused by changes in infrared energy not associated with motion, the sensor shall utilize a balanced Dual-Opposed element.

The PIR detection shall use Motion Analyzer II Signal Processing. Motion Analyzer II is a highly advanced signal processing technique that shall require a specific signature and timing of signals to generate an alarm. The processor shall analyze the incoming signal and automatically adjust for target speed and signal strength. Motion Analyzer II Processing shall provide two sensitivity settings.

Each detector shall contain a module with mirrored surfaces which shall focus received infrared energy onto the sensor. The sensor and module combined shall then construct a protection coverage field of view. There shall be a field selected choice of one standard field of view; (a) a 74° wide

Broad Coverage pattern with three (3) planes of protection. The top plane shall consist of nine (9) sensor zones angled 0° downward from the horizontal, and horizontally spaced at 0°, ±9.25°, ±18.5°, ±27.75° and ±37° from center. The rated range of the top plane shall be forty feet (40 ft.) [12.2 m]. The second plane shall be angled 13.5° downward from the horizontal, and shall consist of five (5) sensor zones horizontally spaced at 0°, ±18.5° and ±37° from center. The third plane shall be angled 36.8° downward from the horizontal, and shall consist of three (3) sensor zones horizontally spaced at 0° and ±37° from center.

To achieve pattern aiming, the detector[s] shall provide vertical coverage pointability of +2° to -18°. [An optional low-profile bracket for up to ±45° horizontal, and plus 2° and minus 18° vertical adjustment shall be available].

To accomplish microwave detection, [each] [the] detector shall utilize an integrated DRO oscillator and strip-line antenna design. Using a precise pulse width and repetition frequency, the transmitter shall transmit pulses of microwave energy into the intended area of protection. Employing the Doppler Shift principle, the receiver shall monitor for any returned microwave energy at or near the transmitted frequency, and shall compare the received frequency to the transmitted frequency.

To guard against false activations, the microwave portion shall incorporate both adaptive Signal Processing and Pattern Recognition Technology. Pattern recognition circuitry shall identify and ignore repetitive false alarm sources. Adaptive Processing shall adjust to background disturbances. This shall help to reduce false activations while maintaining catch performance.



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Free-space microwave coverage shall be a teardrop shaped pattern rated at [40 ft. long by 40 ft. wide] [12.2 m long by 12.2 m wide]. To suit the properties of each installation, the coverage shall be field adjustable by use of a built-in Microwave Range. To compliment the PIR technology, the microwave circuitry shall be designed to enhance cross-walk performance, and shall contain a filter for rejection of electrical noise signals generated by fluorescent lights. Pulse Modulation design shall permit multiple unit installation, and low current operation.

To ensure proper circuit operation, the detector[s] shall incorporate both a PIR self-test and Microwave self-test with defaults. The PIR circuitry shall be tested once every 12 hours by an internally generated electronic signal.

[Each] [The] detector shall include immunity to signals produced by pets and other small animals. This shall include immunity to one dog up to [60 pounds] [27 kg], or 5 cats, or any number of small rodents.

The Microwave shall perform a self-test every 12 hours by oscillating the transmitted signal and analyzing the received signal. If the microwave section fails, the detector[s] will default to PIR only operation. If this occurs, the detector[s] shall adjust the PIR sensitivity to standard.

If either supervision condition occurs, the detector[s] shall indicate the trouble condition by flashing the alarm LED continuously in a 4 pulse sequence .

The DS840T shall provide a "Form A" [NC] [Normally Closed] tamper switch which shall open when the detector cover is removed.

Electronic circuitry shall be mounted on a base produced from the UL Component Recognized material "ABS Cyclac", Grade T, Rated 94HB, and shall be enclosed with a two-point positive-latch snap-in-place cover of the same material. The front of the cover shall contain a white-light opaque window which is infrared transparent. When combined, the total package shall not exceed [4.25 inches High, by 2.75 inches Wide, by 1.83 inches Deep] [10.8 cm High, by 7.0 cm Wide, by 4.6 cm Deep].

[Each] [The] detector shall be rated to operate within the temperature range of [minus 40° Fahrenheit to plus 120° Fahrenheit] [minus 40° Celsius to plus 49° Celsius].

The Dual Technology Intrusion Detector[s] shall be model [DS840] [DS840T] [with Low Profile Gimbal Mount Bracket B335].

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