



**SUBJECT: HPV900 PM Fine Tune Alignment Procedure**

With some startups, the alignment angle needs to be fine-tuned. This can be noticed when currents and voltages are not the same running balanced car up vs. down.

The HPV900 PM drive offers great resources to help fine tune the alignment and encoder offset angle. The following procedure will help determine the correct ENCODER ANG OFST (A5).

**Fine-Tune Alignment Procedure**

**Test Measurements**

1. Set ENGR PARM LOCK (C1) to UNLOCKED
2. Set Id REF THRESHOLD (A4) to 0.00
3. Set ANGLE OFFSET (A4) to -30.00. If Encoder Fault or another fault occurs, set ANGLE OFFSET (A4) to -20.00.
4. Run car up and down and note the peak current displayed in MOTOR CURR (D2) in table below
5. Set ANGLE OFFSET (A4) to +10.00 and note peak current in table below
6. Reiterate Steps 4 and 5 increasing ANGLE OFFSET (A4) until peak current equals the value found when ANGLE OFFSET (A4) was set to in Step 3.

ANGLE OFFSET (A4) Value	MOTOR CURRENT (D2)

**Calculate new ENCODER ANG OFSET**

7. With the two currents equal, use the following formula to determine the value in ENCODER ANG OFSET (A5)

$$\left( \text{ENCODER ANG OFSET (A5) new} \right) = \left( \text{ENCODER ANG OFSET (A5) old} \right) - \left( \frac{\left( \left( \frac{\text{ANGLE OFFSET (A4) positive value}}{\text{positive value}} \right) + \left( \frac{\text{ANGLE OFFSET (A4) negative value}}{\text{negative value}} \right) \right)}{360 \times \text{number of poles}} \right) \times 8192$$

Example: ENCODER ANG OFSET (A5) old value = 185

ANGLE OFFSET positive value (A4) = 40

ANGLE OFFSET negative value (A4) = (-70)

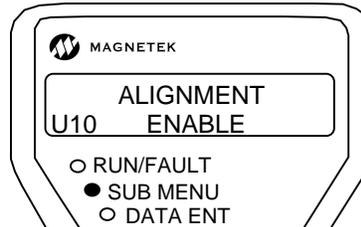
Number of poles = 16

$$(228) = (185) - \left( \frac{(40) + (-70)}{360 \times 16} \right) \times 8192$$



**Enter new ENCODER ANG OFFSET**

8. Enable Alignment by setting ALIGNMENT (U10) to ENABLE, then change the value in ENCODER ANG OFFSET (A5) from the previous one, to the one calculated in the formula above



9. Set ANGLE OFFSET (A4) to 0.0
10. Set Id REF THRESHOLD (A4) back to the original value (0.10 is default value)
11. Set ENGR PARM LOCK (C1) to LOCKED

This completes the fine-tuning procedure for the EnDat Alignment. With balanced car, peak current and voltage should be the same in both directions.