Wahl Assembly Optimization

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Abstract

A testing mechanism is to be developed for Wahl Clipper that can encompass a wide variety of different quality assurance tests.
Internal Tests: Charge Current, Motor Current, Motor Voltage
External Tests: Battery Indicator Light Brightness.

The mechanism must be built for adaptability for different models and parameters that is seamless and quick for workers to adjust.

Objectives

-Run four quality control tests in quick succession

-Run individual tests more frequently

-Have adaptability to add new models that have different sizes but also different output ranges

-Adaptability in pass/fail ranges to make more precise

-Infrastructure for new units and new tests to be added

Methods and Materials

Mechanical Design:

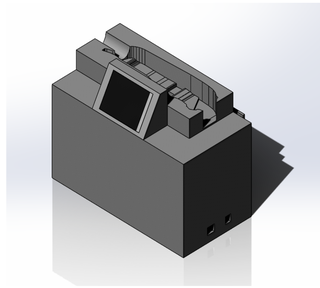

Figure 1: Clipper Holder

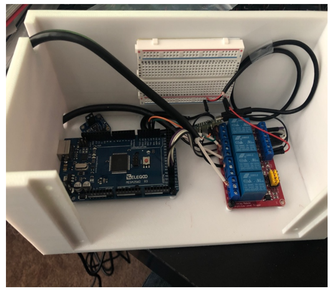

Figure 2: Electrical System

The clipper is held in place by a form fit 3D printed holder that is modular and can be replaced for different models
Light Test:
Completed by a lumen sensor at base of holder

All wiring and Arduino components are held within the base of the clipper holder, all accessible by an access panel in the back of the unit.

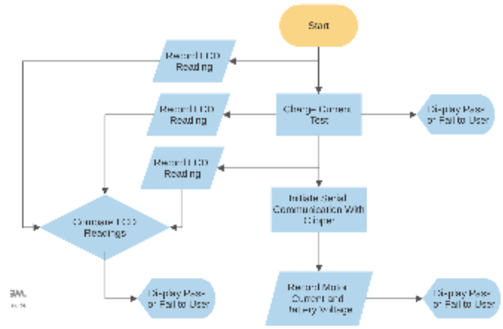

Figure 3: Program flow chart

Electrical Design:
At the click of a button, **four** tests run in quick succession.
The process utilizes:
-Modular Relay
-Arduino Mega
-TerraTerm communication with clipper MCU

Figure 4: Arduino Mega

Results and Discussion

-**Four** tests can be run in a fraction of the time of old methods

-Modular design allows for different clippers to be tested on the same unit, with minimal adjustments

-Adjustable tolerance ranges

-Testing unit has built in infrastructure to house more testing on current and future models

-Unit has a programmable output display to show results and improve synergy between assembly floor and engineering team.

Conclusions

The Wahl Assembly Optimization process greatly reduced the testing time per unit while adding more in-depth quality assurance. This entire process is also automated, thus creating minimal user interaction, greatly lowering the possibility of error.