

**Project Title:** PHD Cable Tensiometer

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**Area:** Mechanical Engineering

**Sponsored By:** PHD, Inc.

PHD, Inc. is an automation company located in Fort Wayne Indiana. PHD is well known for their GHR series of grippers. This gripper series has a cable system that links two pulleys at the fixed locations; it is used as a synchronizer of the two jaws with opposite motions. The cables are tied to the pins on the jaws at the ends, and the tension forces of the cables can be adjusted by tightening or loosening. The current process for PHD to measure the tension is through an analytical method relating the cable tension to the number loops it makes around the pins to which it is fixed. This process does not measure the tension of the synchronizer directly. Therefore, PHD has requested a device to measure the tension forces of cables in four different grippers.

This project aims to directly measure the tension in the synchronizer cables. The cable tensiometer will be developed to read in data that can be used in correlation to a tension value. To obtain repeatable measurements, the gripper and the device will be positioned such that the measurement is taken in the same orientation every time. There are some safety hazards when considering the design of the measurement device. The safety hazards consist of potential pinch points on the device and grippers. Additionally, the device must be under three pounds to ensure operator comfort and safety. The pinch points will be prevented by covering the moving parts. The weight of the device can be limited if some of the components are 3D printed. The budget of the project is \$500 excluding the cost of any 3D printing which will be provided by PHD Inc.