

**SUBJECT: Elevator Modernization - Notes on Reducing Acoustic Noise of Wiring
“Buzzing” When Using a SCR DC Drive**

The first question to be answered is, are the noises coming from;

1. The AC input lines to the isolation transformer/transformer itself?
2. The DC lines to the motor?
3. From the motor? See Magnetek Application Note DSD 412-106.

If hum is from the AC lines:

Assuming the transformer is also in the machine room with the drive, *a three phase harmonic trap filter made specifically for SCR type drives* would be the best choice. It must be placed between the transformer primary and the utility feeder, and located in the machine room to isolate harmonic currents from entering the long AC feeder lines. The SCR drive produces, and must have, current harmonics. They will continue to circulate between the drive and filter. The utility line will see sinusoidal current. Some points to consider;

1. It must be selected and tuned to work at the site utility frequency.
2. It must be located close to the drive, on the transformer **PRIMARY** side.
4. The manufacturer should be consulted about high currents during I_{accel} to avoid inductor saturation caused drive mistuning effects. (Acceleration current in an elevator drive can approach 2.5 X run current – the inductor must not saturate during Acceleration)
4. Input reactors (as part of the filter) are recommended. But...
DO NOT select a *reactor only filter*, as it will NOT WORK with an SCR Drive.

A harmonic trap filter will be expensive in terms of cost, size, or weight, but it will clean up current and voltage harmonics as seen by the utility, and virtually eliminate any 360 HZ noise in the AC input lines to the isolation transformer.

Note: Just in case the transformer is located in the building basement, it is possible to place a harmonic trap filter *between the drive and transformer*. But it **WILL AFFECT** SCR commutation during regeneration and the Kipp angle compensating features designed into the drive. The filter will need to be selected to operate at the transformer secondary voltage and current, not the usual 230/460 utility value. In this case the harmonic filter must have 3 % load side output inductors.

If hum is from the DC lines:

The DC feeder lines were designed to handle dc current from a motor/generator, not a rectifier type power converter.

The metal wireway or buss bar hardware may “rattle” due to the 360 HZ ripple current frequency inherent in the DC output of a SCR type DC Drive.

Is there a Ripple Filter? Where is it? It should be close to the drive, not remotely mounted near the motor. If there is none, get one, and mount it close to the drive. Adding inductance is about the only way to reduce ripple out of a solid state DC Drive.

Install the Ripple Filter close to the drive to minimize ripple current in the filter-to-motor feeder lines. You want to keep DC lines shortest where ripple currents are highest.

If using the Magnetek DSD 412, you will have to do the “Self Tune Test” again due to the added impedance of the filter.

Note: Refer to Magnetek Application Note DSD-106A, “**Using a Ripple Filter with the DSD 412 Elevator Drive**” for proper set-up of a Ripple Filter.