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Interference from Electronic Ballasts Can Degrade Sensormatic Ultra•Max® System Performance

Electronic ballasts use power supply circuits that vary widely in frequency. Although they are not intentional radiators, lighting fixtures emit fields that can interact with other devices operating at the same frequency. The typical frequency of electronic ballasts may vary from 20 kHz to 100 kHz. This frequency range is a public domain and band widths are not licensed or managed by the FCC.

Sensormatic EAS systems operate in the public domain frequency of 58 kHz, and as such, are subject to background noise or interference that may be present at a site. Sensormatic systems use a transmitter to create a surveillance area where tags and labels are detected. The Sensormatic transmitter sends a signal in pulses. The transmit signal energizes a tag or label in the surveillance zone. When the transmit signal pulse ends, the label continues to respond, emitting a single frequency signal like a tuning fork. The label signal is detected by a receiver, which causes an alarm. Because EAS labels are small and powered only by absorbed energy from the surveillance field, they emit low signal levels. To obtain high detection for wide exits the receivers must be very sensitive.

GE UltraMax ballasts operate between 56 kHz to 62 kHz depending on the lamp and ballast factor used. GE UltraMax H ballasts typically operate in the 61.5 – 62 kHz range and N & L ballasts operate in the 56 – 58 kHz range. The interaction between GE UltraMax ballast and Sensormatic EAS systems is dependent on several factors: fixture size, bulbs, wiring in the fixture, ballast fundamental operating frequency and ballast harmonic distortion (the inadvertent emission of multiples of the fundamental frequency). GE UltraMax ballasts within a close proximity to Sensormatic EAS systems may cause some interference issues with the detection functionality of detection pedestals. When the fundamental or a harmonic of the ballast frequency approaches the operating frequency of the Sensormatic EAS system, it "hears" the ballast as noise in the Sensormatic receiver. The noise reduces system sensitivity which reduces the tag detection rate of the system. If noise levels become high, system detection can be significantly degraded or, in severe cases, lost entirely.

How can the ballast interference be eliminated? Typical solutions to avoid interference with the functionality of Sensormatic Ultra*Max EAS systems include:

1. Sensormatic systems require a dedicated circuit. Verify the system is on dedicated circuit and securely grounded.
2. Ensure the ballast and fixture are properly grounded that may be within a 20ft radius to Sensormatic pedestals.
3. Testing has shown that a minimum separation of six feet to 20 feet between the ballast and the Sensormatic pedestals is needed to prevent interference.
4. In some cases, changing to Watt Miser or F28 lamps will help eliminate interference, as this causes the ballast to shift frequency slightly, and may be enough to minimize the interference.
5. the interference can be replacing it with a ballast that does not emit noise at the 58kHz frequency such GE Proline ballasts.
6. Sensormatic systems may be more accurately tuned, making it more selective to pick out its own signals from the background noise. Ensure Sensormatic is made aware of the situation. They may be able to more closely tune the unit to the center of its band and they will ensure the system is operating per specification and minimize excess gain to lower background noise
7. Noise may also be coming in through the power line. Sensormatic may be able to add power line input filtering to their units.