



SUBJECT: DC Drives – Don't use the Main Isolation Transformer Secondary as a Source for Control Voltage

Issue

A customer complained that the 24V DC power supply output in his elevator controller (not the 24V supply in the DSD 412) was being corrupted when the DSD 412 was operating. The 24V DC output was erratic and noisy.

Investigation

Investigation showed that the customer had wired the **primary** of the **control voltage transformer** to the **secondary** of the **drive isolation transformer** to obtain 120V AC control power. **The subject 24V DC power supply was powered from the control transformer secondary.**

The customer used this connection because the drive isolation transformer secondary happened to be 240VAC, a convenient number, and allowed him to use a lower cost control transformer (rather than a control transformer with a 600V AC primary winding to match building primary power).

Analysis

This was not a good design choice. A DC Drive uses the inductance of the drive isolation transformer secondary windings as part of a filter to control SCR di/dt. So the secondary voltage of the drive isolation transformer feeding a DSD 412 (or any other SCR type Drive) will have severe line notching and a distorted voltage waveform.

Design Rules

1. **Never** wire any other apparatus to directly use the same secondary voltage as that supplied to the motor armature power converter. (L1, L2, L3 connections on the DSD 412)
2. **Always** supply auxiliary power from the building mains/primary side of the drive isolation transformer. Magnetek shows it that way on our diagrams.
3. Even if it appears to work when wired from the secondary side, the control transformer will be subjected to severe amounts of voltage and current harmonics which will cause overheating and premature failure.
4. A second set of **isolated** secondary windings on the drive isolation transformer **is ok** for obtaining control voltage power.