DIY V1 Design

Lessons From Prove OF Concept

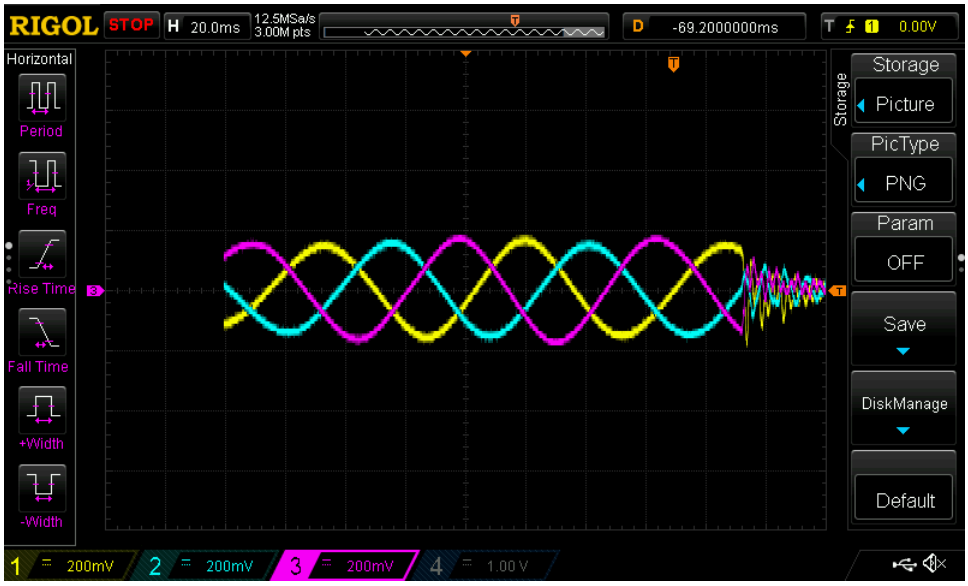
1. Thermal Problems with materials → Joule losses through the coil heated up the forms melting them causing the windings to be able to move around. (Collapse of the “inter” section causes the coils to move)

🔥 Thermal Appox.

2. Resistance of coils → Limits maximum current and so maximum force. Calculated somewhere that it was: (K: Constant depends on motor geometry) (Decrease Resistance)

$$F = kI \Rightarrow F = k(\frac{V}{R})$$

3. Coil Winding → Isn’t ideal currently. Resistance and inductance changes between coils causes the motion to not be as smooth → Coil winder or take more care winding the coils. (Look at the differences between the 3 phases in induced voltage. Not good; should all have the same peaks.



4. Superglue ain't going to work for connecting the magnets to stator. Higher temperature glue is needed. Should ideally be something that spreads out well so the magnets are perfectly flat with the stator.
5. WYE configuration: Works well for testing as the natural point allows for measuring the induced phase voltage without a differential probe however delta configuration is better for V1 as we know the geometry to electrical relationship. (Lower phase resistance = More current = More Force)

   Note: Could just make the coil pairs be in parallel not series and the phase resistance would be 4 times less for 2coils per phase.
6. Not really lesson but a breakout board would be nice as its a pain to wire all the coils in correct configuration.
7. Make the default current sense (INA240) work with the motor. Probably was a software issue in the first place.

Design Page:	**Status:**
Design 1 (Block)	Dead
Design V2	Active

Components & Possible Suppliers:

Components