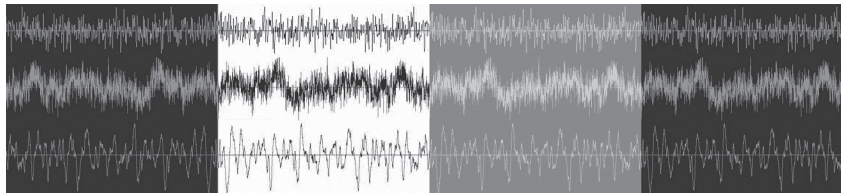


WHITE PAPER

WP-2004: Noise Effects on Signals

Electrical noise generated by AC power, electric motors, fluorescent lighting, relays, and many other sources can cause a plethora of problems in electrical systems. For the encoder in your system these problems can range from simple miscounting to a complete servo system lockup.

Electrical noise typically enters a system as one of two types: radiated and conducted. Radiated noise propagates through the air, while conducted noise finds an electrical path onto the encoder cables from ground loops, power supplies, or other equipment connected to the system.



Electrical noise

Reducing Noise

There are several methods that can reduce noise:

1. Route power and signal lines separately.
2. Twist and shield signal lines, and place signal lines at least 12 inches from other signal lines and from power leads.
3. Maintain signal wire continuity from the encoder to the controller/counter (i.e., avoid junctions or splices).
4. Provide clean regulated power to encoder and associated equipment ($\pm 2\%$).
5. Ensure equipment (motors, drives, shafts, etc.) is properly grounded.
6. Connect encoder cable shield to ground at controller/counter end, leaving the end near the encoder disconnected.
7. If possible, use differential line driver signal outputs with high-quality twisted, shielded pair cable. The complimentary signals greatly reduce common mode noise levels, as well as signal distortion resulting from long cable lengths.

For additional details on differential outputs, please refer to the White Paper [WP-2005: Noise Suppression of Differential Signals](#).

If you still have questions about output, or anything else encoder-related, give us a call. When you [contact EPC](#), you talk to real engineers and encoder experts who can answer your toughest encoder questions. [Contact EPC](#) today to get the information you need.