

**DATE:** JULY 29, 1996  
**TO:** CEC CUSTOMERS  
**FROM:** TECHNICAL SUPPORT  
**RE:** NEW DSD 412 PCU AND DCU SOFTWARE AND PRE-CONDITIONING / PRE-TORQUING CAPABILITY

---

We are implementing the latest set of software from Magnetek. This software includes fixes and modifications that enhance the DSD 412. **When implementing this software you must change the PCU (U13, U14) and the DCU (U39, U40) software.** The new parameters and adjustments are as follows:

- ⇒ **F 104** Gain switch control, determines if CEC or DSD controls when gain is switched. OFF = Local (DSD) control and ON = Serial channel control
- ⇒ **F 105** Gain switch speed. Typical value = 0.05 to 0.10 which is in percent of speed. Example: Value of 0.05 on a 500 fpm car = a gain switch at 25 fpm. Only used if F 104 = OFF. Determines speed reference value at which gain is switched. If reference is below F 105 then the closed loop bandwidth is equal to F 40. If the reference is above F 105 then the closed loop bandwidth is equal to (F 40) x (F 108).
- ⇒ **F 107** Tach rate gain. Only used if vibration is still noticeable after all other adjustments. Typical values are 0.01-0.05
- ⇒ **F 108** Gain reduce. Typical setting = 0.33 to 0.60. Multiplication factor applied to Response (F 40) when in the “low gain mode”. **The closed loop bandwidth when speed reference is less than the gain switch speed, the closed loop bandwidth is (F 40) x (F 108).** The effective bandwidth between the speed reference and the motor speed still remains equal to F 40 due to the feed forward action.
- ⇒ **F 42** Stability. This parameter should be less than or equal to (F 108) x (F 40). **Never to exceed a value of 2.** Typical setting 1.0—1.6
- ⇒ **F 40** Response. Typical values 5.5 to 6.5 but may be set higher due to the gain reduction feature at high speed.
- ⇒ **F 41** Inertia: Should be set to **90 %** of the calculated value. **The calculated value must be used with this new software.** Measure the armature current during steady state acceleration only- both up and down runs. Make the longest runs possible without the motor field current weakening. Add the armature currents measured in both the up and down runs and divide the sum by two (2) to get the average current. Then divide the average current by the nameplate current to get the *per unit value of current*. Multiply the per unit value of current by the *time it takes to accelerate the car to top speed* (Contract speed in ft/min, divided by the value set in the ACR parameter (ft/min/sec) = accel time in seconds). **Example: ACR = 240 ft/min/sec and top speed = 1200 ft/min, so 1200 / 240 = 5 sec’s, which is the time it will take to go from zero speed to top speed, disregarding the jerk rate. You then multiply the time by the per unit value of current to get the inertia value. Example: per unit current = 0.675 and time = 5 sec’s. Then .9 x (0.675 x 5) = 3.038. Enter 3.038 in F 41, the Inertia parameter.**

#### **Pre-Conditioning / Torque Compensation**

- ⇒ **Pre-Conditioning** is the adjustment of the **speed reference** from feedback of the CEC load sensing device, prior to the start of the elevator. This will enable the elevator to start smoothly in either direction, regardless of the load in the car.
- ⇒ **Torque Compensation** is the adjustment of the **torque output** of the DSD-412 drive or the Unico 1100 drive from feedback of the CEC load sensing device, prior to the start of the elevator. This will enable the elevator to start smoothly in either direction, regardless of the load in the car.
- ⇒ **As always the brake must be adjusted properly and mechanical items such as armature bearings, worm gears, thrust bearings, etc., must be in proper operating condition.**
- ⇒

### TORQUE COMPENSATION FOR THE DSD-412 DRIVE

#### Parameters for Torque Compensation:

- ⇒ **CS6 bit 8:** Set = analog speed reference output. (Used with optional SBX-414 board that is **not required for normal operation**).
- ⇒ **CS8 bit 9:** Set = Torque compensation selected.
- ⇒ **CS8 bit 11:** Set = Allow torque compensation during re-leveling.
- ⇒ **PDT:** Pre-torque delay time (1/64 sec). Time that pre-torque will remain set after start. Typical setting = 1
- ⇒ **BAL:** Percent load for balanced car. Ex. 40 = 40%.
- ⇒ **TRC:** Value between 0 and 10,000 to adjust the roll back of the car. Typical setting = 1500 to 2500
- ⇒ **LWT:** Load Weighing damping Time (filtering 1/16 second). Typical setting = 8

#### Parameters Needed For Speed Reference Feed forward (Gain select):

- ⇒ **CS9 bit 2:** Set = select speed reference feed forward in drive control. Reset = speed reference feed forward is disabled.
- ⇒ **FSV:** Feed Forward Start Velocity. Velocity value to start speed reference feed forward. Velocity must be greater than this value to start speed reference feed forward. When SR feed forward starts the drive will go into low gain operation. Typical setting 5 to 15 FPM
- ⇒ **FEV:** Feed Forward End Velocity. Velocity value to end speed reference feed forward. When the SR velocity goes below this value the SR feed forward will stop and the drive will go into high gain operation. Typical setting the same as FSV.

### PRECONDITIONING FOR MG, DSD OR UNICO DRIVES

#### Parameters for Pre-conditioning speed reference.

- ⇒ **CS3 bit 7:** Set = Enable pre-conditioning.
- ⇒ **CS8 bit 11:** Set = allow pre-conditioning during re-leveling.
- ⇒ **BAL:** Percent load for balanced car. Ex. 40 = 40%.
- ⇒ **TRC:** Value between 0 and 10,000 to adjust the roll back of the car. Typical setting = 1500 to 2500
- ⇒ **LWT:** Load Weighing damping Time (filtering 1/16 second). Typical setting =8

- ⇒ **PDT:** Pre-conditioning Delay Time (1/64 sec) Typical setting =1
- ⇒ **PPT:** Pre-conditioning Phase out time (1/64 sec) Typical setting = 64 or 128
- ⇒ **PPS:** Pre-conditioning Phase out start time after start of motion (1/64 sec). Typical setting = 64---  
Must be greater than SST.

***Note: If both torque compensation and pre-conditioning bits are set, the controller will use torque compensation for the UNICO drive and pre-conditioning for the DSD-412 drive.***

### **TORQUE COMPENSATION FOR UNICO DRIVE (V.014 ONLY)**

#### **Parameters for Torque Compensation:**

- ⇒ **CS8 bit 9:** Set = Torque compensation selected.
- ⇒ **CS8 bit 11:** Set = allow torque compensation during re-leveling.
- ⇒ **PDT:** Pre-torque delay time (1/64 sec). Time that pre-torque will remain set after start. Typical setting = 1
- ⇒ **TZO:** Torque Zero Offset. Zero = 2048. Adjust up or down for + or - offset.
- ⇒ **BAL:** Percent load for balanced car. Ex. 40 = 40%.
- ⇒ **TRC:** Value between 0 and 10,000 to adjust the roll back of the car. Typical setting = 1500 to 2500
- ⇒ **LWT:** Load Weighing damping Time (filtering 1/16 second). Typical setting = 8

#### **Wiring for Torque Compensation on SBX-414 board.**

- ⇒ V com      Pin 4              (black)
- ⇒ V out        Pin 5              (red)
- ⇒ Shield      Pin 10

#### **SBX-414 jumpers to add.**

JM4 3-4, 7-8

### **Parameters for final stop. (Version v.014 software only)**

- ⇒ **CS9 bit 4:** Set to zero velocity quickly on stop.
- ⇒ **FSD:** Final Stop velocity Damping. Will cause a velocity dictation ramp down at final stop. This value is 1/64 second filtering of the speed reference going to zero and must be set below or equal to MVD. For best results, set VDT to 22, MVD to 21, VDD to 1, and adjust FSD from 0 to 21 for best final stop.