

SUBJECT: GEARLESS ELEVATORS; SETTING UP THE DSD 412 ELEVATOR DRIVE

A gearless elevator is more difficult to adjust than a geared application. An example problem is described below, with recommendations that will minimize the parameter “back and forth” adjustments required.

Example Problem:

Customer had the following elevator: 2800 LBS., 700 FPM, Gearless.

Customer had set up the DSD 412 parameters as follows;

F#40 – RESPONSE	8.5	
F#41 – INERTIA	1.7	
F#42 – STABILITY	1.5	
F#105 – GAIN SWITCH SPEED	.07	(49ft/min)
F#107 – TACH RATE GAIN	0	
F#108 – GAIN REDUCE	0.7	∴ @ <49ft/min, #40 is at 8.5 @ >49ft/min, #40 is at 6.0 (0.7 X 8.5)

The customer said the elevator had a rumble at high speed when the gains were set low, and an oscillation during leveling when the gains were set high.

How to Approach the Problem

Keep in mind that sometimes the installer has to “play” with the DSD 412 parameters to get both leveling and top speed performance optimized. Utilizing the following procedure will lower the probability of having to fine tune for both low and high speed operation. Also, Self-Tune F#997, and PCU Diagnostics F#998 must be done before any “tuning” is attempted. DSD 412 Current regulator gain depends on the Self-Tune values.

- 1.** The first thing noticed is the customers Inertia setting F#41. 1.7 is low for such a heavy elevator. Magnetek would expect to see an Inertia value around 2. When using the DSD 412 in lower performance Geared elevator systems, it is possible to estimate System Inertia. *Estimating System Inertia for Gearless applications is not recommended. When using the DSD 412 in Gearless applications, it is very important that the Inertia value be accurate.* The speed regulation/performance of the drive is greatly affected by the System Inertia setting entered in F#41. There is a procedure in the DSD 412 Technical Manual, page 5-2, that the installer can use to calculate the elevator Inertia, or see Magnetek Application Note DSD 412-105, “Measuring Elevator System Inertia”.
- 2.** Once System Inertia is calculated and entered in F#41, set the other above listed parameters to the default values. Run the elevator. If it works well save the parameters.

- 3.** Begin re-tuning the elevator starting with Response parameter F#40. You may find that no other tuning is necessary because of the new System Inertia value. A Response parameter setting of 5.0 – 6.0 may work well without the Gain Switch Speed F#105 enabled.

- 4.** Stability (F#42) *should be the last parameter tuned*. In most cases it is possible to leave the Stability setting at the factory default. Changing the Stability setting often compensates for a System Inertia setting (F#41) that is incorrect.